HIGH-LEVEL CONFERENCE ON FINANCING FOR DEVELOPMENT AND THE MEANS OF IMPLEMENTATION OF THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

18-19 NOVEMBER 2017
DOHA, QATAR

SHERATON HOTEL

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PREFACE

HIGH-LEVEL CONFERENCE ON FINANCING FOR DEVELOPMENT AND THE MEANS OF IMPLEMENTATION OF THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

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To achieve the Sustainable Development Goals (SDGs), we must get the financing right. The Addis Ababa Action Agenda on Financing for Development (Addis Agenda) provides a global framework for financing sustainable development in all its dimensions and is an integral part of the 2030 Agenda for Sustainable Development (2030 Agenda). However, we are facing a challenging global environment characterized by subdued economic growth in many countries, natural disasters, climate change, environmental degradation, humanitarian crises and geopolitical tensions. Multilateralism and international cooperation is more important than ever to deliver the financing that is commensurate with the ambition of the SDGs.

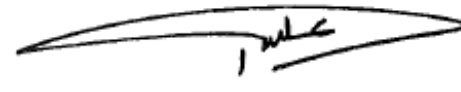
In this context, the Government of the State of Qatar and the United Nations Department of Economic and Social Affairs convened a High-level Conference on Financing for Development and the Means of Implementation of the 2030 Agenda for Sustainable Development from 18 to 19 November 2017 in Doha, Qatar. The Conference was the first of its kind, serving as a preparatory event for both the 2018 ECOSOC Forum on Financing for Development follow-up (FfD Forum) and the 2018 High-Level Political Forum on Sustainable Development (HLPF). The innovation of the Conference attracted more than 100 high-level participants from 60 countries across all regions of the world. Ministers of finance and economy, other high-level government officials, as well as representatives from international financial institutions, the private sector, civil society and academia actively participated throughout the two-day event.

The Doha Conference was a successful illustration of creating synergies and coherence toward the implementation of the SDGs. It brought together finance policy makers and sectoral experts to discuss innovative approaches to finance the SDGs, in particular those selected for the in-depth review at the 2018 HLPF. It went beyond diagnostics towards finding near and long-term solutions. National experiences and lessons learned from international cooperation featured prominently throughout the discussions. The Conference resulted in 10 "Doha messages", which will be fed into both the 2018 FfD Forum and the 2018 HLPF.

The 2030 Agenda and the Addis Agenda have spurred a shift in how we, as a global community, address development challenges of our economies, environments and societies. The outcome of the Conference illustrated that international cooperation is essential to support national efforts in moving from commitment to action.

This publication is a useful record of the important dialogues that took place in Doha, with a view to inspiring further action and innovation toward financing the SDGs.

LIU Zhenmin
Under-Secretary-General for
Economic and Social Affairs
United Nations



Alya Ahmed S. Al-Thani
Ambassador
Permanent Representative of the
State of Qatar to the United Nations

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FOREWORD

The **High-level Conference on Financing for Development and the Means of Implementation of the 2030 Agenda for Sustainable Development**, hosted by the State of Qatar and organized with the support of the United Nations Department of Economic and Social Affairs, provided an inclusive forum for high-level representatives of Member States, the United Nations system, international and regional financial institutions, development banks, civil society organizations and the private sector to discuss how to strengthen coherence and cooperation for the implementation of the Sustainable Development Goals (SDGs).

In 2017, the global economy took an overall positive turn. Investments picked up and financial markets became more favorable for development finance. However, these positive trends must not conceal multiple shortfalls that continue to jeopardize the achievement of the SDGs, such as the uneven distribution of the benefits of economic growth and challenges to multilateralism. But the rising momentum of the global economy opens a pivotal window of opportunity to align policies and to channel additional financial resources towards sustainable development. International and regional cooperation has an important role to play in supporting national efforts to realize the 2030 Agenda for Sustainable Development and the Addis Ababa Action Agenda on Financing for Development.

To this end, the Conference provided an important space for dialogue among the multiple constituencies involved in implementing the two Agendas. The interactive nature of the sessions resulted in direct exchanges between the political and expert levels. During the ministerial round tables, a diverse set of countries from all regions and at different stages of development presented their respective national experiences with the implementation of the SDGs and the Financing for Development outcomes.

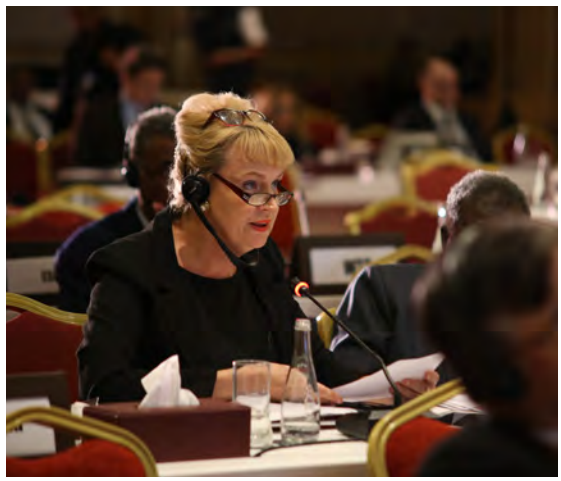
Special attention was paid to policy and institutional innovations. A number of countries introduced national development strategies that are based on or aligned with the SDGs. Domestic resource mobilization was recognized as a continuous challenge to the implementation of the strategies in many developing countries. The ongoing need for official development assistance, especially for countries in special situations, was also highlighted. Participants from all countries and constituencies further emphasized the vital need for strong commitment to sustainable development at the highest political level.

The breakout sessions linked the issue of financing with the SDGs selected for an in-depth review at the 2018 High-level Political Forum on Sustainable Development (HLPF). In the session on SDG 7 (water) and SDG 8 (energy), participants elaborated on ways to address financing gaps and the role of technology and innovation in achieving the goals. Particularly, discussions focused on infrastructure needs and high-

lighted key features of policy and regulatory frameworks at the international, national and local levels to ensure that funds were directed to high-impact projects. On the demand side, the importance of raising public awareness about issues such as sustainable consumption and cost-recovery featured prominently in the session.

The session on SDG 11 (cities) focused on the potential of technology in enabling cities to respond to the challenges of providing critical services in times of increasing urbanization. Financing and capacity gaps were acknowledged as two of the most important challenges faced by local governments. It was underscored that fiscal transfers from the central level remain the most significant source of funding for cities in both developed and developing countries. To ensure that cities can fulfill their potential as drivers of economic growth and sustainable development, citizens must be at the center of urban planning and decision-making.

Sustainable consumption and production (SDG 12) and terrestrial ecosystems (SDG 15) were at the center of the third breakout session. Participants emphasized the strong interlinkages between the two goals. For example, the reduced utilization of natural resources, toxic materials and waste and pollutants throughout the production and consumption process would have a crucial impact on the protection of terrestrial ecosystems. A strong call was made for policies and technologies that would decouple the use of natural resources from economic growth. Specifically, the socially acceptable pricing of negative externalities was highlighted as a critical tool to change behavior and to generate financial resources.



Two subsequent plenary sessions took the discussion from the policy level to the financing instruments. The first plenary session heard expert views on how to overcome challenges to mobilizing sovereign wealth funds for SDG investments. In principle, the SDGs are well-aligned with the investment priorities of sovereign wealth funds due to their long-term time horizon and expected returns. To ensure that sovereign wealth funds increase their investments in sustainable infrastructure, as called for in the Addis Agenda, governments need to play their part in setting up adequate mandates and legislation. In addition, the need for establishing pipelines of investment-ready projects in developing countries was stressed.

In the second plenary session, participants discussed the potential contribution of Islamic finance to sustainable development. Islamic finance through its fundamental principles can promote social and financial inclusion, improve financial stability and provide large-scale financing. While Islamic finance grew significantly in the last decades, it remains largely concentrated in specific countries and regions. Stronger efforts should be made to facilitate the market integration of Islamic finance by developing additional products and mechanisms, while simultaneously streamlining its Sharia-compliance process. Also, the regulatory frameworks and implementation channels for Islamic finance require further strengthening.

Building on the spirit of the Conference, its outcome – the ten "Doha Messages" – defined multilateralism as the fundamental basis for achieving peaceful and sustainable development. It was recognized that the 2030 Agenda and the Addis Agenda had spurred an unprecedented shift in the governance of the economy, the environment and the society within and across countries. Sharing of national experiences was considered essential for a tighter connection between local knowledge and global norm-setting. To meet the financing needs of the SDGs, a mix of all available resources – public and private, domestic and international – will be required. In this context, domestic resource mobilization for long-term development should not affect meeting the urgent short-term needs. National development banks, as well as blended finance, have not yet exhausted their full potential to address shortfalls in current funding. The SDGs can create business opportunities, which will balance profitability and sustainability.

Member States and other actors should build on the outcome of the Doha Conference in the follow-up processes of the 2030 Agenda and the Addis Agenda. Creating synergy and coherence in the means of implementation of the SDGs, including through the HLPF Voluntary National Reviews, is crucial for the effective realization of both Agendas and for supporting integrated, whole-of-government and whole-of-society approaches at the local, national and international levels. This publication is intended to serve as a substantive input to the forthcoming ECOSOC Forum on Financing for Development follow-up and the 2018 HLPF.

DOHA MESSAGES

Excerpt from closing remarks delivered by Mr. Liu Zhenmin,
Under-Secretary-General for Economic and Social Affairs, United Nations

1. **The 2030 Agenda and the Addis Agenda are the game changing documents. They create strategic assets in the longer-term that provide fundamental conditions for peaceful, resilient and prosperous societies.**

The 2030 Agenda and the Addis Agenda are spurring an unprecedented shift in the governance of the economy, the environment and the society within and across countries. The wealth of national experiences should be widely shared. But, sharing is not an end in itself. Sharing through the follow-up mechanisms should create a tighter connection between local knowledge, capacity-building and global norm-setting.

2. **Neither the State nor the market can accomplish the SDGs alone. Financing the SDGs demands a shared approach with the right mix of both forces.**

SDGs create business opportunities. Investing in the SDGs does not mean a choice between profitability and sustainability. Tested and new financial instruments that bring private investment in sync with sustainable development make it possible. But, private investments are not a panacea. They will only flourish in an enabling environment provided by the State and sound public policies.

3. **Domestic resource mobilization for long-term development does not have to come at the cost of short-term needs.**

Increasing the share of GDP for investing in social capital has shown positive impact on the fundamentals of economic growth. Setting up national development banks to sustain long-term investment for social sectors offer one possible way forward to fill the funding gap. Blending public and private resources to address near-term shortages of public services has shown some success. Global follow-up and review mechanisms should further unpack the potential of blended finance in different country contexts.

4. **International development cooperation is the "glue" that brings a diverse range of actors under a common objective of sustainable development.**

While advocating for meeting the long-standing ODA commitments, we must also pay attention to the shift in aid with global mega trends. Aid should stay focused on reaching those most in need and those furthest behind. The impact of aid is multiplied when invested in building the fundamental capacities, including policy making, statistical capacity and institutions.

5. **Global growth and ending extreme poverty cannot happen without strengthened multilateralism and more robust trade.**

There is no alternative to multilateralism. The United Nations, as the cornerstone of multilateralism shall only be strengthened. The backlash against global trade is based on wrong diagnosis, which leads to the wrong medicine. We should make trade work better by designing and implementing policies that tackle job losses and inequality. Governments and global institutions have a responsibility to make a well-informed and balanced case for trade.

6. **Scaling up investment in water and energy infrastructure is critical.**

Science-based energy systems analysis can help quantify and prioritize viable and sustainable

energy, water and transport infrastructure investments, and help identify obstacles and opportunities to successful investments. Cross-border, regional and global electricity exchange is essential for overcoming the uneven distribution of energy resources and unlocking the full potential of intermittent renewable sources, including reaching those at risk being left behind.

7. **Resource efficiency and environmental resource management need to substantially improve.**

A circular economy approach combined with modes of sustainable consumption and production could improve the efficiency of the global socio-economic system. Economic and technology transfer mechanisms, combined with smart SDG policies, can create net positive outcomes for all countries.

8. **Cities around the world are facing multiple challenges, such as increased urbanization and a growing demand for services and infrastructure, reduced budgets, environmental concerns and global competition. Better budgetary management, enhanced creditworthiness, municipal bonds, reform of international public finance, building resilience and the leverage of cities over taxation are all important approaches in overcoming these challenges.**

Urgent action is also needed to protect terrestrial ecosystems against the backdrop of continued population growth and pressures on ecosystems. Long-term strategies, commitments, planning, funding and leveraging interlinkages with other SDGs are key elements. Science, technology and innovation are also crucial for making an impact.

9. **As Governments explore new financing mechanisms for investing in the growing low-carbon economy, sovereign wealth funds could become an important player in green investment. Regulations in certain socially or politically-sensitive sectors; the lack of stable and predictable investment environment; and inadequate information on and effective packaging of investable projects for potential investors, should be given adequate attention in the FfD follow-up process.**

Islamic finance plays an important role in promoting social inclusion, channelling resources for social investments through solidarity-based Islamic finance products; and contributes to filling the large financing gap for investment in sustainable infrastructure. It has the potential to contribute to the achievement of the SDGs.

10. **It is vital to enhance the coherence of the implementation of key international frameworks, including the 2030 Agenda and the AAAA.**

DESA has just launched the 2017 Synthesis report based on the voluntary national reviews by Member States at the High-Level Political Forum. 65 countries have conducted their reviews in 2016 and 2017. 48 countries have volunteered for next year.

One key message is that integrated, whole-of-government and whole-of-society approaches at the local, national and international level are critical. We need to think both vertically and horizontally.

The 10 "Doha Messages", as the outcome of this High-level Conference, will feed into the preparations of the third ECOSOC Forum on Financing for Development and the High-level Political Forum in 2018.

OPENING OF THE CONFERENCE

18 NOVEMBER 2017

The opening of the Conference featured statements by the Minister of Finance of the State of Qatar, H.E. Mr. Ali Shareef Al Emadi; the Under-Secretary-General for Economic and Social Affairs of the United Nations, Mr. Liu Zhenmin; and the President of the Economic and Social Council (ECOSOC), H.E. Ms. Marie Chatardova, delivered by H.E. Mr. Mahmadamin Mahmadaminov, Vice-President of ECOSOC and Permanent Representative of Tajikistan to the United Nations.

H.E. Mr. Al Emadi emphasized that international cooperation was essential to achieving collective development objectives. Development should be a participatory process, with all actors maintaining their commitments to the 2030 Agenda for Sustainable Development and the Addis Ababa Action Agenda (Addis Agenda). The speaker further discussed the national development strategy of the State of Qatar that had been aligned with the 2030 Agenda for Sustainable Development. Qatar National Vision 2030 identified key economic, social, human and environmental goals, and placed development at the center of its priorities. The State of Qatar had integrated the 2030 Agenda for Sustainable Development in its Second National Development Strategy (2017-2022). Recalling the voluntary national review (VNR) that was conducted by Qatar in 2017, Mr. Al Emadi outlined the continued support that the country would provide to development and humanitarian relief for its development partners in addition to the voluntary official development assistance provided by the State of Qatar. The State of Qatar had provided international assistance in 13 sectors through various humanitarian and development initiatives around the world. Qatar had also expanded its external assistance both geographically and by sector in the form of contributions, grants, donations and soft loans, with a particular focus on SDG 4 (quality education).

Mr. Liu thanked the Government of the State of Qatar for hosting the Conference and for its unwavering commitment to the implementation of the 2030 Agenda for Sustainable Development and Addis Agenda. He recalled that there remained major challenges and vulnerabilities to the sustained recovery of the global economy. Progress had been uneven and inequalities had grown in many parts of the world. In this regard, Mr. Liu underscored that global challenges should be addressed through global cooperation. The 2030 Agenda for Sustainable Development and the Addis Agenda provided the compass for the way forward. The High-level Political Forum on Sustainable Development (HLPF) and the ECOSOC Forum on Financing for Development follow-up (FfDF) helped ensure that the global community was on the right course towards the achievement of the SDGs. However, the current pace of progress would not be sufficient to achieve the SDGs by 2030. It was thus essential to get the financing right. Strengthening public and private long-term investments into the implementation of the SDGs; strengthening national tax systems and interna-

tional tax cooperation; unleashing the potential of private investment into sustainable development through regulatory frameworks and incentives; and establishing policies to reduce inequalities and addressing the needs of the most vulnerable countries should all be part of the package. In addition, Mr. Liu also emphasized the urgency of fulfilling official development assistance (ODA) commitments and the need to step up climate finance. Mr. Liu concluded by reaffirming that the United Nations Department of Economic and Social Affairs (DESA) would continue to play a leading role in moving the FfD agenda forward and supporting Member States in the implementation of the Addis Agenda. He encouraged participants to use the present Conference, which aimed to strengthen coherence and coordination of the follow-up to FfD outcomes and the means of implementation of the 2030 Agenda for Sustainable Development, to engage in fruitful discussions in preparations for the 2018 FfDF and HLPF.

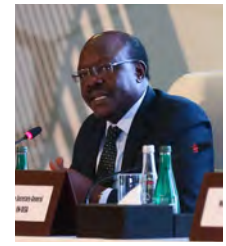
H.E. Mr. Mahmadaminov, speaking on behalf of the President of ECOSOC, highlighted the convening power of ECOSOC to bring together policymakers across sectoral boundaries. Recalling the importance of FfD to the work of the ECOSOC, he noted

that the FfD Forum, established by the Addis Agenda, had the mandate and capacity to bridge the gap between global policy and national-level implementation. Mr. Mahmadaminov further pointed out that the success of the 2017 FfD Forum, in terms of the high-level ministerial participation, substantive outcome, and unprecedented engagement of Bretton Woods institutions and other major institutional stakeholders, had set positive momentum for the 2018 FfD Forum. In this regard, he underscored the importance of the means of implementation for achieving the SDGs and encouraged participants to step away from the siloed approach and embrace a holistic approach to sustainable development. To that end, he encouraged the 2018 VNR countries to pay adequate attention to the means of implementation in their preparations for the HLPF.

KEYNOTE PRESENTATIONS

Keynote presentations were delivered by the Administrator of the United Nations Development Programme (UNDP), Mr. Achim Steiner, and the Secretary-General of the United Nations Conference on Trade and Development (UNCTAD), Dr. Mukhisa Kituyi.

Mr. Steiner emphasized that getting financing right would be critical to achieving the SDGs by 2030. He noted that the global financial systems were not channeling existing funds effectively towards investments in sustainable development. In this regard, the reorientation of investments on the side of the private sector was needed, but Governments also had a key role to play in aligning private finance with sustainable development objectives through strengthened policies and institutional, legal and regulatory frameworks. One way that UNDP was supporting the scaling up of investment in the SDGs was through collaboration with the Islamic Development Bank on the Global Islamic Finance and Impact Investing Platform. The initiative looked to engage Islamic finance through more innovative approaches, particularly at the local level. Mr. Steiner also discussed the important role of domestic public finance and international development cooperation in the achievement in the SDGs, and more effective tax administrations to support efforts in domestic resource mobilization. In this regard, he highlighted the work of the UNDP joint initiative with the Organization for Economic Cooperation and Development (OECD) entitled "Tax Inspectors Without Borders," which aimed to build local capacities to address complex international tax issues. He also noted the importance of combatting tax evasion and avoidance and illicit financial flows. ODA and South-South Cooperation (SSC) were also mentioned as critical to achieving sustainable development at the country level. In concluding, the speaker underscored the role that national financing strategies would play in achieving the SDGs.



Dr. Kituyi outlined that the triple promise of achieving the SDGs, meeting the financing commitments of the Addis Agenda, and meeting the climate finance modalities from COP 21 would cost at least $1.5* trillion annually in additional financing for developing countries, according to estimates from UNCTAD. Despite the challenging global economic outlook, Dr. Kituyi noted that the Addis Agenda contained ambitious global policy solutions, which had spurred new and ambitious initiatives on regional trade, development finance institutions and SSC. The private sector had also recognized the benefits of contributing to the financing of the 2030 Agenda for Sustainable Development. In this regard, Dr. Kituyi outlined the work that the major institutional stakeholders were doing in the context of the FfD follow-up process to build an evidence base for how best blended finance and public-private partnerships (PPPs) could work, to ensure that Governments did not over-privatize and impede their policy space and ability to regulate. He also outlined the work that UNCTAD was doing to strengthen their role to support countries in integrating trade, finance, investment and technology policies into national development plans. In conclusion, Dr. Kituyi noted the important role that multilateralism would play in overcoming our collective financing challenges in achieving the SDGs.

* All dollars are United States dollars, unless otherwise noted.

MINISTERIAL ROUND TABLES

PROGRAMME

MINISTERIAL ROUND TABLE 1

- ***Co-Chairs:***
  - **H.E. Dr. Ahmad Hassan Al-Hamadi**, Secretary-General of the Ministry of Foreign Affairs, State of Qatar
  - **Mr. Liu Zhenmin,** Under-Secretary-General for Economic and Social Affairs, United Nations

- ***Presentations:***
  - **H.E. Mrs. Carmen Elena Falconí Vaca,** National Secretary for Planning and Development, Ecuador
  - **H.E. Mr. Michael Gerber**, Ambassador, Special Envoy for Global Sustainable Development, Switzerland
  - **H.E. Mr. Francisco Javier Niembro Cibrian**, Ambassador of Mexico to the State of Qatar
  - **Mr. Yonov Frederick Agah**, Deputy Director-General, World Trade Organization (WTO)

- ***Interactive discussion***

MINISTERIAL ROUND TABLE 2

- ***Co-Chairs:***
  - **H.E. Dr. Ahmad Hassan Al-Hamadi**, Secretary-General of the Ministry of Foreign Affairs, State of Qatar
  - **Mr. Liu Zhenmin,** Under-Secretary-General for Economic and Social Affairs, United Nations

- ***Presentations:***
  - **H.E. Dr. Edward Scicluna**, Minister of Finance, Malta
  - **H.E. Mr. Mustafa Mastoor**, Acting Minister of Economy, Afghanistan
  - **H.E. Dr. Abdul Rahman Mohamed Dirar,** Minister of State, Ministry of Finance and Economic Planning, Sudan
  - **Mr. Chaikou Yaya Diallo,** Deputy National Director of Cooperation, Ministry of Planning and Cooperation, Republic of Guinea
  - **Mr. László Borbély**, State Counsellor to the Prime Minister, Romania

- ***Interactive Discussion***

GUIDING QUESTIONS

1. What steps have been taken at the national level towards mainstreaming the Addis Agenda and the means of implementation of the 2030 Agenda for Sustainable Development into national develo-ment strategies?
2. What challenges have been encountered in the implementation of these mainstreaming efforts?
3. What policy innovations have been useful in overcoming these challenges? How were such innov-tions developed and implemented?

MINISTERIAL ROUND TABLES

Summary: The ministerial round tables focused on the "sharing of country experiences in mobilizing resources from public, private, domestic and international sources towards the implementation of the Addis Ababa Action Agenda and the 2030 Agenda for Sustainable Development—policy and institutional innovations". Both round tables were co-chaired by the Secretary-General of the Ministry of Foreign Affairs of the State of Qatar, H.E. Dr. Ahmad Hassan Al-Hamadi, and the Under-Secretary-General for Economic and Social Affairs of the United Nations, Mr. Liu Zhenmin.

H.E. Dr. Al-Hamadi noted that the successful implementation of the 2030 Agenda for Sustainable Development and the Addis Agenda would be based on political will and resource mobilization at the domestic and international levels. He underscored the importance of developed countries honoring financing commitments, and provided examples of how the State of Qatar had broadened its foreign assistance, both by sector and region, with a focus on humanitarian programmes and initiatives focused on education.

Mr. Liu welcomed ministers and other high-level participants to the ministerial round tables. He noted that the round tables responded to the mandate of the Addis Agenda for the FfD follow-up process to promote the sharing of lessons learned from experiences at the national level. This modality was successfully utilized during the 2017 FfD Forum and would be further enhanced in 2018. The sharing of national experiences would encourage dialogue between countries on policy and institutional innovations on financing the SDGs.

MINISTERIAL ROUND TABLE 1

Summary: Ministerial round table 1 featured presentations by the National Secretary for Planning and Development of Ecuador, H.E. Mrs. Carmen Elena Falconí Vaca; Special Envoy for Global Sustainable Development of Switzerland, H.E. Mr. Michael Gerber; the Ambassador of Mexico to the State of Qatar, H.E. Mr. Francisco Javier Niembro Cibrian; and the Deputy-Director-General of the World Trade Organization, Mr. Yonov Frederick Agah.

H.E. Mrs. Falconí Vaca shared the experiences of Ecuador in mobilizing resources towards the implementation of its national development plan. The speaker outlined that the national development plan was designed to give everyone equal opportunities. In particular, she gave the example of the housing solutions that were achieved through the issuance of housing loans by the social security bank to low- and middle-income families. This programme built on housing initiatives from 2008 in which housing bonds were issued for those with limited resources. Together, the bonds and loans had reduced the housing deficit, solved problems of overcrowding, empowered families, and improved the quality of construction. However, while people had land, challenges still persisted in ensuring access to water and sanitation. In this regard, there was need to expand coverage of drinkable water and sewage services. Towards that end, emphasis had been placed on building PPPs. Referring to lessons learned, Mrs. Falconí Vaca emphasized the importance of preferential interest rates and the relaxation of loan requirements for the private sector. Taken together, external financial aid and external loans, combined with domestic resources, were essential to the successful achievement of housing goals. The speaker concluded that external funding was important for domestic programming, especially as earthquake recovery efforts continued.

H.E. Mr. Gerber focused his presentation on three aspects of the Addis Agenda: (i) finance; (ii) partnerships; and (iii) policy coherence. On finance, he noted that the challenge would be to mobilize investment for sustainable development in the face of trillions of dollars in funding gaps. There was a clear case for channelling more private investment into SDG-relevant sectors. Blending public funds with private and philanthropic funds could increase available finance. Furthermore, he noted that development finance institutions could be an important vehicle to boost investment. Mr. Gerber recalled that social impact investing was on the increase and the pilot project that was underway in Mexico, in collaboration with the Inter-American Development Bank, used the social impact incentives model to achieve social outcomes. The Swiss Capacity Building facility was providing technical assistance grants to public service providers in developing countries as a way to lower entry costs into the market. Microfinance and business engagement in sustainable development had also

grown, including the development of a number of financial products that had been made available to reduce vulnerability. On partnerships, Mr. Gerber noted the importance of multi-stakeholder partnerships, including development cooperation and the pursuit of effective PPPs. Switzerland, in particular, supported partnerships in statistics for sustainable development and, more concretely, capacities in statistical offices of developing countries. Finally, on accountability and policy coherence, Mr. Gerber emphasized that the inclusion of non-state actors would raise accountability. He provided examples of how Switzerland had included non-state actors in its gap analysis process and how dialogue with non-state actors had become a fixture in preparations for its VNR.

H.E. Mr. Cibrian noted that Mexico had been the first to present its VNR in 2016, and would present again in 2018. He recalled the retreats of the Group of Friends of Monterrey that Mexico had hosted in 2016 and 2017, and announced that Mexico would host another such retreat in March 2018. On the role of international development cooperation, Mr. Cibrian underscored that it was imperative that all countries contribute and receive based on their capacities and needs. In this regard, a fit-for-purpose strategy was instrumental. He noted that while the conversation must go beyond ODA, ODA should not be replaced with other flows. A multidimensional and universal approach should be adopted, which is not limited to per capita income. Least developed countries (LDCs) should remain the priority for the international community. However, ODA could also be leveraged as an enabler for funding. South-South and triangular cooperation should therefore be strengthened to be a public policy that is predictable, transparent and managed with the highest standards through an inclusive, multi-stakeholder alliance. In conclusion, Mr. Cibrian noted that a new architecture for international development should be built whereby all countries win.

Mr. Agah focused his presentation on two elements: (i) the role of trade as a mobilizer of resources; and (ii) the experience of the World Trade Organization (WTO) in delivering on the SDGs. He noted that both the 2030 Agenda for Sustainable Development and Addis Agenda recognized trade

as an engine for inclusive economic growth and poverty reduction. Trade had been proven as an engine for poverty reduction by boosting growth, specifically by narrowing the income gap between developing and developed countries. Trade and economic growth increased income-generating capacities and could be an important source of finance to both the public and private sector in developing countries. Increased growth could also make resources available for reinvestment in development targets. However, trade alone was not enough: policies must also support an inclusive trade environment and should be tailored to national contexts. Mr. Agah provided examples of effective policies, including reducing trade costs; building capacity for trade and production; improving the business environment; labour market policies which support workers; education policies to ensure skill development and women's economic empowerment; and ensuring access to finance. Mr. Agah also outlined some of the work of the WTO towards implementing the SDGs, specifically SDGs 2 (hunger), 3 (health) and 14 (life below water) through collaborations with the World Bank, International Monetary Fund (IMF), Food and Agriculture Organization, UNCTAD, International Trade Commission and other United Nations agencies. He emphasized that multilateral cooperation was important and should be enhanced through further collaboration to support the implementation of the 2030 Agenda for Sustainable Development and the Addis Agenda.

Several countries took the floor during the interactive dialogue. It was emphasized that the Addis Agenda was universal and was a game changer that contained responsibilities for all countries. It was also noted that all the SDGs were equally important, interlinked and interdependent, thus requiring all countries to step away from the siloed approach to policymaking and implementation.

Participants called on developed nations to fully and in a timely manner honor their aid commitments to provide full support to developing countries in their efforts to achieve the SDGs. They also underscored the need to make globalization more open, tolerant and balanced to enable everyone to achieve true sustainable development. Several

country representatives noted the importance of domestic resource mobilization and enhancing the capacities and efficiencies of tax systems. Participants shared specific initiatives to enhance international development cooperation, including through South-South cooperation, training and capacity development, as well as national initiatives focused on domestic resource mobilization and tax. Many also reiterated the call for enhancing private sector engagement, blended finance and impact investing to achieve the SDGs. Multi-stakeholder partnerships were emphasized as a mechanism to develop appropriate policies for implementation.

Creating enabling environments for the achievement of the SDGs at all levels was another point of discussion. Some countries stressed the importance of the autonomous management of national resources without intermediation, which may impede the ability of a country to retain its domestic resources. A number of Member States highlighted gender empowerment as central to achieving the SDGs.

Finally, the institutionalization of SDG implementation was considered critical to the achievement of the SDGs, as it would support better coordination within the government and between stakeholders.

MINISTERIAL ROUND TABLE 2

Summary: The round table was chaired by the Secretary-General of the Ministry of Foreign Affairs, State of Qatar, H.E. Dr. Ahmad Hassan Al-Hamadi, and the United Nations Under-Secretary-General for Economic and Social Affairs, Mr. Liu Zhenmin. Presentations were made by the Minister of Finance of Malta, H.E. Dr. Edward Scicluna; the Acting Minister of Economy of Afghanistan, H.E. Mr. Mohammad Mustafa Mastoor; the Minister of State at the Ministry of Finance and Economic Planning of Sudan, H.E. Dr. Abdul Rahman Mohamed Dirar; the Deputy National Director of Cooperation at the Ministry of Planning and Cooperation of the Republic of Guinea, Mr. Chaikou Yaya Diallo; and the State Counsellor to the Prime Minister of Romania, Mr. László Borbély.

H.E. Dr. Scicluna presented Malta's experience with the implementation of FfD outcomes and the SDGs. He elaborated on the challenges of integrating sustainable development in national policymaking, given Malta's constraints as a small island State. For example, after experiencing increasing difficulties with its waste management, Malta was now developing a concept to convert waste to energy. In addition, Malta had initiated urban wastewater treatment that would allow reuse of the water for industrial purposes. As a result of financial and political reform, Malta, which is now one of the fastest growing countries in the European Union, had been able to spur economic growth, reduce its debt and significantly increase female participation in the labour market. This was achieved by introducing universal free childcare and tax incentives that encourage women to join the workforce. Malta also strengthened the regulation of its banking sector after the financial crisis, diversified capital markets and set up its own development bank to address market failures in the economy. Finally, against the background of the refugee crisis, the Minister highlighted the need for further investments in Africa and the respective roles of regional and international development banks.

H.E. Mr. Mastoor contended that the debate on financing for development should not be about more financial resources but about more effective financing. Using the example of investments from both public and private sources, as well as ODA in Afghanistan, Mr. Mastoor argued that it would have shown stronger results if the money had been spent based on accepted effectiveness principles. The continuous armed conflict in Afghanistan had seriously impacted its economic performance, including its labour market, investment opportunities and poverty rates. Despite these setbacks, positive impact was achieved in some sectors, such as health. Mr. Mastoor highlighted the need for the developing countries to portray a clear vision for sustainable development and an accompanying implementation structure. Cooperation with all actors, including local governments, the private sector and civil society organizations, as part of national coordination mechanisms for the implementation of the SDGs would be critical. He further called for increased regional integration

and cooperation for sustainable economic development.

H.E. Dr. Dirar described the situation in Sudan and called for stronger support for vulnerable and marginalized groups. He pointed out that the severe finance and capacity gaps limited the Government's ability to provide essential public services and implement the 2030 Agenda for Sustainable Development. As a result, Sudan's national sustainable development plan included specific finance provisions that were based on the Addis Agenda. The plan contains the following pillars: creating the institutional set-up for implementation; raising public awareness of the 2030 Agenda for Sustainable Development; building national capacities; and organizing national conferences and workshops to advance the achievement of the SDGs. To achieve SDG 1 (eradicate poverty), the Government was aiming to increase wages and establish a social protection system, as well as to provide housing and health care. The Government would place a special focus on gender equality and the empowerment of women. Part of the financing would come from the utilization of Islamic finance instruments.

Mr. Diallo provided an overview of Guinea's Vision 2040 and how it integrated the SDGs. The national strategy was based on developing good economic and social governance, building infrastructure (especially in the agricultural and mining sectors), strengthening human capital and protecting oceans and the environment while using natural resources for economic development. Guinea had also been able to demonstrate to the World Bank and the IMF that it was capable to lower the debt ceiling. Further progress had been made on transparency, which had opened the door for increased foreign investment. Despite the progress, Mr. Diallo pointed out that ODA remained a critical financing flow for Guinea to ensure sustainable development and the achievement of the SDGs.

Mr. Borbély highlighted the need for political will and a critical mass at the local, national, regional

and international levels to support the implementation of sustainable development. In Romania, a multilayer approach had been established for the implementation of the 2030 Agenda for Sustainable Development. This included the launch of a subcommittee of the national parliament in charge of reviewing the implementation of the 2030 Agenda for Sustainable Development, and the establishment of a Department for Sustainable Development in the Office of the Prime Minister to build a clear institutional framework and accountability structure for the achievement of the SDGs. Mr. Borbély also pointed out the need for quantifiable targets and corresponding indicators at the national level to track progress in implementation. An exchange of experiences at the regional and international level could strengthen national implementation. He also urged Ministries of Finance to adopt a holistic perspective for the integration of sustainable development into national policies. Finally, Mr. Borbély stressed the critical role of regional and international organizations, especially the United Nations, in ensuring cooperation between countries and coordination of national efforts.

During the interactive discussion, speakers underlined the need to regionalize or even localize global frameworks, such as the 2030 Agenda for Sustainable Development, the Addis Agenda, the Paris Climate Agreement and the Samoa Pathway, through the development of national implementation strategies. National mapping exercises could help in understanding the extent to which national legislation reflected the priorities set out in international agreements. Speakers also highlighted the need for additional funds from all sources and pointed out the continuing importance of ODA. In this context, the special situation of small island developing States was emphasized, which continued to rely on international cooperation for many critical steps towards sustainable development. A call was also made to strengthen existing partnerships and form additional partnerships for the implementation of the 2030 Agenda for Sustainable Development, including South-South and triangular cooperation.

THE MEANS OF IMPLEMENTATION OF THE SDGs SELECTED FOR AN IN-DEPTH REVIEW AT THE 2018 HLPF

19 NOVEMBER 2017

BREAKOUT SESSION ON SDGs 6 AND 7: WATER AND ENERGY

- ***Chair:***
  - **H.E. Mr. Mahmadamin Mahmadaminov,** Vice-President of ECOSOC, Permanent Representative of Tajikistan to the United Nations

- ***Keynote Speech:***
  - **H.E. Ambassador Tariq Ali Faraj Hashim Al-Ansari,** Director of International Cooperation Department, Ministry of Foreign Affairs, State of Qatar

- ***Moderator:***
  - **H.E. Mr. Csaba Kőrösi,** Sherpa to the President of Hungary in the High-level Panel on Water

- ***Panelists:***
  - **Dr. Constantinos Taliotis**, Post-doctoral researcher, KTH Royal Institute of Technology, Sweden
  - **Mr. Nicholas Craven**, Independent Expert

- ***Interactive Discussion***

GUIDING QUESTIONS

1. What are the main technology and innovation solutions and gaps for attaining SDGs 6 and 7 (water and energy)? What are the financing and other obstacles to the adoption and scaling up of relevant technologies and innovations?
2. What are the best approaches to addressing financing shortfalls and challenges at different levels (global, national and sub-national)? Do science, technology and innovation (STI) road maps hold potential?
3. Based on your experience, what is your most important recommendation for the way forward?

Summary: The breakout session on energy and water was chaired by H.E. Mr. Mahmadamin Mahmadaminov, Vice-President of ECOSOC, Permanent Representative of Tajikistan to the United Nations. The session featured a keynote presentation by H.E. Ambassador Tariq Ali Faraj Hashim Al-Ansari, Director of International Cooperation Department, Ministry of Foreign Affairs, State of Qatar. The panel was moderated by H.E. Mr. Csaba Kőrösi, Sherpa to the President of Hungary in the High-Level Panel on Water and was comprised of presentations by Dr. Constantinos Taliotis, Post-doctoral researcher, KTH Royal Institute of Technology, Sweden and Mr. Nicholas Craven, an independent expert

H.E. Ambassador Al-Ansari stressed the importance of SDGs 6 and 7 for Qatar. In particular, Qatar had incorporated these SDGs in its first implementation strategy. The second implementation strategy was targeting years 2017-2022 and would be implemented by the Ministry of Environment, Ministry of Foreign Affairs and Kahramaa (specialized agency on electricity and water in Qatar). Qatar was specifically working on indictors to measure achievements in development. Referring to SDG 7, he mentioned that there was an urgent need to secure safe water in Qatar due to a fast-growing population. Qataris used 675 liters of water per day per person, so there was a need to balance demand and supply. Qatar was placing specific focus on education and raising public awareness about the need for responsibility in using water, in particular through Tarsheed, a programme facilitating initiatives and organizations with an aim to contribute to achieving the Qatar 2030 Vision by providing technical assistance and implementation support.

H.E. Mr. Kőrösi noted that in order to achieve SDG 6,600 billion USD in investment would be needed until 2030. However, he emphasized that both monetary and non-monetary investment would be essential. Both SDG 6 and 7 were infrastructure heavy with slow returns on investment. Moreover, many risks existed, including political, social, environmental and currency. He emphasized that there were many similarities and interlinkages between SDG 6 and 7 but also distinct differences. First, technology penetration was different, with some challenges being posed to technology in the water sector that did not apply to the energy sector. Second, energy solutions were immediately visible, while water solutions were often only seen on the horizon. Third, in case of energy, focus was on the source of energy, distribution and efficiency of consumption. In case of water, post-consumption was also relevant, in particular in the area of wastewater management. Finally, energy projects were usually financed through a market-based approach. However, in the case of water, there were issues that weighed on the valuation and investment in water including political security, human rights, market-based factors, cultural and historical dimensions.

Dr. Taliotis spoke about the high availability of energy resources in Africa including fossil fuels, wind, hydro, uranium, and solar. He noted that the level of interconnectedness and volume of trade would increase in African countries and there would be 2 to 6 billion USD of annual cost savings due to trade. He underlined that vulnerability of energy infrastructure was an essential consideration for climate change. In this connection, he noted three ways forward: (i) identification and prioritization of key projects at the lowest costs; (ii) accounting for changes in climate to increase investor confidence: and (iii) directing capacity-building to national governments, institutions and academia.

Mr. Craven highlighted differences in financing for energy and water projects. ODA to energy projects was well beyond those for water projects. Investment in startups in energy was far more than those in water. There was a lack of innovation in water sectors. Small and medium-sized enterprises (SMEs) in this sector complained about the lack of resources, research and development and commercialization. National policies tended to be biased towards the energy sector. National regulation and institutions should address this issue. Another issue raised

by Mr. Craven was the low pricing of water. Many countries failed to cover maintenance of water projects due to low levels of service, barriers to investment and innovation. Moreover, there were problems in efficiency as 30 per cent of water that was extracted and treated was lost because of underpricing. Therefore, there was a need to increase the price of water, while adopting a pro-poor policy. Additionally, there was a need to increase private sector investment in water projects. Private sector investment in middle income countries were counted in the trillions, while in LDCs, they were counted in the billions. To achieve greater investment in the water sector, national governments should send clear signals to private sector that they would prioritize these investments. Developing countries should stress their interest in long-term regulatory policy to decrease risk and increase investment.

During the interactive dialogue, water was identified as an existential issue for many populations. The moderator stressed that apart from providing drinking water, there was also a need to improve sanitation, pollution control, and waste management. Climate change would put even more demand on some of these areas. Participants noted the importance of an integrated approach to water issues. Desalination was raised as an issue, given that many countries rely on seawater. The decentralization of water management was also discussed, as a more efficient and sustainable way of managing water. On energy, participants raised concerns over high energy costs in LDCs. It was highlighted that more private sector investment was needed to invest in energy projects. LDCs could not mitigate all risks to attract investment, and therefore developed countries should provide support in this respect and increase capacity building support.

To conclude, the moderator summarized the key messages of the session. While there was a huge task ahead to secure investment in water and energy, it was possible. However, the impacts of climate change were augmenting problems, thus requiring quick action. There should be a long-term strategic approach for integrated solutions to create cost efficient and lasting solutions. This was particularly important when discussing the valuation of water and regulation. However, in order to be successful in long-term investments, a long-term social contract would be needed. In this regard, risk mitigation should be distributed, stakeholder engagement would be essential and the creation of enabling environments at all levels for investment would make investments predictable.

BREAKOUT SESSION ON SDGs 11: CITIES

- ***Chair and Moderator:***
  - ➢ **H.E. Mr. Jerry Matthews Matjila,** Vice-President of ECOSOC, Permanent Representative of the Republic of South Africa to the United Nations

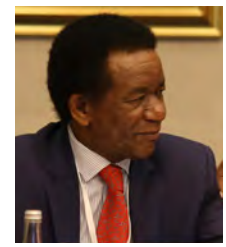
- ***Panelists:***
  - ➢ **Dr. Philip Turner**, Independent Expert
  - ➢ **Dr. Robby Berloznik,** Director, Programme Global Science Technology Innovation Conferences (G-STIC), Flemish Institute for Technological Research (VITO), Belgium
  - ➢ **Dr. Peter Adriaens,** CEO, Corymbus Asset Management, New York, and Professor of Environmental Engineering and Finance, The University of Michigan at Ann Arbor

- ***Interactive Discussion***

GUIDING QUESTIONS

1. What are the main technology and innovation solutions and gaps for attaining SDGs 11 (cities)? What are the financing and other obstacles to the adoption and scaling up of relevant technologies and innovations?
2. What are the best approaches to addressing financing shortfalls and challenges at different levels (global, national and sub-national)? Do STI road maps hold potential?
3. Based on your experience, what is your most important recommendation for the way forward?

Summary: The breakout session was chaired by H.E. Mr. Jerry Matthews Matjila, Vice-President of ECOSOC and Permanent Representative of the Republic of South Africa to the United Nations. Presentations were made by Dr. Philip Turner, independent expert; Dr. Robby Berloznik, Director of the Programme Global Science Technology Innovation Conferences (G-STIC) at the Flemish Institute for Technological Research (VITO) in Belgium; and Dr. Peter Adriaens, CEO of Corymbus Asset Management in New York and Professor of Environmental Engineering and Finance at The University of Michigan at Ann Arbor.



H.E. Mr. Matjila introduced the session by highlighting the role of local governments for the implementation of the SDGs in times of increasing urbanization. He stressed the potential of information and communications technology (ICT), which would be increasingly included in urban planning processes, for the development of smart cities. The increasing availability of data could make a critical impact on city planning, for example for the linkage of transportation and housing. From an African perspective, he

also underscored the finance and human capital challenge faced by most cities and local governments. In addition, H.E. Mr. Matjila pointed out that urban-rural linkages should not be overlooked in the discussion of how to achieve sustainable development at the local level.

Mr. Turner elaborated on the intersection of resilience and STI in the context of financing SDG 11. Cities in developing countries would have the opportunity to leapfrog development stages that were taken by cities in developed countries if the right lessons were applied. The technology to address most challenges that cities face related to sustainability, efficiency and security would already be available. However, for the implementation of STI road maps, cities needed to overcome constraints of piecemeal finance, capacity gaps and a disparity of objectives of different stakeholders. A shift from project-based approaches to integrated initiatives with strong engagement from citizens would be the best response to achieve sustainable urban development. Furthermore, funding sources would have to be diversified and capacity-building efforts should be undertaken.

Dr. Berloznik highlighted the importance of viable business models for the use of technology at the city level, which is usually supported by subsidies. He further argued against thinking in sectoral siloes, as well as only considering the city level in its entirety. The focus should instead be on communities and the linkages between the sectors—for example in the areas of energy, water and waste management. Dr. Berloznik also underscored the role of visionary planning and foresight to adequately design urban transformation processes. He also emphasized the relevance of both financial and non-financial means of implementation.

Dr. Adriaens discussed how investment models would have to be designed to promote the redirection of financial resources to address the limited scale of investments in sustainability. He suggested that project finance should be targeting large-scale investors, such as pension funds, and that investment models should pool different asset categories to create more attractive portfolios. Innovative approaches, such as asset-backed securities and green bonds for more developed cities, should also be considered. Furthermore, he argued that cities should not be viewed as projects, but rather as systems in which the different components interact and influence each other. Dr. Adriaens further called for economic and environmental capacity-building at the city level and to link such efforts with financing for sustainable infrastructure.

During the ensuing discussion, speakers presented several examples to point out the diverse situations of primary and secondary cities within countries. In this context, one speaker cautioned to ensure that development efforts are not focused only on one city in a country or region in order to avoid excessive migration. Overall, participants agreed that urban development should have the citizens' perspective at its core. In this context, participants also addressed the need to nudge behavioural changes, for example to promote the use of public transport. Participants further highlighted institutional arrangements that have an impact on cities, such as the degree of decentralization and the availability of own-source and external resources for local governments. In general, participants welcomed the call for the use of ICT and data to promote sustainable development, but also referred to possible limitations for cities in developing countries.

BREAKOUT SESSION ON SDGs 12 AND 15: SUSTAINABLE CONSUMPTION AND PRODUCTION AND TERRESTRIAL ECOSYSTEMS

- ***Chair:***
  - ➢ **H.E. Ms. Inga Rhonda King,** Vice-President of ECOSOC, Permanent Representative of Saint Vincent and the Grenadines to the United Nations

- ***Presentation:***
  - ➢ **Mr. Simon Zadek,** Senior Advisor on Finance to the Deputy Secretary-General, Executive Office of the Secretary-General, United Nations

- ***Moderator:***
  - ➢ **Mr. Shantanu Mukherjee,** Chief, Policy Analysis Branch, Division for Sustainable Development, Department of Economic and Social Affairs, United Nations

- ***Panelists:***
  - ➢ **Dr. Michael Obersteiner**, Program Director, International Institute for Applied Systems Analysis (IIASA), Expert Member of the International Resource Panel
  - ➢ **Ms. Julie McBride**, Senior Social Franchise Consultant, MSA Worldwide
  - ➢ **Dr. Nikolay Khabarov**, Research Scholar, Ecosystems Services and Management, IIASA

- ***Interactive Discussion***

GUIDING QUESTIONS

1. What are the main technology and innovation solutions and gaps for attaining SDGs 12 and 15 (sustainable consumption and production and terrestrial ecosystems)? What are the primary obstacles to technology adoption and scaling up?
2. What are the best approaches to addressing financing shortfalls and challenges at different levels (global, national and subnational)? Do STI road maps hold potential?
3. Based on your experience, what is your most important recommendation for the way forward?

Summary: The breakout session on sustainable consumption and production and terrestrial ecosystems was chaired by H.E. Ms. Inga Rhonda King, Vice-President of ECOSOC and Permanent Representative of Saint Vincent and the Grenadines to the United Nations. A keynote presentation was made by Mr. Simon Zadek, Senior Advisor on Finance to the Deputy Secretary-General. The panel was moderated by Mr. Shantanu Mukherjee, Chief, Policy Analysis Branch, Division for Sustainable Development, Department of Economic and Social Affairs. It was comprised of presentations by Dr. Michael Obersteiner, Program Director, International Institute for Applied Systems Analysis (IIASA), Ms. Julie McBride, Senior Social Franchise Consultant, MSA Worldwide, and Dr. Nikolay Khabarov, Research Scholar, Ecosystems Services and Management (IIASA).

H.E. Ms. King noted that for sustainable consumption and production, it would be essential to minimize the use of natural resources, toxic materials and waste and pollutants throughout the production and consumption process. The material footprint, which reflects the amount of primary materials required to meet a country's needs, and domestic material consumption, which measures the amount of natural resources used in economic development, were two measures which could paint a picture of the sustainability of economic growth. Given the data that existed on both of these measures, innovation on both fronts was necessary to achieve the SDGs in a timely fashion. On terrestrial ecosystems, Ms. King noted that the preservation and sustainable use of resources had been uneven. In particular, she recalled the extinction risk for corals and wildlife poaching. Innovative approaches were needed to break the use of harmful practices. In that regard, STI could play an important role.

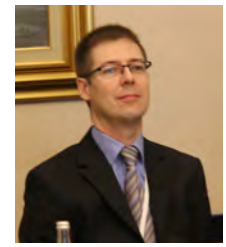
Mr. Mukherjee began the session by noting the deep interconnection between SDGs 12 and 15. Both SDGs dealt with how to manage negative externalities, and how to identify the appropriate balance between market-based interventions and non-market-based interventions. In this regard, each source of finance was looking for some type of return, even if it was a social return. In looking at such financing mechanisms, it would be important to account for the different realities facing developing and developed countries. He recalled that it was not just about resources, but also challenges to phasing out certain types of production that have certain financing mechanisms inherent in them. He noted that developing countries should be able to leapfrog in the long term.

Mr. Zadek focused his presentation on needed changes in the way finance works. He summarized that the cornerstone to the economy was the global financial system, both bank lending and capital markets. The global financial architecture was defining which enterprises received funds and which did not; there was a need to look at the system itself. He raised questions as to why the financial system had not been shaped towards SDG implementation, such that returns were maximized but in a way that served a broader interest, both of investors and of communities. In this regard, he discussed the "Roadmap for sustainable finance," a joint initiative by the United Nations Environment Programme and the World Bank, which attempted to crystalize the changes that are happening in the evolution of capital markets and their relationship to some of the SDG outcomes. The initiative illustrated that the shaping of the global financial system was possible, with actors that have typically not been part of the conversations.

Dr. Obersteiner began by providing a brief outline of the background paper he prepared for the Conference on financing sustainable, resilient and inclusive solutions to attain SDG 12. He asserted that the SDGs would not be attainable without decoupling natural resource use and environmental pressures from economic growth and improvements in living standards. Improving resource efficiency, economic growth and making cuts to greenhouse gas emissions were necessary means of improving performance. Dr. Obersteiner noted that resource efficiency and

environmental resource management needed to be significantly improved. "Smart" SDG policies were those that targeted impact decoupling and resource efficiency and led to economic gains as measured by gross domestic product. In this regard, economic and technology transfer mechanisms combined with smart SDG policies could create positive outcomes for all countries. In addition to these "smart" portfolios, regulatory and policy instruments were essential to creating a stable investment environment. Existing technologies, however, were not sufficient to achieve the SDGs, and technology gaps needed to be closed through large scale STI programmes that, in turn, required a substantial amount of funding to ensure that no one was left behind. Thus, blended finance would be necessary to bringing international STI programmes to scale.

Ms. McBride emphasized that the challenge was not just in scaling, but in scaling faster. She discussed how franchising held a great deal of promise for the social sector because of its ability to achieve exponential growth while maintaining standards and economies of scale. Franchising had increasingly gained traction as a way to expand businesses that were not only generating profit, but were also addressing social needs such as access to drinking water, health care, food security, and sanitation. In this sense, franchising was not just a way to import western brands, but was a way to develop home-grown brands that were exported to other countries. This specific deployment technology was a market approach that delivered solutions on time and that used finance to incentivize particular behaviours. The model had been proven, but was not used to the extent that it could be. Ms. McBride further discussed how to drive progress in this field using the franchise model to scale appropriately.



Dr. Khabarov focused his presentation on science-based policy developments. He discussed monitoring and evaluation mechanisms such as remote sensing, citizen-science data collection and checking, and data fusion. However, he noted that these processes often put more costs into the system. As such, obstacles to technology adoption included a lack of legally binding agreements, indicators, market incentives and insecure land tenure and resource rights. Dr. Khabarov discussed how these obstacles could be overcome through improvement of the socioeconomic situation of a country, a long-term strategy with commitment, planning and funding, and an ecosystems services market. To address the financing shortfalls, he noted that the emergence of a global carbon market could go a long way in valuing ecosystems and achieving SDG 15. Benefit-sharing mechanisms could also have positive effects. He concluded by emphasizing that to respond to the call of the Addis Agenda for more international investment, an international ecosystems market should be created.

During the interactive discussion, participants raised questions around coherence of the implementation of FfD outcomes. Namely, that the FfD follow-up process was essential to stabilize the process, but that much of the innovation was happening in other United Nations agencies in a fragmented way. Participants discussed how to bring this innovation together, including through spaces like the Doha meeting, which provided opportunities for goal-specific financing dialogues.

PLENARY SESSION ON THE MEANS OF IMPLEMENTATION

- ***Chair and Moderator:***
  - ➢ **Mr. Alexander Trepelkov,** Director, Financing for Development Office, Department of Economic and Social Affairs, United Nations

- ***Reports from Breakout Sessions:***
  - ➢ **Mr. Nicholas Craven,** Independent Expert
  - ➢ **Mr. Philip Turner,** Independent Expert
  - ➢ **Dr. Michael Obersteiner,** Program Director, IIASA, Expert Member of the International Resource Panel

- ***Discussants:***
  - ➢ **Ms. Louise Kantrow,** Permanent Representative to the United Nations, International Chamber of Commerce (ICC)
  - ➢ **Mr. Stefano Prato,** Managing Director, Society for International Development

- ***Interactive Discussion***

Summary: The plenary session of the means of implementation of the selected goals to be reviewed at the High-level Political Forum (HLPF) was chaired by Mr. Alexander Trepelkov, Director, Financing for Development Office, DESA. The session featured reports from the breakout sessions, and commentaries by Ms. Louise Kantrow, Permanent Representative to the United Nations, International Chamber of Commerce, and Mr. Stefano Prato, Managing Director, Society for International Development.

Mr. Trepelkov highlighted the link between the Addis Agenda and the 2030 Agenda for Sustainable Development by pointing out that the Addis Agenda included all financial and non-financial means of implementation of the SDGs. The Addis Agenda also identified synergies across the SDGs where progress in one area would contribute to progress in others. Finally, the Addis

Agenda contained numerous important financing commitments across all seven action areas of the Agenda, which were integral to the achievement of the SDGs. Mr. Trepelkov also highlighted the importance of the multi-stakeholder approach to the FfD process, recalling the key role that both civil society and the private sector had played throughout—from Monterrey, through Doha, to Addis. He reaffirmed that the contributions of these stakeholders would continue to be an integral part of FfD follow-up going forward.

Mr. Craven underscored that there were acute access gaps to energy and water. However, technological solutions were available and could help. While the investment gap was daunting, it would be manageable if the SDGs were localized. These were global problems with local solutions. Significant upfront investments would be needed. However, there was also a race against time as climate change necessitated urgent action, and climate adaptation made things more complex. He reported discussions on the "think, plan, invest" strategic approach. Additionally, regulatory environments played an important role in attracting investment, as long-term social contracts were needed to attract investment. Risk mitigation was also important, particularly to increase investment in low-income countries. It would also be essential for Governments to create the right enabling environment for private sector investment. Finally, stakeholder engagement was essential for meaningful solutions.

Mr. Turner summarized the discussions of the breakout session on SDG 11, emphasizing the need to look at cities as systems that have a lifetime. From this understanding of cities as long-term actors, four key issues emerged in the discussions. First, the alignment of policy by local governments with the SDGs provided investors with confidence that there would be scale for their investments in cities. Second, effective and diverse funding sources within cities would need to be aligned with the specific business case and model at the city level: cities could provide better services at a lower cost, which would make the business case for investing in cities clear. Third, along with finance, capacity-building was needed for financial organizations to better understand business models. Capacity-building was also needed to help city officials learn technologies and engage citizens, as well as for the citizens themselves. Finally, cities should be seen as breeding grounds for technology and innovation, as they offer opportunities for co-creation among cities, businesses and citizens for better service delivery. While technology should serve cities, citizens' needs and best interests should be at the heart of the implementation of SDG 11.

Dr. Obersteiner outlined the discussion from the breakout session on SDGs 12 and 15, stressing that business as usual was not a viable option moving forward, in terms of both material consumption and destruction of ecosystems. Discussions focused on how to manage externalities that were not priced and how to address the need for the phasing out of some modes of production that were not fit for the 2030 Agenda for Sustainable Development. With regard to the finance system, the dialogue highlighted that current rules did not provide appropriate incentives for investment in long-term solutions. However, there was still opportunity to shape and rethink the financial system to deliver on the targets of the SDGs. On sustainable consumption and production, it was noted that it was not enough on its own to attain the SDG targets. More STI and new technologies were needed. Franchising social businesses might be one way to achieve exponential growth to bring solutions to scale. On SDG 15, externalities were not priced and incentives did not exist, primarily because an appropriate policy framework was not in place. In this regard, science-based policymaking was critical.

Ms. Kantrow expressed appreciation for the focused discussions on the means of implementation, which aligned the financing discussions with the more thematic discussions at the HLPF. She emphasized that business had the power to create solutions and bring them to scale and that private finance was

a driver for major economic growth. To that end, it was essential to create a business environment conducive to incentivizing long-term investment. The ICC, in turn, was also trying to adjust its strategic objectives to be more "fit for purpose" and be an active partner for Member States in supporting the development of enabling environments.

Mr. Prato called for discussions on the scaling up of solutions to also account for the realities on the ground. He noted that it was critical to build coherence between the SDGs and the FfD process. However, he also emphasized that when discussing solutions, particularly those based on technology, they should be discussed in a way that is integrated with the real economy, accounting for the implications of the use of such technology on communities. Shortcomings of such technologies should also be discussed since technology or finance alone could not fix all problems. He also observed that there was more discussion on incentives for the wrongdoers, rather than incentives for new and emerging approaches. It was necessary to also pay attention to fiscal and normative space for policy-making. Finally, he suggested that VNR countries should more explicitly put forward challenges and vulnerabilities in the financial architecture, which could then be further discussed in the FfD follow-up process. He reiterated the importance of active and meaningful civil society engagement in these discussions.

During the interactive dialogue, a number of countries commented on the additional steps they had taken at the national level to address the specific means of implementation of goals 6, 7, 11, 12, 15 and 17. Questions around how to ramp up investment in the water sector were raised, particularly in the face of climate change and difficulties in infrastructure development. Pro-poor pricing of utilities was also discussed.

OVERCOMING CHALLENGES TO MOBILIZING SOVEREIGN WEALTH FUNDS (SWFs) FOR SDG INVESTMENTS

- ***Chair:***
  - ➢ **H.E. Mr. Bart De Groof,** Ambassador, Embassy of Belgium in Qatar

- ***Presenter and Moderator:***
  - ➢ **Dr. Rajiv Sharma,** Research Director, Global Projects Center, Stanford University

- ***Panelists:***
  - ➢ **Mr. Bayasgalan Rentsendorj,** Sr. Membership Manager, International Forum of Sovereign Wealth Funds
  - ➢ **Mr. Adam Robbins,** Practice Lead, Long-term Investing Initiatives, World Economic Forum (WEF)

- ***Interactive Discussion***

GUIDING QUESTIONS

1. What are the lessons learned from SWF efforts to reconcile their financial objectives with the social, economic and environmental deficits that the SDGs seek to address?
2. What are the barriers that hold back SWF investment in key sustainable development sectors, notably in developed economies?
3. What measures can Governments (both source and destination), international trade and financial institutions, as well as other international regulatory and supervisory bodies take to facilitate more SWF investment in sustainable development sectors?

Summary: The session on overcoming challenges to mobilizing SWFs for SDG investment was chaired by H.E. Mr. Bart De Groof, Ambassador of Belgium in Qatar and moderated by Dr. Rajiv Sharma, Research Director, Global Projects Center, Stanford University. The panel discussion featured presentations by Mr. Bayasgalan Rentsendorj, Sr. Membership Manager, International Forum of Sovereign Wealth Funds, and Mr. Adam Robbins, Practice Lead, Long-term Investing Initiatives, World Economic Forum.

H.E. Mr. De Groof noted that no single source could meet the financing challenges that lay ahead for the implementation of the 2030 Agenda for Sustainable Development. The Addis Agenda identified institutional investors as a large but underutilized source of financing for sustainable development and encouraged SWFs to dedicate a larger percentage of investments in infrastructure, particularly in developing countries. Given the vast resources of these SWFs, even a small percentage increase in investment in SDGs could have a significant impact. However, to achieve greater SWF investment in the SDGs, it was essential to understand the barriers faced by SWFs towards such investment. This would assist in creating the right incentives and enabling environments to encourage SWFs to reorient their investments in the direction of the world's sustainable development needs. He noted that it was essential for countries to develop a game plan to scale up investments and better align SWF investment with the SDGs. He encouraged participants to be concrete and action-oriented in deliberations and discussions to ensure that concrete recommendations on how to scale up SWF investments in the SDGs could be fed into the FfDF and HLPF in 2018.

Dr. Sharma discussed the main findings of the background study he had prepared for the Conference. He noted that the SDGs were essentially an issue of long-term investment and that SWFs could provide substantial long-term investment at scale. However, there were a number of barriers that were inhibiting such investment by the SWFs, including: (i) liabilities; (ii) risk appetite; and (iii) resource capabilities. Dr. Sharma spoke to each of these barriers, in the context of various SWF models of investment including the Norway model, endowment model, Canadian model and, finally, the collaborative model. He also elaborated upon a number of case studies, across geographic regions, using different investment models that had been successful in channelling funds towards SDG objectives. Dr. Sharma concluded with four main recommendations. First, more work was required to develop SDG specific metrics that SWFs could use to appraise their investments. Second, aspects of sustainable development investment, or responsible investment, should be incorporated into the legislation of SWFs by Governments from the start. Third, in order to attract SWF capital to emerging economies, Governments needed to package projects in a way that was amenable to SWF investment. Finally, he noted that sovereign development funds could also be a way to crowd in SWF capital to invest in SDG-specific projects, in addition to being commercially attractive opportunities.

Mr. Robbins began by noting that almost all long-term investors and asset owners had legal investment mandates. The mandates themselves varied, but they were all codified in law, usually with a risk-return mandate, which created a specific focus and legal mandate for what managers should and should not invest in. However, the SDGs were well aligned with the investment objectives of long-term investors. Investment value and investment returns were ultimately what would move money towards the SDGs. SWFs were especially well suited for this type of investment, not just because of their horizon but also because of their scale and risk tolerance. Responsibility and leadership within the investment community were important motivators for SWFs. SWFs were unique in the way they worked and the communities they engaged. Since they were government-owned, they often had policy and government connections that enabled them to create networks and scale, which made investing in new markets more feasible. He concluded by making recommendations for three groups: (i) financial investors; (ii) the policy community; and

(iii) investment recipient countries. For financial investors, Mr. Robbins underscored that SWFs had grown and become more professionalized as an investment partner. It was valuable to share experiences and successes within the SWF community to develop long and deep partnerships. For the policy community, he noted that it was essential to realize that some markets were not investible for various reasons (e.g., political instability, rule of law, risk-return profile, which does not align with institutional mandates). It was important to match investment solutions with the governance and capacities of specific country contexts. Finally, for recipient countries, outcomes of SWF investment can vary, and it would be important to understand what had driven or hindered success in different contexts. For those countries considering SWFs, it would be important to learn from others' successes and build the institution gradually.

Mr. Rentsendorj outlined that SWFs were a heterogeneous group, with many structures and mandates. As long-term investors, SWFs could emerge as a source of funding to address the funding gap for the SDGs. However, when it came to implementation, it was important to have a well-planned sovereign asset-liability structure in place based on advanced financial assessments. Many countries were setting up strategic investment funds, using economic rate of return measures. Many Governments were also using SWFs as a way to diversify the economy and act as a catalyst to growth. SWFs could act as a seed investor in key development sectors and crowd in private capital for various projects, particularly infrastructure. In this regard, he spoke about the partnership and co-investment model, which had seen success in a number of countries. He noted that many countries needed to reorganize and professionalize their markets so they would become more investible. Extensive adoption of innovation in social entrepreneurship could be one way to overcome this barrier. Mr. Rentsendorj concluded by maintaining that the success of these funds depended on their ability to balance policy with commercial objectives.

During the interactive discussion, the Santiago Principles (a practical guidance for SWF management for long-term investment practices) and the role they play in investment in the SDGs were discussed. However, implementation of these principles was entirely dependent on specific country contexts. While SWF legislation had thus far set requirements for risk adjustment and impact investing, environmental, social and governance (ESG) and SDG issues had not yet been addressed, despite more traction of ESG and climate change as a new asset class. There was a need to promote and educate SWFs on new investment policies that they could adopt within their portfolio, which could assist in their investment decisions. Additionally, it was suggested that the SDGs be put into an investment language, which could map the SDGs with asset classes, investment portfolios and regions. Fiduciary mandates and responsibilities of fund managers and the tension between the public good approach and the asset class approach were also discussed.

THE ROLE OF DEVELOPMENT FINANCE INSTITUTIONS IN ACHIEVING THE SDGs: THE CASE OF ISLAMIC FINANCE

- ***Chair:***
  - ➢ **Mr. Alexander Trepelkov,** Director, Financing for Development Office, Department of Economic and Social Affairs, United Nations

- ***Keynote Speech:***
  - ➢ **H.E. Dr. Ahmed bin Mohammed Al-Muraikhi,** Secretary-General's Special Envoy for Humanitarian Affairs

- ***Presentation:***
  - ➢ **Dr. Habib Ahmed,** Professor and Sharjah Chair in Islamic Law and Finance, Durham University Business School

- ***Moderator:***
  - ➢ **Mr. Michael O'Neill,** Assistant Secretary-General and Director of External Relations, UNDP

- ***Panelists:***
  - ➢ **Mr. Nedzad Ajanovic,** Senior Partnership Specialist, Islamic Development Bank
  - ➢ **Mr. Marco Lichtfous,** Partner, Deloitte

GUIDING QUESTIONS

1. What can Islamic finance teach us about financing the 2030 Agenda for Sustainable Development, including the SDGs?
2. What challenges does Islamic finance need to overcome to ensure its contribution to sustainable development?
3. What specific steps and policies are required to unleash the full potential of Islamic finance, particularly for large-scale, sustainable infrastructure investments?

Summary: The session was chaired by Mr. Alexander Trepelkov, Director of the Financing for Development Office, United Nations Department of Economic and Social Affairs and moderated by Mr. Michael O'Neill, Assistant Secretary-General and Director of External Relations at UNDP. A keynote speech was delivered by H.E. Dr. Ahmed bin Mohammed Al-Muraikhi, the Secretary-General's Special Envoy for Humanitarian Affairs. Dr. Habib Ahmed, Professor and Sharjah Chair in Islamic Law and Finance at the Durham University Business School, presented a background paper. Presentations were also made by the Senior Partnership Specialist at the Islamic Development Bank, Mr. Nedzad Ajanovic; and Mr. Marco Lichtfous, Partner at Deloitte.

Mr. Trepelkov, in his opening remarks, highlighted the growing importance of Islamic finance, which in 2016 represented almost $2 trillion in assets. Many Islamic finance products had shown significant potential to contribute to sustainable development—for example, through advancing social development, including the provision of additional financial resources for the poor, and promoting financial inclusion. Furthermore, Islamic finance had contributed to financial stability, since its fundamental principles of sharing risk and building longer-term relationships between individuals and financial institutions facilitated a sound connection between the financial sector and the real economy. Islamic finance could also help bridge the infrastructure investment gap through sukuk (sharia-compliant financial certificates). Mr. Trepelkov further encouraged the consideration of Islamic finance products by non-Muslim providers and users, where they are competitive and offer positive externalities in promoting sustainable development.

H.E. Dr. Al-Muraikhi, in his keynote speech, referred to the contribution of Islamic finance in the context of humanitarian aid. In addition, he emphasized the need for capacity-building in countries affected by crisis. He suggested that development finance and humanitarian aid should be linked more closely, since in many fragile situations, financial resources would often rather be allocated for reconstruction efforts than for social needs. Islamic finance could play an important role in advancing the integration of both instruments, and thus contribute to the implementation of the SDGs.

Dr. Ahmed presented the background paper for the session, which analyzes the contribution of Islamic finance to the 2030 Agenda for Sustainable Development, with a special focus on infrastructure finance. The asset-linked and risk-sharing features of Islamic finance made it conducive to financing the SDGs, and infrastructure in particular. However, as of now, the full potential of Islamic finance still remained untapped. Islamic banks traditionally were too small and would participate in infrastructure projects through smaller tranches of syndications. Similarly, the contribution of non-banking financial institutions such as mutual, insurance and pension funds, was marginal. This was changing slowly, with the overall growth of the Islamic finance sector, allowing for banks to fully finance infrastructure projects. Likewise, the use of sukuk for infrastructure finance had increased in some countries. To further strengthen the contribution of Islamic finance to the achievement of the SDGs, Dr. Ahmed recommended that financial plans that were linked to national sustainable development strategies should explicitly include the role of Islamic finance. He also urged for the standardization of national governance, legal and regulatory frameworks, as well as sukuk structures, to ensure sharia compliance. In addition, he advocated for the development of Islamic financial products for infrastructure as an asset class and the incorporation of environmental, social and governance criteria.

Mr. O'Neill emphasized the potential of Islamic finance to contribute to closing the financing gap for the SDGs. He underscored that while the 2030 Agenda for Sustainable Development had set a common framework to promote prosperity, preserve and protect the planet, and improve the livelihoods of people, more

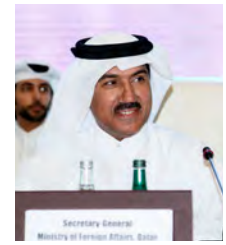
financial resources were needed for its implementation. Mr. O'Neill pointed out that UNDP and other United Nations system organizations had scaled up their efforts to form innovative partnerships on Islamic finance with Member States. These included initiatives to support Syrian refugees and investments into renewable energy projects in Indonesia based on Islamic finance mechanisms. UNDP and the Islamic Development Bank also launched a Global Islamic Finance and Impact Investing Platform, to promote market-based solutions to sustainable development needs and to nurture a business ecosystem for Islamic finance and impact investing.

Mr. Ajanovic provided an overview of the activities of the Islamic Development Bank and the Islamic financial service industry. Currently, the Islamic financial service industry would be growing 50 per cent faster than the traditional banking sector, with a potential customer base of 25 per cent of the world population. Strategic needs for sustainable growth of the sector would be a framework for continuous development, combined with solutions for liquidity management and a stronger focus on financial inclusion. Islamic finance could advance the SDGs through its fair and equitable allocation of risks, as well as through its power to mobilize resources and its social welfare tools that could leverage concessional finance. In the area of infrastructure finance, Islamic finance could provide sharia-compliant funding mechanisms through sukuk programmes and Islamic syndicated finance. Social spending could be facilitated through Islamic microfinance, zakat (alms-giving, treated like a tax) and waqf (charitable donation of assets). Private sector development could be stimulated by sharia-compliant equity finance. The Islamic Development Bank would support the SDGs through its focus on alleviating poverty, prospering people, promoting education, improving health and governance, and several sharia-compliant funding mechanisms.

Mr. Lichtfous elaborated on the evolution and proliferation of Islamic finance in the last decades. Institutionally, geographically and in terms of product offering, Islamic finance grew substantially, with the latest developments in the areas of e-commerce and financial technology. Even though Islamic finance activities were still concentrated in certain geographic areas (Asia, the Middle East and North Africa, and sub-Saharan Africa) today, it would hold significant potential to reach wider audiences, including in Europe and North America. Mr. Lichtfous underscored the point that through its focus on shared prosperity, inclusive growth and human welfare, Islamic finance products (financial instruments, contracts, funds, equity funding, insurance) would be well aligned with the SDGs. However, Islamic finance would still face several challenges on a global level that would constrain its potential to contribute to sustainable development. This includes the widespread misperception that Islamic finance is only available to Muslims. Furthermore, Islamic finance would be more focused towards sharia-compliance than market integration. Also, the absence of money markets and short-term maturity investments would make the Islamic finance market less liquid and therefore less attractive. Mr. Lichtfous recommended to develop its enabling environment, specifically the policy framework and implementation channels. In addition, strengthening policy effectiveness in banking and capital markets, as well as leveraging digital strategies and offering a larger product range to widen maturities and increase liquidity, would be vital to fully realizing the potential of Islamic finance.

CLOSING OF THE CONFERENCE

In his closing remarks, **Mr. Liu** thanked the Government of Qatar for hosting the Conference and the excellent cooperation with DESA in the organization of the event. He commended the demonstrated commitment at the highest level by the Government of Qatar to the implementation of the 2030 Agenda for Sustainable Development and the Addis Ababa Action Agenda. Mr. Liu pointed out that the Doha Conference tested a new approach to support the global follow-up and review mechanisms, one that combines both financing for development and the means of implementation of the 2030 Agenda for Sustainable Development. What was achieved in Doha should not end with the event, but rather should have a life of its own beyond Doha. In this regard, Mr. Liu presented the ten "Doha Messages" as the outcome of the Conference (see page 9), which would be fed into the 2018 FfDF and HLPF. In line with the spirit of the Conference, the Doha Messages identified multilateralism as the fundamental basis for achieving peaceful and sustainable development. The messages also called for synergy and coherence in the implementation of the 2030 Agenda for Sustainable Development and the Addis Agenda. Therefore, the integrated, whole-of-government and whole-of-society approaches at the local, national and international levels were critical. Mr. Liu affirmed that the United Nations had a key role to play in supporting Member States to realize the vision of the 2030 Agenda for Sustainable Development and address the full range of interrelated challenges. Mr. Liu concluded by expressing the commitment of DESA to responding to the strong call for support from Member States.



H.E. Dr. Al-Hamadi thanked all Conference participants for their contributions to the success of the meeting. Through their participation in the Conference, countries had renewed their political will to mobilize resources at the national and international levels to ensure that no one is left behind. He further applauded the ten Doha Messages as an important contribution to the implementation of the 2030 Agenda for Sustainable Development and the Addis Agenda, particularly as an input to the 2018 FfDF and the 2018 HLPF. H.E. Dr. Al-Hamadi further emphasized that the continued support by the State of Qatar to the international efforts to achieve the objectives sought by the international community was based on its foreign policy that seeks serious and genuine participation in supporting the objectives of the United Nations in all their aspects. For Qatar, hosting of the Conference was an expression of its commitment to and in its role in strengthening international cooperation. H.E. Dr. Al-Hamadi reiterated that Qatar would continue to pursue openness to the world and support to international multilateral action.

ANNEXES

PROGRAMME

The high-level meeting will serve as a joint preparatory event for the 2018 ECOSOC Forum on Financing for Development follow-up (FfDF) and the 2018 High-level Political Forum on Sustainable Development (HLPF). It will be the first joint preparatory meeting for both the FfDF and the HLPF. It will aim to achieve the following objectives:

i. Identify challenges in advancing financing for the SDGs, as well as country-level policy and institutional innovations in addressing them;

ii. Strengthen coherence and coordination in preparation for the 2018 FfDF and the 2018 HLPF; and facilitate dialogue between their respective national constituencies;

iii. Sensitize national policy makers on the policy developments at the global level (outcomes of the FfDF and HLPF);

iv. Showcase new initiatives and innovations in areas of sustainable development finance.

18 NOVEMBER 2017

OPENING OF THE MEETING — 10:00 - 11:00 AM

- **H.E. Mr. Ali Shareef Al Emadi,** Minister of Finance, State of Qatar
- **Mr. LIU Zhenmin**, Under-Secretary-General for Economic and Social Affairs, United Nations
- **H.E. Ms. Marie Chatardová,** President of the Economic and Social Council (ECOSOC), Permanent Representative of the Czech Republic to the United Nations (remarks to be delivered by **H.E. Mr. Mahmadamin Mahmadaminov,** Vice-President of ECOSOC, Permanent Representative of Tajikistan to the United Nations)

KEYNOTE PRESENTATIONS

- **Mr. Achim Steiner,** Administrator, United Nations Development Programme (UNDP)
- **Dr. Mukhisa Kituyi,** Secretary-General, United Nations Conference on Trade and Development (UNCTAD)

TEA BREAK / BILATERALS — 11:00 - 11:30 AM

MINISTERIAL ROUND TABLES — 11:30 - 5:00 PM

"Sharing country experiences in mobilizing resources from public, private, domestic and international sources towards the implementation of the Addis Ababa Action Agenda and the 2030 Agenda for Sustainable Development – policy and institutional innovations"

After the opening of the meeting, high-level officials of Governments, representing countries at different income and vulnerability levels, will present their policy and institutional innovations in implementing the Addis Ababa Action Agenda (Addis Agenda) and the means of implementation of the 2030 Agenda for Sustainable Development (2030 Agenda) at two successive round tables. The innovations can be national or sub-national broad-based reforms or specific innovative interventions in specific action areas of the Addis Agenda. The presentations will be in the form of case studies, putting the innovations into local context, explaining their relevance for global policy-making and international support needed to make them successful. Each round table will include presentations by country officials and lead discussants from international financial institutions and other stakeholders, as well as an interactive dialogue.

MINISTERIAL ROUND TABLE 1 — 11:30 a.m. - 1:30 p.m.

CO-CHAIRS

- **H.E. Dr. Ahmad Hassan Al-Hamadi,** Secretary-General of the Ministry of Foreign Affairs, State of Qatar
- **Mr. LIU Zhenmin,** Under-Secretary-General for Economic and Social Affairs, United Nations

PRESENTATIONS

- **H.E. Mrs. Carmen Elena Falconi Vaca,** National Secretary for Planning and Development, Ecuador
- **H.E. Mr. Michael Gerber,** Ambassador, Special Envoy for Global Sustainable Development, Switzerland
- **H.E. Mr. Francisco Javier Niembro Cibrian,** Ambassador of Mexico to the State of Qatar
- **Mr. Yonov Frederick Agah,** Deputy Director-General, World Trade Organization (WTO)

INTERACTIVE DISCUSSION

LUNCH BREAK — 1:30 - 3:00 p.m.

MINISTERIAL ROUND TABLE 2 — 3:00 - 5:00 p.m.

CO-CHAIRS

- **H.E. Dr. Ahmad Hassan Al-Hamadi,** Secretary-General of the Ministry of Foreign Affairs, State of Qatar
- **Mr. LIU Zhenmin,** Under-Secretary-General for Economic and Social Affairs, United Nations

PRESENTATIONS

- **H.E. Dr. Edward Scicluna,** Minister of Finance, Malta
- **H.E. Mr. Mustafa Mastoor,** Acting Minister of Economy, Afghanistan
- **H.E. Dr. Abdul Rahman Mohamed Dirar,** Minister of State, Ministry of Finance and Economic Planning, Sudan
- **Mr. Chaikou Yaya Diallo,** Deputy National Director of Cooperation, Ministry of Planning and Cooperation, Republic of Guinea

- **Mr. Laszlo Borbely,** State Counsellor to the Prime Minister, Romania

INTERACTIVE DISCUSSION

Guiding Questions

1. What steps have been taken at the national level towards mainstreaming the Addis Agenda and means of implementation of the 2030 Agenda into national development strategies?
2. What challenges have been encountered in the implementation of these mainstreaming efforts?
3. What policy innovations have been useful in overcoming these challenges? How were such innovations developed and implemented?

DINNER HOSTED BY THE GOVERNMENT OF QATAR **7:30 - 9:30 p.m.**

19 NOVEMBER 2017

MORNING SESSIONS

The means of implementation of the SDGs selected for an in-depth review at the 2018 HLPF

The 2018 HLPF is mandated to conduct an in-depth review of selected SDGs. In addition to SDG17 (means of implementation and the global partnership) which is reviewed annually and with a cross-cutting approach, goals 6 (clean water and sanitation), 7 (affordable and clean energy), 11 (sustainable cities and communities), 12 (responsible consumption and production) and 15 (life on land) will be reviewed. The morning session will feature breakout sessions to discuss progress and challenges related to the financing (including the financing of technological solutions) of these selected SDGs based on background studies, prepared in advance of the meeting. Each breakout session will feature brief presentations of the relevant background studies and an interactive dialogue.

BREAKOUT SESSIONS **10:00 - 11:30 AM**

SDGs 6 AND 7- ENERGY AND WATER

CHAIR

- **H.E. Mr. Mahmadamin Mahmadaminov,** Vice-President of ECOSOC, Permanent Representative of Tajikistan to the United Nations

KEYNOTE SPEECH

- **H.E. Ambassador Tariq Ali Faraj Hashim Al-Ansari,** Director of International Cooperation Department, Ministry of Foreign Affairs, State of Qatar

MODERATOR

- **H.E. Mr. Csaba Korosi,** Sherpa to the President of Hungary in the High-Level Panel on Water

PANELISTS

- **Dr. Constantinos Taliotis,** Post-doctoral researcher, KTH Royal Institute of Technology, Sweden

- **Mr. Nicholas Craven,** Independent Expert

INTERACTIVE DISCUSSION

Guiding Questions

1. What are the main technology and innovation solutions and gaps for attaining SDGs 6 and 7 (energy and water)? What are the financing and other obstacles to the adoption and scaling up of relevant technologies and innovations?
2. What are the best approaches to addressing financing shortfalls and challenges at different levels (global, national and sub-national)? Do STI roadmaps hold potential?
3. Based on your experience, what is your most important recommendation for the way forward?

SDG 11 - CITIES

CHAIR AND MODERATOR

- **H.E. Mr. Jerry Matthews Matjila,** Vice-President of ECOSOC, Permanent Representative of the Republic of South Africa to the United Nations

PANELISTS

- **Dr. Philip Turner,** Independent Expert
- **Dr. Robby Berloznik,** Director, Programme Global Science Technology Innovation Conferences (G-STIC), Flemish Institute for Technological Research (VITO), Belgium
- **Dr. Peter Adriaens,** CEO, Corymbus Asset Management, New York, and Professor of Environmental Engineering and Finance, The University of Michigan at Ann Arbor

INTERACTIVE DISCUSSION

Guiding Questions

1. What are the main technology and innovation solutions and gaps for attaining SDGs 11 (cities)? What are the financing and other obstacles to the adoption and scaling up of relevant technologies and innovations?
2. What are the best approaches to addressing financing shortfalls and challenges at different levels (global, national and sub-national)? Do STI roadmaps hold potential?
3. Based on your experience, what is your most important recommendation for the way forward?

SDGs 12 AND 15- SUSTAINABLE CONSUMPTION AND PRODUCTION, AND TERRESTRIAL ECOSYSTEMS

CHAIR AND MODERATOR

- **H.E. Ms. Inga Rhonda King,** Vice-President of ECOSOC, Permanent Representative of Saint Vincent and the Grenadines to the United Nations

PRESENTATION

- **Mr. Simon Zadek,** Senior Advisor on Finance to the Deputy Secretary-General, Executive Office of the Secretary-General, United Nations

MODERATOR

- **Mr. Shantanu Mukherjee,** Chief, Policy Analysis Branch, Division for Sustainable Development, Department of Economic and Social Affairs, United Nations

PANELISTS

- **Dr. Michael Obersteiner,** Program Director, International Institute for Applied Systems Analysis (IIASA), Expert Member of the International Resource Panel
- **Ms. Julie McBride,** Senior Social Franchise Consultant, MSA Worldwide
- **Dr. Nikolay Khabarov,** Research Scholar, Ecosystems Services and Management, IIASA

INTERACTIVE DISCUSSION

Guiding Questions

1. What are the main technology and innovation solutions and gaps for attaining SDGs12 and 15 (sustainable consumption and production, and terrestrial ecosystems)? What are the primary obstacles to technology adoption and scaling up?
2. What are the best approaches to addressing financing shortfalls and challenges at different levels (global, national and sub-national)? Do STI roadmaps hold potential?
3. Based on your experience, what is your most important recommendation for the way forward?

TEA BREAK / BILATERALS **11:30 - 12:00 PM**

PLENARY SESSION ON THE SDG MEANS OF IMPLEMENTATION **12:00 - 1:00 p.m.**

CHAIR AND MODERATOR

- **Mr. Alexander Trepelkov,** Director, Financing for Development Office, Department of Economic and Social Affairs, United Nations

REPORTS FROM BREAKOUT SESSIONS

- **Mr. Nicholas Craven,** Independent Expert
- **Mr. Philip Turner,** Independent Expert
- **Dr. Michael Obersteiner,** Program Director, IIASA, Expert Member of the International Resource Panel

DISCUSSANTS

- **Ms. Louise Kantrow,** Permanent Representative to the United Nations, International Chamber of Commerce
- **Mr. Stefano Prato,** Managing Director, Society for International Development

INTERACTIVE DISCUSSION

LUNCH BREAK **1:00 - 2:00 p.m.**

AFTERNOON SESSION

Innovative instruments to finance sustainable development

This session will move the discussions of innovations at the policy and institutional levels to the instrument level. Sessions on the role of development finance institutions and Sovereign Wealth Funds (SWFs) will give participants an opportunity to learn about a wide range of financial mechanisms, including Islamic finance, that hold great potential for financing sustainable large-scale investments in the SDGs.

OVERCOMING CHALLENGES TO MOBILIZING SOVEREIGN WEALTH FUNDS FOR SDG INVESTMENTS — 2:00 - 3:15 p.m.

CHAIR

- **H.E. Mr. Bart De Groof,** Ambassador, Embassy of Belgium in Qatar

PRESENTER AND MODERATOR

- **Dr. Rajiv Sharma,** Research Director, Global Projects Center, Stanford University

PANELISTS

- **Mr. Bayasgalan Rentsendorj,** Sr. Membership Manager, International Forum of Sovereign Wealth Funds
- **Mr. Adam Robbins,** Practice Lead, Long-Term Investing Initiatives, World Economic Forum (WEF)

INTERACTIVE DISCUSSION

Guiding Questions

1. What are the lessons learned from SWF efforts to reconcile their financial objectives with the social, economic and environmental deficits that the SDGs seek to address?
2. What are the barriers that hold back SWF investment in key sustainable development sectors, notably in developed economies?
3. What measures can Governments (both source and destination), international trade and financial institutions, as well as other international regulatory and supervisory bodies take to facilitate more SWF investment in sustainable development sectors?

TEA BREAK / BILATERALS — 3:15 - 3:30 p.m.

THE ROLE OF DEVELOPMENT FINANCE INSTITUTIONS IN ACHIEVING THE SDGS- THE CASE OF ISLAMIC FINANCE — 3:30 - 4:45 p.m.

CHAIR

- **Mr. Alexander Trepelkov,** Director, Financing for Development Office, Department of Economic and Social Affairs, United Nations

KEYNOTE SPEECH

- **H.E. Dr. Ahmed bin Mohammed Al-Muraikhi,** Secretary-General's Special Envoy for Humanitarian Affairs

PRESENTATION

- **Dr. Habib Ahmed,** Professor and Sharjah Chair in Islamic Law & Finance, Durham University Business School

MODERATOR

- **Mr. Michael O'Neill,** Assistant Secretary-General and Director of External Relations, UNDP

PANELISTS

- **Mr. Nedzad Ajanovic,** Senior Partnership Specialist, Islamic Development Bank
- **Mr. Marco Lichtfous,** Partner, Deloitte

INTERACTIVE DISCUSSION

Guiding Questions

1. What can Islamic finance teach us about financing the 2030 Agenda, including the SDGs?
2. What challenges does Islamic finance need to overcome to ensure its contribution to sustainable development?
3. What specific steps and policies are required to unleash the full potential of Islamic finance, particularly for large-scale, sustainable infrastructure investments?

CLOSING OF THE MEETING 4:45 - 5:00 p.m.

- **Mr. LIU Zhenmin**, Under-Secretary-General for Economic and Social Affairs, United Nations
- **H.E. Dr. Ahmad Hassan Al-Hamadi,** Secretary-General of the Ministry of Foreign Affairs, State of Qatar

CONCEPT NOTE

1. Background

Two years after the adoption of the 2030 Agenda for Sustainable Development (2030 Agenda) and the Addis Ababa Action Agenda (Addis Agenda), the world has seen discernible progress across all levels in implementing these frameworks. Despite this positive momentum, the international community is concerned that progress is not happening at the pace required to achieve the Sustainable Development Goals (SDGs). In the outcome document of the 2017 ECOSOC Forum on Financing for Development follow-up1 (FfD Forum), Member States "express concern about the significant impacts of the challenging global environment in 2016 on national efforts to implement the Addis Ababa Action Agenda. Challenges include not only economic factors, such as difficult macroeconomic conditions, low commodity prices, subdued trade growth and volatile capital flows. They also include natural disasters, climate change, environmental degradation, humanitarian crises and conflicts. The current global trajectory will not deliver the goal of eradicating poverty in all its forms and dimensions by 2030." In order to reverse this trend, Member States commit to "take concrete and immediate action to create the necessary enabling environment at all levels for the achievement of the 2030 Agenda for Sustainable Development and accelerate national and international efforts to implement the Addis Ababa Action Agenda."

To achieve the SDGs, it is critical that the 2030 Agenda and the Addis Agenda stay at the top of the political agendas of national policymakers, regardless of emerging challenges and the change of political cycles. This will require that global follow-up and review processes stay current and relevant to the concerns and most current challenges of countries, and able to guide problem-solving at the national level. The Voluntary National Reviews (VNRs), in the context of the High-level Political Forum on Sustainable Development (HLPF), have effectively created a stronger link between global policies and local implementation, encouraging countries to make candid evaluations of the successes and Challenges of the implementation of the 2030 Agenda.

Financing sustainable development takes place in a dynamic environment, where public and private balance sheets change frequently with interest rates, exchange rates, commodity prices and monetary and fiscal adjustments. The relevance of global policies, to an even greater degree, hinges on the timeliness and effectiveness of the feedback from the national to the global level. Given the call from Member States for greater sharing of national experiences on the implementation of the Addis Agenda, the 2017 FfD Forum introduced ministerial round tables, encouraging ministers to have a dialogue on action areas of the Addis Agenda that resonated most with their national sustainable development priorities. This modality has been successful in sharing countries' experiences, since reflecting very dynamic national realities in annual events represents a major challenge. Countries have expressed a strong desire to pronounce themselves on a more regular basis, thereby retaining the integrity of their positions and complementing third-party reporting.

A more integrated approach to the preparatory process of the 2018 FfD Forum and 2018 HLPF could be an effective way to highlight the synergies between the 2030 Agenda and the Addis Agenda and ultimately enrich international discourse on approaches to financing the SDGs. The process would aim to encourage a dialogue on the means of implementation within countries between different ministries and other actors, at the national level, and between countries, at the global level, with a focus on financing and scaling up solutions for the SDGs. The high-level Conference in Doha will be the first attempt at such an integrated approach.

1 E/FFDF/2017/3

2. Objective

The high-level meeting will serve as a joint preparatory event for the 2018 FfD Forum and the 2018 HLPF. It will aim to achieve the following objectives:

- Identify current challenges in advancing financing for the SDGs, as well as country-level policy and institutional innovations in addressing them;
- Strengthen coherence and coordination in preparations for the 2018 HLPF and the 2018 FfD Forum; and facilitate dialogue between their respective national constituencies (e.g. between ministries of finance, economy, trade and development cooperation, and ministries of foreign affairs and environment, as well as sustainable development councils);
- Sensitize national policy makers on the policy developments at global level (outcomes of the FfD Forum and HLPF);
- Showcase initiatives and innovations in areas jointly identified by the host country and the United Nations.

3. Focus Areas

Sharing country experiences in mobilizing resources towards the implementation of the Addis Agenda and the 2030 Agenda – policy and institutional innovations

The 2030 Agenda and the Addis Agenda provide overarching global frameworks but their application has to be tailored to the specific circumstances of each country, which justify differentiated policies and institutions. The reforms and innovation undertaken at national level represent a diverse and rich body of knowledge, which provides an indispensable input to global policy dialogue. To this end, a group of governments, representing countries at different income and vulnerability levels will be invited to present their policy and institutional innovations in implementing the Addis Agenda and the means of implementation of the 2030 Agenda. The presentations will ideally be in the form of case studies, putting the innovations into local context, explaining their relevance for global policy-making and necessary international support.

Means of implementation of the SDGs selected for an in-depth review in the 2018 HLPF

The 2018 HLPF is mandated to conduct an in-depth review of SDG 6 (clean water and sanitation), SDG 7 (affordable and clean energy), SDG 11 (sustainable cities and communities), SDG 12 (responsible consumption and production) and SDG 15 (life on land) (in addition to SDG17 which is reviewed annually). Countries presenting at the high-level meeting will be invited to share their innovative solutions to financing these particular goals. A special area of focus will be the use of financing and other instruments to scale up technology solutions for this purpose. There will also be a panel discussion focused on means of implementation of these selected SDGs based on background studies, which will be prepared in advance in order to make a concrete contribution to the 2018 HLPF.

Emerging state-led instruments to finance SDGs – the case of sovereign wealth funds

Holding the meeting in Qatar presents an opportunity to learn from the unique state-led instruments that are widely-used in the region and hold great potential for financing sustainable development. Since 2000, the world has seen growth of sovereign wealth funds (SWFs) thanks to a decade of high commodity prices and export-led growth in many countries, as well as the increasing allure of financialization. At the moment, SWFs are particularly well positioned to become a major player in green investment, as an increasing number of SWFs are looking to economic diversification of their wealth into industries and sectors that would yield broader societal, economic and environmental benefits. It is envisaged that established and new SWFs (particularly in Africa) will be invited to share their successes and challenges in diversifying their investment into sustainable development, as well as national and global policies needed to support such transition.

The role of development finance institutions in achieving the SDGs

This session will invite representatives of global and regional development finance institutions to discuss the potential of a wide range of financial mechanisms in funding large-scale investments into the SDGs. Discussions will focus on instruments that allow these institutions to provide greater concessional and non-concessional stable, long-term development finance by leveraging contributions and capital, and by mobilizing resources from capital markets. In particular, Islamic finance is well placed to contribute to the implementation of the 2030 Agenda, through its focus on financial stability, financial inclusion and shared prosperity. According to a 2016 joint World Bank Group and Islamic Development Bank Group report, global Islamic finance represents $1.9 trillion in assets. Islamic banking, Islamic capital markets, insurance, housing and other asset classes, and Islamic social finance have all been growing in importance. The main components of Islamic capital markets are equity markets and sukuk (asset-backed securitized Islamic products), which holds hold significant potential to finance large scale infrastructure investments for the SDGs. Total sukuk outstanding globally amounted to $311 billion as of end-2014, with several very large scale issuances by sovereigns and quasisovereigns in recent years.

4. Outcome

The outcome of the conference will be an informal summary by the co-organizers, which will be transmitted by the host country to the 2018 FfD Forum and the 2018 HLPF.

5. Participation

Up to 250 high-level representatives of governments, major institutional stakeholders of the FfD process (World Bank, IMF, WTO, UNCTAD and UNDP), other international and regional organizations, civil society and the business sector, as well as other relevant stakeholders will be invited to participate in the conference.

6. Host/Venue

The meeting will be hosted by the Government of Qatar in the Sheraton Hotel in Doha. Qatar was the host of the Second International Conference on Financing for Development in 2008. As emphasized by the Government of Qatar during the recent FfD Forum, financing for development has always been a main objective of the foreign policy of the State of Qatar. Qatar has demonstrated strong commitment to the implementation of the Addis Agenda and the 2030 Agenda. During the reign of His Highness Sheikh Hamad bin Khalifa Al Thani, Qatar National Vision 2030 has been launched to serve as a clear roadmap for Qatar's future, in line with the 2030 Agenda. Her Highness Sheikha Moza bint Nasser joined the SDG Advocacy Group in order to generate momentum and commitment to achieve the SDGs.

OPENING REMARKS BY QATAR MINISTER OF FINANCE

STATEMENT OF THE STATE OF QATAR

His Excellency Mr. Ali Shareef Al- Emadi
Minister of Finance

The High-level Conference on Financing for Development and the Means of Implementation of the 2030 Agenda for Sustainable Development
(Doha, Qatar, 18 November 2017)

Excellencies,

Your Excellency Under-Secretary-General for Economic and Social Affairs of the United Nations,

Your Excellency the President of the Economic and Social Council and the Permanent Representative of the Czech Republic to the United Nations,

Your Excellencies the Ambassadors and delegates of States and United Nations and regional agencies,

Ladies and Gentlemen,

Distinguished guests,

May peace, mercy and blessings of God be upon you,

It is my pleasure to convey to you at the outset the greetings of His Highness Sheikh Tamim Bin Hamad Al Thani, Emir of the State of Qatar. We welcome all of you in glorious Qatar. We also highly appreciate efforts made by the United Nations Department of Economic and Social Affairs to cooperate with the Ministry of Foreign Affairs in preparation for this Doha-hosted conference.

We look forward to holding fruitful discussions over the coming two days through the numerous sessions and themes that will address a number of important items, in line with the wide scope of the global framework of the 2030 Agenda for Sustainable Development objectives and goals. We trust that our deliberations will provide an important opportunity to further our common goals.

Excellencies,

The State of Qatar's hosting of this conference emanates from our constant concern to be, as always, present to work with partners in the international community to achieve the goals envisaged by the United Nations. We also believe in the importance of international cooperation to move forward with the implementation of the 2030 Agenda for Sustainable Development, especially that the successful implementation of the Agenda depends, to a large extent, on resource mobilization at the national and international levels, and on the effective use of such resources.

In this context, Doha hosted also the 2008 Follow-up International Conference on Financing for Development to Review the Implementation of the Monterrey Consensus.

Excellencies,

Ladies and Gentlemen,

We meet today at a time when efforts to achieve sustainable development are facing many challenges that undermine the ability of countries to make progress on the development front. Such challenges include, inter alia, extreme poverty and resource scarcity, hunger, unemployment, climate change, frequency of natural disasters, forced displacement, violent extremism and escalating conflicts.

While those challenges constitute a source of concern, we are confident that international cooperation will ensure investing in the available opportunities to take a further step in our common endeavor towards implementing the objectives of this ambitious plan, strengthening the financing for development framework

and ensuring that no one is left behind, while taking into account the different conditions, capacities, needs and levels of development, and respecting the countries national policies and priorities.

It goes without saying that the financing for development agenda reflects the sincere desire of the international community to assist developing countries, least developed countries, landlocked countries and small island States in achieving sustainable development, particularly by revitalizing Sustainable Development Goal number 17, Partnership for Development.

Such desire was reflected in the 15-year long inter-governmental negotiations, Mexico's 2002 Monterrey Consensus, the 2008 Doha Declaration on Financing for Development and its ministerial meeting that was hosted in Doha to come up with an ambitious plan of action that embodies the political will to achieve the international development goals, and Ethiopia's 2015 Addis Ababa Declaration.

In this regard, we stress the importance of fulfilling the commitments made by Member States, particularly the developed countries, to achieve this Agenda, and of monitoring and evaluating the progress made in the implementation of the agreed international commitments.

Ladies and Gentlemen,

Distinguished guests,

We view the development process as a participatory approach that respects all human rights. In fact, the theme of inclusive and sustainable development is among our top concerns and is based on the joint efforts among all components of society. Qatar National Vision 2030 has identified key economic, social, human and environmental goals, and placed development at the center of its priorities.

The State of Qatar has integrated the 2030 Agenda for Sustainable Development in the Second National Development Strategy 2017-2022.

As part of our efforts to meet our commitments to implement the 2030 Agenda for Sustainable Development, the State of Qatar submitted the voluntary national review during the 2017 High-Level Political Forum on Sustainable Development, which gave a transparent picture of the State development efforts and its effective role at the international level. We also look forward, next year, to submitting a voluntary national review that sheds more light on the alignment of our national priorities with the goals of the 2030 Agenda.

Excellencies,

In line with its responsibilities and commitments to strengthen our regional and international partnerships, the State of Qatar continues to play a prominent and increasingly important role in providing development and relief assistance to many countries in the world facing economic and humanitarian crisis and natural disasters, in addition to the voluntary official development assistance provided by the State of Qatar.

The State of Qatar has thus provided international assistance to friendly countries in 13 sectors through various humanitarian and development initiatives around the world. It is noteworthy that government support for aid has reached more than 70 per cent of the foreign assistance compared to non-governmental assistance. Such percentage demonstrates the political will to meet Qatar's external commitments in line with its role as an active and responsible member of the international community.

Thirty per cent of the value of external support took the form of contributions donated by charities, humanitarian organizations and Qatari donor institutions, that often work to deliver various kinds of assistance to those in need, in accordance with the highest international standards and in partnership with specialized UN agencies, regional and subregional institutions and counterparts from around the world.

It is clear that, over the past years, the State of Qatar has managed to expand its external assistance, both geographically and by sector. Such assistance has taken many forms, including contributions, grants, material donations, donations in kind, technical donations, or soft loans that often end up being written off.

The country's efforts have also included support for humanitarian and development projects and programs. The State of Qatar has prioritized the education sector in providing aid within the total development assistance, in pursuit of SDG 4.

The largest share receiving aid in the humanitarian sector was the relief sector. It has increased manifold since the beginning of the second decade of this millennium as a result of natural disasters and man-made disasters.

It should be noted that the assistance provided by the State of Qatar exceeded the official development assistance share assessed to the developed countries of the North. In fact, Qatar's government and non-government foreign aid has reached an average of $ 2 billion a year, despite the fact that the State of Qatar is not legally bound to pay such percentage.

The State of Qatar's contribution emanates from its belief in the importance of supporting the agenda of South-South cooperation, triangular cooperation and the financing for development agenda, which will positively impact international peace and security, human rights and development for all, to achieve integrated peaceful societies that marginalize no one, that are based on accountable and efficient strong institutions, that would be more resilient to countering the scourge of extremism and the threat of terrorism, in accordance with SDGs 11 and 16, which are the focus of Qatar's development policy.

Excellencies,

Ladies and Gentlemen,

We look forward to our meeting today as an opportunity to exchange best practices and experiences on the most effective means of implementation to advance the 2030 Agenda for Sustainable Development.

We trust that our efforts as an international community will have a positive impact on the way we deal with the pressing challenges to financing for development. As we continue our joint efforts to achieve the goals of sustainable development, we stress that we, in the State of Qatar, will continue to exert our efforts as an active partner in the international community, despite of the regional and global challenges, in order to achieve the common objectives we seek and meet the challenges in all areas of common concern, in accordance with the purposes and principles of the Charter of the United Nations.

Ladies and Gentlemen,

Doha will remain a platform for cooperation among all countries and parties that believe in the importance of joint action to meet the challenges facing us that affect the entire international community.

I thank you.

OPENING REMARKS BY USG LIU

OPENING REMARKS

Mr. Liu Zhenmin
Under-Secretary-General for Economic and Social Affairs, United Nations

The High-level Conference on Financing for Development and the Means of Implementation of the 2030 Agenda for Sustainable Development
(Doha, Qatar, 18 November 2017)

Your Excellency Minister Al Emadi,

Excellencies,

Distinguished Delegates,

Ladies and Gentlemen,

At the outset, I would like to thank the Government of the State of Qatar for hosting this timely and important Conference. Qatar has shown unwavering commitment to the implementation of the 2030 Agenda for Sustainable Development and the Addis Ababa Action Agenda.

Nine years ago, the Second International Conference on Financing for Development took place here in Doha. Held at the height of the global economic and financial crisis, the Doha Conference reunited the international community around the financing for development agenda, despite the difficult circumstances.

Since the Doha Conference, the development landscape has undergone major transformation. Nevertheless, the spirit of respect and cooperation, a legacy of Doha, remains with us. It is in the same spirit that in 2015 the international community came together in Addis Ababa, New York and Paris towards milestone agreements.

Meeting here in Doha thus cannot be more fitting. It reminds us of where we came from and where we are going. It revives the spirit of respect and cooperation, which is needed more than ever in view of the challenging global environment.

Ladies and Gentlemen,

Despite an improved global economic outlook, multiple vulnerabilities and policy uncertainties pose major challenges to sustained recovery of the world economy.

Global trade is unlikely to serve as a broad stimulus for growth, given weak global demand and setbacks in multilateral trade negotiations. Commodity prices have mildly recovered, but their positive effects on many developing countries have been cancelled out by domestic and regional pressures, especially in Africa.

Developing and transition economies have experienced negative capital flows since 2014. Capital flows remain volatile while creating macroeconomic risks, especially in developing countries. In addition, large-scale humanitarian crises and natural disasters are eroding hard-earned progress in many regions and pushing millions of people back into poverty.

At the same time, there are encouraging signs of progress. For example, global energy-related carbon dioxide emissions have stayed flat since 2013, even as the global economy continued to grow and as large-scale infrastructure was built in emerging economies around the world. Human life expectancy has continued to increase, global health has improved, and universal primary education has been achieved in most parts of the world.

However, progress has been highly uneven, with rising inequality in many parts of the world. Billions remain excluded from the benefits of progress. At the same time, biodiversity continues to decrease at rates of 100 to 1,000 times the pre-human levels. Humans impact more than half of the world's terrestrial ecosystems and almost half of the oceans. In fact, humanity claims an unprecedented 24 per cent of global terrestrial net primary production. Humanity also suffers from local and regional freshwater shortages and water stress over more than one-third of the planet.

Looking at this complex global picture, we need to appreciate the strong interlinkages. Local issues can quickly become global challenges, and progress in one area may well be at the expense of future generations or of progress in other areas.

Global challenges must be addressed through global cooperation. The 2030 Agenda and the Addis Agenda provide the compass for our way forward.

Two years after their adoption, the implementation of these global frameworks is on sure footing, thanks to strong buy-in to the global follow-up review processes under the auspices of the United Nations.

The High-level Political Forum on Sustainable Development has become the centrepiece of the global follow-up to and review of the progress towards implementation of the SDGs. It broadened the scope of the SDG review by providing space for various communities, going beyond sectoral boundaries and focussing on coherence, inter-linkages and transformative actions.

At its 2017 session, held last July, 43 National Voluntary Reviews facilitated the sharing of experiences, including successes, challenges and lessons learned, with a view to accelerating the implementation of the 2030 Agenda. Another conclusion from this year's HLPF was that to succeed we need to have a complete picture of what is needed for SDG implementation. This includes science, evidence-based policies, inter-linkages with other SDGs and processes, and trade-offs.

The ECOSOC Forum on Financing for Development follow-up has established itself as the global platform to discuss progress and challenges in the implementation of the FfD outcomes, based on national experiences.

It has galvanized unprecedented high-level engagement in the FfD process and advanced the cooperation between the UN and Bretton Woods Institutions. The 2017 FfD Forum sent a strong signal that the international community remains deeply committed to multilateralism and the global partnership for sustainable development. The rich discussions highlighted the urgency of changing the current growth trajectory and strengthening international cooperation to increase investment in sustainable development.

The outcome of the 2017 Forum reaffirms key elements of the Addis Agenda, and contains new commitments on policies and actions to ensure the full and timely delivery of the means of implementation of the SDGs. It gained universal support from Member States and was considered exemplary in intergovernmental negotiations.

The report of the Inter-agency Task Force on Financing for Development provided the major substantive input to the Forum and its outcome document. The Task force is a model of cooperation, comprising more than 50 organisations from the UN system and beyond.

Ladies and Gentlemen,

Despite the progress, if we remain at the current pace, we will not be able to meet our global goals by 2030. Getting the financing right is key to changing this trajectory.

We need to strengthen global public and private long-term investments into the implementation of the SDGs, especially into critical infrastructure. Public finance is essential to providing public goods, increasing equity and supporting macroeconomic stability. National tax systems need to be strengthened, and international tax cooperation needs to be stepped up.

We must get the regulatory frameworks and incentives right to unleash the potential of private investment in sustainable development. I see reorienting financial regulation and policy-making towards

broader aims such as access to long-term finance as a core competency of the United Nations. Because of our stewardship of the universal agreements on sustainable development, it is our role to bring an integrated perspective to all policy-making fora.

To ensure that no one is left behind, we must establish policies that reduce inequality and are inclusive of all vulnerable groups. We must also pay attention to the special situations and needs of the most vulnerable countries.

We should not forget the critical role of international development cooperation. ODA commitments need to be fulfilled urgently. Climate finance must be stepped up.

DESA will continue to lead global efforts to advance Financing for Development, and to support Member States in implementing the Addis Agenda. Looking ahead, the year of 2018 offers important opportunities to move the agenda forward.

In February 2018, the Inter-Agency Platform for Collaboration on Tax, comprising the IMF, OECD, UN and the World Bank, will hold its first global conference at UN Headquarters on the theme "Taxation and the Sustainable Development Goals".

In April, the third FfD Forum will review progress and challenges in all action areas of the Addis Agenda. We will engage many ministers and strengthen the participation of the private sector. On the eve of the Forum, DESA will organize a SDG Investment Fair to promote interaction between high-level government officials and the private sector.

Ladies and Gentlemen,

The primary responsibility for the implementation of both the 2030 Agenda and the Addis Agendas lies with national governments. By promoting the dialogue among national policy makers and constituencies, this Conference will facilitate experience sharing among them and increase their understanding of important policy and process developments at the global level.

As the first joint preparatory event for the 2018 FfD Forum and the 2018 HLPF, this Conference also aims to strengthen the coherence and coordination of the follow-up to FfD outcomes and the means of implementation of the 2030 Agenda. I therefore urge all of you to utilize this Conference at this early stage to build momentum for these important meetings next year.

I wish to end by thanking once again the Government of the State of Qatar for its generous support and hospitality. I wish you fruitful and constructive discussions.

Thank you.

STATEMENT BY UNDP ADMINISTRATOR

KEYNOTE SPEECH

Achim Steiner
UNDP Administrator

The High-level Conference on Financing for Development and the Means of Implementation of the 2030 Agenda for Sustainable Development
(Doha, Qatar, 18 November 2017)

As prepared for delivery.

I would like to thank the Government of Qatar for the invitation to this important conference co-organized by the United Nations Department of Economic and Social Affairs. This conference provides an excellent opportunity to discuss progress on financing for sustainable development and share country experiences. UNDP is pleased to contribute to the Financing for Development process as one of the five major institutional stakeholders.

Getting financing right will be critical to meet the SDGs by 2030. There is no shortage of capital in the global economy. The total stock of global financial assets has been estimated at close to $300 trillion. However, currently the global financial system is not channeling those vast sums effectively towards investments for sustainable development and achieving the SDGs.

For example, international institutional investors — such as sovereign wealth funds and pension funds— hold an estimated US$115 trillion in assets under management. This is a significant potential source of finance for sustainable development. Yet, when we look at the portfolios, for example, of the largest pension funds, less than 3 percent is invested in infrastructure and even lower shares in developing countries. Reorienting even a fraction of these investments would accelerate sustainable development.

By some estimates, the official sector and asset managers currently hold as much as $10 trillion in negative yielding assets. Governments have a key role to play to create incentives to align larger shares of private finance with sustainable development objectives through direct financial interventions such as subsidies or guarantees as well as strengthened policies and institutional, legal and regulatory frameworks.

Many investors and private sector companies are leading the way and investing in the SDGs under innovative categories like 'sustainable finance' or ethical investments. The total impact investment portfolio is an estimated US$114 billion, with 26 percent growth in commitments this year alone. Sixty percent of impact investors are aligning their portfolios to the SDGs. The private sector's involvement has also been on the rise in corporate social responsibility initiatives, philanthropic giving, and inclusive business approaches. All these developments can help drive SDG progress and should be scaled-up.

To tap this potential, UNDP and the Islamic Development Bank launched the Global Islamic Finance and Impact Investing Platform last year, which promotes market-based solutions to sustainable development challenges. The size of the commercial Islamic finance industry is expected to reach US$3.5 trillion by 2021. Islamic social finance – including Zakat, endowments, and philanthropy – represents an important opportunity to leverage the resources needed to leave no one behind. The Islamic Development Bank estimates that Zakat contributions may exceed US$500 billion per year. Tapping into a fraction of this pool for the 2030 Agenda would have a very large impact.

To help leverage this financing for the SDGs, we have scaled up our engagement with Islamic finance in innovative ways. In Indonesia, for example, UNDP is partnering with BAZNAZ, the national Zakat collection body to apply Zakat towards local SDG plans, beginning with renewable energy projects in

under-served communities. Islamic Finance projects are being explored locally by our teams around the world from the Philippines to Palestine, from Turkey to Suriname.

Domestic public finance and international development cooperation nevertheless remain central for the achievement of the SDGs. Domestic public finance, in particular, is the largest and most important source of finance for sustainable development. Enhancing the capacity of tax administrations, widening the tax base and making it more progressive, and more effective taxation of multinational enterprises are vital for effective domestic resource mobilization. However, performance varies significantly across countries. Some are constrained due to narrow tax bases, dependence on a few commodities and large informal sectors. Many face the challenges of tax avoidance by multinational enterprises, as revealed recently by the Panama and Paradise Papers. These challenges are especially acute where tax administration capacities are weak.

One way we are supporting countries to tackle this challenge is the joint UNDP-OECD initiative "Tax Inspectors Without Borders". Through this programme, we have provided 25 developing countries with targeted tax audit assistance programmes to help build local capacities to tackle complex international tax questions. These programmes have mobilized an additional US$328 million in tax revenues so far.

To combat tax evasion and avoidance, and illicit financial flows that drain developing countries from vital resources, both domestic efforts and international cooperation are necessary. In recent years, efforts particularly within the G20 have been gathering momentum to address base erosion and profit shifting (BEPS) as well as improve tax transparency through the automatic exchange of tax information. We should build on this momentum; strengthened international cooperation in this area can make a real difference to the financing for the SDGs.

In addition to mobilizing new and additional resources for development, countries also need to use existing resources more efficiently. Phasing out inefficient and harmful subsidies, such as fossil fuel subsidies, can drive win-wins: (1) by freeing up resources in budgets that can be used for sustainable development, and (2) by better capturing negative externalities, such as environmental impacts. The IMF estimated that the removal of post-tax energy subsidies in 2013 would have resulted in a global welfare gain of US$1.4 trillion, equivalent to 2 percent of the world GDP. As these subsidies are being phased out, it will be critical to ensure the poorest segments of societies are protected.

In many developing countries, even with enhanced efforts, domestic resources will remain insufficient. International public finance will continue to play a critical role, especially in the poorest countries and those that have the least capacity to raise domestic resources as well as those most vulnerable to shocks, conflicts and disasters. Small island developing states are a case in point as demonstrated so tragically recently with the devastation wrecked by Hurricanes Maria and Irma. Concessional development assistance will remain critical for these and other countries, for example those that host large refugee populations, regardless of their formal income classification.

ODA can also have a catalytic impact in crowding in finance from the private sector. For example, last year through our strong partnership with environmental vertical funds, UNDP helped countries access US$3.1 billion in 143 countries. These grant investments leveraged another US$14 billion in co-financing; thus, more than US$17 billion was invested in sustainable development priorities in these countries.

South-South cooperation is important too, as we are already seeing in initiatives such as the Belt and Road initiative. Countries of the Gulf also have a longstanding history of development cooperation. To further support and facilitate South-South cooperation, UNDP has established initiatives such as "SSMart" which is a global marketplace that fosters real-time exchanges of solutions demanded and supplied by developing countries to address challenges in achieving the SDGs.

More broadly, UNDP is supporting countries to define national sustainable development financing strategies, with a focus on identifying catalytic interventions, crowding-in finance from the private sector, building partnerships, scaling-up innovative financing mechanisms and improving the effectiveness of financial resources. At UNDP, we believe that the effectiveness of our work at the country level should result in lowering the policy and institutional risk for long term private investment to help secure SDG

outcomes. Our Derisking Renewable Energy Investment (DREI) initiative is an example of an innovative framework to assist policymakers in developing countries to cost-effectively promote private sector investment in renewable energy.

Climate change is already impacting us all. The discussions in the COP23 in Bonn have shown that we need to mobilize more climate finance and that financing needs to be risk-informed. For instance, instead of ad hoc and ex-post responses to debt distress following major shocks and crises, there is a strong case for scaling up innovative approaches, such as GDP-linked official sector lending. These instruments which aim to ex-ante and automatically trigger downward adjustments in debt service during shocks and economic downturns have the potential to help countries manage risk and cope with shocks more effectively.

To conclude, in order to achieve the SDGs we need an international financial system that works for all countries. This needs to be combined with scaling up innovations and new financing instruments and approaches. Many developing countries need support to build capacities to maximize these opportunities. UNDP is firmly committed to assisting Member States in achieving the 2030 Agenda and looks forward to playing a key role in moving the financing for development agenda forward.

Thank you.

STATEMENT BY UNCTAD SECRETARY-GENERAL

KEYNOTE SPEECH

Mukhisa Kituyi
UNCTAD Secretary-General

The High-level Conference on Financing for Development and the Means of Implementation of the 2030 Agenda for Sustainable Development
(Doha, Qatar, 18 November 2017)

Many thanks to the Government and people of the State of Qatar for organizing this High-Level Conference on FFD and MoI.

- At UNCTAD we appreciate the importance of the State of Qatar's leadership on financing for development;
- The appropriate role of finance in development-led globalization was – not without controversy – the defining debate of the UNCTAD 13 Conference graciously hosted by the State of Qatar in 2012, in the aftermath of the Global Economic and Financial Crisis.

I also thank the State of Qatar for playing an important role in our celebration of UNCTAD's fifty-year anniversary in 2014.

- We are grateful for the recognition of the Government and State of Qatar of the importance of UNCTAD as a financing for development stakeholder acting in the interests of developing countries.

Since UNCTAD 13 was held here in Qatar, a little more than 5 years ago, we have seen the international community agree on the triple promise of 2015: the ambitious SDGs, the holistic Addis Agenda's financing commitments, and climate financing modalities agreed at Paris at COP21.

- UNCTAD estimates implementation of this three-pronged agenda will cost at least $1.5 trillion annually in additional financing in developing countries, alone.

However today, achieving this triple Agenda is at risk because the world is overdrawing on the inheritance of future generations, amidst populist politics and dog-eat-dog trade rhetoric.We are already a decade beyond the onset of the global crisis, but the challenge of financing development has become even more daunting than ever:

- Now, a crisis of multilateralism threatens the solidarity that has led to international cooperation on climate, on trade, and on financing for development more broadly.
- A view of globalization has re-emerged focused not on development-oriented mutual benefit, but on mercantilist self-interest and declining trust in multilateral solutions.
- The global enabling environment for financing continues to be hindered by weak demand, sluggish global trade and insufficient productive investment, both domestic and foreign, as well as challenges brought on by new and emerging technologies, including the 4th industrial revolution and the new digital economy.

The holistic financing roadmap laid out by the Addis Ababa Action Agenda offers ambitious global policy solutions to counter these trends. Encouragingly, defenders of globalization's continued prospects for inclusivity and productivity have reacted to the backlash against globalization with a new scale of ambi-

tion, rooted in the AAAA commitments. These include:

- Intensified and pragmatic bottom-up regional trade agreements, like the CFTA and the COMESA-EAC-SADC Trilateral Free Trade initiatives in Africa.
- A new phase of international investment agreement reform that is leading to a new generation of investment treaties aimed at the sustainable development imperative is starting to replace uneven treaties from past decades of unequal globalization.
- New development finance institutions, like the New Development Bank and the AIIB – primarily dedicated to filling the $1.5 trillion financing gap with the infrastructure needed to achieve sustainable prosperity.
- Scaled up ambition for South-South initiatives, such as China's Belt and Road Initiative, and Triangular initiatives, like Japan-India-Africa cooperation, which are instrumental in not only creating the connectivity across developing regions needed to ignite sustainable development, but also at strengthening international solidarity.

Also encouragingly, the private sector has recognized their own self-interest and responsibility in financing Agenda 2030. Knowing how markets work, however we must help Governments ring fence the private sector's sustainability gains against the whims of the marketplace and fickle shifts in investor sentiment.

- Global consensus on the role of MNEs is a pillar of the AAAA. But this also is a challenge to Government and the United Nations system in finding new ways of working and defining smart partnerships.
- Philanthropic partnerships, like UNCTAD's work with the Ali Baba Foundation for digital economy Africa, is one promising route; multi-stakeholder forums, like the World Investment Forum we host every two years, are another.
- An express purpose of the FFD follow-up process – led by the major stakeholders (UNDP, UNCTAD, WTO as well as the WBG and IMF) today is to help build the evidence base on what makes blended finance and public-private partnerships work best, and how can Governments assure they don't privatize away their policy space and right to regulate.

In order to rally to the defense of multilateral solutions, and to leverage the private sector's potential, we at UNCTAD have been working to strengthen our role helping countries integrate their trade, finance, investment, and technology policies into their sustainable development strategies.

- This was called for in Addis Ababa Action Agenda paragraph 88, and UNCTAD 14 last year has re-situated our work programme to this end, which we are implementing now as part of the broader UN reforms.
- A key step was last week when the 1st UNCTAD Intergovernmental Group of Experts on FFD, created by UNCTAD 14, produced policy recommendations on
    - Improving measurement of illicit financial flows that harm domestic resource mobilization – as documented most recently by the Paradise Papers
    - Analyzing effectiveness of blended finance tools to mobilize private capital for long-term productive investment in developing countries.
- We were grateful for active participation from the other FFD stakeholders, especially our partners in the FFD Office of DESA who have helped organize this Doha Meeting.
- We hope the thought leadership that UNCTAD can provide on these issues will contribute to the deliberations of the upcoming FFD Forum and HLPF.

Global ambitions for financing for development however also must be built on the success and sharing of country experiences and sector experiences.

- This is one of the challenges we face in making the FFD Forum and the HLPF work most constructively for the benefit of member states.
- We can't risk relegating the multilateral system's role in financing for development to passively monitoring national progress, but instead we must foster active multilateral cooperation on implementation.
- Consider the financing of the goals under review at the HLPF in 2018 – 6 on water, 7 on energy, 11 on cities, 12 on sustainable consumption and production and 15 on ecosystems – these are critical to the environmental sustainability all countries must achieve by 2030.

Prospects for financing Goals 6, 7, 11, 12, and 15 vary dramatically and need different types of smart partnerships so that the furthest behind are put first.

- The furthest behind on Goal 7 – sustainable energy, for example, are LDCs.
    - Next week UNCTAD's LDC Report will be launched focusing on Energy for Transformation in the LDCs. While many LDCs have made strides in increasing energy access to their populations, the emphasis on access alone has held back sustainability, as it doesn't turn energy into a transformational asset.
    - The 2017 LDC report will argue that international support to LDCs in energy infrastructure should focus on energizing the productive sectors in order to help kick-start transformation in LDC countries.
    - Energizing production in LDCs is also a relative bargain given the growth dividend it can pay in helping end poverty. Total cost in LDCs (embargoed figure: $12-40 bn/year) is dwarfed by trillions needed for SDGs.
    - There is a major role for international donors, new financing partners, and private actors that we can mobilize through the FFD process to finance this goal.
- Contrast this with Goal 12 – sustainable consumption and production, which calls on private capital market participants to transition to sustainable practices.
    - This is an area where the furthest behind have been until recently some of the major capital markets around the world – many of whom are only recently signing up to sustainability reporting guidance requirements.
    - With peer pressure and with a growing sense of corporate responsibility to contribute to effective multilateralism we have seen unprecedented developments over the past year for green finance at the G-20 and Financial Stability Board.
    - Just last week at COP23 in Bonn, UNCTAD's Sustainable Stock Exchange initiative, bringing together 65 member exchanges representing ¾ of the world's market capitalization launched a voluntary action plan on "how stock markets can grow green finance". This principles-based approach will help individual companies align their incentives with the international community, in order to finance development, even when some governments have not.

Concerted smart partnership among traditional and innovative stakeholders can make a difference one country and market at a time, as well, in pursuit of the global ambitions we seek and the renewed multilateralism we need.

Many thanks to the State of Qatar and to the President of ECOSOC, as well as my colleagues in DESA and the broader UN family, who have organized this important event. I look forward to working together to revive multilateralism and leverage all sources of financing for development for the benefit of developing countries.

PRESENTATION BY WTO DEPUTY DIRECTOR-GENERAL

Trade as domestic resource generator

- Trade and economic growth enhances a country's **income generating capacity**, which is one of the essential prerequisites for achieving sustainable development.
- International trade can be an important **source of finance** to both the private sector and the public sector in developing countries.
- By **increasing growth** trade can also make available the necessary **resources** to implement other **development targets in the social and environmental** sphere.
- But this needs to be **accompanied** by a host of **other policies** to ensure that trade is **inclusive**, that it benefits the largest possible sections of the population and that those who may be losing out are provided assistance to **adjust.**

The role of accompanying policies

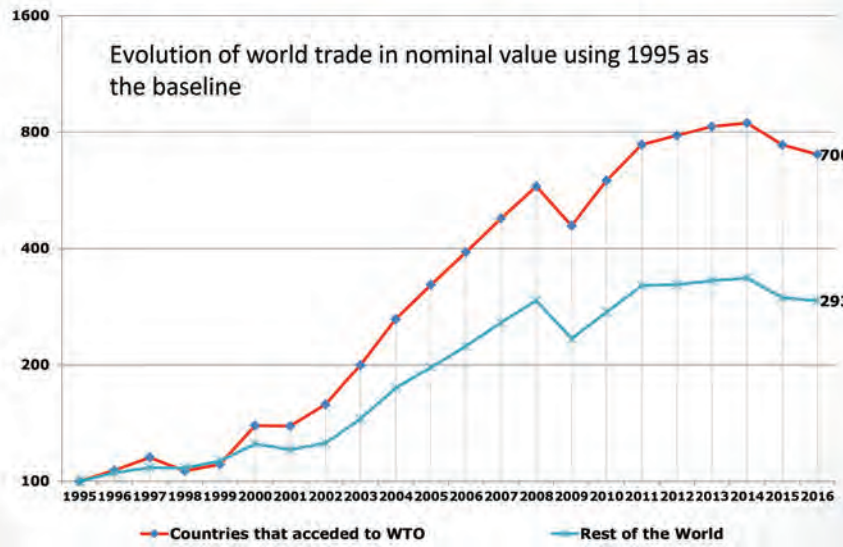
- There is **not a 'one size fits all'** recipe, approaches need to be tailored to a **country's specific situation** and **mainstreamed** into development policy objectives
- Some **policies** that can play an important role include, for example:
  - **Reducing trade costs** to ensure more can participate in trade
  - **Building capacity** for trade and production, including through Aid for Trade
  - **Improving connectivity** - both physical and digital
  - Improving the **business environment**
  - More active **labour market** policies
  - The provision of **support for workers** and adjustment
  - **Education** policies to equip people with the right skills to participate in an information-driven global economy
  - Mainstream **gender issues** and empower women economically
  - Ensure **access to finance**, including trade finance

Case Story – graduating LDCs and Countries that acceded to WTO

- Countries that have integrated into the multilateral trading system by following the right mix of policies were able to achieve:
  - Faster **trade and GDP growth**
  - More **resilience** in crises
  - Increased **competitiveness** and export **diversification**
  - Greater **attractiveness** to **FDI**
- Integration in the multilateral trading system has provided these countries with
  - Access to **new markets**
  - Access to **new technologies**
  - Access to **new investment**
- An example of success are countries that **acceded to the WTO** and the **graduating LDCs.**

WTO OMC

Evidence: Trade performance of acceded members



WTO OMC

Organizing to implement Agenda 2030 and Addis Agenda

- Far-reaching **multilateral co-operation** is important and should be enhanced as trade measures alone will not address challenges of implementing Agenda 2030
- WTO has worked with the **World Bank** and **IMF** to produce publications on the role of trade in ending poverty and making trade an engine of growth for all. We also worked on a report report with the **ILO** that looks at the relationship between technology, trade and skills in today's economy and with **FAO** on trade and food standards.
- WTO also works closely with **UNCTAD** and **ITC**, in what has been called the **Geneva Trade Hub**, to provide support to the various UN agencies that have been tasked with the follow-up and implementation of the Agenda 2030.
- The WTO has also taken internal steps to better follow and coordinate work on the SDGs with the creation of an **in-house task force**.
- This WTO task force is working on a publication on **Mainstreaming Trade in the SDGs** which will hopefully be launched early next year.

WTO OMC

WTO experience with delivering on SDG targets

WTO has already started to deliver in several of the SDG targets where our work has been specifically mentioned.

- **SDG:2** Zero Hunger. Target 2.b of this Goal urges the reduction of distortions in agricultural markets. The WTO's Export Competition in Agriculture Decision reached at the Nairobi Ministerial Conference delivers on this target by prohibiting the use of export subsidies and other measures of equivalent effect. We are working to further deliver on this target at MC11.
- **SDG:3** Good Health. At the beginning of the year an amendment to the WTO TRIPs Agreement entered into force that will make it easier for developing countries to have a secure legal pathway to access affordable medicines in line with target 3.b.
- **SDG:14** Life Below Water. WTO negotiations to eliminate subsidies that cause overfishing and overcapacity are very advanced and an outcome in this area at MC11 is a possibility. This would deliver on target 14.6 of this goal.

WTO OMC

CLOSING REMARKS BY USG LIU

CLOSING REMARKS

Mr. Liu Zhenmin
Under-Secretary-General for Economic and Social Affairs, United Nations

The High-level Conference on Financing for Development and the Means of Implementation of the 2030 Agenda for Sustainable Development
(Doha, Qatar, 18 November 2017)

Your Excellency Dr. Al-Hamadi,

Distinguished participants,

Ladies and Gentlemen,

We have now come to the end of the High-level Conference.

On behalf of all participants, I wish to extend my heart-felt thanks to our wonderful host, the State of Qatar, the Ministry of Foreign Affairs, the Permanent Mission of Qatar to the United Nations in New York and the Permanent Committee for Organizing Conferences. Your excellent preparation and hospitality are well recognized.

In particular, I would like to thank His Excellency Mr. Al Emadi, Minister of Finance of Qatar, for being with us at the opening of the Conference and His Excellency Mr.Al-Hamadi, Secretary-General of the Ministry of Foreign Affairs to co-chair the meeting with me, and Ambassador Alya, Permanent Representative of the State of Qatar to the United Nations, for her efforts to make the Conference a great success. They all demonstrated the highest-level commitment of Qatar to supporting the implementation of the 2030 Agenda and the Addis Ababa Action Agenda.

Excellencies,

Ladies and gentlemen,

Let's have a look at the participant list. We have almost all members of the ECOSOC Bureau, who will guide the preparations of the FfD Forum and HLPF in 2018.

We have representatives of Member States from all five regions, from Doha, their Capital or New York.

We have high-level participation from the UN system, which demonstrates that we can join hands and deliver as one.

Ladies and Gentlemen,

Just as I said at the opening of the Conference, Doha is the place to remind us where we are from and where we should go on the issue of Financing for Development.

Today, we gather here in Doha to learn, to test, to build a bridge and then to move forward.

We learned from participating governments what is being done and what needs to be done on the ground to advance the implementation of the 2030 Agenda and the Addis Agenda.

We tested a new approach to support the global follow-up and review mechanisms, one that combines both financing for development and the means of implementation of the 2030 Agenda.

We built a bridge that connects policy-makers and other stakeholders.

However, what we collectively achieved here in Doha should not end with this event, but rather has a life

of its own going beyond Doha.

Excellencies, Ladies and Gentlemen,

In this spirit, I would like to share with you ten key messages drawn from the discussions, which we may call "Doha Messages".

First, the 2030 Agenda and the Addis Agenda are the game changing documents. They create strategic assets in the longer-term that provide fundamental conditions for peaceful, resilient and prosperous societies.

The 2030 Agenda and the Addis Agenda are spurring an unprecedented shift in the governance of the economy, the environment and the society within and across countries. The wealth of national experiences should be widely shared. But, sharing is not an end in itself. Sharing through the follow-up mechanisms should create a tighter connection between local knowledge, capacity-building and global norm-setting.

Second, neither the State nor the market can accomplish the SDGs alone. Financing the SDGs demands a shared approach with the right mix of both forces.

SDGs create business opportunities. Investing in the SDGs does not mean a choice between profitability and sustainability. Tested and new financial instruments that bring private investment in sync with sustainable development make it possible. But, private investments are not a panacea. They will only flourish in an enabling environment provided by the State and sound public policies.

Third, domestic resource mobilization for long-term development does not have to come at the cost of short-term needs.

Increasing the share of GDP for investing in social capital has shown positive impact on the fundamentals of economic growth. Setting up national development banks to sustain long-term investment for social sectors offer one possible way forward to fill the funding gap. Blending public and private resources to address near-term shortages of public services has shown some success. Global follow-up and review mechanisms should further unpack the potential of blended finance in different country contexts.

Fourth, international development cooperation is the "glue" that brings a diverse range of actors under a common objective of sustainable development.

While advocating for meeting the long-standing ODA commitments, we must also pay attention to the shift in aid with global mega trends. Aid should stay focused on reaching those most in need and those furthest behind. The impact of aid is multiplied when invested in building the fundamental capacities, including policy making, statistical capacity and institutions.

Fifth, global growth and ending extreme poverty cannot happen without strengthened multilateralism and more robust trade.

There is no alternative to multilateralism. The United Nations, as the cornerstone of multilateralism shall only be strengthened. The backlash against global trade is based on wrong diagnosis, which leads to the wrong medicine. We should make trade work better by designing and implementing policies that tackle job losses and inequality. Governments and global institutions have a responsibility to make a well-informed and balanced case for trade.

Sixth, scaling up investment in water and energy infrastructure is critical.

Science-based energy systems analysis can help quantify and prioritize viable and sustainable energy, water and transport infrastructure investments, and help identify obstacles and opportunities to successful investments. Cross-border, regional and global electricity exchange is essential for overcoming the uneven distribution of energy resources and unlocking the full potential of intermittent renewable sources, including reaching those at risk being left behind.

Seventh, resource efficiency and environmental resource management need to substantially improve.

A circular economy approach combined with modes of sustainable consumption and production could improve the efficiency of the global socio-economic system. Economic and technology transfer mechanisms, combined with smart SDG policies, can create net positive outcomes for all countries.

Eighth, Cities around the world are facing multiple challenges, such as increased urbanization and a growing demand for services and infrastructure, reduced budgets, environmental concerns and global competition.

Better budgetary management, enhanced creditworthiness, municipal bonds, reform of international public finance, building resilience and the leverage of cities over taxation are all important approaches in overcoming these challenges.

Urgent action is also needed to protect terrestrial ecosystems against the backdrop of continued population growth and pressures on ecosystems. Long-term strategies, commitments, planning, funding and leveraging interlinkages with other SDGs are key elements. Science, technology and innovation are also crucial for making an impact.

Ninth, as Governments explore new financing mechanisms for investing in the growing low-carbon economy, sovereign wealth funds could become an important player in green investment. Regulations in certain socially or politically-sensitive sectors; the lack of stable and predictable investment environment; and inadequate information on and effective packaging of investable projects for potential investors, should be given adequate attention in the FfD follow-up process.

Islamic finance plays important role in promoting the social inclusion, channelling resources for social investments through solidarity-based Islamic finance products; and contributes to fill the large financing gap for investment in sustainable infrastructure. It has the potential to contribute to the achievement of the SDGs.

Tenth, it is vital to enhance the coherence of the implementation of key international frameworks, including the 2030 Agenda and the AAAA.

DESA has just launch the 2017 Synthesis report based on the voluntary national reviews by Member States at the High-Level Political Forum. 65 countries have conducted their reviews in 2016 and 2017. 48 countries have volunteered for next year.

One key message is that integrated, whole-of-government and whole-of-society approaches at the local, national and international level are critical. We need to think both vertically and horizontally.

Dear participants,

The 10 "Doha Messages", as the outcome of this High-level Conference, will feed into the preparations of the third ECOSOC Forum on Financing for Development and the High-level Political Forum in 2018.

The United Nations has a key role to play in supporting Member States to realize the above vision and address the full range of interrelated challenges. DESA is committed to responding to the strong call from Member States.

I am currently taking steps to enhance the effectiveness, efficiency, accountability and internal coordination of DESA. I believe a strengthened DESA will provide the best possible support to Member States. I count on your strong support in this regard.

Finally, let me thank all the moderators, panellists, speakers, and participants for your active participation.

My thanks also go to all those working behind the scenes, including interpreters, technicians as well as my colleagues from DESA for their hard work.

I wish you all a safe journey back home.

CLOSING REMARKS BY QATAR SECRETARY-GENERAL OF MINISTRY OF FOREIGN AFFAIRS

INTERVENTION OF THE STATE OF QATAR AT THE CLOSING SESSION

His Excellency Dr. Ahmad Bin Hassan Al-Hamadi
Qatar Secretary-General of Ministry of Foreign Affairs

The High-level Conference on Financing for Development and the Means of Implementation of the 2030 Agenda for Sustainable Development
(Doha, Qatar, 18 November 2017)

Your Excellency the Under-Secretary-General for Economic and Social Affairs,

Your Excellency the President of the Economic and Social Council,

Your Excellencies the Ambassadors and representatives of States and United Nations and international agencies,

Distinguished ladies and gentlemen,

At the conclusion of this meeting, I would like to renew the expression of the State of Qatar's pleasure in hosting this important meeting and express our satisfaction at the impressive results achieved during these two days of hard work and valuable discussions. I would like also to thank His Excellency the Under-Secretary-General, his team, all the participating States, representatives of the United Nations and non-governmental organizations and experts who have enriched the discussions reflected in the Doha Messages, as outlined in the closing statement by His Excellency the Under-Secretary-General. Such messages will be a new beginning to ensure the successful implementation of the 2030 Agenda for Sustainable Development, and the renewal by the States of their political will to mobilize resources at the national and international levels, thereby ensuring the participation of all States in making sure that no one is left behind.

Excellencies,

Distinguished guests,

The continued support by the State of Qatar to the international efforts to achieve the objectives sought by the international community is based on its foreign policy that seeks serious and genuine participation in supporting the objectives of the United Nations in all their aspects. Doha is proud to be associated with many international and regional conferences and declarations. It has never hesitated to open its doors and the hearts of its people to be a platform for love, peace and reach out to the world. Here we are meeting today in Doha to complete a long process dating back decades, in which the State of Qatar has reiterated its commitment and adherence to international cooperation to meet current and emerging challenges. Similarly to the 2008 Doha Follow-up International Conference on Financing for Development to Review the Implementation of the Monterrey Consensus, the Doha Messages, announced by the Under-Secretary-General, will constitute an important milestone for they reflect the conclusions reached at this meeting, and will provide an input to the Financing for Development Forum, to be held next year, as well as to the High-level Political Forum.

In conclusion, we are honored by your choice of Doha to hold this meeting and by the wide and high-level participation for they reaffirm the trust in the commitment by the State of Qatar and in its role in strengthening international cooperation. The State of Qatar will continue this process while brushing

aside the various attempts and pressures to prevent her openness to the world and her support to international multilateral action. Such pressures would only strengthen our resolve to fulfill our commitments, that the leadership of the State of Qatar is keen to implement, and to support the efforts of the United Nations in all fields.

I thank you again, Your Excellency the Under-Secretary-General for your valuable efforts, and I thank all participating representatives of States and international and governmental organizations. We look forward to seeing you in Doha in future occasions to promote the serious and fruitful process of international action.

FINANCING SUSTAINABLE, RESILIENT AND INCLUSIVE SOLUTIONS TO ATTAIN SDGs 6, 7 AND 11

EXECUTIVE SUMMARY

This background paper considers the means of delivery and intersection between cross cutting themes of finance, resilience and science, technology and innovation (STI) with the Sustainable Development Goals (SDG) 6 (clean water and sanitation for all), 7 (affordable and clean energy for all) and 11 (sustainable, inclusive and resilient cities and human settlements). These goals are notable because they have been included in the in-depth review at the High Level Conference for Financing and Development and the Means of Implementation of the 2030 Agenda in November 2017 as well as the 2018 Financing for Development (FfD) Forum and July 2018 High Level Political Forum (HLPF) under the theme "transformation towards sustainable and resilient societies".

Funding for STI must be more effective, diversified, scaled up and aligned with the SDGs. This requires increasing the participation of the private sector through regulatory reform and building both capacity and partnerships with the private and public sectors but also with other stakeholders. In particular, enabling access to finance and funding by subnational governments and utility companies offers huge potential for transformational change. Public efforts have an irreplaceable role to play in supporting research and development (R&D), helping to manage risk as a part of blended finance and with Overseas Development Assistance (ODA) targeted to help those furthest behind (e.g. lacking access to basic energy, urban opportunities and water services).

There are also important opportunities to make significant progress which can be implemented without recourse to increased funding, but within short timescales. Implementing proven regulation to drive efficiency in buildings, transport and industry can save money and increase GDP. Removing pricing distortions by phasing out of inefficient subsidies and adopting carbon pricing can also help to reach SDG targets whilst also simultaneously making extra revenue available. Devolving decision making and budget authority can enable better and faster investments.

STI roadmaps have an important role to play by setting a clear direction and identify national priorities (e.g. for developing countries this could target leapfrogging through technology transfer) to achieve the SDGs. This in turn can help support coherence in policy and decision making across all related institutions and stakeholders. Crucially, this can also encourage private sector investment by building confidence in a stable regulatory, financial and policy environment. Fundamentally, this must be driven by strong political will.

A number of detailed recommendations are presented throughout and at the end of this paper needed to advance the financing of sustainable, resilient and solutions needed to attain SDG 6, 7 and 11.

INTRODUCTION

On 1 January 2016, the 17 SDGs of the 2030 Agenda for Sustainable Development — adopted by world leaders in September 2015 at an historic UN Summit — officially came into force. Countries, regions, cities but also sectors are now working on implementation, supported by a monitoring, reporting and verification (MRV) approach.

Funding and finance are a critical enabler for development and has been the focus of a number of important inter-governmental events, notably the Third International Conference on Financing for Development which resulted in the 2015 Addis Ababa Action Agenda (AAAA). Whilst the outcome reaffirmed commitments to ODA, it also reflected the reality that the role of ODA is diminishing whilst that of the private sector is growing. Emphasis is placed on the most vulnerable countries (LDCs, LLDCs and SIDS) which may help to ensure that nobody is left behind. Other important points include the focus on strengthening domestic resource mobilization (widening the tax base, setting revenue targets, etc.), social protection (with spending targets including water and sani-

tation), as well as the Technology Facilitation Mechanism (TFM), a focus on cities and commitments to support resilient and environmentally sound infrastructure in developing countries.

The important role of technology transfer in facilitating sustainable development has been discussed in many fora over the years resulting in a Rio+20 mandate to explore the idea of creating a TFM. This was later formalised in paragraph 123 of the AAAA and then incorporated into paragraph 70 of the 2030 Agenda for Sustainable Development which created; a) a UN inter-agency task team STI for the SDGs, b) an online platform to provide information on existing STI initiatives, and c) the STI forum. These priorities are also reflected in SDG 17, notably on the targets related to technology.

Resilience is an important cross cutting issue with many dimensions including climate change and natural disasters. Improving the resilience of water, energy and cities can have numerous knock-on effects that can also help increase efficiencies at the same time. Improving resilience is directly noted by a number of the SDGs - notably in SDG 11 on cities which makes specific reference to the Sendai Framework for Disaster Risk Reduction. It recognises that whilst the state has the primary role to reduce disaster risk, responsibility is shared with local government, the private sector and other stakeholders, commensurate with this, it prioritises investing in disaster risk reduction for resilience using both public and private sources.

THE CHALLENGE OF FINANCING THE SDGS

The United Nations Conference on Trade and Development (UNCTAD) has estimated that the SDGs will cost up to US$175 trillion over 15 years. Globally, this an incremental increase of 1.5-2.5% of world GDP invested each year by the public and private sectors to achieve the SDGs in every country. **Whilst there may be sufficient public and private savings to fill the gap on finance, the key challenge is to more effectively use and redirect these financial flows to support the achievement of business models for the SDGs.** This is because spending would be offset in other areas such as energy (-30%) and other infrastructure (-9%), meaning that overall investments would largely reflect business as usual spending. The problem is that whilst the costs are upfront, savings will accumulate overtime and felt in other sectors. The key will be to take this into account when making investment decisions so as to be more effective and holistic when it comes to current spending patterns.

Local and national actions as well as international cooperation can help change the trajectory of the global economy and support countries towards achieving the SDGs. The seven action areas of the Addis Agenda address the different sources of finance: domestic public resources; domestic and international private business and finance; international development cooperation (including ODA, South-South cooperation and development bank lending); international trade; debt sustainability; systemic issues; and STI as well as capacity building.

Public resources from national budgets have historically been a major source of funds and will remain so to support SDG implementation. Countries, like Ecuador, are aligning their national development plans and strengthening funding frameworks to support SDG implementation. National budgets are essential for the SDGs and include the use of revenues the countries raise themselves, in particular through the taxes. In developing countries and emerging economies around 65% of the costs of infrastructure investments are financed by public resources. In advanced economies, public resources contribute to around 40%.

On average, there is increasing evidence that countries with tax revenues below 15% of GDP have difficulty funding basic state functions. Yet taxes in most LDCs remain below that threshold, especially in states that are experiencing or have recently experienced social, economic or environmental difficulties.

What this points to is the need to mobilise and effectively use significant additional domestic and international public and private resources to achieve the SDGs. Additional local and domestic resources will be, first and foremost, generated by economic growth, which STI policies can play a key role in facilitating. Improved policies and administrations will also help realize more efficient and effective resource mobilization. However, in a world of cross-border trade, investment and finance, there are limits to what can be done by domestic policy alone, necessitating strengthened local, regional, national and international cooperation.

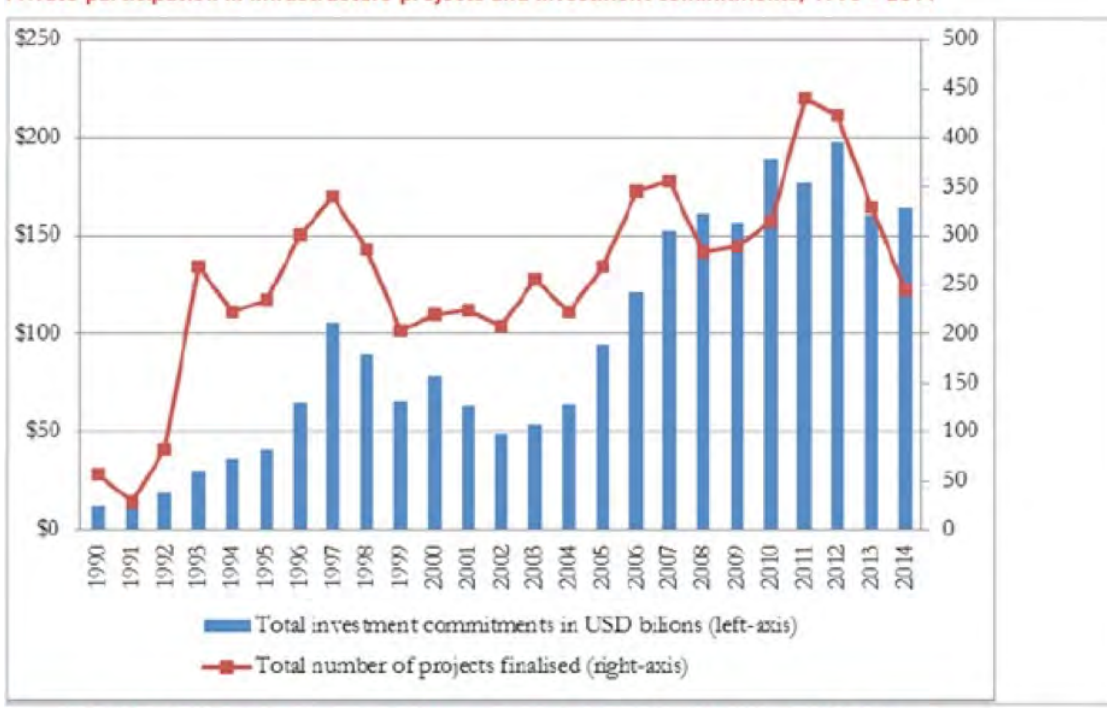
For **sub-national and local governments,** there will be a need to diversify funding sources and raise finances on their own. As expenditures and investments in sustainable development are increasingly being devolved to the

subnational level, the problem is that they often lack adequate administrative and technical capacity, financing and support. A study by the OECD showed that grants and subsidies in developed economies account for just over 50% of total subnational revenues, while tax revenue accounted for just over 30% and other sources (such as social contributions, user charges, fees for public services) for around 15%. Sub-national governments in low-income countries studied are more dependent on government transfers and subsidies, at around 65% of revenue. This shows that cities are still very much depending their on national governments, highlighting the need to diversify funding sources at the local level. At the same time, cities are increasingly finding themselves in debt, further hampering access to much needed finance.

Green and municipal bonds may prove crucial in augmenting new sources of finances in the public sector. For the private sector to increase SDG financing, in addition to an enabling environment, new business models based on payment for performance, and innovative financing facilities such as risk sharing offer great opportunities. In 2017, the World Bank launched the first-ever bonds directly linked to the SDGs. BNP Paribas arranged the bonds, which the World Bank will issue in order to raise financing (€163 million) to support projects that contribute to achieving the SDGs, including eradicating poverty, boosting efforts on energy, water, cities and tackling climate change. While SDG bonds are extremely new, green bonds are increasingly being issued in efforts linked to the SDGs.

Only some large cities, if any, have access to capital markets. As such, the majority of subnational governments have no access at all to public or private credit – often because of federal law restrictions on local borrowing - and therefore depend on capital grants from the central level for large-scale investments. Public revenues may be used to fund private concessions as infrastructure operators or other private entities, for example, using procurement mechanisms or **Public-Private-Partnerships (PPPs).** It will be essential that private finance be aligned with the SDGs and focused not solely on financial return. Private finance can come from many sources and can be raised through a variety of mechanisms, some of which can be used to blend public and private investment for the SDGs.

Private participation in infrastructure projects and investment commitments, 1990 – 2014



Source: World Bank, Private Participation in Infrastructure Projects Database (http://ppi.worldbank.org/

As outlined in the graph above, there has been a sharp rise in the private sector's participation in infrastructure development in developing countries since the 1990's. The majority of this investment was for PPPs in middle income countries. Over the period 1990-2014, only US$61 billion was invested in low income countries, compared

to US$1.6 trillion in middle income ones. Of the sectors invested, energy, telecommunications and the road sector are by far the largest beneficiaries but the value of PPPs have not always stacked up. It has been found that the costs of tendering and monitoring can add up to 10-20% in additional costs, can encourage unsound country fiscal management and do not necessarily enhance service provision. This is not to say that all PPPs are bad, examples such as the Metro de Seville, Spain, allowed for better governance and the ability of the public authority to raise important revenue for the project via land value capture. The 2012 London Olympics created 457apprenticeships through PPPs, of which 11% of jobs went to the previously unemployed. This is because the PPP from the outset had a higher purpose than simply the bottom line. There was a focus on legacy and future growth of the region. If all PPPs had the attainment of the SDGs at heart, then huge advances could be made.

Corporate reporting mechanisms are important tools by which to encourage companies to align their business strategies to advance the SDGs. In particular, SDG 12.6 encourages large companies to adopt sustainable business practices and to integrate sustainability information into their reporting cycle as this can help financial risk management, accountability and transparency towards the SDGs. Increasingly, countries across the global are passing regulations requiring both public and private organisations to account sustainability information and provides an important tool going ahead to encourage companies to align their contributions on the SDGs. Voluntary reporting frameworks - such as the Global Reporting Initiative (GRI) - are also aligning themselves against the SDGs and could aid benchmarking in the future. The same is also true for city reporting frameworks.

Blended finance offers a huge, largely untapped potential for public, philanthropic and private actors to work together to dramatically improve the scale of investment in developing countries. It's potential lies in its ability to remove many bottlenecks that prevent private investors from targeting sectors and countries that urgently need additional investment. To accelerate progress towards the SDGs, blended finance needs to be scaled up, but in a systematic way that avoids certain or uncertain risks.

Trillions of dollars are held by **sovereign wealth funds (SWF), pension funds and private endowments** with an interest in long-term stability and sustainable development. SWFs areexpanding quickly in all parts of the world and are becoming a major force in global capital markets. The number of funds specifically has grown fivefold since 2000 to approximately 80 and more are being created constantly. Furthermore, the SWFs have grown US$400-500bn per year since the global financial crisis, reaching a total level of over US$6.5 trillion currently. Theoretically, there is significant scope for SWFs to invest in sustainable development sectors and support the SDGs.

ODA is obviously critical towards meeting the SDGs in developing countries, and in particular for reaching those furthest behind. In general, it is established that the majority of ODA is allocated to central governments and not subnational governments or at the sectoral level. It is clear that ODA allocation levels will not be sufficient to bridge finance gaps or capabilities in developing countries, particularly the least developed. At the same time, ODA providers should deliver on the commitments pledged so as to catalyse wider investments.

Development finance institutions (DFIs), including multilateral development banks (MDBs) are a key source of public finance for sustainable infrastructure. They are well placed to work as a bridge between governments and private investors, and the use of public finance to catalyse private finance. MDB finance of infrastructure has more than doubled from 2004-2013 to about US$54 billion. Ensuring that these investments are geared towards the SDGs will be essential and MDBs have also been encouraged to better leverage their existing capital by the G20, and have taken steps in this regard. Nonetheless, significant scope remains to optimize their balance sheets and take advantage of the funds available. For example, up to 50% of the World Bank's funding in some areas are not used due to a lack of capacity to develop bankable projects to invest in. It is widely agreed that the MDB system has the potential to significantly expand its contributions to financing the 2030 Agenda for Sustainable Development. Indeed, the Addis Agenda pointedly recognizes this potential and calls on MDBs to take responsive steps.

Key factors that shape views of bankability

Source: New Climate Economy, 2016

International funding mechanisms, such as climate finance, also offer new sources of funding - with the Green Climate Fund the most obvious mechanism that will be available. A number of large scale crises and emergencies are also driving a dramatic increase in humanitarian funding needs. Funding requirements for inter-agency humanitarian appeals coordinated by the United Nations have risen significantly over the last decade, from US$5.2 billion in 2006 to US$22.1 billion in 2016. While funding also increased over the same period, from US$3.4 to US$12.6 billion (as of 30 December 2016). Allocating more development funding to emergency responses should not divert resources from long-term investments in sustainable development, but should be used to stimulate wider financial sources at the same time.

Despite the range of financing options available to meet the SDGs, there remains a number of barriers. There is a need to incentivise investment in underfunded areas and overcome barriers that hamper investment flows. Ensuring that these investments are geared towards the SDGs adds another level of complexity. According to the New Climate Economy, the main barriers are:

- **Unfavourable investment regulations and policies** - subsidies and tax breaks which fail to address negative externalities can steer finance and investments away from the SDGs and favour technologies and infrastructure that support unsustainable options. Uncertainty over policies, notably tax policy which typically has a short term horizon, is a serious stumbling block.
- **Lack of transparent and bankable projects** - there is a general consensus that there is not a lack of capital for projects, rather there is a lack of bankable projects because they are likely or perceived to not deliver enough return to the attract private sector. In both developed and developing countries, the capacity to develop such projects remains a significant challenge. The timescale of projects further complicates the process, with large-scale infrastructure investments taking a number of years to prepare but also construct. This highlights the urgent need to make the right investments decisions today in order to meet the 2030 Agenda.
- **Risk and inadequate returns** - in some cases, risks associated with unproven, new technologies puts off investors or the rate of return on projects is deemed too low. Better models to capture co- benefits of projects is needed because they are not properly accounted, making the case for investment further diminished.
- **Lack of viable funding and business opportunities** - many governments, cities as well as companies have not built up their creditworthiness to access affordable debt finance. Some investments for the SDGs may not generate any revenue at all, so there will be a lack of investor interest in such projects to pay for upfront costs.

- **High transaction costs** - the bureaucratic and fragmented nature of project approval and delivery can put off investors as well as governments at all levels. Scale is also an issue, as small scale projects can result in high transaction costs with limited opportunities for further development. Institutional gaps and capacity, notably in developing countries, can add additional costs which is a further barrier for investment.

All these barriers will need to be overcome in order to meet SDGs 6, 7 and 11 but STI strategies and roadmaps can play a significant role in addressing these challenges, with solutions explored in the following chapters.

TRENDS IN SCIENCE, TECHNOLOGY AND INNOVATION

Investing in sustainable infrastructure alongside STI will be key to realising the SDGs, the new Urban Agenda, Addis Agenda and the Paris Climate Agreement. All these agreements have strong STI elements attached to them in order to transform the efficiency and resilience of both traditional and new infrastructure.

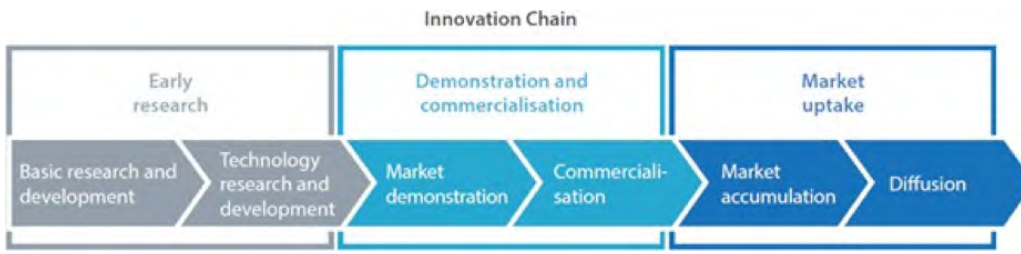
Key elements of identified successful national STI strategies (e.g. South Korea, Denmark, New Zealand, U.K.) and leading economic research all point to the fact that for them to succeed, they need to be based on strong policy, good governance, capacity development and knowledge sharing, regulatory environments, monitoring and reporting as well as partnerships.

Technology and innovation are at the heart of economic development and as economic growth will essentially determine the public budget for innovation, the two can be seen as mutually supportive. Over the past several decades, there has been progress in access to many technologies, particularly in information and communication technology (ICT). As such, STI strategies can help overcome bottlenecks and redirect the necessary finance and funding needed for the SDGs.

The innovation chain

Many technologies are initially developed in industrialized countries and then spread through different types of trade. The STI performance of a country, as well as the economic and social impact of STI, are affected by the quality and level of interactions and flows of knowledge between agents in the innovation system — such as cities, business, universities, research centres, public agencies and intermediate organizations.

It can be seen that the development and deployment of new technology have different drivers at each stage of innovation, and different policy mechanisms will be most effective depending on where the technology is in the innovation chain.



Source: UN Secretary General's High Level Advisory Group on Sustainable Transport, October 2016

As innovations are of different types, occur in many different ways, and have varying effects, they call for different policy responses. For example, policies that address the tail-end of the product innovation cycle and encourage demand for innovation are more likely to stimulate incremental innovation rather than to foster radical innovation. By contrast, experience indicates that publicly funded research has often been critical to the development of many radical innovations.

As an innovation moves down the line from research to uptake, it is critical that policy, investment frameworks and capacity also adapt to the new reality, and that decision makers work to facilitate the up taking of such innovations. Regulations and standard setting can also help advance R&D efforts, for instance, Japan's top runner

approach to regulation, where the latest innovations set the standard for development, provide an incentive for R&D. As such, national governments can provide push policies for R&D, but one of the major challenges in promoting technological innovation, notably in developing countries, is the lack of knowledge and capacity.

ICTs are specifically mentioned as a means of implementation and essential to driving future innovation under SDG 17, highlighting the cross-cutting transformative potential of them. They can play a key role in achieving all of the SDGs, since ICTs are catalysts that accelerate all three pillars of sustainable development as well as providing an innovative and effective means of decision making for implementation in today's interconnected world. Paragraph 15 of the 2030 Agenda for Sustainable Development highlights that "the spread of information and communication technology and global interconnectedness has great potential to accelerate human progress, to bridge the digital divide and to develop knowledge societies…" We are seeing real breakthroughs in digital education, e-governance and health care, mobile money as a tool for financial inclusion and new business models to connect the unconnected. Each sector will need to leverage ICT effectively to achieve the SDGs by 2030: for technology and innovation to deliver transformational change at the pace and scale required, but three key supporting aspects need to align – an enabling policy framework, strong partnerships, and sufficient investment.

Facilitating the innovation chain through innovation strategies

National policies and strategies for STI serve several functions in government policy making. First, they articulate the government's vision regarding the contribution of STI to their country's social and economic development. Second, they set confidence in priorities for public investment in STI and identify the focus of government reforms (e.g. university research funding and evaluation systems). Third, the development of these strategies can engage stakeholders ranging from the research community, funding agencies, business, and civil society to regional and local governments in policy making and implementation. In some cases, national strategies outline the specific policy instruments to be used to meet a set of goals or objectives. In others, they serve as visionary guideposts for various stakeholders.

An example of best practice is South Korea which has committed to a technology-based economic development model and enjoys a national consensus on the importance of STI throughout its national strategies. It has high levels of R&D expenditure (circa. 4% of GDP), a highly educated labour force, good and improving innovation framework conditions, large knowledge-intensive and internationally competitive firms, and a strong ICT infrastructure. In 2012, the national STI strategy focused on accelerating development on three fronts: 1) advancement in new green innovation and technology; 2) high value industry (such as health and education) and; 3) new technologies, such as robotics and ICT. Alone, the strategy has earmarked US$2.4 billion to invest in green technology. In 2011, the National Science and Technology Commission (NSTC) was reconstituted as a coordinating agency with considerable responsibility for national STI policies and allocation of public R&D funding. The creation of a strong governance framework and coordination system enabled a monitoring and evaluation framework to advance implementation of the national strategy. The evaluation framework follows a 'plan, do, check, act' approach against key performance indicators (KPIs) to ensure that R&D spending is directed towards national priorities for maximum impact. Key elements of success include a well- structured, integrated system, with a committed high level policy and governance framework to enable, engage and align with ministries and resources, a focus on capacity building and stakeholder engagement to drive continuous improvement and partnerships alongside clear long term prioritisation, monitoring and evaluation.

Countries should work to develop national strategies for STI that are in line with the SDGs, compromising policy, regulatory and institutional frameworks and agencies that will help to strengthen the enabling environment and enhance interactive learning, while also allocating resources for STI rollout, which in turn will attract greater private investment.

The 2016 OECD STI policy survey identified a number of countries where national STI policies specifically supported objectives linked to SDGs 6, 7, and 11. A high level review indicates that energy is included in virtually all national STI policies, water is represented but in less than 50% of the surveyed policies, whereas cities issues are more difficult to identify. However, this high level review should be interpreted with some caution, SDGs 6 (water) and 7 (energy) represent well defined fields of technology and so lend themselves to easy identification. Contributions to SDG 11 (cities) depend on the application of a broader range of disciplines and so may be supported in some way by many of the STI strategies, with ICT is becoming the cornerstone.

Global trends for R&D

Since 2000, the total spending from both the private and public sector on R&D as a proportion of GDP has grown in all country categories and doubled in the last 15 years. A group of larger countries dominate total R&D funding, with just 25 countries (both OECD and non-OECD, but not LLDCs, LDC, SIDS) accounting for 90% of expenditure. Pressure on public spending in OECD countries may pose a challenge for STI strategies since government budgets account for an average 90% of higher education and government R&D expenditure, this is particularly true for the largest performers, e.g. Japan (98%) and the United States (96%). Although, public spending on R&D in many developing countries has contracted in recent years, overall there has been an incremental increase in total spending.

Public budgets for R&D have shifted in past decades towards environmental and health-related objectives. A degree of country level specialisation can be detected, with energy being prioritised in R&D budgets for Mexico (19%), Japan (11%) and Korea (9%). Linking R&D budgets to clear long term strategies with strong long term political commitment is obviously important. Supply side driven technologies are not going to drive market diffusion alone, demand side innovation and diffusion policies will be just as important.

Incentives have a huge impact on investment decisions, and in turn R&D, which are key elements to successful STI strategies and implementation. These incentives should reflect the full costs of development (social, economic and environment) and be used to redirect financing and funding towards sustainable infrastructure and technologies. These incentives can be played at the national but increasingly at the local level, which can attract stronger private investment.

All levels of governments should introduce policies that ensure that spending and efforts on R&D remains stable and long-term and should be deployed alongside a variety of incentives that can leverage private investment.

The establishment of innovation funds can greatly advance efforts in this area and more than 35 have been established globally. For example, under the Australian National Innovation and Science Agenda the strategy includes AU$36 million invested over four years to, amongst other things, seed funding to support global Small and Medium Enterprises (SME)-to-researcher collaborations to enable viable projects to grow and test commercialisation through the Global Connections Fund. Bulgaria's National Innovation Fund supports R&D of enterprises and fosters cooperation between science and business, focused on the technological development of new products, processes, services, or on a significant improvement in existing ones in priority sectors (maximum grant - 500,000 BGN (€255,646). While most national funds concentrate on providingresources, some also offer technical advice. For example, the Global Innovation Fund (GIF) provides funding and advice at three stages: pilot, test and scale – and is open to ideas from any sector and any country provided that the innovation targets those living on under US$5, or preferably, under US$2 a day. GIF offers grants, loans (including convertible debt), and equity investments ranging from £30,000 to £10 million.

While some progress has been made in establishing innovation funds, more effort is encouraged not just at the national and global level, but also regionally and locally. Funds should be aligned with the SDGs and scaled up over time. Overall, there should be an increase in funding targeted at STI's for SDGs implementation, this should include a modest but visible floor percentage of countries' ODA, which is also made available to cities.

One notable recent initiative is the Technology Bank for Least Developed Countries, located in Gebze, Turkey, and operationalized on 22 September 2017. This will improve access and policy relating to STIs helping increase and improve utilization and partnerships in the 47 least developed countries. The new Bank will contribute to efforts to achieve the SDG target 17 on building capacity to support developing countries, including for LDCs and SIDS, to increase significantly the availability of high-quality, timely and reliable data so as to respond to the principle of "leaving no one behind".

It is critical that the Technology Bank provides the financial and knowledge base by which to help least developed countries strengthen their STI capacities and generate home grown research in order to take these to market.

Trends in scaling up capacity, education and deployment of innovations

The Addis Agenda and the 2030 Agenda recognises capacity development for innovation as an integral part of sustainable development. It calls on governments to enhance international support and establishment of multi-stakeholder partnerships for implementing effective and targeted capacity- building in developing countries, as well as to reinforce national efforts in developing countries.

Projects, including technical cooperation and capacity-building initiatives, represent around 75% of South-South cooperation. There are numerous examples of capacity building by international organizations. It is important to note that capacity development can be influenced by national policies but also in the context of financing for development. Collectively the countries subscribing to the Addis Tax Initiative declare their commitment to implement the Addis Agenda in the leading action of raising domestic public revenue, to improve fairness, transparency, efficiency, and effectiveness of their tax systems, and commit to step up their efforts that will collectively double their technical cooperation in the area of domestic revenue mobilisation and taxation by 2020.

There is a need to strengthen international cooperation for STI and develop the necessary partnerships for sustainable development which lie at the heart of SDG 17. South-South cooperation on STIs would help to significantly scale up efforts on SDG implementation, notably because 47% of total South-South foreign direct investment is geared towards ICT.

Education policy also has a major impact on university research and the availability of highly skilled labour in technology intensive firms. Education policies, the intellectual property rights (IPR) regime and a range of other policies are important contributors to an enabling environment for STI and capacity development, while the international environment needs to be supportive as well. On education, the Addis Agenda commits to enhance technical, vocational and tertiary education and training, ensuring equal access for women and girls and encouraging their participation therein, including through international cooperation. It also commits to scale up investment in science, technology, engineering and mathematics education. The commitment can also help to enhance technology transfer.

Partnership development will also be essential as technology has always advanced through partnership between public and private entities - research, through the public infrastructure needed to integrate new technologies into everyday life and through the public policy frameworks that serve as the context for progress. This can help enhance North-South, South-South and triangular regional and international cooperation and enhanced knowledge sharing on mutually agreed terms. This can include improved coordination among existing mechanisms, in particular at the United Nations level, notably through the TFM. Business can also play an important role here, not only through their practices but also through partnership with their supply chain.

Development banks should play a key role in building capacity and established dedicated mechanisms to build STI understanding and capacity alongside project implementation and partnership development in support of the TEM. This will ensure that projects are bankable and skills developed.

The final key area is the importance of high quality data for policy making and monitoring against strategic goals. Data capacities will need significant strengthening at all levels as well as the monitoring of financial flows.

Significant efforts should be made to build capacities through the UN system, notably in those countries who need it most, especially on those SDG goals and targets with no data attached to them. Particular focus should be given to cities through relevant non-state actors so that STI investment can be better targeted and tracked.

The following sections will look at some of the specific issues faced by SDG 6, 7 and 11 in the three broad categories of policy, finance and capacity needed to scale up STI for SDG implementation. From this, overall recommendations will be made to scale up STI roadmaps and financing sustainable, resilient and inclusive solutions to facilitate the necessary investments to attain SDGs 6, 7 and 11 and beyond.

SDG 6 - ENSURE ACCESS TO WATER AND SANITATION FOR ALL

SDG 6 aims at achieving universal access to drinking water, sanitation and hygiene, addressing inequalities and global challenges on water quality, efficiency resource management and ecosystem services. These issues cannot be addressed in isolation as there are strong connection with other areas, such as health, cities, agriculture, climate change, energy, poverty, economic productivity, equity and education. Agriculture accounts for 70% of global water withdrawals rising to 95% in some developing countries. Water is an important gender issue with the burden of collecting water falling on mainly women and girls (263 million people spend over 30 minutes daily to collect water).

Water covers 71% of the Earth's surface but only 4% of this is freshwater, of which only 0.5% is suitable for human consumption. Every year, nearly a million people, more than a third are children under five, die from diseases, caused by unsafe water, inadequate sanitation and poor hygiene. Around 90% of disasters are water related and in Northern and Western Asia water stress levels often exceed 60%. Water is an increasingly contentious issue between countries given the cross boundary nature, and also with cities, as highlighted recently in São Paulo, Brazil, where water shortages resulted in civil unrest. Today, over 2 billion people still lack access to safely managed drinking water and around 40% of the global population suffer from water scarcity.

Global requirements for water will double over the next 20 years, which together with further pressures resulting from climate change, mean that some observers are predicting a water crisis and unrest in the years to come. The sector needs to be more resilient and adapt to ensure that it can continue to meet the needs of people, businesses and the environment – and government frameworks needs to adapt too. There is a need to enhance national policy frameworks to secure the long-term resilience of the sector, helping to deliver a cleaner, healthier environment, benefiting people and the economy. However, significant recent progress has been made - in 2015 nearly 90% of the world's population used improved drinking water sources and around 5 billion used improved sanitation facilitates, notability in rural areas.

There is a sound economic case to further advances on SDG 6 as water and sanitation interventions offer a payback of 3-6 fold. The costs of inaction is even more compelling; inadequate sanitation in India costs 6.4% of GDP, water related disasters wiped out 5% of Thailand's GDP in 2011 and water pollution in China costs 2% of rural GDP. South Africa needs SAR700 billion (approx. US$50bn) in the next decade to prevent water demand from outstripping supply by 2025.

Technological solutions and patterns of innovation

There are already many technology solutions available for water supply, sanitation and hygiene that are proven to be cost effective. However, these technologies alone will not be enough - other factors will also need to be put into place, such as behaviour change, financing, capacity, policy, partnerships and so on, which will be explored later.

There are three broad types of technological solutions, all of which must be considered in order to improve efficiency and resilience needed for SDG 6. Water supply enhancement technologies can advance more drought resistant water supplies, such as reclaimed water or desalination, greywater, rainwater and stormwater capture, which also reduce energy costs. The second major area are demand management technologies that encourage and enable water efficiency or water conservation. This can help regulate water use, supply and pollution. Examples include drip irrigation and smart meters, which can encourage behaviour change as well as water use through real time information via sensors (ICT) which can allow for pollution detection, for example. The final category looks at governance improvements, which can enable water utilities to more closely match demand and supply through real time issuing and forecasting that can help tackle inefficiencies in governance but also maintenance.

Countries are starting to implement these technologies so that they will more efficiently manage energy and water consumption, for example it is planned to install 800,000 smart water meters in Kuwait. There is also an economic reason to save water, for example in the US 30% of treated water is lost due to leaks resulting in a substantial loss in revenue. Smart monitoring technologies, such as those established in Portugal, offer real time monitoring allowing utilities to better detect pipe bursts and match demand with supply to drive efficiencies, all helping to reduce operational costs.

Smart water use technologies is becoming particularly important for cities given future demands as populations grow. In Hong Kong, the use of seawater to flush toilets has reduced freshwater consumption by 20%. Given that 65% of major global cities are located alongside coasts it offers potential solutions for a huge percentage of global citizens. Smart metering solutions in buildings and households are further driving efficiencies and storm water retention tanks, collecting runoff when sensors signal heavy rain and drain when safe to do so, also provide low cost solutions when planned properly.

Despite these advances, there are a number of bottlenecks to innovation in the water sector, causing it to lag behind others. Globally, venture capital investment in the energy sector grew by a factor of fivefold compared in the water sector over 2004-2011, with billions invested in energy and only millions in water. In the US, since 2000, the clean energy sector has benefited from about US$8 billion in public investments, while only US$28 million in public funding in the water sector. This lack of financial resources and investment is holding back innovation by SMEs as well as R&D, demonstrations and commercialisation. There is also a tendency for risk aversion partly due to the high financial and other impacts associated with disruption to water and sanitation but also an absence of visible demonstration projects to show the capabilities of new innovation.

Coherent regulation has the ability to stimulate innovation but the water sector is highly fragmented, with utilities responsible for each of the SDG 6 targets independent from each other. Often these utilities are relatively small, lacking strategic, technological and planning competencies as well as the necessary funds to implement innovative technologies, particularly at scale. This also results in conservative and fragmented procurement practices which give preference to low cost, short term offers with proven technologies. All these factors explain a lack of innovation in the sector, but these can be addressed through innovations in improved regulations, institutions, policy, finance, capacity and management, as recommended to the UN High Level Panel on Water. The following section will outline the key elements that should be included in a STI roadmap focused on SDG 6.

A coherent policy, regulatory and institutional environment

Integrated water resource management (IWRM) plans have been developed in three quarters of countries and will, in part, address problems with institutional silos which divide the multiple agencies at the nexus of water, energy, agriculture, climate (and so on). Yet implementing IWMRs has proceeded at a slow pace, meaning that integrated responses at the national, sub-national as well as between countries are few and far between. In many countries, institutional and legal reforms are required to facilitate implementation as seen by ground breaking jurisprudence in countries such as India, South Africa and Argentina, which are addressing the rights to water and sanitation. **There is a need for institutional strengthening to transform water management practices and coordinated policies through advanced STI, this is a priority issue for developing countries.**

A successful example can be seen in the reform of water management in Pakistan supported by IDA- financed programs, notably the National Drainage Program. The water users' associations were given delegated authority by the national government to operate and maintain irrigation canals and requested changes to the mandate and structure of the Water Authority and the Irrigation Departments. This enabled measures to increase operational efficiency, accountability and financial sustainability including contracting out operation and maintenance to the private sector. Public awareness campaigns were used to build wider support for the reforms, all of which help to enhance institutional capacity.

Better coordination between agencies and sharing knowledge will help further policy coordination, institutional strengthening and integrated decision making. In Italy, the Arno River Basin Authority developed a shared information dashboard to gather all relevant data regarding river basin management planning. By gathering all this information into a single depository, it has helped to bridge information gaps hindering effective management decisions and coordination across the different agencies involved.

Regulations and standards will always play an important role in the water sector when it comes to policy coordination but they will also be fundamental to driving innovation. Regulatory regimes developed around existing technologies should be avoided as they may provide barriers to innovation. While the WHO develops international norms on water quality in the form of guidance, these need to be translated into a country's own unique circumstances. The guarantee, predictability and clarity of this translation as well as their enforcement mechanisms is fundamental in driving innovation but also policy coordination. Technology forcing mechanisms in the water sector have effectively helped to drive policy and innovation in the EU and Japan. The US Clean Water Act

requires the implementation of best available technologies (BAT). By imposing such a standard, it encourages the development of innovation and provides an incentive towards continual improvement. **It is essential that advances in water policies, regulations and practices are also reflected in STI strategies as well as funding for innovation.**

Bridging the finance gap for technology and innovation

As stated in the FfD Sustainable Development Report, finance is key to implementation but also technology development. Advances will be felt greatest by those most in need yet in 77% of countries, public finance is still insufficient to meet the SDG targets for access to drinking water and sanitation. **There is a need to use finance and funding more effectively, diversify sources andPPP development in the water sector.**

Many water systems are subsidised to support the extraction, purifying and distribution of water. Globally, only 39% of utilities set tariffs that cover total costs and many utilities in Africa do not cover even their operating and maintenance. This under-pricing of water presents a significant obstacle to innovation. As costs are low, the return on investment for innovation is also low, leaving limited options to pursue profits. The water sector's low investment levels compared to other sectors means that less than 1% of all start-ups are in the water sector. The Water Council found that in 2015, only US$44 million in deal flow went to water technology start-ups compared to almost US$60 billion in other areas. One area of funding which can help address this gap is 'challenge funds' as this can play an important role in start-up innovation and partnership building. For example, the Human Development Innovation Fund is a £40 million UK challenge fund providing grants to businesses, NGOs and research institutions for scaling innovations focused on the quality, value for money, and sustainability of basic services in education, health and water, sanitation and hygiene in Tanzania. The prize, worth £25,000 (US$38,348), have been awarded to a number of low cost solutions, including a water filter which absorbs anything from copper and fluoride to bacteria, viruses and pesticides which should help the 70% of households in Tanzania that do not have clean drinking water.

Addressing the price of water can also help to address the innovation gap and can be done through using shadow water prices, where the price is set according to local availability rather than the actual price thus incentivising better water management by utilities. Better metering can also ensure that the true costs of consumption are captured. For example, metering of water consumption is mandatory in Israel and by doing so, the innovative use of recycled water has been encouraged, notably in the agricultural sector. Strategies to increase the cost of water, as recently seen in South Africa, can also help to drive behaviour and innovations towards SDG 6.

Broader implementation of pro-poor pricing is needed to overcome barriers to access and innovative solutions. Some families in developing countries spend half of their income on safe drinking water. The application of 'pro-poor' principles can overcome this problem by adjusting prices (e.g. by offering rebates to the poorer farmers) to reflect the user's circumstances, whilst at the same time discouraging waste and incentivising efficiency. New technologies - notably ICT - can play an important role in advancing efforts given the opportunities to increasing efficiency, cleanliness, access to services and introduce dynamic pricing strategies with metering and billing.

Making more effective use of current funding opportunities is essential but there is also the need to diversify funding sources. The Green Climate Fund will support countries to adopt mitigation and adaptation efforts representing as much as US$100 billion per year. This offers potential sources of funding for the SDG and in addition, agricultural funds such as the Fund for Smart Agriculture in Latin America and the Caribbean offers alternative sources at the international level. ODA is another such source which is well suited to addressing problems of access for those furthest behind. Since 2005, ODA investments in water have remained relatively constant at about 5% of total ODA disbursements reaching US$8.5 billion in 2015.

The strategic use of blending finance of public taxes, development grants, loans and subsidies offer a new way to finance water infrastructure, distribution, maintenance and technology development. A mix of new instruments can be used and green bonds offer an additional source. They are starting to be used in the water sector, for example the District of Columbia Water and Sewer Authority (USA) issued a US$350m green bond for their Clean Rivers project that helps to significantly reduce pollution incidents to the areas waterways. Creditworthiness schemes can also help to repay debt and raise valuable revenue for water projects at the local level. This in turn can help to improve governance and institutional arrangements as well as enhance technical, operational

and financial efficiency. **It is recommended that greater support is provided to water utilities to enhance their creditworthiness and use of green bonds.**

The use of micro finance has advanced STI efforts notably in developing countries. Schemes in Bangladesh, Cambodia and the Philippines have helped households to invest in water and sanitation. Nearly 600,000 projects accounting for US$120 million have benefitted 2.4 million people to date and 25% of women are able to increase incomes due to greater productivity as a result. Projects include rainwater harvesting, shallow wells, pumps, biogas toilets. Importantly, they offer small loans to individuals that do not have access to traditional credit. **Microfinance solutions should be scaled up – notably within STI strategies – with a focus on addressing gaps in access to water services.**

Private sector financing accounts for only 7% of total spending on water and sanitation in developing countries, and in Sub-Saharan Africa the figure was estimated to be less than 0.5%. Outside financial sources can help to attract more private capital by de-risking the investment. Notably, in Uganda, the Ministry of Water has facilitated growth of a domestic water market with the implementation of a number of small-scale water PPPs. The government began by introducing one-year area performance contracts that remunerated local managers based on results, bonuses and penalties (of up to 25% of basic salary) tied to targets. During the first year of the project, residents have seen a dramatic improvement in the quality and level of water services. A total of 430 connections have been installed, water production has increased from eight to 21 m3/hr and collection rates have increased from 70% to 85%. **Improvements to the technical skill set and openness to innovation should be prioritized in order to attract and enable greater levels of PPP investment.**

The virtuous cycle of financing the water sector, source: World Bank

Capacity building, knowledge and R&D

The key to implementing STIs for SDG 6 will be to upscale not only institutions but also individuals, communities and citizens which can support the uptake of smart water solutions. In 2013, the Portuguese Association of Water and Wastewater Services launched the 'Young Water Professionals' group with the aim to develop the capabilities of young professionals under the age of 35, and prepare the future generation of leaders and technicians in various fields of knowledge, helping them to meet the growing challenges in the water sectors and the technologies that can help scale up performance.

Better knowledge exchange and consultation with citizens can also help drive performance, accountability and capacity. In Scotland, UK, the establishment of a Customer Forum in 2011 enabled customers to provide their views on setting water prices in a drive to boost efficiencies. This sense of co-creation and knowledge exchange helped inform long term business planning and greater exchange of knowledge between customers and suppliers. This process of engaging customers has also proved successful in Canada, Japan and South Aus-

tralia. Online platforms, like the one established in Rijnland, Holland, can also help to address knowledge gaps of water authorities as it allows citizens to inform them of local circumstances and problems.

Knowledge exchange will clearly help R&D development and schemes, for example Israel's NEWTech programme helps to promote water technologies in both global and local markets by supporting R&D, participating in water related stakeholder events and for creating marketing tools to raise awareness of such innovations as well as knowledge exchange and capacity building. Business can also play a vital role in R&D advancement through sustainable business practices and projects but also SDG 6 delivery.

ICT tools can greatly enhance the monitoring of water availability, withdrawals and consumption which enables improved allocation as well as savings, efficiency and greater resilience. Similarly, information about drinking water quality and the sanitation situation, including wastewater discharge, supports public health intervention and the protection of water bodies. Monitoring can also inform best practices, latest technologies and innovations as well as support productive integration across sectors within the SDG framework. Monitoring costs are often marginal compared to the large investments that are typical for the water sector and can offer significant returns. For example, Philadelphia's Surveillance and Response System demonstration project integrates monitoring and data streams through ICT to promote early and rapid detection of a water-supply contamination. Information was integrated via an innovative event detection dashboard using a web GIS-spatial platform in real time and has saved significant costs due to proper asset management, quick decision making and a transition from reactive to proactive maintenance. It also increased efficiency by operating assets at peak performance, better cross- departmental communication through open information sharing as well as enhanced citizen communications regarding safety, security and compliance with environmental regulation.

Early adoption of mobile-to-web technologies in Africa provides a unique opportunity for the region to bridge the gap between the lack of data and information on existing water and sanitation assets and their current management — a barrier for the extension of the services to the poor.

Monitoring frameworks are also central to IWRMs and their implementation, which is vital in order to achieve SDG 6.5. The classical plan-do-check-act framework must be complemented by institutional reforms. Data and monitoring are central to Egypt's IWRM as they allow for continual improvement and benchmarking, aimed at creating an incentive for good performance at village levels and at Branch Canal Water Board levels. It is also a key element in creating both partnerships and incentives for sustaining agreed water quality and health goals.

This coordination of stakeholders at all levels will help scale up action as well as pool the resources and capabilities needed for effective delivery of technology for SDG 6. In September 2017, the EU and China stepped-up joint work on water protection by establishing a Water Policy Dialogue. The platform will help shared best practice and knowledge on the latest technologies and innovations needed for effective water management but also help engage the business community. **Collective agreements can help trust building and transboundary cooperation which will be especially important to achieve SDG 6.5, particularly in Africa and landlocked countries.**

Partnerships are also essential not only for the macro level but also for small scale delivery which are particularly important for developing countries. India's Urban WASH Alliance partners with public and private sectors to implement and scale innovative water and sanitation initiatives in India's largest urban centres. The Alliance is supporting five public-private partnerships that are improving water and sanitation services through technological solutions in Bangalore, Ahmedabad, Delhi, Chennai, Kolkata, and Hyderabad. These types of partnerships are an essential part of SDG 6.b which encourages the support and strengthening of local communities and in improving water and sanitation management.

Business can also help further partnership through corporate sustainability efforts. For instance, the Coca-Cola Company committed by 2020 to safely return to communities and nature an amount of water equivalent to what it used in its finished beverages and their production. Over 100 billion litres of water have now been replenished to communities and nature. In addition, with partners across government, civil society and the private sector, more than US$300 million in replenish programs has been invested globally.

Finally, given the synergies with various SDG goals - resilient infrastructure (SDG 9), sustainable cities (SDG 11), sustainable consumption (SDG 12) and inclusive societies (SDG 10) - partnerships should go beyond just those involved in the water sector. An important dimension of IWRM is that it provides a framework for water man-

agement to encourage engagement options into broader national and international development planning in a structured way. By aligning and integrating interests and activities that are traditionally seen as unrelated or that, despite obvious interrelationships, are simply not coordinated, IWRM can foster more efficient and sustainable use of water resources to achieve the SDGs but also technological innovations. By identifying win-win solutions, costs can be shared and innovation scaled up.

SDG 7 – ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE AND MODERN ENERGY FOR ALL

Energy is central to social and economic well-being and inextricably interlinked too many SDGs, including poverty eradication, food security, clean water and sanitation, health, education, prosperity, job creation and the empowerment of youth and women. Yet more than 1 billion people have no access to electricity and over 3 billion people have to cook with polluting, inefficient fuels. This acute access gap epitomises those most in need and furthest behind and as such presents a strong case for ODA funding. Whilst progress has been made against the SDG 7 targets of access, efficiency and renewables, more rapid progress is needed or it will impossible to deliver on other SDGs by 2030.

Decarbonising the global energy supply is perhaps the single most important and challenging objective required in order to deliver the Paris Agreement and SDG 13. In addition, energy production and use is by far the largest man-made source of air pollution, and linked to SDG target 11.6 and contributing factor towards the 6.5 million premature deaths each year associated with poor air quality.

The energy sector is popular for private sector investment (electricity attracted US$744Bn investment 1990-2014, second only to telecommunications) and relatively well suited as demand is steady, quality of service can be easily assessed and better quality infrastructure can lower operational costs. However, in developing countries public funds tend to dominate with over 90% of all investment in infrastructure.

STI has a major role to play with a range of proven solutions offering huge potential to improve access, efficiency and the use of renewables. Innovation must be supported at all stages with governments taking a leading role. Allocation of resources should be informed by both long and short term opportunities for SDG 7.

Policies at the national level have great potential for impact, e.g. power generation, grid expansion, building codes, standards and labelling for equipment, road vehicles, etc. Meaningful improvements will require higher levels of financing, bolder policy commitments and embracing new technologies. **Technology transfer must be supported to enable developing countries to leapfrog. The energy transition must be a 'just' transition and not leave anyone behind.**

Energy resilience is also a key issue especially as climate change leads to increasingly severe and frequent devastation around the world, as such shoring up the resilience of energy infrastructure has become an urgent priority, especially in SIDS that often find themselves in the eye of the storm. The 2017 hurricane season was one of the most active in recent history, as severe rain and winds wreaked havoc across the Caribbean, and took out essential services - including electricity. Energy systems are vulnerable not just to hurricanes, but also to other extreme weather events such as earthquakes, wildfires, winter storms and rising sea levels. When electricity infrastructure is damaged in the wake of natural disasters, it affects all walks of life. Essential recovery services suffer. Hospitals are left unable to run life-saving equipment or preserve critical medication at the right temperatures. Markets have trouble preserving food and people live in darkness, and cannot use basic appliances stoves. The best way to be prepared to face and recover from natural disasters is for countries to have a good emergency preparedness plan, accompanied by strategic investments that can shorten restoration time and limit the impact of disasters. Therefore, resilience in the energy sector is essential and innovative solutions can help the sector to prepare for any eventuality.

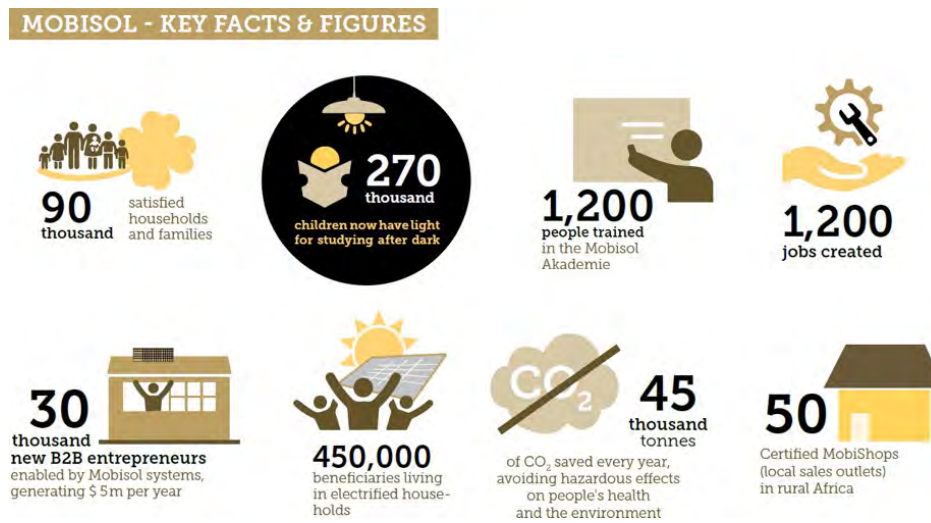
Energy technology & innovation solutions

A range of technologies are available to provide access to electricity where the extension of the national grid may not be a feasible option due to remoteness and low population density. Decentralised renewable energy solutions are cost-effective over the system's lifetime, easy-to-deploy, install and maintain and their design can be tailored according to individual needs. Solar energy stands out as the mostfavoured generation tech-

nology, followed by batteries/storage, hydro, diesel back-up, biomass and wind. For example, Mobisol has more than 90,000 customers in rural Tanzania, Rwanda and Kenya using their decentralized solar electrification as described in the following case study.

Case study - Mobisol decentralized solar electrification in rural SubSaharan Africa

Mobisol offer decentralized solar electrification to lower-income households and small businesses in rural SubSaharan Africa financed using a PAYG (Pay-As-You-Go) model. Combining solar energy with mobile payment technology, Mobisol designs, procures, distributes and services 80 to 200 Watt solar home systems sufficient to illuminate entire households, power laptops, radios, TVs and other appliances. The company has more than 90,000 customers and installed almost 10 MW of capacity in Tanzania, Rwanda and Kenya. Mobisol's pay-as-you-go system circumvents the initial investment hurdle for customers who previously could not afford high-quality solar home systems



The efficiency of electrical distribution offers huge scope for improving efficiency and thought this reducing total electricity production needs, for instance, presently some 70% of electricity is wasted before it reaches the end-user. Large-scale expansion of high-voltage transmission infrastructure connecting grids can help balance supply and demand, assist penetration of renewables while maintaining energy security. To date, interconnecting grids has largely been at the national level, with some exceptions. Innovative smart metering and smart grids can shift peak load to off-peak times enabling a step-change in productivity whilst also supporting integration of renewables. For example, the German city of Munich is developing smart grids and a virtual power plant (a network of several small-scale energy plants using water, geothermal, solar and biomass, wind power) in order to meet its entire electricity demand with renewable energy by 2025. This approach offers emerging economies an opportunity to leapfrog to more sustainable energy development at the same time spurring economic growth. A range of energy storage technologies are available with others currently in development.

Improvements to building thermal insulation (e.g. double glazing) can be retrofitted to existing stock or designed in from the start for new constructions which is important because the building envelope has most influence over heating and cooling needs. Ownership of household appliances (e.g. refrigerators) is increasing energy demand in buildings, however there has been some good progress with increased use of high-efficiency LEDs lighting which is around 30% of residential sales in 2016 and television sets where improvements in efficiency is moving faster than increases in television sizes.

For road vehicles there is a range of proven technologies available to improve efficiency, including engine downsizing, hybridisation, electrification, waste heat recovery, aerodynamics, reduced rolling resistance for tyres, weight reduction, driver training and speed governors.

Currently renewables have risen to 24% of global power output, costs continue to fall with solar PV overtaking wind power in terms of new capacity. Utility-scale solar PV has halved over just four years, and in some cases is now competitive without subsidy and cheaper than fossil fuel alternatives. Prices are coming down dramatically, for example in India, the prices of solar fell by 40% in one year in 2017, thanks to access to cheaper finance and growing investor confidence in the country's pledge to increase renewables capacity.

Policy and regulation must enable the coming energy revolution

Energy technologies interact and thus must be developed and deployed together with a whole system perspective. Whilst the economic competitiveness of some new technologies is improving, market forces alone will not deliver the needed impetus. Strong, consistent and coordinated policies as well as regulation are essential to both support the penetration of sustainable technologies and enable innovative business models.

Top performing countries generally do well for policy and regulation across all three energy supply solutions - grids, mini-grids and stand-alone systems - suggesting that all three components are complementary. The main barriers to wider deployment of this mixed approach include early stage market fragmentation and unmade linkages.

Energy efficiency is often overlooked but offers enormous untapped potential for saving both money and energy, in particular for buildings, transport and industry. For example, since 1990 IEA member countries have saved US$5.7Tn in energy expenditure through improving efficiency. In developed countries, efficiency is the largest source of 'new' energy supply. It has been estimated that further investments in efficiency could boost global GDP by US$18Tn by 2035 increasing growth by 1.1% per year. There are also large potential savings in developing countries, for example in India there is a difference of 40% in energy demand between the low and high efficiency scenarios for 2030. This saving is equivalent to India's entire current energy consumption. Notably, investments in efficiency create up to three times more jobs than for fossil fuels.

However, only one third of countries have mandatory requirements for building energy efficiency codes and a similar number have standards for energy-consuming equipment in buildings. As the vast majority of new buildings will be constructed in developing countries, this presents an important opportunity to leapfrog development by implementing the latest technology standards, accessing affordable renewable energy and energy efficiency policies supported by global initiatives such as the Clean Energy Ministerial Global Lighting and Energy Access Partnership (LEAP) and the Efficiency for Access Coalition.

Many countries, including 20 EU Member States, Brazil, Canada, China and South Africa, impose vehicle taxes based on fuel economy or CO_2 emissions with some of these using the revenue to subsidise cars with superior fuel economy. The Global Fuel Economy Initiative (GFEI) have had some notable success working with governments (including Indonesia, Kenya, Ethiopia and Chile) and other stakeholders to support stronger policy on minimum road vehicle fuel efficiency standards. A number of technologies can be retrofitted to existing vehicles with payback periods as low as three years. Relative poor uptake reflects a market failure that could be addressed through awareness raising and financial support. **It is recommended that broader implementation of proven, aligned policy and regulatory instruments concerning energy efficiency be considered as a priority.**

Whilst the cost of renewables continues to fall, support from coordinated policy and regulation is needed, e.g. feed in tariffs and policy on energy security, carbon pricing and air quality, etc. Renewable policies continued to shift from government-set tariffs to competitive tenders with long-term power purchase agreements. By 2016, almost 70 countries had employed auction/tender schemes to determine support levels. While the first adopters were primarily emerging economies (Brazil and South Africa), this trend has now spread to mature renewable markets (the European Union and Japan).

Carbon pricing is an important tool that should be strengthened to support penetration of renewable energy by both improving competitiveness and raising funds for investment. According to the World Bank nearly 40 countries and more than 20 cities, states and provinces use or are preparing to implement carbon pricing mechanisms such as emissions trading systems (current market value US$30 billion) and carbon taxes. The share of greenhouse gas emissions covered by domestic carbon pricing initiatives increased significantly, led by the launch of six carbon markets in China. The impact of carbon pricing is largely affected by the strength and predictability of the price signal, but prices vary considerably from US$1 (Mexico) to US$168 (Sweden) per tonne.

Finance and other barriers

Universal access to modern energy services will require annual investments of US$45 billion (targeted at grid expansion, mini-grid and off-grid solutions), raising to at least US$1 trillion per year in order to tackle climate change. Analysis of the 20 high-impact countries (Sub-Sahara and Asia) shows that current finance flows for decentralized energy solutions are very low (US$200 million per year, or only 1% of trackable electricity finance) which is alarming given their enormous potential to improve rural electricity access. The problem is even more acute for residential clean cooking where solutions are vastly underfunded. The needed investment for the 20 high-impact countries has been estimated at US$4.4 billion per year, far greater than the trackable investment which averages US$32 million a year (2013-14 data), or just US$1 per capita per year.

By refining finance strategies to scale up action and prioritize energy access, it is possible to reach more people with sustainable energy. **Targeted strategies are needed from national governments, and the international finance community and partnerships with the private sector so that energy access gains - especially in rural areas with the biggest gaps - can be delivered faster.** One positive trend since the early 2000s is the steady increase in international development finance commitments and disbursements for electricity, although much of this is targeted towards non high-impact countries.

Fossil fuel subsidies present another important barrier to sustainable energy, as they create a burden on government budgets, reducing resources that could be put to more efficient use; undermine access to affordable energy by benefiting the rich rather than the poorest people; decrease the competitiveness of low-carbon businesses, discouraging investment in renewables energy efficiency; as well as compromise energy security (compared to subsidising alternatives such as renewables and energy efficiency). Fossil fuel subsidies also have a significant impact deterring technology transfer to developing countries. However some important progress is being made with reforms being undertaken in almost 30 countries in 2013 and 2014, some of which were spurred by falling oil prices (in line with SDG 12.C.1). In early 2017, investors and insurers with more than $2.8 trillion in assets under management called on the group of G20 economies to phase out fossil fuel subsidies by 2020 in order to accelerate green investment in the energy sector and reduce climate risk. **It is recommended that prompt action is taken to phase out inefficient fossil fuel subsidies.**

Implicit in the target to increase the share of renewable energy, is the need to reduce consumption of fossil fuels. In particular, the phasing out of coal mines and coal fired power stations is an important step with multiple benefits including climate change (SDG 13.2) air quality (SDG 3.9.1 & 11.6) and energy security. In recognition of this, both the National Australian Bank and European Investment Bank have said that no new deals will be signed to financing new coal power plants, sending a strong signal about the future of coal.

As a first step the construction, commissioning and expansion of coal mines and fossil power stations should be halted, followed by closure of facilities approaching or past the end of their economic lifespan and then early closures should be considered. Whilst closure and decommissioning of all facilities will incur cost (e.g. in North America decommissioning of a 500-MW coal-fired power plant may cost US$5-15 million net of scrap and take 18 to 30 months) at the same time, phasing out unprofitable coal plants could save US consumers US$10 billion per year, but also boost the whole country's competitiveness.

The last step where plants are closed before the end of their economic lifespan poses the most difficult challenge, particularly where money has been borrowed for construction but not yet repaid. There are a number of possible sources of finance which could cover the remaining debt, including shareholders, the local or national government, climate finance or funds raised through carbon taxes. Whilst there is often no legal or other requirement to demolish an old power plant, it is important to consider and properly manage recycling, disposal and redevelopment of the site and assets within a reasonable time frame.

Many power plant sites may have significant redevelopment potential, they tend to be large consolidated properties and maybe located close to water near cities or industrial areas. Options for regeneration will depend on the individual circumstances, but typical choices include ports and terminals, petrochemical or industrial plants, commercial, or mixed-use development. Conversion from coal to natural storage gas is also a popular option (particularly North America driven by low gas prices) although this may not help to increase the share of renewables (SDG 6.3) there are other benefits including reduced carbon emissions, pollution and waste.

However, significant progress in the transition away from coal is being made. In 2016, China set a target of stop-

ping or delaying at least 150,000 megawatts of coal-fired power plant projects and followed this in 2017 with action on 150 proposed plants which together contribute 50,000 megawatts towards this target. Whereas in the USA, since 2000 over 200 coal fired power plants (over 100 gigawatts of capacity) have been closed. More recently at the COP23 Climate Change negotiations, 19 Countries committed to a rapid phasing out of coal.

Whilst greater access to finance is critical to increase energy efficiency investments in both non-OECD and in OECD countries, numerous studies have identified various barriers including both the availability of funds and project development / transaction costs. Energy efficiency projects require an upfront investment which pays off by delivering cost savings over time (e.g. oil and gas boilers have low upfront cost whereas renewable technologies have lower whole life costs) but they do not increase business revenue and so it can be difficult to clearly perceive the benefits. Energy efficiency projects often struggle to attract lending from Local Financial Institutions (LFI) because they are small, fragmented, have high transaction costs, a high proportion of "soft costs" (project design and development) and therefore a lower proportion of securitised assets. Aggregators who could create scaled bankable opportunities are often lacking.

PPP's have been used with remarkable success to attract investment in energy efficiency. Practice shows that institutional capacity for PPPs is very important. There are many possible PPP approaches, some examples include:

- Dedicated credit lines overcome the issues related to insufficient availability of funds for energy efficiency projects by providing the needed funds to LFIs which they can then on-lend to project developers or implementers. For example the Kreditanstalt fur Wiederaufbau Bankengruppe (KfW) of Germany provided a dedicated credit line of €50 million to the Small Industries Development Bank of India (SIDBI) to finance energy efficiency projects in SMEs. Investments focused on efficiency for plant and machinery and production processes and delivered a reduction of 25 tonnes of greenhouse gases for every INR1 million (about US$22,500) invested.
- Risk-sharing facilities provide LFIs with partial risk coverage on loans for energy efficiency projects, thereby overcoming a perception of increased risk. Examples include the Commercializing Energy Efficiency Finance (CEEF) which was designed to meet the Global Environment Facility objectives to promote and enhance commercial financing of energy efficiency projects in Hungary, Czech Republic, Slovak Republic, Latvia, Lithuania, and Estonia.
- Energy Saving Performance Contracts (ESPCs) have proven to be effective tools in overcoming financing barriers to energy efficiency implementation in countries with very mature markets (e.g. in the USA more than 500 ESPC projects have been completed to save US$11.7 billion in energy costs). In the ESPC approach, the customer engages a commercial service provider to design and implement an energy project with remuneration connected to the performance of the project.

Access to modern energy must go beyond residential power access. It must aim to unlock new entrepreneurial opportunities and support global energy interconnection. **The technology for worldwide energy connectivity is available, the barriers are institutional, not technological. Decisive progress can only be made through partnerships that mobilize and share knowledge, expertise, technology and financial resources.**

Capacity building, knowledge & partnerships

Capacity building and knowledge have a critical role to play in ensuring that the right policy and regulatory framework is in place, but also to unlock both public and private funding by presenting bankable projects and scaling up proven solutions such as micro finance and energy efficiency. LFIs are often unfamiliar with energy efficiency technologies leading to unfounded aversion due to a perception of complexity, additional expertise, effort and cost. **Building capacity within project developers, energy services companies (ESCOs), project hosts (energy users), and LFIs can help to overcome the 'disconnect' between projects and current lending practices.** There is also lack of knowledge and trained professionals required to complete risk assessment and management of these projects. MRV protocols have been developed but these must be more widely disseminated and implemented particularly among bankers and lenders.

Extensive international experience and knowledge should be leveraged to expand labelling programmes and minimum energy performance standards for major buildings equipment (e.g. boilers, refrigerators, air

conditioners etc.). Programme development, training, capacity building, and financing are especially needed in developing countries where there is strong evidence that investments can produce large energy savings.

At the global level monitoring and reporting progress towards SDG 7 is essential and is chiefly undertaken by the Sustainable Energy for All (SEforALL) initiative. Findings are published in a biennial report, the 2017 edition concluded that whilst many countries are taking action, the world is not moving fast enough.

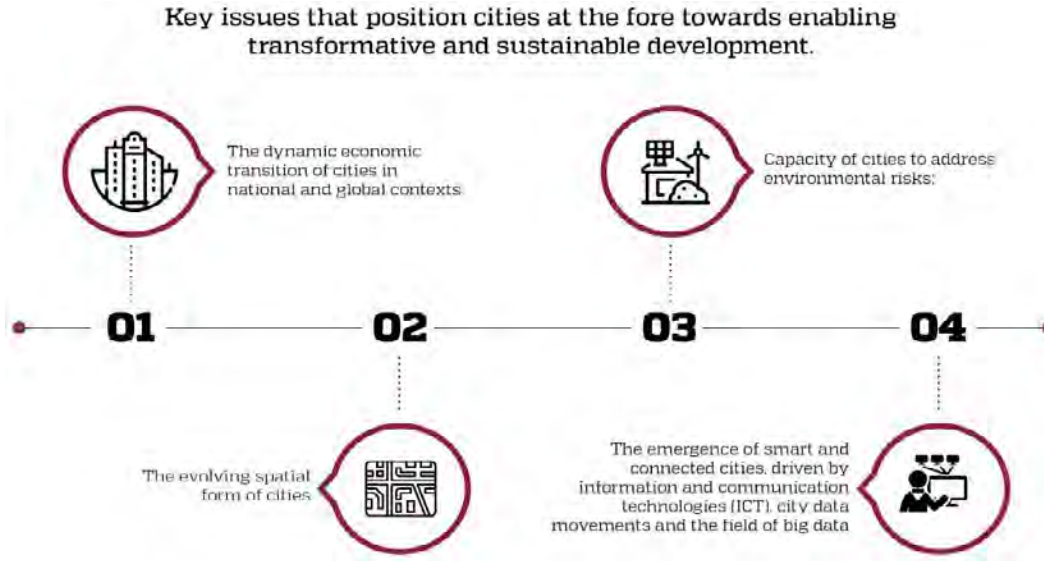
Country level assessments regarding policy and regulatory support for sustainable energy have been completed using the World Bank Regulatory Indicators for Sustainable Energy (RISE). This provides a reference point to help policymakers benchmark their sector policy and regulatory framework against those of regional and global peers, and offers a powerful tool to help develop policies and regulations but also target investments that advance sustainable energy goals.

Partnerships have a direct role to play in delivering SDG target 7A (aimed at enhancing international cooperation), and more broadly for all the targets. The SEforALL supports international cooperation and partnerships including with governments, business, institutions, financiers, development banks, unions and communities, entrepreneurs and civil society in support of SDG 7. The Global Compact for Sustainable Energy provides a complementary framework dedicated to business action in support of SDG 7. The objectives are to motivate, inspire, and guide private-sector engagement in support of SEforALL and identifies where different industries can have the most significant impact. More specifically aligned with SDG target 7.3, the International Partnership for Energy Efficiency Cooperation (IPEEC) works with 17 of the Group of 20 (G20) economies (representing 80% of energy use) to accelerate energy efficiency policies. The Partnership has agreed an action plan with nine dedicated task groups focused on priority areas, best available technologies and best practices. A quick win solution to develop partnerships between state and non state actors is the Marrakesh Partnership on Global Climate Action under the UNFCCC. Cooperative climate action among Parties and non-Party stakeholders through the Marrakech Partnership aims to support implementation of more climate action now, consistent with the achievement of the national climate action but also SDG 7, and to foster greater ambition over time on mitigation, adaptation, and the delivery of finance, technology and capacity building to developing countries. The tracking of progress in the delivery of commitments by non-Party stakeholders and voluntary initiatives can build the confidence required to increase ambition over time, and will help identify gaps and where there is a need for improvement**. Countries should sign joint declarations with initiatives and countries to reinforce partnership efforts and political dialogue on SDG 7 implementation, notably via the Marrakesh Partnership.**

SDG 11: MAKE CITIES INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE

By 2030, the majority of the world's population will live in urban areas, with most of the expansion set to take place in developing countries. If we are to end global poverty and inequality by 2030, it's not just countries that need to achieve the SDGs, but cities too. Yet cities face a number of challenges of their own, many of which could reverse progress. The number of people living in slums is rising, widening the gap between rich and poor. City governments frequently lack the resources to provide water, sanitation, waste management, transport and other infrastructure services that contribute both to well-being and poverty, reducing economic growth. Cities produce a high level of pollution and account for most of the world's energy consumption and high population levels make urban areas more vulnerable to human, social and economic loss caused by climate change and natural disasters. SDG 11 aims to address these challenges head-on and by endorsing a standalone goal on cities, the international community recognized urbanization and city growth as a transformative force for sustainable development.

This transformative force can be achieved with cities taking the lead to address many of the global challenges of the 21st century, including poverty, inequality, unemployment, environmental degradation, and climate change. Cities have become a positive and potent force for addressing sustainable economic growth, development and prosperity, and for driving innovation, consumption and investment in both developed and developing countries. This dramatic shift towards urban life has profound implications for energy consumption, politics, food security and human progress. Although some of this change is positive, poorly planned urbanization can potentially generate economic disorder, congestion, pollution and civil unrest.



Source: UN Habitat, 2016

Clearly, cities need to be enabled to deliver but they also need to understand their role in achieving the global policy agenda. The challenge for cities has never been greater: increasing demands on services and infrastructure, reduced budgets, increased expectations, concerns about the environment and global competition. Advances in technology, ICT, the Internet of Things (IoT), and data analytics provide cities with the tools to better understand the functioning and operation of cities, and to better plan as well as deliver services more effectively and efficiently - helping create 'smart cities'. This can enable them to make more efficient use of physical infrastructure, improve local governance, respond to city needs in real time and even predict them. This will allow for better water and waste management, traffic flows, more efficient building and energy systems as well as allowing for greater resilience, improved governance as well as more cost effective on demand services that benefit citizens.

By taking an integrated approach to strategic city planning, as targeted by the SDGs (11.3 and 11a), all the above city systems and interlinkages are considered collectively which would result in greater efficiency in terms of both carbon and cost. This highlights the need to take a holistic approach to solutions, which is in the spirit of the SDGs. Moving from sectoral interventions to strategic urban planning and more comprehensive urban policy platforms is crucial in transforming city form, notably to enhance the densification of cities. ICTs have the potential to enhance better urban planning and smart city growth, rejuvenating inner city areas and older suburbs, remediating brownfields and, where new suburbs are developed, designing them to be town centred, transit and pedestrian-oriented, with a mix of housing, commercial and retail uses, drawing on cleaner energy and green technologies.

Urban innovation is becoming a massive global market, estimated to be worth over US$400 billion to US$1 trillion by 2020. Meaning, many of the technologies and innovations needed for SDG 11 are already on the market and with around 50% of all urban development yet to be built - mainly in developing countries - this offers an opportunity to leapfrog traditional urban development and design in smart solutions from scratch.

Given the long-lived nature of urban infrastructure, the decisions made over the next five years by both national and local governments will determine the development pathway of the future and SDG 11. Urban infrastructure investment is expected to make up two thirds of global infrastructure to 2030, which equates to around US$4.2 trillion. Financing urban areas are hindered by many of the same barriers faced in other areas, including market failures, short term thinking, lack of bankable projects and the capacity to develop such projects. Many cities around the world are constrained by their national governments, their inability to raise local revenue, take on debt, and engage in PPPs and so on. Successful approaches that cities have employed to overcome these bottlenecks will be explored in further detail but it is essential that there is scale when it comes to capital investments and in LDCs, development finance needs to be exploited.

Cities and resilience

Technology and innovation is helping to make cities more resilient, which is recognised as a priority for SDG 11 (targets 11b and c). Currently, every seventh person worldwide lives in an informal urban settlement, summing up to 850 million people globally. With growing numbers of disadvantaged people now concentrated in mainly urban areas, investments in urban infrastructure can help to meet the needs of poor but also offer huge resilience dividends. This includes providing access to electricity, clean water, and waste disposal as well as access to schools, hospitals and housing. Providing basic infrastructure such as sanitation and sewers helps to build resilience, for instance during floods and disease outbreaks. Public transport, energy installations and basic housing also help to enhance resilience and alleviate poverty help to increase access to urban opportunities and reduce the costs of providing basic urban services. ICT development can play a key role especially in the upgrading of city slums. For example, Kibera, the largest slum in Kenya's capital, Nairobi, is home to approximately 1 million people. Yet Kibera has been excluded from city maps, but by working with local universities and developing an interactive digital map with ICT technologies, it has help the city build resilience as well as to provide basic urban services and better information to citizens, for instance where unsafe areas are flagged.

Many large cities are concentrated in low coastal zones and are exposed to extreme coastal water level events and inland cities, like their coastal counterparts, are also at risk. Settlements located along rivers are specifically considered 'high risk locations'. ICT can play an essential role in disaster risk detection and management through improved flood management systems, as has been done in the City of São Paulo where rain gauges equipped with ICT sends information to an online management platform in real time. This provides an early warning system to the city and its citizens on the likelihood of floods, landslides and droughts. The city of Calgary uses a similar approach to predict floods and by having better information, more targeted regulations on flood prevention have been formed, saving the city millions in water damage costs and improved city resilience. Usually, this benefits those most vulnerable and getting this right will be fundamental to achieving the 2030 Agenda.

The Philippines is a case in point where ICTs have been incorporated in all stages of the disaster management lifecycle from the national to local level. This is helping to prepare and predict flood incidents and in Japan, ICT is helping to prepare urban residents for potential earthquakes. As such, ICT is becoming an increasingly important tool to help cities, countries and citizens prepare and enhance their resilience. In addition, given increasing urbanism, the more resilient a city is, the more likely it is to be able to recover and bounce back to its normal state. **It is imperative that cities take climate and social risks into account when making investment decisions because if not, then cities become increasingly vulnerable and unattractive for further investment.**

Localising the SDGs, driving change and building institutional capacity

In order to make meaningful progress against the targets, national governments and cities need to both adapt their goals towards the SDGs as well as implement, monitor and report progress against them - a process known as localising the SDGs. As much as 65% of the SDG agenda may not be fully achieved without the involvement of urban and local actors. Given their critical role, local governments cannot be mere implementers of a global or national SDG agenda, but must be partners in co-creating and defining policy and programmatic responses, and in the implementation and monitoring of progress against the goals and targets. This can be initiated as part of a national agenda, ensuring policy alignment from a vertical perspective or decentralised to the local level or indeed, driven by cities themselves. As in the case of New York, USA, the city 'OneNY' strategy has been aligned with the SDGs and in Davao, Philippines, they have done an inventory on how local initiatives align with the SDGs. This can ensure the alignment of policies at the national level but also across city departments for SDG 11.

As a priority, national and local policies should be aligned to the SDGs, which in turn will create confidence to investors. Three additional factors should be addressed: greater access to finance, strengthening devolution alongside institutional capacities and development of partnerships in order to boost innovations.

This process of localising SDGs can also be integrated with STI development, for instance Dubai, UAE, has developed a number of policies to govern the opening and sharing of data through the use of ICT developments to support implementation of SDG 11. It has also created a governance structure to oversee its implementation.

The Smart Cities Mission is an urban renewal and retrofitting program by the Government of India. It aims to develop 100 smart cities all over the country making them citizen friendly and sustainable. As of June 2017, 90 cities had been selected to be upgraded as part of the mission. Each city will create a corporate company to oversee implementation, thus enhancing institutional capacity, and in return will receive core government funding to ensure implementation.

It is clear that strong leadership is a prerequisite to "kick start" significant STI uptake within a city but organisational change and strengthening is just as important in order to overcome siloed action, which in turn will help to delivery effective city services at a lower cost for citizens. For example, in Barcelona, Spain, after a major organizational reform, the Urban Habitat Department (the 'Smart City' department) was created. It is a new umbrella structure to coordinate services previously provisioned by individual departments regarding infrastructure, ICT, urban services, urban planning, environment, housing, architecture, energy and water, etc. Thus, previously siloed governmental departments are called to synchronize their strategies to achieve common sustainability goals.

In the UK, there is also a growing trend to decentralise power to the local level for urban STI uptake. Manchester's Smart City Strategy is based on this decentralised model where the national government has given greater autonomy to the city, giving them greater access to local finance (including powers to raise local taxes) so as to invest in local SMEs to advance STI projects throughout the city. This is also helps to drive the local economy and further raise local taxes which the city can then re-invest. **While this trend in overcoming departmental silos and decentralisation is a growing trend in developed countries and cities, the focus in developing countries should be to first establish the necessary institutions and capabilities.**

Emerging markets, like those in Africa, have the opportunity to leapfrog now-redundant technologies in developed nations and create truly smart cities and importantly, the development of such cities are on the increase in Africa, many of which are being built from scratch. An example is a new smart city, Sèmè City, in Benin, which is aiming to foster Africa-grown innovation as a solution to the continent's economic challenges. Sèmè Citywill serve as a tech hub for Benin, complete with a business incubator – with 250 start-ups to be selected to receive support by 2030. A range of incentives have been offered by the government to encourage entrepreneurship and investment, such as tax and customs incentives, special economic zones and procedural advantages. The smart city will also host a number of research facilities and higher education initiatives, and is currently looking for international universities to create new learning establishments. The Sèmè City project aims to address the economic challenges faced by Benin and Africa at large, and graduate 200,000 students and create 200,000 new jobs by 2030.

To enhance local level institutional capacity to better plan, generate revenues, direct public investment as well as attract private investment, city authorities should have more influence and impact at the local level as well as being recognised and supported by their national governments.

Integrated land-use management and city planning should be a priority at the local level to improve coordination and support local investments. National governments must scale up efforts on making their cities more sustainable and smarter but also hubs of innovation.

This is important as structural problems and a lack of coordination between levels of government and across cities often constrain the levels of public investment. Particularly in developing countries, development coordination, including through MDBs and other development institutions, can play a key role in enhancing organisational capacity. Kampala, in Uganda, has worked with development banks to strengthen institutional arrangements and processes, in order to enhance service delivery. Such an approach has helped the city's financial management, which has enhanced its creditworthiness thereby giving greater access to finance which can be used to advance STI efforts. Institutional strengthening and reform can also mean that private companies are less likely to be hesitant to invest in new technologies and infrastructure within cities.

Access to smarter finance and new business models

Access to finance is one of the most significant barriers that city leader's face in delivering on their development plans and SDGs. Additionally, there is a shortage of not only financial resources but also expertise in

securing investment for infrastructure projects. Despite these difficulties, many cities are devising innovative ways to diversify sources of finance as well as strengthening urban access to appropriate finance so as to empower them as agents of change.

In many cases, the public sector – locally and centrally – have limited budgets. This means that new market-oriented and sustainable strategies of public-private cooperation must be developed and cities must seek greater levels of external investment. For this to happen, the investment community seeks certainty through policy, leadership and direction, but most importantly scale of investment. However, most cities, at an individual level, presently deliver neither of these.

There is a need for cities to diversify traditional funding sources, but also generate new sources of revenue. These include greater budgetary control, enhanced creditworthiness, the use of land value capture, municipal bonds, reform of multilateral funding, and the ability of cities to generate their own taxation. In Lagos State, Nigeria, land and property tax reforms helped to raise public revenues from US$190 million to over US$1 billion. The "Rail plus Property" model which captures the increase in property values due to new public transport routes delivered US$940 million in profits in 2009 for the 76% government-owned MTR Corporation in Hong Kong. Land sales and leases of government owned land also offers a one-off opportunity to raise revenues, notably if land value capture opportunities are not available. For example, Mumbai, India, generated US$1.2 billion in 2006 from the auction of 13 hectares of land, which was 10 times more than the city budget the previous year.

In addition, user charges and fees can generate much needed revenue, for example in the UK, London's congestion charge generates over £100 million which is earmarked for enhancements in the capital's sustainable transport network. The ability for cities to generate their own taxes is also important. In France, cities have been given the authority from their national government to charge business over a certain size a tax so that the revenues can be invested back into the public transport network which ultimately benefits the business in return. This type of 'beneficiary pays' approach is becoming increasingly popular, for example, in the UK around a third of the funding for a cross-London rail project will be funded by local business given the benefits that they will receive from it.

National governments can play a key role in addressing the finance gap in cities so that they can meet local level needs aligned to the SDGs. A key area will be to strengthen city authorities in terms of finance, capacity and policy frameworks. This will help to transform the financial system of cities and the effectiveness of investments needed to meet the SDGs.

A major sticking point is that only 4% of the 500 largest cities in developing countries are deemed creditworthy in international financial markets, rising to 20% in local markets. This is centrally related to the weak revenue bases that often characterise municipal budgets. Investing US$1 in raising the creditworthiness of cities can leverage more than US$100 in private-sector financing for smart infrastructure. The World Bank's City Creditworthiness Initiative has proved particularly successful for cities such as Lima, Peru, which enabled it to issue bonds to invest in low-carbon public transport. **Improving urban finance for the least-developed countries is a global development imperative and improving knowledge exchange is particularly important for developing countries but also for South-South cooperation.**

Cities can also use municipal bonds to finance a group of infrastructure projects, whose collective assets underwrite the bond. Such bonds allow cities to attract large institutional investors which typically prefer not to invest in small, individual projects. Sometimes, investors will accept a lower return when there is a commitment to use funds in a socially or environmentally responsible manner. The volume of labelled green bonds has grown steadily since 2013, reaching US$221 billion outstanding issuances in 2017, but of this less than 2% has been directed to Southern cities. Despite this, Johannesburg in South Africa has recently successfully issued green bonds, worth ZAR1.5bn (approx. US$143m) and is funding projects across a range of sectors including 150 new dual fuel buses and converting 30 buses to biogas. The bond was 150% oversubscribed. Citizens should be also involved in innovative co-creation and "crowdfunding" mechanisms, in order enhance their sense of awareness by getting tangible outcome from smart cities initiatives. This has proved successful in New York where local citizens have invested in the city's green bonds, which has also helped to make the city more resilient.

The bond market can help to enhance city resilience, for example, catastrophe bonds can be leveraged in the goal to provide the world with access to the $200-$300 billion of capital required to help countries and cities com-

bat climate change and other natural disaster shocks.

As green bonds are relatively new, MDBs - which are major players in these markets - should only issue them when there is a direct link to the targets of SDG 11. International standards should be established to ensure this. Furthermore, as smaller cities are often unable to take advantage of such facilities, they should look to develop joint initiatives and partner up to raise their scope of borrowing so as to aggregate demand.

However, if bonds are to be issued, the projects themselves must be bankable. This is true for other sources of financing and funding and there are facilities available that can help to achieve this. For example, the UN Habitat Slum Upgrading Facility works with local actors to make slum upgrading projects bankable – that is, attractive to retail banks, property developers, housing finance institutions, service providers, micro-finance institutions, and utility companies. The Facility has pilot projects in Ghana, Indonesia, Sri Lanka and Tanzania, where various approaches are being tested to support the bankability of projects.

PPPs are an obvious area for city finance but tend to be top-down driven by national governments. However, they are increasingly being driven from the bottom up. In Flanders, Belgium, in 2014, the national bank launched a co-financing program of €400 million with the European Investment Bank to facilitate the realization of smart projects. Local authorities and local business joined forces and made a massive use of this program, and the success has resulted in the launch of a second program, again available for €400 million.

For PPPs to succeed, lessons must be learned from historic failures. Poorly structured deals using more expensive private finance and overly optimistic user revenue forecasts have had disastrous consequences. One example is Mexico's PPP road programme, which left local and national users with some of the most expensive road tolls in the world and ended with the government taking 23 projects back into public sector control, along with responsibility for US$5bn of debt. In Egypt, freshwater - a vital resource already in short supply for drinking - was wastefully being used for irrigating urban green areas. The government knew something had to be done, but public funds were tight, and it had limited experience in enlisting the private sector to develop solutions. After adopting PPP legislation, the government invited companies to tender for building a wastewater treatment plant, which could both generate water for irrigation and limit the amount of polluted water being dumped in the Nile. By adopting a prosocial PPP model, costs have been brought down, indirect jobs created and the city of Cairo is now more resilient.

This experience is not unique, PPPs have been effectively deployed in cities across all continents, with PPPs accounting a sizable proportion of investments in some economies, for example the UK where it can be as such as 10%. As PPPs cover long time spans, these can complicate contractual arrangements, difficulties to cover costs through fees and political risks alongside a lack of administrative capacity can all make PPPs unattractive propositions. However, if done well, it can significantly enhance action towards the SDGs.

For PPPs to be successful, there needs to be a shared and balanced distribution of risk and reward and contracts should not try and predict every eventual outcome. By having flexibility in contracts, with the support of national governments, PPPs can scale up implementation on the SDGs.

Leveraging ODA and MDB finance for the local levels can play an important role in scaling up new partners and blending finance for the SDGs. Current ODA to LDCs is in the region of US$41 billion but only US$0.3 billion of ODA is allocated for urban projects in LDCs. ODA to LDCs has recently increased but is way off the UN target of 0.15-0.2%. The AAAA commits to scaling up international coordination to strengthen capacities of local authorities and a concerted effort by all stakeholders. Using ODA will help de-risk investments from the private sector and build institutional capacity as well as accountability. Ensuring the capacity of the local level to develop bankable projects as well as partnership building (including South-South cooperation) is just as important. **ODA funding needs to better target urban areas and not just at the infrastructure level but also at the human capacity level, in terms of project development but also project implementation. This is typically overlooked and technical assistance must feature more prominently in MDB finance.**

Capacity to act and knowledge sharing

Alongside new and better coordinated institutions and finance, there will be a need for new urban managers and skills to take advantage of new technologies and innovations. National government can play an important role in facilitating this. In the UK, the government worked with cities across the country to develop capacity,

best practice sharing and knowledge on scaling the uptake of technology innovations at the local level. City and sectoral networks are also sharing knowledge and best practices around new technologies ideas, which should be taken advantage of at the local and national level.

Skills in integrated planning and management capabilities must be scaled up in both developed and developing cities, which involves spatial, temporal and technical coordination of diverse policy areas and planning resources. It is particularly challenging as it involves managing long-term planning perspectives alongside short-term actions.

Living labs in cities like Singapore, and Santiago de Chile are helping to test innovative technologies, R&D and deployment. In the case of the latter, tax incentives are given to business who support R&D activities. These can act as test-beds for innovation and facilitate the transition for SDGs, which can support the scale and pace needed for their attainment. The most promising innovations right now are already on the market in the building, energy, waste, water sectors and so on. However, the greatest innovations can also come from the way we work and align ourselves to facilitate innovations. To do this, we need the capacity to make this happen. **A quick win solution for national governments would be to establish innovation zones in cities and to facilitate the sharing of best practices and capabilities between cities as soon as possible.**

The old adage, "you can't manage what you can't measure" is fundamental to the urban SDGs given their wide ranging focus but also for decision making. There are a multitude of indicators which are being aligned with the SDGs that incorporate ICT and geospatial information and can be used to progress smart city efforts (e.g. ISO 37120 and the International Telecommunications Union (ITU) indicators on United for Smart Sustainable Cities). By having comparable data, cities can make informed decisions through better data analysis, benchmarks, and target performance, prioritize budgets, improve operations transparency which can support the development of new business models, overcome governance silos, learning and leverage funding for infrastructure and technological investments. Mobile phone data offers a quick and relatively cheap source of information and has been used to enhance understanding of travel patterns in London, UK, Nairobi, Kenya, but also support crowd control and people's safety during Mecca in Saudi Arabia. **Only about 20% of the world's 150 largest cities have even the most basic analytics needed for low-carbon, SDG planning, and too few have created long-term plans and targets. This is a challenge to achieving the SDGs and makes capacity building on MRV – especially in cities – all the more important. This should be a priority for national governments and UN agencies to address.**

Data exchange can also drive the local economy through innovation and open standards, helping to avoid vendor lock in. The Copenhagen City Data Exchange, collates information from various private companies and public authorities, synthesising the information to enhance the efficiency of the city allowing it to eliminate big data silos. The exchange enables large companies, small and medium enterprises, start-up companies, as well as the academic, the public and public sectors, to come together and integrate multiple sources of information. Such levels of data integration helps business develop innovative partnerships and solutions with open standards that also helps the city of Copenhagen to largely improve its city operations and provide improved services without having the need to increase capex on infrastructure and data gathering, while also helping drive local business.

National reviews on the SDGs are starting to include complete local level data but this is the exception rather than the norm. This will need to change if national governments are to put in place the right frameworks in order to facilitate the local level action that can drive STI developments and finance in cities.

Partnerships will be essential to scale up deployment and can take several forms, from partnerships between national and local governments, partnerships between the public and private sector, to partnerships between cities and their citizens. This helps to break down hierarchies and lead to greater innovation, better targeting of resources and an increased sense of ownership of projects and initiatives. At the same time, the objectives of cities and business are sometimes (perceived to be) not aligned, resulting in a lack of partnership development. To overcome this, Amsterdam, Holland, partners with a range of local business, universities and SMEs through an online platform where innovative solutions are put forward and solutions taken up. A key success condition is that the partners involved must agree that this project is valuable, and commit resources to it accordingly (co-financing, charging for products or services at cost, or committing in-kind hours). Most projects thrive by having one partner that can clearly benefit from the project: as owner of the project, he or she feels responsible

for the process and its outcomes, takes initiative when the project struggles and is often also the project leader.

Partnership programmes that have also been set up at the national level to support cities, including in China, Brazil and Holland. By the end of 2015, after four years of numerous applications and 185 concluded projects, the Dutch government has proven with the Green Deal Programme that with a responsive and collaborative approach and by bringing in relevant stakeholders across sectors, many barriers to city investment can be overcome. Partnerships can also work between countries, such as the recent partnership agreement with the EU and India on smart urbanism as well as with cities, for instance through the World Bank's City and Regional Partnership Programmes which helps cities across Japan share best practice efforts on funding and financing STI innovation.

The scaling up of partnerships is essential. Local, national and global initiatives should take advantage of the networks and facilities available. A particular priority will be to bring state and non-state actors at the local level closer together. The city initiatives under the Marrakesh Partnership of Global Climate Action is a quick win solution and should be further facilitated, financed and championed by the UN system as well as at the national and local level.

RECOMMENDATIONS AND CONCLUSIONS

While all the SDGs face their own unique circumstances, they share similar challenges which cannot be seen in isolation. Transformational change is needed in how we run and build our cities, produce and use energy as well as how we manage and supply our water systems. There is a consensus that money will not do the job alone and that a range of barriers need to be firstly tackled to raise the quality and quantity of investment decisions. Other efforts will take time to bed-in but will result in significant progress going ahead.

The importance of strong political will cannot be understated. This can create the right vision and align incentives to support higher levels of ambition, if not, it will lead to disorganised and even conflicting efforts that have the potential to be counterproductive. This will must be enacted at all levels of the political spectrum. Concerted action in five interlinked areas can overcome these barriers and build the much needed enabling framework to advance efforts on the SDGs.

1. **Strengthen investment in STI and foster business dynamism**
2. **Invest in and shape an efficient system of knowledge creation and diffusion that will help to foster talent, skills and optimise their use**
3. **Seize the benefits of the digital economy**
4. **Improve the governance and implementation of policies for innovation**
5. **Transform the financial environment for the SDGs**

In addition to the specific recommendations outlined for the individual SDGs, these cross-cutting recommendations build on and take forward the 10 "Doha Messages" drawn from the discussions of the High Level Conference on Financing for Development and Means of Implementation of the 2030 Agenda (19/11/2017) and provide timely input and consideration to the 2018 HLPF and FfDForum.

1. Strengthen investment in STI and foster business dynamism:

Recommendation: Increase national and global financing and funding targeted at STI's for SDGs implementation, this should include a visible floor percentage of countries' ODA focused on helping those furthest behind and cities. Funding allocation should account both financial and non-financial factors in order to strengthen transparency, allow solid monitoring, increase accountability and review, and provide useful contributions to national SDG reporting.

Recommendation: Governments should tackle fundamental price distortions in order to provide incentives for investment, innovation as well as to generate revenue to support those most in need. Removal of inefficient subsidies, notably inefficient fossil fuel subsidies, should be complemented with pro-poor pricing as appropriate to remove access barriers and ensure that no-one is left behind.

Recommendation: Governments should establish a comprehensive and transparent fiscal accounting and reporting standard for "people first" PPPs and inclusive innovation. They should establish legal, regulatory and monitoring frameworks for PPPs that ensure appropriate pricing and quality of service aligned with the SDGs. It is necessary that countries also set up the public institutional capacity to create, manage, evaluate and monitor PPPs.

2. Invest in and shape an efficient system of knowledge creation and diffusion that will help to foster talent, skills and optimise their use

Recommendation: Increase public and private sector investment in R&D aligned with SDGs. To do this, it will be necessary to provide better public support and include predictability of regulatory regimes, tax credit schemes, proper pricing schemes (e.g. carbon pricing) and other investment incentives, notably in cities. These incentive policies should be time-bound, in that it can trigger rapid learning-by- doing and lower the financial risk associated for the private sector.

Recommendation: All countries, including the poorest, to invest at least 1% of their GDP onresearch and urge the most advanced countries to spend at least 3% of GDP on R&D. Countries should also exploit the impact of trade and aid to scale up opportunities for global, cross border, regional and local capacity building, knowledge sharing and so on, in order to advance SDG efforts. There should be a focus on the diversification of LDC economies and all national funding sources should be aligned to STI roadmaps to avoid a piecemeal approach. A particular focus should be on supporting SMEs, which can play a key role in driving local and national economies. This should include the state acting as a guarantor in the first instance for loans and then acting as an advisor or regulator if needed.

Recommendation: National R&D priorities and STI roadmaps should be developed and aligned with the SDGs. In turn, these roadmaps should influence reforms to the science and education policies, including university, secondary, tertiary and vocational education and skills in countries. This will create a skilled workforce and informed citizens of the future needed to deliver a paradigm shift to advance STIs for the SDGs. At the same time, Governments must also partner with countries (notably LDCs) and non-state actors to help cities to share experiences and best practices, supported by the UN system, notably through the TEM. A quick win solution would be to scale up efforts on the Marrakesh Partnership on Global Climate Action.

3. Seize the benefits of the digital economy

Recommendation: Both the public and private sector should promote open data and open standards in support of SDG implementation. In this context, data should be considered an "asset" whose development for universal use should be the objective of public policies, but also protecting people from the misuse of personal data. Where appropriate, the public sector players should look to "monetise" data wherever possible.

Recommendation: International collaborations on data science and technology research must be scaled up by UN bodies. The HLPF must urgently address data gaps related to the SDGs and associated targets at the local, national and international level. Where gaps are identified, roadmaps and expert groups, at both the national and international level, should be established instantly to build capacity for MRV through STI, notably including ICT.

4. Improve the governance and implementation of policies and regulation for STI

Recommendation: Establish National Science and Technology Agencies and Funds to ensure coordination at all levels. Governments should devolve decision making and budget control to an appropriate level in order to enable local level action to implement STI solutions for SDGs. For this to be effective at the local level, particularly in developing countries, institutional capacity and funding / finance need to be strengthened. Better budgetary management, enhanced creditworthiness, municipal bonds, reform of international public finance and the leverage of cities over taxation are critical for making an impact. Countries should set up excellence centres, technology incubators etc. in cities with SMEs, where in some cases national regulations are relaxed to test innovative solutions.

Recommendation: Quick action should be taken to improve effective and proven regulation, standards, labelling and trade towards the SDGs. This should account end of use issues and be mandated by public authorities as well as the private sector. The public sector should also include SDG criteria in all procurement procedures and decisions.

Recommendations: Apply relevant policy principles (e.g. polluter pays, beneficiary pays, etc.) that will help drive behaviour change. All countries should develop long term transitional plans for STIs aligned with the SDGs and related international agreements in order to accelerate efforts. These plans should be replicated in cities, prioritising long-term policies and investments aligned to the objectives of Goal 11 and beyond, to ensure a whole government and society approach, ensuring coordinated action both vertically and horizontally.

5. Transforming the financial system for the SDGs

Recommendation: Multilateral and other DFIs, alongside governments at all levels, to formally commit and detail how their future policy and investment decisions and STI roadmaps will be aligned to the SDGs. Sovereign wealth funds and financial blending should also be aligned to the SDGs and best practices on how to do this can be done must be urgently shared, notably through the UN system, in order to scale up supply and demand side innovation.

Recommendation: Governments, MDBs and investors should agree common standards for the scaling up of investments towards the SDGs, notably in relation to municipal green bonds so as to enhance liquidity in financial markets and unlock capital for investment towards. As an urgent first step, municipal and green bonds should only be issued if there is a direct link with the SDGs and international standards should be established to ensure this. Wider financing and funding conditionality should be used where necessary to ensure effective investment is targeted towards the SDGs.

Recommendation: Countries should mandate public, private organisations and investors to disclose their contribution to the SDGs by requiring accounting and transparency in their decision making and financial systems through non-financial reporting legislation. This disclosure will help undertakings to incorporate the SDGs in terms of accountability, transparency and investments. Voluntary frameworks for disclosure - such as the GRI - could provide useful mechanisms to ensure that disclosures are sufficiently detailed and transparent, enabling the benchmarking of performance.

Conclusions

The recommendations outlined above, as well as in the individual chapters, detail a number of important steps needed to finance and implement any roadmap for STI transformation for the SDGs. In doingso, with determined political will, economies will be transformed as well as efforts towards SDG 6, 7 and 11. There is also a need for patience as countries, regions and cities as well as the international community at large refocus on their attainment. The SDGs will only be taken seriously if they have a mandatory MRV element attached to them at the company, local, regional, national and international level, with clear lines of responsibility and accountability.

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FINANCING SUSTAINABLE, RESILIENT AND INCLUSIVE SOLUTIONS TO ATTAIN SDG 12

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21 December 2017

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Objective of the background paper is to provide expert knowledge on the theme of financing science, technology and innovation (STI) solutions for Sustainable Development Goal (SDG) 12.

Executive summary

The Sustainable Development Goals (SDGs) will only be attainable with ubiquitous deployment of resource-efficient technologies and the introduction of sustainable consumption patterns. An absolute decoupling of natural resource use and environmental pressures from economic growth and well-being improvements is a key means of implementation for the 2030 Agenda for Sustainable Development. Governments and business leaders have come to the realization that improving resource efficiency, along with inclusive and sustainable economic growth and deep cuts in drivers of environmental pressures, are essential to achieving the SDGs. Likewise, consumer awareness and changed consumption patterns have been identified as indispensable elements for sustainability.

The continuation of an economic development pathway that is based on the premise of stable and ample supplies of cheap, easily accessible materials and energy for inefficient mass consumption has become less probable. High volatility in prices and supply chain risks has already caused large macroeconomic losses, especially in the most vulnerable parts of the world. An economic approach characterized by sustainable consumption and production (SCP) follows a more robust and advanced economic paradigm in line with the SDG agenda and substantially improves the resilience of the global socioeconomic system.

This paper shows the following:

- A continuation of existing consumption and production policies is not compatible with reaching the SDGs;
- Smart SCP policy combinations targeted at impact decoupling in combination with resource efficiency typically lead to net economic gains measured in terms of gross national product.
- SCP policy changes, such as resource taxes, that shift subsidies towards resource efficiency and SCP research and development policies create asymmetries in terms of global winner and loser countries. Economic transfers combined with technology transfer mechanisms carry the potential to create net positive outcomes for all countries with ambitious SCP policy frameworks;
- Public finance systems as well as regulatory frameworks will need to undergo a substantial reform in order to trigger and maintain the momentum for an SDG transition.
- Current SCP technologies are not sufficient to attain multiple SDGs, or even ambitious formulations of single SDGs;
- Targeted large-scale science, technology and innovation (STI) programmes for breakthrough technologies requiring unprecedented amounts and modes of financing are necessary conditions to close the anticipated SCP technology gaps. Incremental technology agendas will not be sufficient;
- The uncertain success of breakthrough technologies needs to be physically hedged by preparing backstop strategies ex ante to ensure the attainability of critical targets. A particular set of risk finance instruments needs to be created to guarantee the availability of "physical backstops" when needed;
- Constructing "smart" SDG policy portfolios will require new economic thinking and analytical tools that couple the economic system with finance, technology and its respective STI sectors. Big data, citizen science and methodological advances will help in the selection of robust STI investment strategies supporting broader SDG policy portfolios.

I. Introduction

The Sustainable Development Goals (SDGs) are considered the most complete expression of the positive aspirations for human development. Among the SDGs, SDG 12—sustainable consumption and production (SCP)—is less of a goal in itself, but more a guideline for means of implementation of the aspects of the goal. Sustainable use of natural resources is referred to 12 times directly in the 17 SDGs and is considered to be a necessary

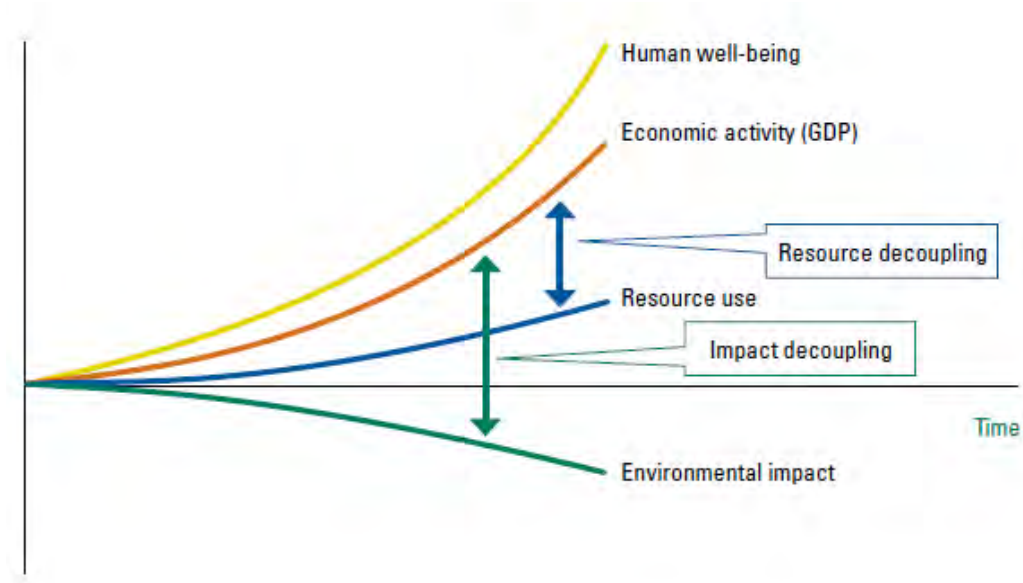
building block for the attainment of all SDGs. In this sense, SDG 12 can be considered to be transversal and cross-cutting. SDG 12 is strongly associated with the notion of dual decoupling, which refers to resource and environmental impact decoupling. The degree of decoupling can serve as a metric of attaining metabolic targets of resource intensities, which are in line with the pathways towards reaching the SDGs.

An expanding human population combined with increasing individual affluence is expected to cause resource use to intensify. Given limitations on the access to and use of resources, SCP is becoming an essential requirement for development and continued human well-being. The economic system of today is surprisingly wasteful in its mode of value creation. For example, according to a study by the Ellen MacArthur Foundation, in Europe, material recycling and waste-based energy recovery captures only 5 per cent of the original raw material value.[1] Analysis has also found significant structural waste in sectors that many would consider mature and optimized. For instance, in Europe, the average car is parked 92 per cent of the time, 31 per cent of food is wasted along the value chain, and the average office is used only 35–50 per cent of the time, even during working hours. Resource efficiencies in the developed world are much higher in certain sectors (e.g., waste paper recovery); when it comes to the use of natural ecosystems, efficiencies are much lower (e.g., deforestation for extensive livestock production), mostly related to weak governance systems and institutional anchoring.

SDG 12, as illustrated in the mind map in figure AII.1, consists of roughly four blocks: (i) sustainable production; (ii) sustainable consumption; (iii) sustainable finance; and (iv) circular economy concept. SCP will lead to decoupling. The concept of decoupling is represented in figure I.1 in an idealized manner. It shows increasing trajectories for gross domestic product (GDP) and human well-being. However, figure I.1 also shows resource use increasing at a slower pace than GDP (relative resource decoupling) and environmental impacts actually declining (absolute environmental decoupling).

Figure I.1

Decoupling of resource use and environmental impacts from GDP growth



Source: UNEP (2011), Figure 1, p. xiii.

I.1 *The economic benefits of resource decoupling and its principle means of implementation*

Resource efficiency can be seen as a potential investable asset class that can generate tangible short- to me-

1 Ellen MacArthur Foundation (2015). Towards a circular economy: business rationale for an accelerated transition. Available from https://www.ellenmacarthurfoundation.org/assets/downloads/TCE_Ellen-MacArthur-Foundation_9-Dec-2015.pdf.

dium-term benefits to economic performance. There are several benefits associated with investments in resource efficiency:

- **Price and price volatility risk**. The last decade has seen higher price volatility for metals and agricultural output than in any single decade in the twentieth century (Ellen MacArthur Foundation, 2015). The market dynamics of resource supply have produced resource and commodity prices, which have been highly volatile over time (UNEP and IRP, 2015). If resource efficiency can reduce the demand for resources and accumulate inventories in recycling and reuse pools, it will be able to dampen price volatility and the subsequent adverse effects on the economies and socioeconomic stability of many nations. Higher resource-price volatility can dampen economic growth by increasing uncertainty, discouraging businesses from investing, and increasing the cost of hedging against resource-related risks. Furthermore, continued reliance on raw material supply rather than products from recycling, reuse or remanufacturing will put more pressure on long-term prices for basic commodities.
- **Physical supply risk**. Resources, especially rare metals, are concentrated in a few countries. Thus, the rest of the world must rely on imports. For example, the European Union (EU) imports six times as much in materials and natural resources as it exports and has been identified together with Japan as a region highly vulnerable to systemic supply risks (Klimek and others, 2015). Japan imports almost all its petroleum and other liquid fuels and its natural gas, and India imports about 80 per cent and 40 per cent, respectively. Even in the area of supply of commodities for basic consumption such as food, countries are surprisingly import dependent. For example, for the supply of phosphorus, an essential component in fertilizers, India is almost completely dependent on imports (Khabarov and Obersteiner, 2017). Security of supply associated with long, elaborately optimized global supply chains appears to be decreasing. With increased resource efficiency, not only will the physical supply be available longer, but the flow of resources to satisfy the material demands of our modern societies can be kept more steady, as the resource pool is more diversified and the primary resource will be maintained for a longer period of time.
- **Intergenerational equity.** Finally, there is the moral argument to be made in favour of increased resource efficiency. In the spirit of intergenerational equity, high resource efficiency assures the availability of resources for an increased number of future generations.

There are several means of implementing resource decoupling, which can be achieved through three principle areas of intervention:

i. Increasing resource productivity through resource-efficiency gains and switching to a circular economy;

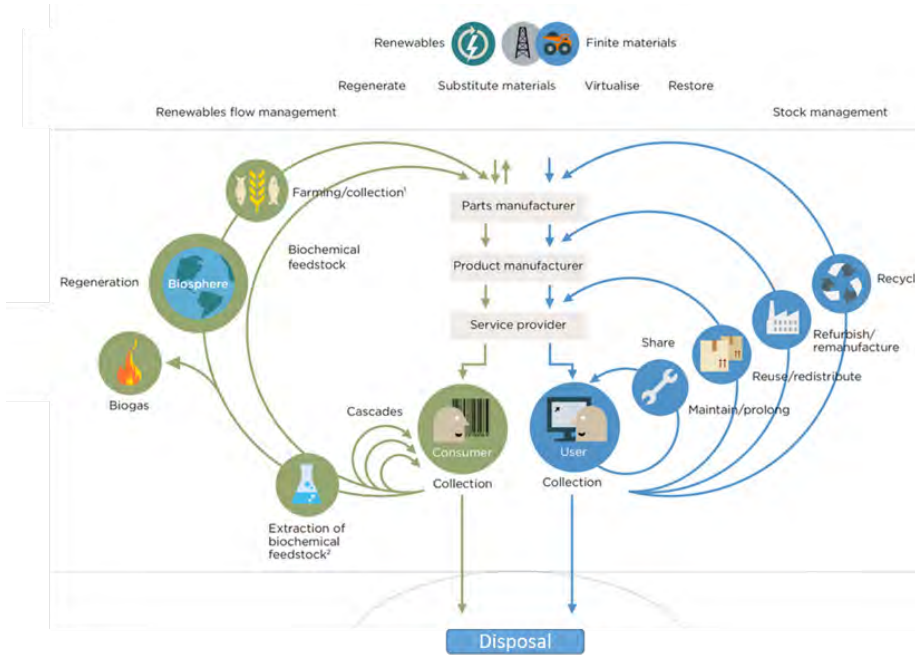
ii. Substituting resource-depleting technologies by resource-saving or resource-neutral technologies;

iii. Switching to more sustainable consumption patterns.

According to the Ellen MacArthur Foundation project's definition, a circular economy is restorative and regenerative by design, and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles. It is conceived as a continuous, positive development cycle. It preserves and enhances natural capital, optimizes resource yields, and minimizes system risks by managing finite stocks and renewable flows.[2]

2 Ibid., p. 5.

Figure I.1: Circular economy diagram



Source: Braungart and McDonough. Cradle to Cradle report and Ellen MacArthur Foundation (2015). Available from https://www.ellenmacarthurfoundation.org/circular-economy/interactive-diagram.

Expressed in a more condensed way, a circular economy is one that is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles.

I.2 *Impact decoupling through SCP in the context of the SDGs*

The degradation of the natural environment and the Earth system at large is a major concern for the global society. There is increasing evidence that further degradation will erode the fundamentals of long-term global wealth creation and human well-being. The depletion of low-cost mineral and metal reserves and the large-scale, rapid degradation of natural capital are affecting the productivity and resilience of our economies. On a global scale, the elements contributing to systemic risks to society as a whole are known as the planetary boundaries—that is, Earth system components such as climate, biodiversity, land, water, air and oceans.

While resource decoupling removes or reduces general pressure from socioeconomic systems and from the natural environment, impact decoupling in the context of the SDGs will ensure that specific environmental targets are reached. Such targets are related mostly to the dimensions of the planetary boundaries. The most iconic and most advanced area of impact decoupling is climate. SDG 13 is about impact decoupling with respect to the climate system. Substantial increases in resource efficiency in production and consumption are essential for meeting climate change targets. At the twenty-first session of the Conference of the Parties (COP 21) to the United Nations Framework Convention on Climate Change (UNFCCC) in Paris, representatives of 195 countries pledged to limit global temperature rise to 1.52.0°C above pre-industrial levels.

Technological change will be critical to decarbonizing these sectors. However, demand reduction through resource efficiency will also have a crucial role. The Intergovernmental Panel on Climate Change (IPCC) states that "efficiency enhancements and behavioural changes, in order to reduce energy demand compared to baseline scenarios without compromising development, are a key mitigation strategy in scenarios reaching atmospheric CO2eq concentrations of about 450 to about 500 ppm by 2100 (robust evidence, high agreement)" (IPCC, 2014, p. 99). In the scenarios analysed by IPCC, the median levels of final energy demand reduction relative to baselines in the transport, buildings and industry sectors are about 20–30 per cent, with the high end of the ranges

exceeding 60 per cent in each sector (IPCC, 2014). Increasing resource efficiency is a critical strategy to enable such necessary demand reductions to be achieved, without negatively affecting human development and well-being.

Impact decoupling with respect to the other major environmental resources, such as water, air, land and oceans, is equally important. In a vision of impact decoupling under a wider SDG framework, revenue streams from multiple ecosystem services will need to be stacked to increase the momentum for a rapid transformation towards sustainability. For example, the economics of a mixed farm will be driven by payment streams for cleaner water provisioning, carbon sequestration, soil nutrient management, biodiversity buffer strips, and crop and livestock production (given specific animal health provisions). Impact decoupling will also require significant changes in the public and private finance systems—especially in the form of ecosystem services payments, either through general budget funds or through market-based instruments.

Figure I.2.1 illustrates a stylized transitional scheme for public finance resulting from active policies to implement impact decoupling. In this case, the scheme involves impact decoupling between GDP and carbon emissions in order to align with ambitious climate stabilization targets, and results in a majority of fossil fuels remaining unexploited. While the estimates of fossil fuel reserves measured in potential emissions of some 11.000 GtCO2 are huge, the allowable budget of the additional carbon load to the atmosphere is only a small fraction of some 870-1240 GtCO2. If there were no climate changes or any other harmful effects on the Earth system functioning (e.g., ocean acidification), nations could continue to rely on relatively cheap fossil fuel reserves to propel their economies with abundant energy. Revenues from taxing the extraction and use of fossil fuels would continue to be a lucrative source of income to national budgets.

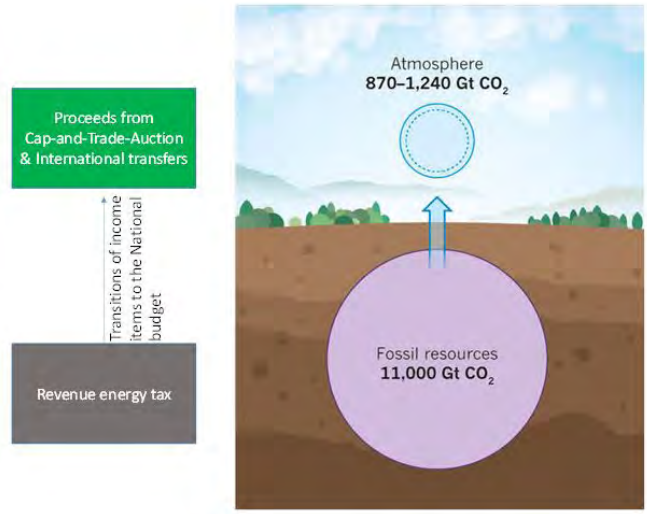
However, since the Paris Climate Agreement calls for impacts from a disturbed climate system to be avoided, national budgets need to be filled by other forms of revenue to the Government. Estimates for the EU28 show that total revenues from energy taxes amounted to €70 billion per year, while support[3] to coal and gas amount to €17 billion per year, and support for nuclear and renewables are in the order of €35 billion per year. Support to energy demand amounts to €27 billion per year while support to energy efficiency only receives some €8 billion per year. As a result, the energy sector is actually a net recipient of governmental funds. On the other hand, proceeds from the Cap-and-Trade-Auction[4] yield some €10 billion per year at a price of ~€10/t CO2, which is at least 10 times too low to provide a strong enough signal to bring the energy sector in line with the Paris Climate Agreement. Under this scenario of a much higher CO2 price, the energy sector would be a large net contributor to the national budget, making much of the support to renewable energy deployment redundant. Some of the proceeds of the EU emissions trading system (ETS) could be used to help fund energy transformations and enhancement of natural carbon sinks in other parts of the world, and help ramp up STI capacities to find new energy solutions, helping to reduce the costs of the energy transition.

3 See https://ec.europa.eu/energy/sites/ener/files/documents/ECOFYS%202014%20Subsidies%20and%20costs%20of%20EU%20energy_11_Nov.pdf.

4 See https://ec.europa.eu/clima/policies/ets/auctioning_en.

Figure I.3

Transitioning of public revenue items under climate policy from tax on fossil fuels to proceeds from auctioning emission rights



II. Science, technology and innovation (STI) challenges and finance assessment of the Sustainable Development Goal (SDG) 12 system

II.1 *STI solutions and gaps to attaining SDG 12*

Significant advances in technology are required to meet the SDGs simultaneously and sufficiently early. If properly guided and resourced, technological advances can produce new solution spaces for society that were thought unattainable just a few years ago. For example, information technologies in combination with new agricultural or industrial technologies are now becoming available and can be deployed at scale, which allow for improved resource efficiency and for the creation of sustainable supply-chain management through a chain-of-custody material tracking system. A new paradigm of "block-chaining the atoms" of the material flows which propel our societal metabolisms no longer seems utopian. These advances carry the potential for more efficient collaboration and knowledge-sharing, full tracking of materials, improved forward and reverse logistics set-ups, and increased use of renewable energy and multiple-use materials (Ellen MacArthur Foundation, 2015).

Detailed technology studies are available for a myriad of sectors that are trying to address particular environmental and social challenges. Such studies typically evaluate technology potentials in terms of marginal abatement costs for additional activities of technology deployment that address a particular environmental goal, such as air pollution or climate mitigation. Studies that address the issues of resource efficiency—the narrower goal of SDG 12—are less numerous, whereas resource efficiency is an integral part of strategies in other sectors. This study will not deal with resource efficiency issues related to SDG 6 (water), SDG 7 (energy) and SDG 11 (cities and human settlements), as they will be covered by separate in-depth studies of the High-level Political Forum on Sustainable Development. For illustrative purposes, the focus of this paper is on technology and innovation options for resource-efficiency opportunities in the global food system.

Technologies and innovations boosting resource efficiency and sustainable consumption and production (SCP) in the agrifood sector

The long-term sustainability of the agrifood sector crucially depends on the sustainable management of its very basic natural resources—land, soil, water, air and climate, biodiversity—as well as the sustainable management of mineral resources, such as phosphorus, for the production of fertilizers. SDG target 12.2 requires that, by 2030, the sustainable management and efficient use of natural resources be achieved by all sectors. Currently,

however, the natural resources managed directly and indirectly by the agrifood sector are often not managed sustainably or efficiently, leading to degradation or depletion of resources and natural capital.

Table II.1.1

Natural resource impacts of the agrifood sector and solutions and gaps

Facts of resource impacts of the agricultural sector	Solutions and gaps
• Globally, an estimated 33 per cent of soil is moderately to highly degraded owing to erosion, nutrient depletion, acidification, salinization, compaction and chemical pollution (FAO, 2015a; FAO, 2015b). • At least 20 per cent of the world's aquifers are overexploited for irrigation, including in important production areas such as the Upper Ganges (India) and California (United States) (Gleeson and others, 2012). • The nitrogen- and phosphorus-use efficiency (from farm to field) in the global food chain is about 15–20 per cent, implying large nutrient losses to the environment (Sutton and others, 2013). Some regions have lower efficiency and higher losses (North America, East Asia), while in sub-Saharan Africa, soil nutrient depletion (where nutrient extraction is higher than input) is common (Obersteiner and others, 2013). • Globally, food systems account for about 24 per cent (21–28 per cent) of the global greenhouse gas emissions (FAO, 2014a; Vermeulen and others, 2012). • Globally, 29 per cent of the "commercial" fish populations are fished at a biologically unsustainable level and therefore overfished. Another 61 per cent of these populations are fully fished (FAO, 2014b). • Food systems activities are also a major source of both terrestrial and marine biodiversity loss (Chaplin-Kramer and others, 2015; Coll and others, 2016; PBL, 2014a), while nutrient losses to ground and surface waters lead to massive algae blooms and dead zones (hypoxic) in coastal areas around the globe (Rabotyagov and others, 2014).	• Agronomic soil conservation practices exist; however, they typically require higher operational costs and investments and are more labour intensive. • Regulatory frameworks are either non-existent or not implemented. Technological solutions for more efficient irrigation exist, but are more costly (Sauer and others, 2010) • Absence of stringent regulation leads to squandering of nutrient inputs. Field-scale agronomic technologies and landscape-level technologies exist to mitigate pollution. Nutrient scarcity in soils of developing countries is related to economic accessibility of fertilizers including large transaction and transportation costs for fertilizers. • Markets for climate smart agricultural solutions are at a primordial state. National-level planning initiatives are emerging. • Effective regulatory solutions would require large-scale investments into monitoring infrastructures for enforcement. Necessary observation technologies are available. • Biodiversity observation systems are still poorly developed; the economic valuation of functional benefits of biodiversity is still not put in practice (IPBES, Pollination report). Regulatory mechanisms on catchment scale are only emerging (Danish nutrient credit-trading mechanism).

Source: Ekins and others (2016). Resource efficiency: Potential and economic implications.

SDG target 12.3 foresees that "by 2030, per capita global food waste at the retail and consumer levels are halved and food losses along production and supply chains, including post-harvest losses are reduced".[5] Although technologies exist to substantially reduce food wastes along the supply chain, the required reductions do not yet seem to be fully economic. Projections foresee that food wastes will be declining in the years to come. However, the rate of food waste decline under business as usual is not in line with SDG target 12.3, as illustrated in figure II.1.1. Additional measures will need to be implemented to attain SDG target 12.3; there

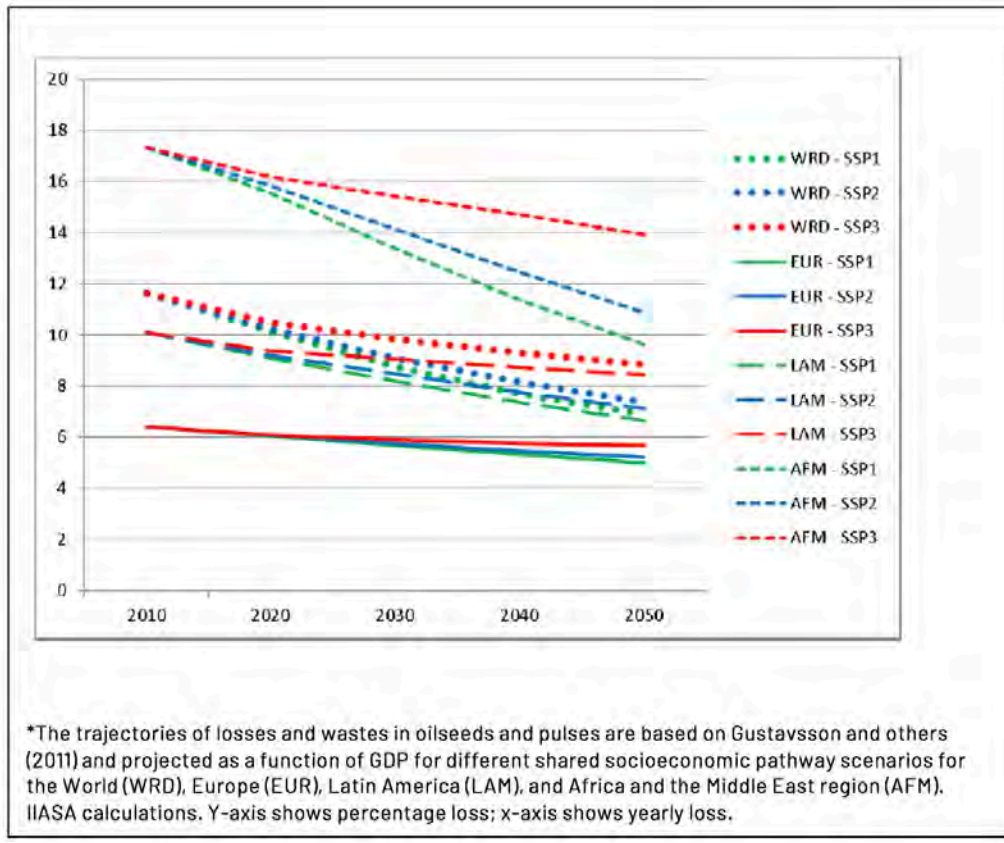
5 See https://sustainabledevelopment.un.org/sdg12.

are many public and private sector initiatives working towards this goal, such as the FRESH initiative coordinated by the World Business Council for Sustainable Development and the activities related to the food waste resolution of the Consumer Goods Forum. The Consumer Goods Forum is an example of industry-led initiatives targeting SCP solutions through their mission of "[b]ringing together consumer goods manufacturers and retailers in pursuit of business practices for efficiency and positive change across the industry benefiting shoppers, consumers and the world without impeding competition".[6]

Figure II.1.1

Illustrative example of projected autonomous improvements of food losses and wastes according to different socio-economic development projections

Autonomous improvements of food loss and waste, by socioeconomic development projections*



*The trajectories of losses and wastes in oilseeds and pulses are based on Gustavsson and others (2011) and projected as a function of GDP for different shared socioeconomic pathway scenarios for the World (WRD), Europe (EUR), Latin America (LAM), and Africa and the Middle East region (AFM). IIASA calculations. Y-axis shows percentage loss; x-axis shows yearly loss.

Despite large losses, the food system delivers ample and safe food and is projected to maintain sufficient production capacity to provide food for all (SDG 2). However, in reality, the food system fails to deliver food security and food safety for all. Globally, more than 800 million people remain hungry, which constitutes 11 per cent of global population and a staggering 34 per cent in Eastern Africa (Food and Agriculture Organization of the United Nations and others, 2017).[7] The number of children under 5 years of age who suffer from stunted growth and wasting is currently estimated to be 155 million and 52 million, respectively. In addition to basic human suffering, these unnecessary failures in the global food system cause physical and cognitive impairments that will in turn create an ill-equipped workforce—an avoidable large-scale human resource loss. At the same time, paradoxically, the global food system yields a huge number of people who are obese—641 million adults, or 13 per cent of all adults on the planet—and 41 million children under 5 who are overweight. The rate is now about 40 per cent in France, Germany and Italy, and about 60 per cent in Canada, the United Kingdom of Great Britain and Northern Ireland and the United States of America. Only in Japan is the rate considerably lower. Another form of malnu-

6 See https://www.theconsumergoodsforum.com/who-we-are/overview/.

7 See http://www.fao.org/3/a-I7695e.pdf.

trition is nutrient deficiency. Globally, women of reproductive age affected by anemia number 613 million (about 33 per cent of all women of reproductive age). In total, over 2 billion people worldwide suffer from micronutrient deficiency (Food and Agriculture Organization of the United Nations and others, 2015; ICN2, 2014)—a number that also partially includes the above-mentioned hungry, overweight and obese. Nutrient deficiency is not only related to the compositions of diets, but also the nutrient content in the respective foods which are related to the health of the soils, the roots and the microbial community associated with the crops.

These aspects of soil health are still largely underexplored and thus add complexity to an adequate definition of resource efficiency and sustainable production. Significant STI effort needs to be invested both in terms of plant breeding (including symbiotic organisms) and soil science in order to develop more sustainable agricultural practices that are fully integral to a vision of healthy diets and lifestyles in line with the SDGs. The global soils are very heterogeneous, which necessitates the establishment of global big data infrastructure and analysis networks to integrate the accumulated knowledge from millions of field-scale trials to predict positive outcomes from changes in farm practices on large scales. Such infrastructures have been built with science grants for studies of the human microbiome (The Human Microbiome Project). Another example of a major data storage facility and bioinformatics infrastructure is the network of the European Bioinformatics Institute. Other STI challenges to improve the resource efficiency in agricultural production relate to the development of new high site adapted seeds, new forms of plant protection, and algorithmic decision support for farming operations ranging from traditional to robotic farming. All of these production innovations will lead to substantial efficiency improvements, from micro-dosing of fertilizers and sparing of chemicals for plant protection to reduced soil compaction due to the use of light robotic vehicles as opposed to large tractors.

SDG 12 is not only about sustainable production but also about sustainable consumption. In the case of efficiency improvements on the consumption side, there are also a number of interesting STI challenges. The principle modes of improvements in sustainable and resource-efficient consumption can also be applied to sectors other than agriculture. Shifting diets would not only be an effective solution to de-pressure the agrifood system in terms of having fewer hungry people and less environmental impact on natural resources (Obersteiner and others, 2016)equity, and inclusivity. The wide scope of the SDGs will necessitate unprecedented integration of siloed policy portfolios to work at international, regional, and national levels toward multiple goals and mitigate the conflicts that arise from competing resource demands. In this analysis, we adopt a comprehensive modeling approach to understand how coherent policy combinations can manage trade-offs among environmental conservation initiatives and food prices. Our scenario results indicate that SDG strategies constructed around Sustainable Consumption and Production policies can minimize problem-shifting, which has long placed global development and conservation agendas at odds. We conclude that Sustainable Consumption and Production policies (goal 12, but also deliver enormously valuable health and well-being benefits (EAT Lancet Commission, 2017). There are still large STI gaps in understanding how behavioural transitions can be brought about that are consistent with diet shifts towards healthier people and a healthier planet. The STI challenges are both technological (including citizen science) as well as behavioural.

Excursion; peace and sustainable production; and STI and SCP to avoid land degradation and associated conflict potential

Natural resource degradation might exacerbate conflict potentials associated with food insecurities (see box II.1). Of the 815 million hungry people on the planet, 489 million live in countries affected by conflict, underlining the importance of peace as a precondition for sustainable production patterns. People living in countries affected by protracted crises are nearly 2.5 times more likely to be undernourished than those living elsewhere (Food and Agriculture Organization of the United Nations and others, 2017). Conflicts and humanitarian crises exacerbate degradation of natural resources because of inadequate management of natural resources, especially in the periods following the crises when access to basic inputs—much less access to modern agricultural technologies and finance—is absent amid prevailing institutional instability. STI challenges for rapid reconstruction in post-conflict zones are numerous. There is insufficient time to master new information technologies that range from characterization of refugee camps using combinations of remote sensing with in-situ crowd-sourcing technologies to the diffusion of adapted "low-tech" agricultural technologies for smart food production. Challenges related to the supply of water and sanitary services also abound.

Projections of drivers of SCP in agricultural production: methods to assess gap closure

Consumption and production patterns change over time owing to autonomous technological change and consumption dynamics. Through STI investment, technological change can be pushed to accelerate. Likewise, policies can pull technological change, both through intensified deployment of best available technologies and increasing private research and development (R&D) investment to push the frontier for SCP technologies.

Box II.1.1

Climate extremes and soil degradation and conflict

There is a growing body of evidence to demonstrate how environmental stress, resource scarcity (water and food shortages in particular) and climate change can play a significant role—as proximate or underlying causes, or multipliers—in causing or exacerbating conflict.

The Arab Spring revolutions were in part triggered by food-price hikes connected to the wheat production failure in 2010 in the bread basket regions in the territory of the former Soviet Union and the subsequent interruption of otherwise affordable and reliable exports, mainly Egypt.

Drought devastated many countries in the region from 2006 to 2011. Rainfall fell below the absolute minimum needed to sustain rain-fed farming. Desperate for water, farmers began to tap aquifers with tens of thousands of new wells in the region. But, as they did, the water table quickly dropped to a level below which their pumps could lift it.

In some areas, all agriculture ceased. In others, crop failures reached 75 per cent. Generally, as much as 85 per cent of livestock died of thirst or hunger in some of the middle-eastern countries. Hundreds of thousands of farmers gave up, abandoned their farms and fled to the cities and towns in search of almost non-existent jobs and severely short food supplies. For example, it was estimated that between 2 million and 3 million of Syria's 10 million rural inhabitants were reduced to extreme poverty (living on less than $1.25 a day).

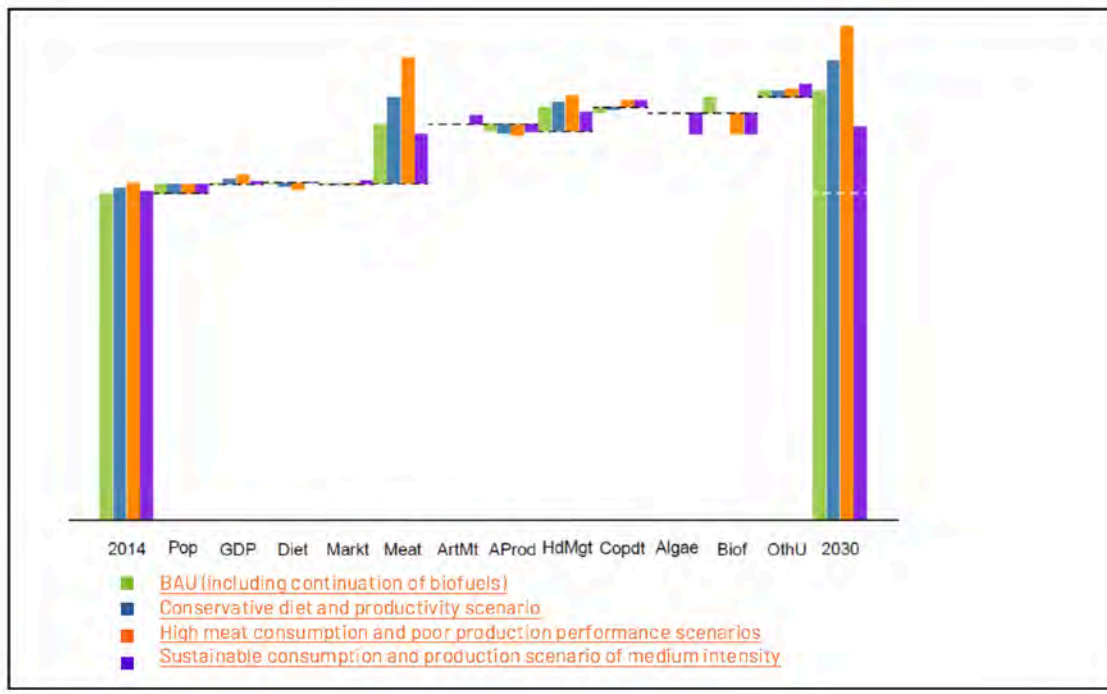
The domestic refugees in the respective countries immediately found that they had to compete not only with one another for scarce food, water and jobs, but, in a few countries, also with the already existing foreign refugee populations. Formerly prosperous farmers were lucky to get jobs at marginal wages. And in the desperation of the times, hostilities erupted among groups that were competing just to survive. What followed were civil wars and subsequent large-scale migration, mainly to Europe, shaking up its established political landscapes.

Long-term funding for sustainable reconstruction of post-conflict societies is an issue that has typically been addressed by regional development banks. Speed and quality of reconstruction could be improved (in terms of sustainability) by the injection of additional patient and ethical private funding through targeted portfolios of bonds, grants and technical cooperation.

In the agrifood sector, our illustrative case study sector for this report, there is a large potential for resource-efficiency improvement not only in terms of efficiency and productivity gains, using the natural resources of land and water, but also by improved efficiency in the food systems. This is illustrated in figure II.1.2, which shows the relative strength of the different drivers of resource efficiency.

Figure II.1.2

Decomposition of direct and indirect drivers of global corn consumption*



*Based on four SCP storylines. Drivers are population growth (Pop), increase in wealth per capita (GDP), lifestyle changes in terms of diet shifts in grains and vegetables (Diet), market feedbacks in terms of prices induced changes in demand and shifts in trade (Markt), meat production (Meat) in terms of artificial meat entering the market (ArtMt), improvements of production efficiencies (AProd), productivity shifts stemming from head management (HdMgt), use of coproducts (Copdt), use of algae as animal co-feed (Algae), corn used for biofuel consumption (Biof) and other uses such as industrial starch additive (OthU). Projections are from 2010 out to 2030.
Source: Obersteiner (own calculations).

The scenarios on the illustrative example of corn outlined in figure II.1.2 were constructed by exogenous assumptions that emulate improvements on an SCP storyline, rather than being modelled on policy reform that induces such SCP processes. What the results show is that, in terms of pushing the production efficiency frontier (in the livestock sector in particular), STI carries a large portion of the potential for resource improvements. The results suggest that a large part of the consumption of corn is avoided through improved livestock production efficiency. Likewise, the arrival of new technologies, such as the production of feed from algae sources, outcompetes corn and leads to substitution. In the case of algae, the resource-efficiency gains would be particularly large, as the algae are produced either offshore or on wastelands, such as deserts close to salt water sources. Algae will be partly or entirely fed by organic fertilizer sources or mineral fertilizer downcycled from municipal sludge and animal manures.

The food sector has created many initiatives to move towards more efficient production in SCP terms, but would benefit from more predictable policy frameworks that provide sufficiently strong direction. Interestingly, there are also many voluntary instruments active in the sector that focus on impact decoupling, such as joint agreements with the NGO community on sustainable forest management certification or deforestation-free commodity agreements (e.g., on soy, palm oil or beef).

However, in today's world, economic and regulatory incentives are not consistently pointing in the direction of more sustainable food production and consumption patterns: externalities are often unpriced; subsidies or tax exemptions are given for fossil fuels in fisheries and farming; certain agricultural sectors are protected; and consumers lack a clear insight into the environmental costs of food production. Farmers and fishermen have to

produce in a very competitive market in which, typically, only price matters. This implies that they do not receive an incentive from the value chain to apply more sustainable production patterns. The food-supply-chain logic in affluent countries is largely aimed at a permanent, abundant supply of highly affordable food, which can lead to unhealthy eating patterns and also food waste. Technology road maps catering for meeting ambitious SCP targets are yet to be constructed. Gap-filling methodologies, as illustrated here for corn, are readily available to support road map exercises.

II.2. *Financing and other obstacles to the adoption and scaling of relevant technologies and innovations*

Figure AII.2 (see annex II) provides a non-exhaustive, but fairly comprehensive mind map for a large survey of literature on the barriers and solutions to the development and diffusion of technologies relevant to SCP. It is beyond the purpose of this short report to provide details on each of the subject areas outlined in this mind map. The focus here is on a selection of economic topics that appear most relevant for financing of SCP initiatives.

The principal starting point to characterize the financial viability of enhanced SCP is the profitability (cost competitiveness) of more resource-efficient (i.e., sustainable) technologies. There are three sources of cost reduction or benefit generation that justify investments to stimulate resource efficiency and sustainable resource management:

- Cost savings from more efficient use of the resource itself, and associated greater profitability and competitiveness of firms and the economy at large;
- Reduced risk as a result of using fewer resources per unit of value generated in the face of supply shocks (e.g., from depletion, mistiming of investment or geopolitical factors) and associated price volatility;
- Reduced costs related to environmental damage that is often associated with resource extraction, processing and disposal.

Deriving an appropriate estimate of the investment needs for different actors of the financial system is not a trivial task. To get a sense of the economics of resource efficiency, benefits accrued from resource efficiency, and improved resource management, activities need to be compared with the respective economic costs of policies (corporate or public) and any associated investments in research and innovation and/or equipment that are necessary to realize the resulting resource improvements. This comparison needs to be specified in monetary as well as non-monetary terms (e.g., in respect of environmental improvements) and be made attributable to the entities to which the costs accrue and who need to make their specific cost-benefit assessments. In particular, the choice of policy instrument will determine who has to carry which cost share from a resource management improvement following a policy change. For example, a resource-use tax is a cost to a producer or a regulated sector, but a tax is revenue to the government, which could recycle back to the same sector for modernization of production or to spend for other purposes. The costs to the country equal the change in GDP growth due to the economic adjustments to the policy, which would be expected to be considerably smaller than the sum of the costs flagged by the regulated entities. These considerations have important implications for who is best suited to invest (e.g., public, private, blended) and which investment instrument is recommended (see figure AII.2 for sustainability finance instruments).

Transaction cost theory and institutional economics helps us to understand why firms do not always take up existing cost-effective measures for resource efficiency. Taking measures to increase technology diffusion requires deep dives into the drivers of technology and investment inertia. A blending of government-led incentive schemes and specialized technical and management consultancies that hold valuable experience in these fields are typically used to help leverage private finance tailored to the specifics of the SCP technology, taking into account associated points of possible market failure.

There is the question of what finance and investment system is required to trigger and maintain momentum for larger transformations towards SCP. Resource efficiency requires a tailored finance approach based on who or what is targeted to achieve desired impacts. From the perspective of an individual producer, economic sector or government entity, the specific finance requirements can be assessed based on microeconomic principles. For large-scale deployment of resource-efficiency projects, de-risking investments vis-à-vis regulatory and policy uncertainty is probably the single most important issue to be tackled. This is not only because of its

impact on expected implementation costs and potential impacts on revenues, but also because resource-efficiency projects usually come with evolving target setting and costly monitoring and evaluation obligations within wider sector-specific resource-efficiency or resource-management frameworks.

Traditionally, Governments have provided interest rate subsidies to capital-intensive, long-term projects to de-risk and foster sector-specific sustainability resource programmes, aiming at accelerated diffusion of the best available technologies. Today, such programmes are either supplemented or gradually substituted by more private-capital-based financial instruments such as green bonds, which are typically designed, issued and guaranteed by public financial institutions (e.g., EBRD, EIB)[8] and accompanied by public-private partnership agreements. These new instruments help financial institutions to report on and comply with their own obligations on environmental and ethical performance (e.g., the Norwegian sovereign wealth fund). STI support to develop guidance for methodological support to assess sustainable resource-use projects/programmes is needed, as well as the development of (bio-)physical resource-efficiency indicator databases to inform existing and emerging financial instruments targeted at sustainable resource use.

The design and oversight of the finance system to deliver sustainable SCP outcomes in the "real" economy are important issues to be tackled. In particular, assessments are needed to determine (i) the sufficiency of capital supply to attain resource-specific targets, on both the state of resources and efficiency benchmarks; (ii) the efficiency, alignment and effectiveness of policies consisting of multiple policy instruments to deliver outcomes; and (iii) investment strategies towards specific R&D road maps, with the aim of building large-scale partnership platforms around more incremental but complex technology clusters, as well as around the generation of radical new technological solutions.

Public finance institutions are traditionally bound to be clear about the benefits that resource efficiency and sustainable resource-use investments will yield. A well-articulated investment rationale is needed that typically includes arguments regarding possible market failure. This section will therefore examine the costs of technologies and benefits of sustainable resource management, and review the literature on the benefits of reducing externalities from resource saving. The microeconomics of resource efficiency will be discussed followed by assessments of the macroeconomic benefits of resource efficiency.

Costs of technologies and benefits of increasing resource efficiency

There have been a number of estimates of the costs of increasing resource efficiency; one of the most often cited is from Dobbs and others (2011), which states that, from the perspective of a private investor, the savings in 2030 arising from implementing all the technologies considered would be $2.9 trillion per year—70 per cent of which would offer a rate of return greater that 10 per cent per year. The $900 billion investment required for implementation is estimated to have the potential of creating 9 million to 25 million jobs.

It may immediately be asked why, if there are such negative cost opportunities for investments in resource efficiency, investors do not make the necessary investments to realize these benefits.[9] This issue has been most thoroughly explored for energy efficiency, but the arguments apply equally well to other resources. Sorrell and others (2004) suggest that the failure to make cost-effective energy efficiency investments is the product of three phenomena:

- *Market failure*, normally identified as a result of incomplete property rights, positive and negative externalities, imperfect competition and asymmetric information;
- *Organizational failure*, as a result of imperfect organizational structure and policy; and
- *Non-failure*, where, because of hidden costs, organizations and individuals are in fact behaving rationally in not taking the efficiency opportunities.

8 For definitions and explanations of such structured finance, see http://www.eib.org/products/blending/sff/index.htm

9 These benefits have been calculated at the market prices of resources prevailing in 2010. To the extent that resource prices have declined since 2010, and this is especially true of fossil fuels, the benefits of resource efficiency will be proportionally less.

The existence, strength and persistence of these barriers vary from issue to issue. Therefore, attempts to improve resource efficiency should seek to understand the barriers applicable in any particular case, before identifying and introducing measures to surmount them.

The benefits of reducing externalities from resource saving

The reduction of extraction and use of resources often results in negative external costs, especially in relation to the environment. Resource efficiency measures that reduce these external costs, by internalizing them into the costs of resource use or otherwise, will improve economic efficiency, over and above any other benefits (e.g., cost savings) in which they may result.

The environmental externalities of resource use, which may also be considered subsidies to that use, are very large indeed. The International Monetary Fund (Coady and others, 2015) estimated the external costs related to climate change and local air pollution from burning fossil fuels in 2015 to be about $4 billion.

Coady and others (ibid., pp. 24-25) estimate that eliminating externality-related energy subsidies through efficient pricing of fossil fuels could reduce global consumption of natural gas by 10 per cent, coal consumption by 25 per cent, and the consumption of road fuels in those regions with the highest subsidies by up to 50 per cent. The environmental benefits for human well-being include reduction in CO_2 emissions of more than 20 per cent, and reductions in premature deaths from local air pollution (mainly from coal combustion) by 55 per cent. The global gain in economic welfare from this elimination of fossil fuel subsidies is $1.4 trillion, equivalent to 2 per cent of 2013 global GDP, with most of this gain going to the more than 50 per cent of the world's population living in developing Asia, which experiences a welfare gain equivalent to 6.9 per cent of regional GDP.

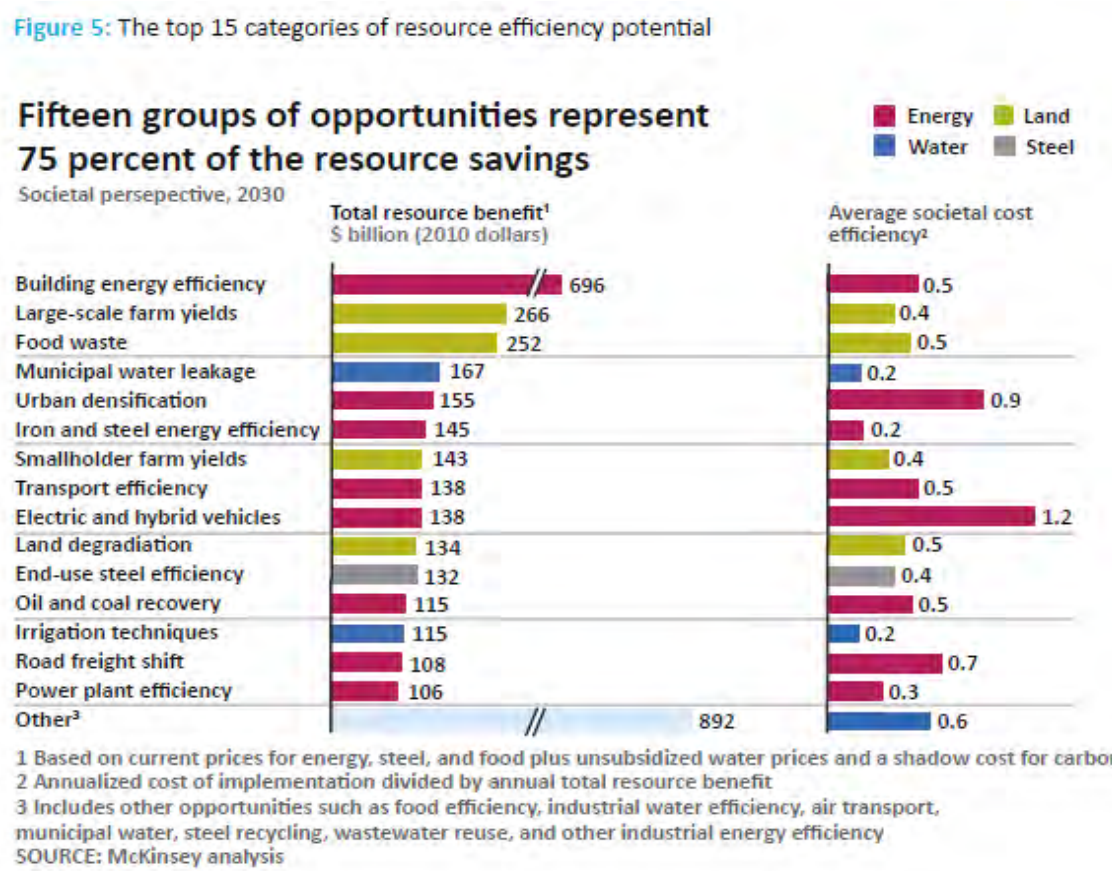
Much of this reduction in fossil fuel consumption could be achieved through increased energy efficiency, rather than reduction in energy service delivery. Thus, International Energy Agency (IEA)(2012) calculates in their Efficient World Scenario that, by 2035, "economically viable" energy-efficiency measures could reduce global coal consumption by 22 per cent, oil consumption by 13 per cent and gas consumption by 14 per cent—all below the level in the IEA New Policies Scenario, which had already achieved energy savings of about 8 per cent through energy efficiency, compared with the Current Policies Scenario (IEA, 2012).

The microeconomics of resource efficiency

Dobbs and others (2011, p.10) calculate that savings to society from resource efficiency would increase from $2.9 trillion from a private investor perspective to $3.7 trillion from a social perspective, if financial subsidies to energy, agriculture and water, and energy taxes were removed, and carbon was priced at $30 per ton. Ninety per cent of this $3.7 trillion savings would yield an investment return of more than 4 per cent (which is often taken as the social discount rate). They group their resource efficiency "opportunities" into 15 categories that capture approximately 75 per cent of this $3.7 trillion savings. These categories are shown in figure 5 from the McKinsey analysis (presented here as figure II.2.1)". Of these 15 categories, it can be seen that only electric and hybrid vehicles have a cost that is greater than the benefit. Many of these categories and opportunities will be discussed in more detail below.

Figure II.2.1

Top 15 categories of resource-efficiency potential



Another important microeconomic factor is risk management. In the case of assessing resource-efficiency projects, environmental risk assessment carries large potential to impact how large amounts of capital can be redirected towards more sustainability. Enhancing environmental risk assessment in financial decision-making is about the effective identification, pricing and management of risk and will need to become an essential feature of efficient and resilient financial markets. Physical and transition factors (including environmental externalities, trends and events) are resulting in a range of financial risks, with implications for both financial institutions and financial authorities. These factors must gain more significance in the future if the SDGs are to be attained. The G20 Green Finance Study Group has developed options for enhancing the ability of the financial system to mobilize private capital for green investments. Environmental risk analysis describes a portfolio of tools and methodologies that enable financial decision makers to integrate environmental data into the decision-making process from the risk management and asset allocation perspectives. Similar work is coordinated by the United Nations Environment Programme (UNEP) Finance Initiative with a stronger focus on climate risks.

Environmental factors are increasingly recognized as being among the most important risk factors for the global economy. The World Economic Forum's 2017 Global Risks Report, for example, concludes that four of the five top risks in terms of impact are environmentally linked: extreme weather events, water crises, major natural disasters and the failure of climate change mitigation and adaptation. These physical risks and the associated transition risks (e.g., policy action to mitigate climate change) are now recognized by some leading insurance companies, asset managers and banks as potential drivers of financial losses, increasing market volatility and sector instability. Examples from practice in several countries show that air pollution, water scarcity and natural

capital degradation may also act as sources of credit, market and legal risks for financial institutions.

Stress testing in view of investment risks associated with either environmental policy changes or material risks associated with environmental change were proposed by Swart and others (2013). Such stress tests have been carried out by a number of studies—in China[10] and Germany,[11] for example—mostly focusing on assessing the microeconomic risks stemming from how government efforts in dealing with pollution (e.g., via higher levies on pollutants, carbon tax and the emissions trading system) and energy system regulation may affect borrowers' creditworthiness, profitability and company value. Detailed calculations on the impact of profit distributions as a function of policy uncertainty and optimal response in terms of investment strategies are presented in Fuss and others (2008, 2010 and 2013). Such stress testing could provide significant improvement in the assessment of relative competitiveness of SCP technologies vis-à-vis conventional technologies. However, the respective methods and banking regulations are still not fully established.

II.3 *Existing and novel approaches for addressing financing and economic challenges: a global and national assessment*

The 2030 Agenda for Sustainable Development defines a broad and comprehensive road map for global transformation towards a better and more sustainable future for all. Sustainable consumption and production and the decoupling agenda is not only found in SDG 12, but also in SDG target 8.4: "Improve progressively through 2030 global resource efficiency in consumption and production and endeavor to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead."[12]

It is important to understand that there will be both synergies and trade-offs across the SDGs, and that SCP plays a crucial role in supporting achievement of multiple specific SDGs and the set of SDGs as a whole (IRP, 2015; Obersteiner and others, 2016). Monitoring and implementing the SDGs thus requires a nexus approach that accounts for multiple interactions. For financing in particular, it is important to understand that investment can only operate effectively in harmony with a much wider policy framework. Results are provided from a modelling exercise that draws together many of the elements required to guide the implementation efforts—financing in particular. Achieving progress on understanding particular finance implications requires robust evidence and advice that is trusted by a wide range of stakeholders.

Scientific capacity needs to provide insights relevant to public policy and private decision-making and thorough analysis must account for and integrate across current and future technology options, socioeconomic drivers, natural resource constraints, environmental impacts, and a wide range of factors influencing human well-being. It should provide robust analysis of policy options across different contexts and specific topics and agendas including sustainable resource management, resource efficiency, waste minimization, pollution reduction, and the circular economy. Only in the frame of such comprehensive economic assessments it is possible to address the issues of financial shortfalls and financing requirements—in particular those related to environmental risk accounting.

Assessing global resource use and greenhouse emissions to 2050, with ambitious resource efficiency and climate mitigation policies

Achieving sustainable development requires natural resource use and environmental pressures to be decoupled from economic growth and improvements in living standards (IRP, 2015), so that the impacts of socioeconomic activity are maintained within planetary boundaries (Steffen and others, 2015).

As illustrated in table II.3.1, Hatfield-Dodds and other (2017) use a novel global multimodel framework to develop projections of natural resource use to 2050 (see the " existing trends" scenario in table II.3.1) and three policy scenarios, incorporating detailed analysis of economic dynamics and incentive effects, including changes in the supply and demand of different types of goods and services. Each of the four scenarios represents a specif-

10 http://www.greenfinance.org.cn/upfile/upfile/filet/ICBC环境压力测试论文_2016-03-19_08-49-24.pdf

11 University of Cambridge Institute for Sustainability Leadership (CISL). (2016). Feeling the heat: an investors' guide to measuring business risk from carbon and energy regulation. Cambridge, UK: Cambridge Institute for Sustainability Leadership. May

12 See https://sustainabledevelopment.un.org/sdg8.

ic combination of potential future resource-use trends and future greenhouse gas emissions pathways.

Existing trends (H3) is calibrated to historical natural-resource-use trends (H) and greenhouse policies that would see a 3°C increase (3) in temperatures by the end of the century, rising to about 4°C after that. Natural-resource-use trends are applied across major world regions, accounting for changes in GDP per capita. Existing trends are aligned with the "middle-of-the-road" Shared Socio-economic Pathway (SSP2) (O'Neil and others, 2015; IIASA, 2015) and greenhouse emissions match the trajectory for Representative Concentration Pathway 6.0 (RCP6.0) (Rogelj, 2012), a little lower than most interpretations of the Paris Climate Agreement pledges (Intended Nationally Determined Contributions) to 2030.

Resource efficiency (E3) assumes a package of stylized measures that drives improvements in resource efficiency (E) from 2020 (described in methods below), with the same greenhouse policies (3) as existing trends.

Ambitious climate (H2) assumes the same natural-resource-use policies (H) as existing trends, but also assumes that the world adopts ambitious greenhouse gas abatement policies capable of limiting likely global temperature increases to 2°C (2) above pre-industrial levels. This represents the increasingly ambitious action required to limit emissions to well below 2°C, going beyond the specific pledges made for 2025-2030, with global greenhouse emissions to 2050 calibrated to match RCP2.6.

Efficiency plus (E2) combines the resource-efficiency settings (E) for the resource-efficiency scenario and greenhouse gas abatement settings (2) for the ambitious climate scenario to explore potential policy interactions. Greenhouse emissions are lower than the RCP2.6 trajectory, implying this scenario has a higher chance of limiting climate change to 2°C than the ambitious climate scenario.

Table II.3.1

Summary of global natural resource use, energy supply, greenhouse gas emissions, resource productivity and economic activity (change from 2015-2050 and impacts in 2050)

Scenario projections	Resource Use (DMC)	Price, non-fossil resources	Energy Supply (TPES)	GHG emissions (CO_2e)	Resource productivity ($/kg)	Economic activity (GWP)
Global projections	Change from 2015-2050					
Existing trends (H3)	119 %	143 %	69 %	41 %	-1 %	116 %
Resource efficiency (E3)	81 %	169 %	46 %	14 %	27 %	130 %
Ambitious climate (H2)	92 %	234 %	38 %	-56 %	9 %	108 %
Efficiency plus (E2)	58 %	239 %	28 %	-63 %	38 %	119 %
Global per capita projections	Change from 2015-2050					
Existing trends (H3)	71 %	143 %	33 %	11 %	not applicable	69 %
Resource efficiency (E3)	42 %	169 %	14 %	-11 %		80 %
Ambitious climate (H2)	50 %	234 %	8 %	-66 %		63 %
Efficiency plus (E2)	24 %	239 %	0 %	-71 %		72 %
Modelling treatments						
Resource-efficiency measures	*Deviation from H3 or H2 in 2050*					
Resource efficiency (E3 vs H3)	-17.38 %	10.7 %	-13.7 %	-19.6 %	28.7 %	6.5 %
E2 relative to H2	-17.41 %	1.4 %	-7.6 %	-15.3 %	27.4 %	5.3 %
Abatement effects	*Deviation from H3 or E3 in 2050*					
Ambitious climate (H2 vs H3)	-12.46 %	37.4 %	-18.4 %	-68.9 %	10.1 %	-3.7 %
E2 relative to E3	-12.49 %	25.8 %	-12.6 %	-67.2 %	8.9 %	-4.7 %
Combined efficiency and abatement effects	*Deviation from H3 in 2050*					
Efficiency plus (E2 vs H3)	-27.70 %	39.3 %	-24.6 %	-73.6 %	40.2 %	1.5 %

Geopolitics and the distribution of impacts across nations

The political economy of resource efficiency and greenhouse abatement are fundamentally different. Resource efficiency can be effectively implemented on a national scale, with well-designed measures providing near-term economic gains to implementing firms and nations in the absence of global action. By contrast, greenhouse abatement is a global public good, with very long lag times between nations incurring the incremental costs of emissions reductions and receiving the non-excludable shared benefits of avoided climate damages.

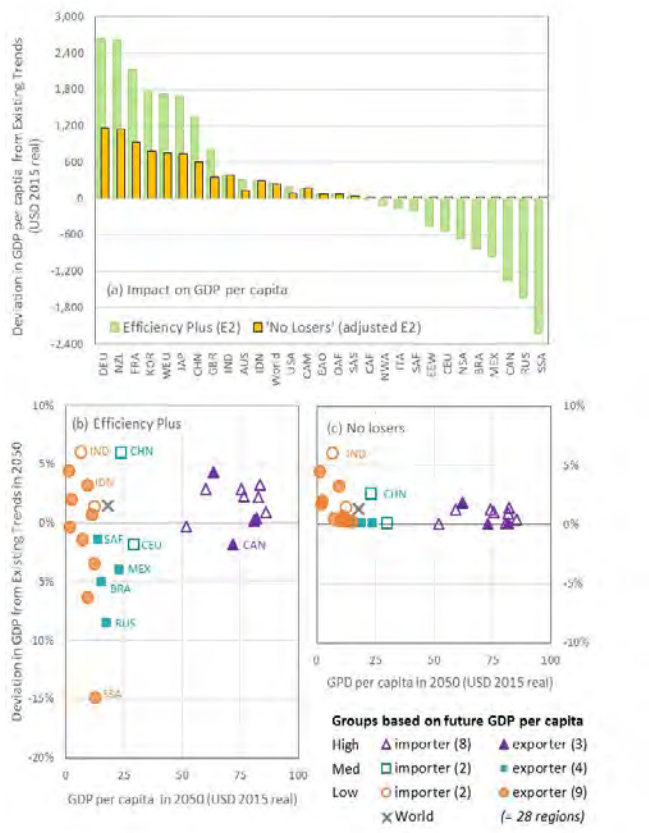
Hatfield-Dodds and others (2017) find that the efficiency plus scenario would provide net economic gains to 17 of 28 regions, accounting for two thirds (66 per cent) of global population in 2050, and losses to the other 12 regions. (These economic gains and losses do not include the benefits of avoided climate change associated

with ambitious abatement in the efficiency plus scenario.) Regions that benefit are largely high-income nations and/or net resource importers (13 of 17), with five of nine low-income net exporters also benefiting (see Figure II.3.1). Benefiting nations include China, India, Indonesia and most Group of Seven nations. Disadvantaged regions include Central Europe, Eastern Europe, South Africa, South America and West Asia. Total net losses are equivalent to 30 per cent of total net gains, or 40 per cent of net gains by high- and medium-income nations. Adding a safety margin of $34 per capita on top of these net losses (recognizing perfect targeting within regions is impractical) would require 50 per cent of net gains by high- and medium-income nations.

Figure shows the impact of an illustrative "no loser" approach in which a grand global deal is struck to deliver both resource efficiency and a 2°C emission trajectory, involving sharing 50 per cent of the potential net economic benefits to high- and middle-income nations to ensure that no region is worse off than they would be under existing trends. This imagines that high- and middle-income nations are willing to forgo some potential gains on the grounds that they are unlikely to be realized in practice without some benefit-sharing. The illustrative deal would address the economic disadvantages of global resource efficiency to resource-exporting nations and the associated geopolitical impediments, and all nations would therefore be better off once the real (but hard to quantify) long-run benefits of avoided climate change are accounted for. It also redresses, at least in part, the lack of formal representation of differentiated emissions targets and associated global emissions trading in the ambitious climate scenario.

Figure II.3.1

Impact on economic activity (GDP per capita) for 28 regions in 2050: 3 scenarios



Source: Hatfield-Dodds et al. (2017)

Assessing the economics of resource-efficiency measures

The modelling explored potential improvements in resource efficiency through a combination of three measures, reflecting the main ways in which reductions in resource intensity and slower growth in natural resource

extraction can be achieved in computable general equilibrium (CGE) and similar economic models: technical resource innovation and improvements (RII) reduce the quantity of resource input required for a given volume of output; a resource extraction tax (RTAX) increases the price of natural resources relative to other inputs; and an exogenous resource demand shift (RDS) shifts the demand curve towards the origin, mimicking the effect of changes to regulations, planning and procurement policies that seek to maintain or improve the services or amenity provided through natural resource use (such as the space and comfort provided by buildings) with progressively lower resource intensity over time.

The three types of measures have very different impacts on natural resource extraction, resource prices, investment and overall economic activity, as shown in Table 2.2. Innovation (RII) reduces prices and boosts economic growth, but has only very modest impacts on extraction volumes, due to the rebound effect, where lower unit costs induce higher direct and indirect natural resource use. The extraction tax (RTAX) increases prices and slows the growth of natural resource use, and also lowers the rate of economic growth. The resource demand shift (RDS) reduces prices and the volume of extractions modestly, and relatively evenly, with a positive second round impact on economic activity through increased investment (due to reduced expenditure on consumption of materials-based goods and services). The measures also impact differently across natural resource categories (biomass, fossil fuels, metal ores and non-metallic minerals).

Crucially, the different patterns of impacts associated with these stylized measures implies that the physical effectiveness and economic impacts of real-world resource efficiency initiatives will depend on the mix and detailed design of the measures employed. While we find here that resource efficiency boosts economic growth and provides net economic benefits, it is possible that resource efficiency strategies could slow growth and result in net economic costs in some circumstances.

Table 2.2

Impacts of resource efficiency components on global resource extraction (DE), resource prices, investment and economic activity (GWP) in 2050. Deviation from Existing Trends (H3).

	Resource extraction (DE)	Quantity, non-fossil resources	Price, non-fossil resources	Investment	Economic activity (GWP)
	Deviation from existing Trends (H3)				
Innovation (RII)	-1.3 per cent	-1.5 per cent	-0.9 per cent	+4.6 per cent	+8.8 per cent
Extraction tax (RTAX)	-8.3 per cent	-5.9 per cent	+25.9 per cent	-5.0 per cent	-4.2 per cent
Demand shift (RDS)	-8.4 per cent	-8.7 per cent	-11.7 per cent	+7.6 per cent	+6.2 per cent
Combined effect (E3 vs H3)	**-17.4 per cent**	**-16.1**	**+10.7 per cent**	**+8.1 per cent**	**+6.2 per cent**

II.4 *The potential for STI road maps to facilitate necessary investments*

In view of climate mitigation, STI road maps exist for many sectors (e.g., energy, building, transport, pulp and paper) on the global level. Typically, they provide a vision of what the particular sectors could do by applying Best Available Technologies (BAT) or known and proven technologies on larger scales. This section takes a deeper look into the road map of the aviation industry—one that stands out by proposing a technology wedge of "radical

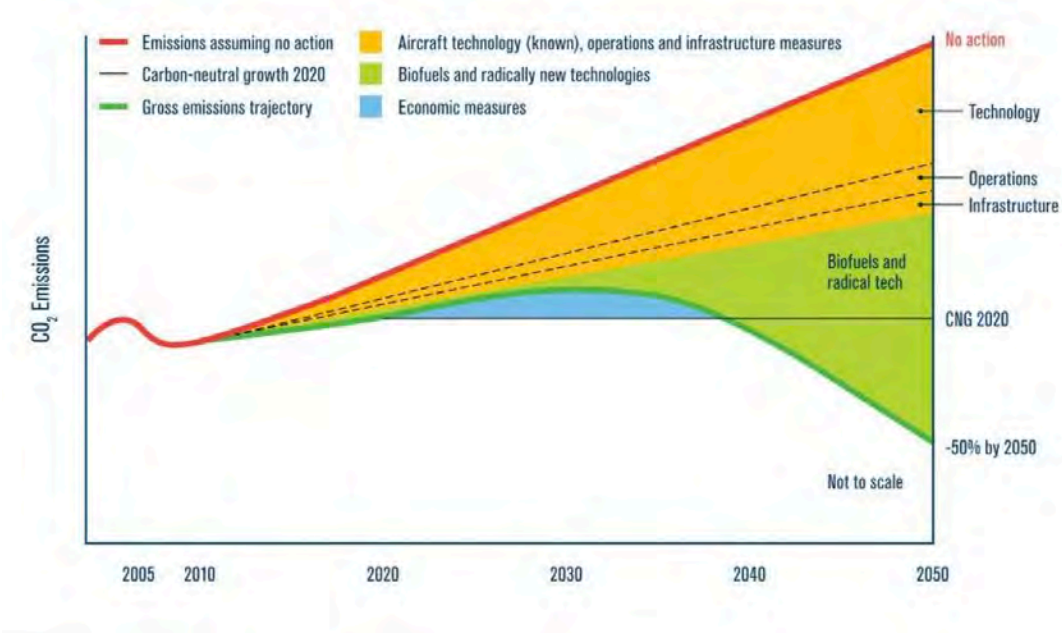
tech," which is currently not fully defined and is yet to be created by targeted STI efforts.

Incremental and radical STI investments in the aviation industry towards its 2050 climate target

There are many road maps on climate mitigation by countries or global and regional sectors. However, there are hardly any road maps that explicitly count on outcomes of new radical technologies because of particular STI investment strategies. The aviation industry represents a notable exception in the sense that it is counting on radical technological solutions in its sector to appear (mostly) two decades from now, which would allow the industry to meet its ambitious mid-century climate mitigation target.

Figure II.4.1

Schematic climate mitigation technology road map



Source: IATA The IATA Technology Roadmap is intended to assist airlines, and the aviation industry in general, in assessing the effect of different technologies, and to monitor how technology measures help achieve the high-level industry goals for emissions reduction by providing an overview of fuel-efficient green technologies and their impacts at both single-aircraft and world-fleet levels.

The aviation industry pledged a commitment to taking a global approach to mitigating aviation greenhouse gas emissions, adopting three high-level goals as illustrated in figure II.4.1:

i. An average improvement in fuel efficiency of 1.5 per cent per year from 2009 to 2020;

ii. A cap on net aviation CO_2 emissions from 2020 (carbon-neutral growth);

iii. A reduction in net CO_2 emissions of 50 per cent by 2050 relative to 2005 levels.

These collective goals were endorsed by the whole aviation industry (airlines, manufacturers, airports and air navigation service providers) in the joint industry submission to the International Civil Aviation Organization (ICAO) in 2009. Governments meeting at ICAO in October 2010 then set out a fuel efficiency goal to 2 per cent per year and made carbon-neutral growth an aspirational goal from 2020. In order to achieve these high-level goals, the aviation industry established a four-pillar strategy comprising

i. Investment in new technology (more efficient airframe, engines and equipment; sustainable biofuels; new energy sources)

ii. Efficient operations (drive for maximum efficiency and minimum weight)

iii. Effective infrastructure (improve air routes, air traffic management and airport procedures)

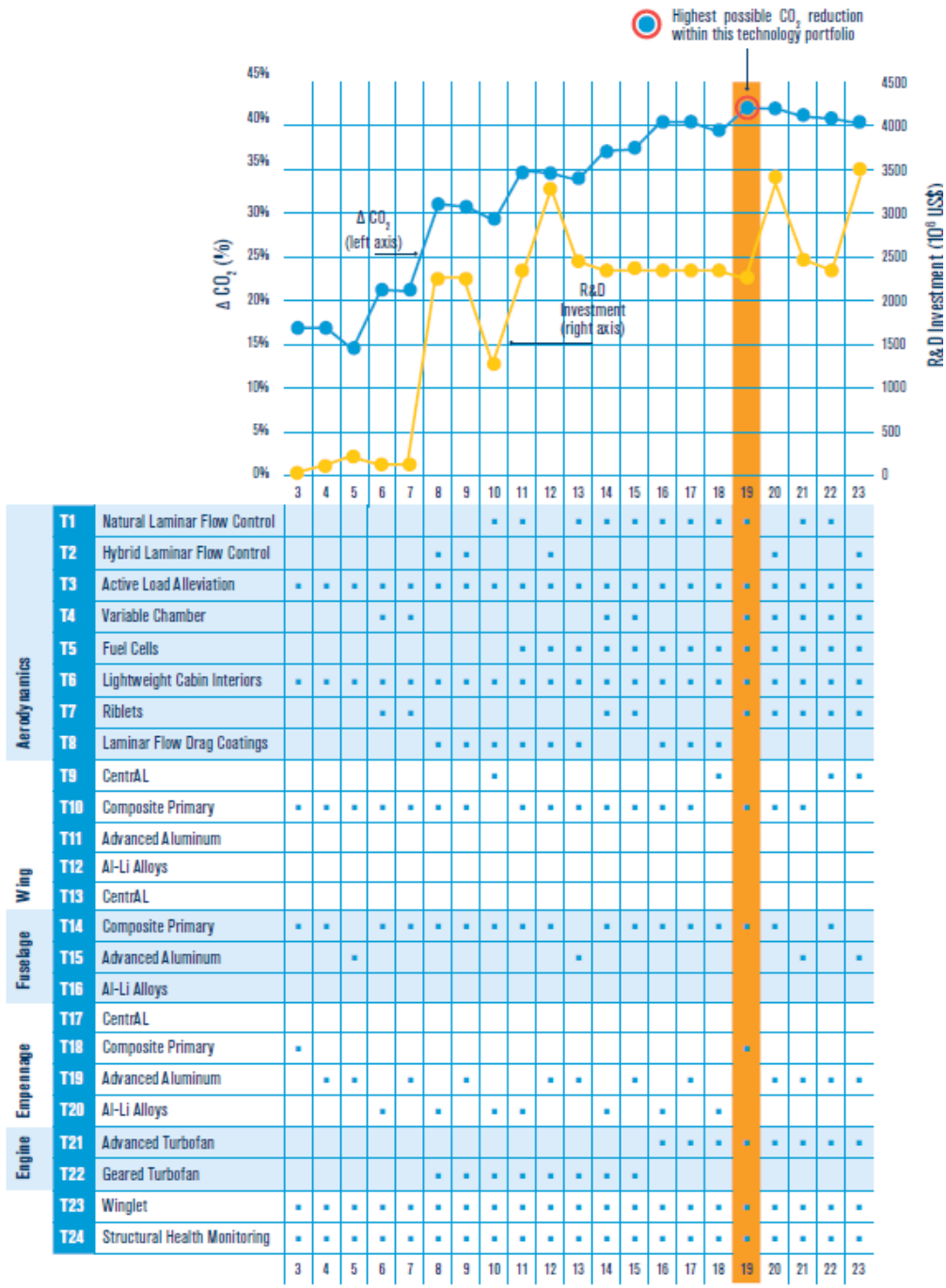
iv. Positive economic measures (carbon offsets, global emissions trading)

The first of these four pillars—new technology—holds the great potential so critical to achieving the desired objectives in emission reduction. This pillar will also require specific, large-scale and long-term funding which the industry, in cooperation with actors from the public STI sector, has yet to raise. Their achievement largely depends on the development and implementation of new technologies by aircraft, engine and equipment manufacturers. The environmental benefits of these technologies (through better fuel efficiency and, thus, lower carbon emissions) will become effective through airline fleet modernization and, to a minor degree, retrofits to in-service aircraft. There is an underlying challenge to selecting the appropriate technologies, as this selection is driven by sometimes uncertain factors, such as current development status, benefits, risk, and R&D costs. IATA (2013) provides an example of technology portfolios and their respective estimates of CO_2 savings and R&D investment requirements. The very dynamically developing area of aviation biofuel technologies can be considered independently from aircraft technologies as long as only drop-in fuels are used, which is expected to be the case for the next few decades. Progress in this area is reviewed on a continuous basis in the IATA Report on Alternative Fuels, which appears annually.

For a long time, fuel costs, which usually represent the largest single item in an airline's operational costs, have been considered to be a sufficient driver for improving fuel and CO_2 efficiency and the related technology developments. In view of its ambitious climate targets the industry has decided to develop an ICAO aircraft certification standard for CO_2 emissions, similar to the existing standards for noise and engine emissions (nitrogen oxides, carbon monoxide, unburned hydrocarbons, smoke). The aim of the CO_2 standard is to foster the development and use of fuel-efficient technologies and designs by aircraft and engines manufacturers. Effective infrastructure measures constitute another straightforward efficiency wedge for CO_2 mitigation and resource sparing.

Figure II.4.2

Technology portfolios to increase carbon efficiency and their estimated R&D investment requirements



Source: IATA (2013)

The fourth pillar proposed by the industry refers to the implementation of market-based offsetting measures in international aviation. While a single market-based measure for aviation may be necessary as a gap filler to achieve the industry's climate change targets, including capping net emissions at 2020 levels (carbon neutral growth 2020), market-based measures are not expected to drive technological developments. They act more as a kind of insurance in cases where certain STI developments are not delivered in time or fail to be delivered,

ensuring that the industry is still able to comply with its three climate mitigation targets at any point in time.

The flexibility gained through the availability of market-based instruments has several advantages:

- It allows the industry to commit itself early on to ambitious climate mitigation targets;
- It allows the industry to engage in a long-term STI-based investment strategy to develop game-changing new radical technologies that will transform the industry in the long run into a low-carbon transport sector. Also, incremental innovations can be developed according to feasible time plans without endangering the high safety standards of the industry;
- It allows compliance with short-term targets, which would otherwise be infeasible due to the vintage structure of the airplane fleet and avoids situations of early retirement of aviation assets characterized by large early sunk costs.

As a consequence of the availability of market-based instruments, STI investment can be planned according to the envisaged road map. Investment instruments can, thus, be tailored towards the necessities of the respective STI project depending on the required investment amounts, level of technology readiness, and public or private interest. The instruments can vary from classical public research grants with or without private co-financing obligations to industry-wide breakthrough technology bonds modelled after catastrophe (CAT) bond structures.

III. Conclusion and suggestions for a way forward

There are a number of high-level points that can be taken away from the analysis presented above.

- **Investments into resource efficiency**, sustainable consumption and production (SCP) are **key** for the attainability of the SDGs in their entirety. However, finance for incremental research and development and deployment of **best available technologies (BAT) will not be sufficient** to meet the ambitions of the Sustainable Development Goals (SDGs).
- A systemic transformation towards sustainability will require significant **additional science, technology and innovation (STI) investments to generate radically new technologies,** which also complement no-regret deployment of BATs (including offsets) together ensuring that the SDGs are attainable.
- **STI investments** are more likely to be **economically superior** to classical technology-diffusion-enhancing policies. Communication of long-term commitments to **large-scale STI programmes** based on adaptively developed technology road maps will provide the necessary market signals for **avoiding** sinking large amounts of investments in **technological lock-ins**.
- The multiple goals of the SDGs need to be addressed by **smart portfolios of regulatory and economic policy instruments, creating a stable investment environment** with the aim of triggering and continuously supporting transformational change towards sustainability. Public finance systems, in particular for STI investments, need to be consistent with societal and technological road maps towards sustainability that are characterized by ambitious goals.
- **New blended finance instruments** will be necessary to **bring international STI programmes to scale**. Cross-border risk sharing in public-private partnership/STI finance constructions will provide strong directional signals and reinforce commitments towards adaptive technology road maps.
- **International STI investment programmes** creating SCP technology clusters of excellence need to be designed such that, from inception, **no one is left behind**. Supplementary international (public) STI finance programmes are necessary for building critical capacity more ubiquitously through open funding calls with minimum participation criteria for developing countries.

IV. A narrative of a way forward: from a business-as-usual transition economy to the SDG economy

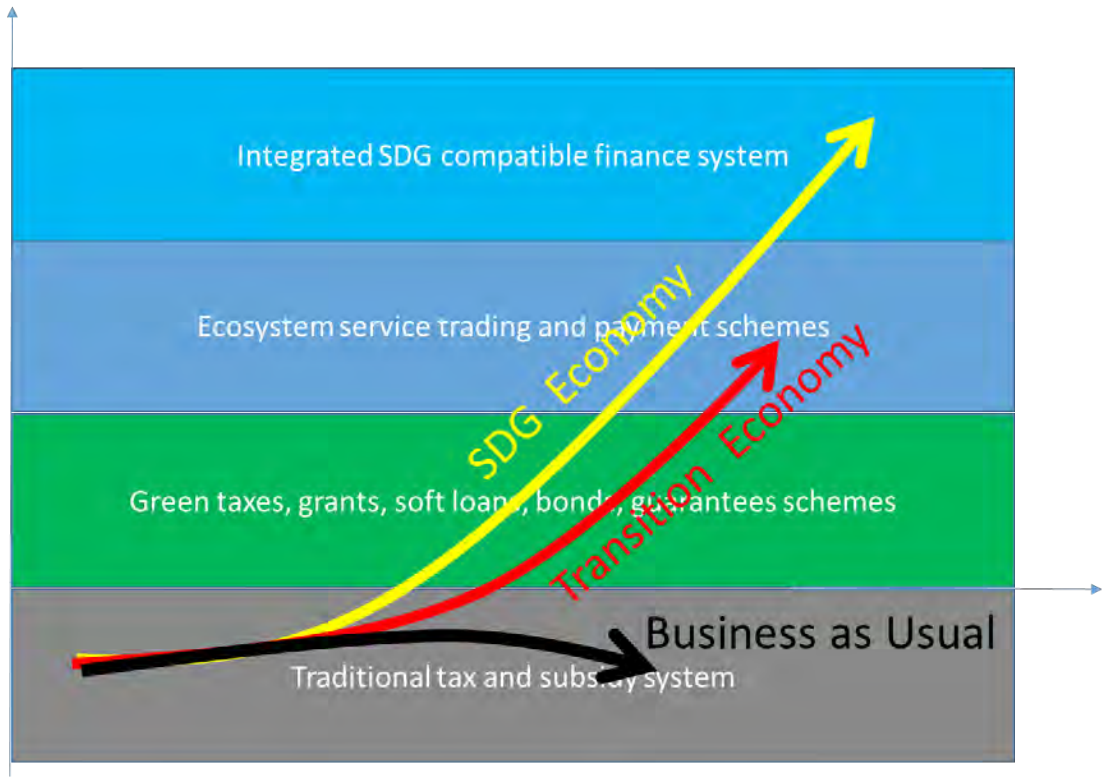
The transition to an economy which is consistent with timely delivery of the Sustainable Development Goals (SDGs) can be conceptualized according to the three horizons framework (Sharpe and others, 2016). As illustrated in Figure IV.1 during the first implementation wave, there is a phasing out of business-as-usual modes of operation. In this phase, the functioning of the economy needs to be increasingly informed by stacking up new policy instruments that first help to push deployment of best available technologies (BAT) technologies through financial incentives, such as tax breaks, green bonds, and public resource efficiency investment guarantee schemes that back private-sector-led soft loan schemes. Green taxes provide economic incentive to reduce extraction, consumption and waste disposal. New technology initiatives are not only pushed by conventional research grant schemes, but are also increasingly combined with incubator funding. Technology road maps that are co-created in technology platforms provide inputs to science, technology and innovation (STI) policy planning and prioritization.

The ***transition economy*** also starts with experiments and scales up markets for ecosystem services. Trading systems and ecosystem service payment schemes such as carbon markets are currently approaching 20 per cent coverage of global power plant emissions at prices not yet compatible with the Paris Climate Agreement. Sector-specific global alliances are emerging and engaging in joint target-setting and technology road-mapping as illustrated by the example of the aviation industry: Public-private partnership arrangements emerge to finance large-scale STI programmes with the purpose of developing radically new technologies necessary for attaining ambitious sector-wide sustainability targets by mid-century. The economy becomes increasingly circular and resource decoupling is observable and intensifies. Signs of impact decoupling become visible.

The ***SDG economy*** starts to rise when some of the breakthrough technologies emerge on the markets and lead to fast transitions. Breakthrough technologies are crowding out other technologies that are not compatible with SDG pathways. There is a constant STI pull as regulatory and economic incentives follow the pressure to achieve impact decoupling through not only creative destruction of obsolete old economy assets, but also smarter consumer behaviour and an integrated public and private financial system guided by Environmental and Social Risk Assessment methodologies. The SDG-compatible finance system rewards risk taking for sustainability solutions and discourages investments that are not in line with the principles of the circular economy and that fail to deliver large enough marginal impact avoidance. STI finance systems allow for participation of developing countries, ensuring the presence of critical STI capacities in large-scale globally distributed STI clusters of excellence and that STI solutions are also locally adapted and can be rolled out on a global scale. Breakthrough technology initiatives are funded by traditional public granting mechanisms, but new financial instruments (e.g., those modelled after catastrophe (CAT) bonds) also become available to accelerate the production and diffusion of hard and soft technologies in service of a resource-efficient circular economy attaining levels of impact decoupling. For some resources, impact decoupling can even become regenerative. Economic tools that served the old economy diminish in their relative importance.

Figure IV.1

Conceptual framework of economic levers to enable sustainable economic transition with respect to SDG 12*

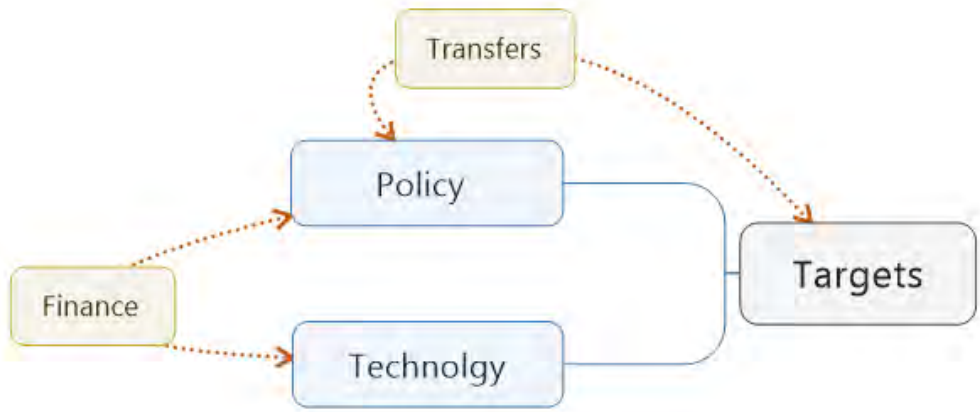


*Economic levers were selected to match the goal of achieving the sustainable management and efficient use of natural resources in a wider SDG framework. Three pathways of development of the economic system are distinguished: (i) business as usual; (ii) emerging economy; and (iii) SDG compatible economy. The stacked blocks indicate the elements of economic instruments to be bundled to attain advanced states of SDG compatibility.

Finally, as depicted in , a consistent STI finance framework needs to be embedded in a wider SDG policy process, where clear and quantitative targets are set on global, national and subnational levels. Pathways to reach these goals are investigated and translated into tangible policy and technology road maps, which are sufficiently adaptive to absorb exogenous shocks. These road maps are the outcome of adaptive multi-stakeholder consultation processes involving public, private and civil society entities. Road maps are differentiated by geography, sectors and timelines. The elaboration of globally consistent national/regional plans will only become politically feasible if they are enabled by transfers from the global North to the global South, following the principle of common but differentiated responsibilities. Public and private sources of finance provide the capital and, therefore, the coordination function to deploy technologies and create behavioural changes through price incentives. Early retirement of capital that has become obsolete sooner than expected is properly priced and technically hedged. Finally, STI finance also serves the function of promoting the radical new technologies necessary to attaining the ambitious SDG goals—which currently seem out of reach, but their fulfilment is essential to avoiding transgressing planetary boundaries and ensuring well-being for all.

Figure IV.2

Simplified process diagram of the SDG delivery system in relation to targets for sustainable resource management



Source: Obersteiner.

5. Annotated Bibliography

REFERENCE	COMMENT
UNEP (2017) Resource Efficiency: Potential and Economic Implications. A report of the International Resource Panel. Ekins, P., Hughes, N., and others.	Comprehensive report on the economics of resource efficiency, impact decoupling and circular economy; There are many relevant case studies for resource efficiency presented in this report
The 10-year framework of programmes on sustainable consumption and production patterns (10YFP)	The 10YFP also fosters knowledge and experience sharing, and facilitates access to technical and financial resources for developing countries. 10YFP Trustfund (18 small scale projects funded)
Ellen MacArthur Foundation (2017) "Achieving growth within"	A €320-BILLION CIRCULAR ECONOMY INVESTMENT OPPORTUNITY AVAILABLE TO EUROPE UP TO 2025
Ellen MacArthur Foundation (2015) Towards a Circular Economy: Business rational for an accelerated transition	Presents a vision and concrete steps and investment potential for business to implement a circular economy. The report has a strong focus on Europe.
OECD (2015), Material Resources, Productivity and the Environment, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264190504-en	Gives a good understanding of how minerals, metals, timber or other materials flow through the economy throughout their life cycle, and of how this affects the productivity of the economy and the quality of the environment. Report considers the production and consumption of materials, as well as their international flows and available stocks, and the environmental implications associated with their use. It also describes some of the challenges and opportunities associated with selected materials and products that are internationally-significant, both in economic and environmental terms (aluminum, copper, iron and steel, paper, phosphate rock and rare earth elements).
EAT Lancet Commission (2017)	Understanding what constitutes a healthy diet and how to produce it sustainably for 9 billion people by 2050 is arguably the greatest challenge facing humanity. The EAT-Lancet Commission on Food, Planet, Health is developing science-based targets that define what is a healthy diet from a sustainable food system – and showing how to take action for a better food future.
(Obersteiner and others, 2016)	SCP in the food sector act as depressor elements to attain SDG 15 goals in the overall land system
IATA (2013). IATA Technology Roadmap, 4th edition, June 2013. https://www.iata.org/whatwedo/environment/Documents/technology-roadmap-2013.pdf	In this publication the global airline industry provides an ambitious and detailed technology roadmap for low to no GHG emissions fuels and practices.
(Lemoine and others, 2010)	Portfolio approach to investment in R&D for incremental resource efficiency in energy technologies and R&D investment to produce radical new technologies to attain ambitious climate targets.

OECD (2016), Policy Guidance on Resource Efficiency, OECD Publishing, Paris. http://dx.doi.org/10.1787/9789264257344-en	Improving resource efficiency by putting in place policies that implement the principles of reduce, reuse, recycle (the 3Rs) is crucial to improving resource use, security and competitiveness while diminishing the associated environmental impacts.
(Klimek and others, 2015)	Paper illustrates that for risk reduction in supply of key minerals and metals SDP and circular economy concepts can help mitigate risk exposure.
UNEP (2011) Decoupling natural resource use and environmental impacts from economic growth, A Report of the Working Group on Decoupling to the International Resource Panel. Fischer-Kowalski, M., Swilling, M., vvon Weizsacker, E.U., Ren, Y., Moriguchi, Y., Cran, W., Krausmann, F., Eisenmenger, N., Giljum, S., Hennicke, P., Romero Lankao, P., Siriban Manalang, A.	
UNEP-FI Guide to Banking and Sustainability (2016)	Through these pages, three key messages emerge on what defines a sustainable bank: • First, addressing sustainability issues requires responsibilities and actions to be taken at all levels and across all the key functions of banks. • Second, a sustainable bank is one that not only understands and manages the risks that arise because of sustainability issues, but also perceives the strategic dimension of these issues. • Third, communicating and engaging—within the bank, with peers and with stakeholders—is critical to embracing something as complex and as vital as sustainability issues.

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Annex I

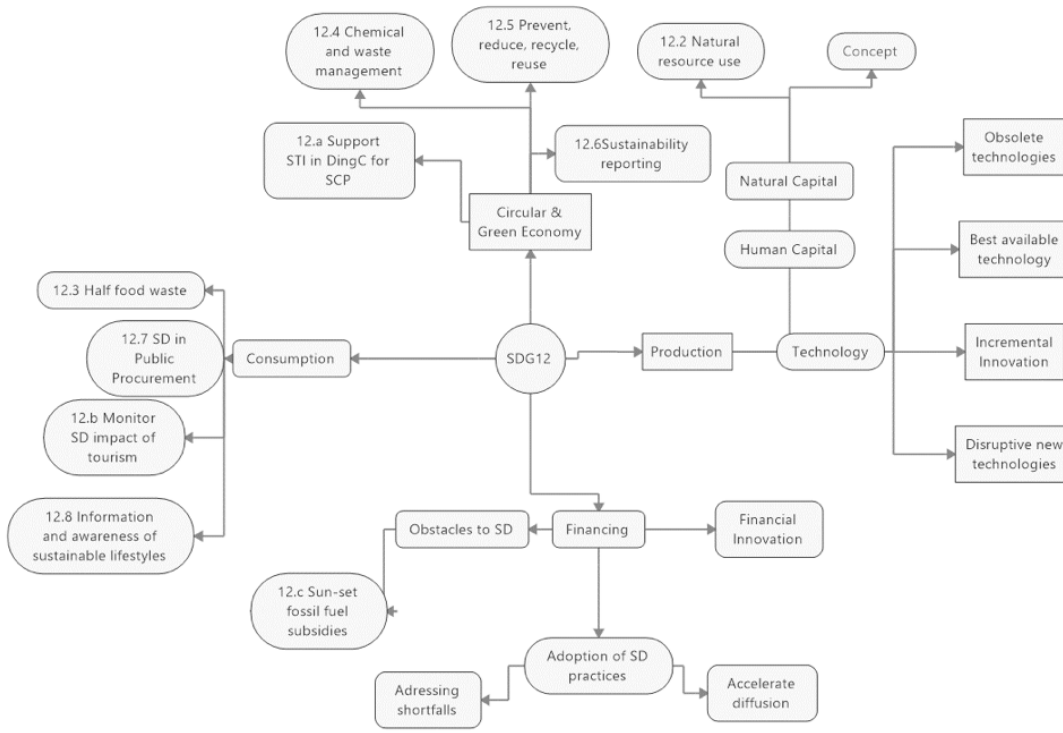
SDG 12 and its targets

SDGs	Targets
12: Ensure sustainable consumption and production patterns	12.1 Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries
	12.2 By 2030, achieve the sustainable management and efficient use of natural resources
	12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses
	12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment
	12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse
	12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle
	12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities
	12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature
	12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production
	12.b Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products
	12.c Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities

Annex 2

Figure AII.1

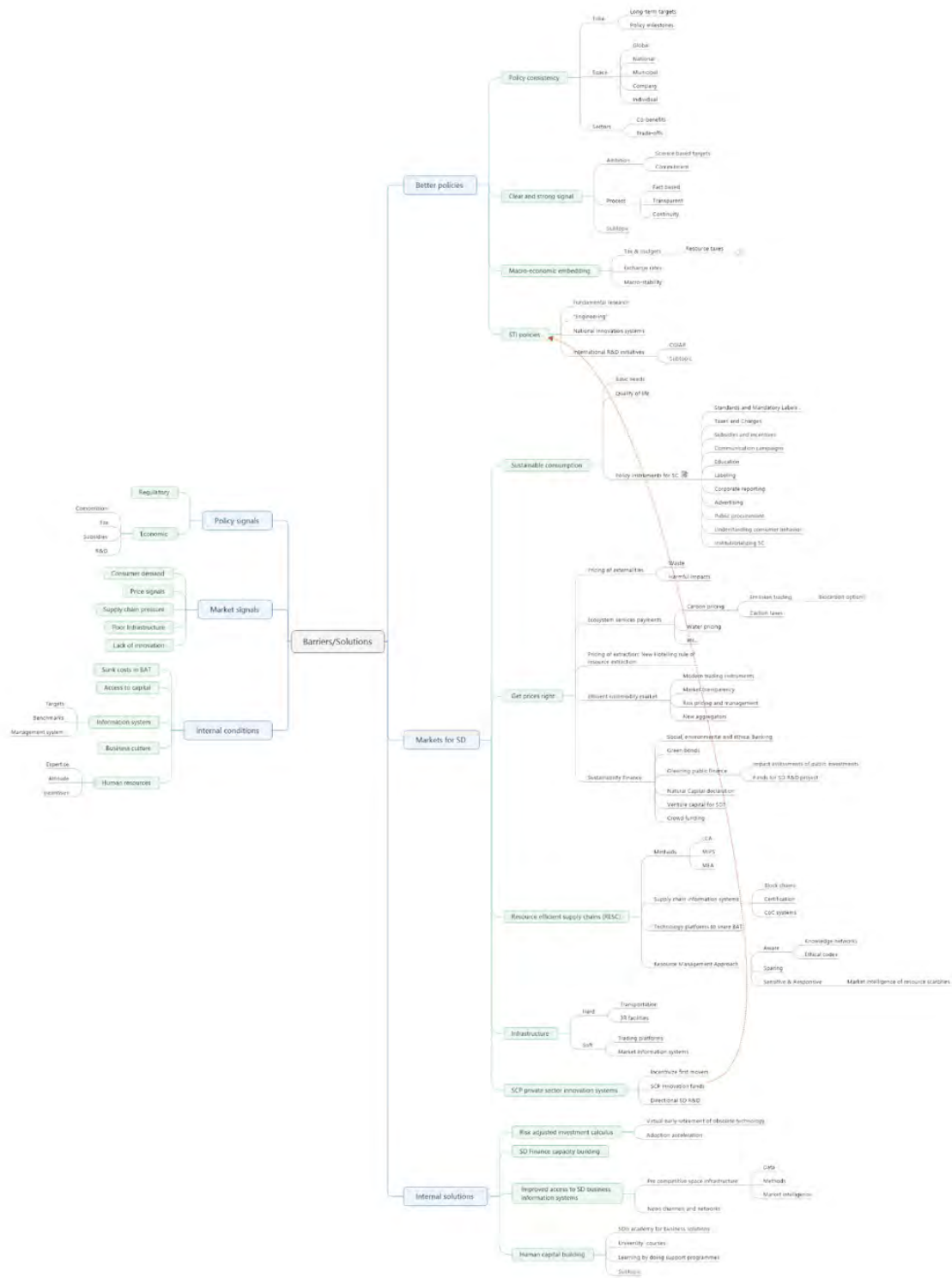
Mind map of SDG 12



Source: Obersteiner

Figure AII.2

Mind map of barriers and solutions related to STI development and deployment issues in the context of SDG 12.



Source: Obersteiner

FINANCING SUSTAINABLE, RESILIENT AND INCLUSIVE SOLUTIONS TO ATTAIN SDG 15

Dr. Michael Obersteiner

20 December 2017

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I. Executive summary

An extremely important aspect for attaining the Sustainable Development Goal (SDG) 15 targets is the temporal component—that is, the feasibility of SDG targets (SDTs) over time, given projected population growth and the growing pressures on ecosystems stemming from current limitations in technological/environmental possibilities and, in particular, from limits to intensification of agricultural production. Quantitative estimates already show the infeasibility of zero net deforestation and biodiversity targets in 2030-2050, unless new technologies emerge to provide additional sources of animal protein or traditional food consumption patterns are substantially shifted. This consideration directly links to SDG 12 on sustainable consumption and production patterns.

Based on extensive analysis of the literature, the following aspects become prominent.

Obstacles to technology adoption

- Legally binding agreements at the international level are needed to set clear rules of operation and to transfer these to the national level, thereby opening possibilities for private finance;
- The technological aspects should be supported by a set of commonly accepted biophysical and socio-economic indicators. This problem may turn out to be rather complex, however, as these can be location specific;
- The lack of market incentives, insecure land tenure and resource-use rights are major prohibiting factors across many SDTs of SDG 15. The issue is pressing because of the important role of local communities across the SDTs of SDG 15 that are affected by these problems. One of the possible innovative approaches to resolving this issue is providing affordable land-rights documentation to rural communities, as in the

approach of Landmapp;[1]

- In addition to stronger law enforcement, improving the socioeconomic situation is a key to many SDTs of SDG 15. However, it has to be recognized, that, in many cases, under a business-as-usual scenario, there is a trade-off between environment and economics and both cannot be improved at once without changing a particular system;
- Long-term strategy, commitments, planning, and funding are key in the context of SDG 15. Even though there are cases of successful long-term endowments-based funding, this approach has obvious limits in upscaling, so creating market incentives seems to be the way forward.
- Referring to SDT 15.9 (integrate ecosystem and biodiversity values to national planning), there is a need to link national and international levels in order to allow more flexibility in finance. Reducing Emissions from Deforestation and Degradation (REDD) can serve as an example of this approach.

Science, technology and innovation (STI) solutions and gaps

- There are many gaps regarding scientific and economic assessments (e.g., delineation of areas to be protected, setting priorities, and definition of targets for each area). In many cases, these gaps are a starting point in resolving apparent issues and are therefore primary targets for funding;
- Current and near-term limits in remote-sensing monitoring technologies imply the need for in-situ measurements that incur considerably higher costs;
- Promising solutions to this gap could include (i) a wider use of (incentives-based) citizen science that has yet to be explored and (ii) data fusion employing multiple sources—for example, satellite and aircraft acquired light detection and ranging (LiDAR). However, these solutions are not yet operationalized;
- SDG 15 directly links to the broad problem of climate change, as there are numerous examples of the effects of climate change on various species providing solid evidence that climate change will be catastrophic for many of them. Joining efforts and uniting "climate change" and "ecosystems" communities may foster cross benefits and facilitate progress at all levels;
- Emergence of a global carbon market could foster valuing ecosystems via REDD and create financial inflow to support actions under SDG 15. To efficiently combat uncertainties associated with it, the innovative approaches employing (a) optionality and (b) a benefit-sharing mechanism have strong potential to amplify mobilization of private finance and allow for maximizing the market size; However, actual costs and environmental benefits of REDD are uncertain;
- Generally, preventive measures are preferable in addressing existing/created problems (i.e., post-interventions), such as quarantine control and early detection as it relates to invasive and alien species.

II. Introduction

Beginning in 2016, the 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development officially came into force (United Nations, 2017). Countries will mobilize efforts to end all forms of poverty, fight inequalities and tackle climate change, while ensuring that no one is left behind (United Nations, 2017). The SDGs call for action by all countries to promote prosperity while protecting the planet. While the SDGs are not legally binding, Governments are expected to take ownership and establish national frameworks for the achievement of the goals (United Nations, 2017).

This analysis is focused on SDG 15, which is broadly formulated as "Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss" and has twelve targets (SDTs) that further detail SDG 15. The objective of this analysis is to provide expert knowledge on the theme of financing science, technology and innovation (STI) solutions for SDG 15. This analysis is carried out in the format of a background paper comprising a compre-

1 See http://www.landmapp.net/.

hensive overview, grounded in well-established science and factual evidence, representing the latest thinking in the field and including assessments of existing approaches as well as innovative new instruments and novel approaches. A proper differentiation across developed and developing countries is made clear whenever appropriate.

The remaining sections of this paper are structured as follows:

Section III provides an overview and analysis that reflect upon the set of SDG 15 targets (15.1-15.c, as specified in Annex I). This section addresses the following aspects (with their corresponding section numbers):

III.1 Technology and innovation solutions and gaps for attaining SDG 15;

III.2 Financing and other obstacles to the adoption and scaling up of relevant technologies and innovations;

III.3 Existing and novel approaches for addressing financing shortfalls and challenges for natural capital building at different levels (global, national and sub-national);

III.4 The potential for STI road maps (based on concrete examples) to facilitate necessary investments.

The arrangement of SDTs within these topics is such that SDTs 15.1-15.9 and 15.c are put into subsection III.1, which provides primary information on solutions and gaps that are relevant to technology innovation and beyond, as required by the importance of the respective issues. SDTs 15.a and 15.b are put directly into discussion in subsection III.2 for two reasons. First, both SDTs explicitly specify financial aspects that make a respective discussion more relevant for the subsection **III.2**. Second, the technological side of respective topics is covered to a large degree in preceding subsections relevant to SDTs 15.1-15.9. Sections III.3 and III.4 cover in a condensed way the entire SDG 15, with examples and applications from relevant SDTs.

Section IV provides conclusions and suggests a way forward. Section 5 supplies a bibliography for the cited literature sources.

III. Overview and analysis reflecting on the set of SDG 15 targets

III.1 *Technology and innovation solutions and gaps*

15.1. By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements

This section provides a brief overview of the topic of legislative support to international agreements. Even though this analysis is not explicitly focused on finances, it helps to better understand the legal environment relevant to Sustainable Development Goal Target (SDT) 15.1 in particular and Sustainable Development Goal (SDG) 15 as a whole. It serves as a broad legal framework for future financial efforts and highlights a few important gaps and reports on implemented solutions.

Sirakaya, Cliquet, and Harris (2017) provides a review and assessment of the legally binding instruments on biodiversity at the international level that focus on urbanization, causing an adverse impact on biodiversity and ecosystem services. The authors emphasize that, currently, the international biodiversity conservation practice mainly focuses on rural areas, and not on urban conservation and restoration, thus creating a gap. The authors assess legally binding instruments in order to see if they provide a sufficient legal basis for relevant solutions and if there are any gaps in protection of ecosystem services in urban areas. From this point of view, the authors elaborate on the Aichi Targets related to the Biodiversity Convention and the Ramsar Convention on Wetlands of International Importance. Earlier research (Luederitz and others, 2015) highlights the main existing science, technology and innovation (STI) gaps and challenges in securing and enhancing ecosystem services that go far beyond the urban aspect, suggesting a solid framing of the ecosystems-related challenges relevant to SDG 15, which include:

- *Spatial and contextual*. Most work is currently concentrated in the developed countries, whereas some of the most acute problems occur in low- and middle-income countries;

- *Clarification of definitions*. Greater clarity is needed, particularly regarding the definition of "urban" which requires unambiguous description of the environmental, spatial and socioeconomic context;
- *Limited transferability of data*. Global estimates of services and values cannot easily be transferred to local contexts, due to differences in biomes and socioeconomic circumstances;
- *Stakeholder engagement*. Few studies involve stakeholders, leading to the danger that the process could become technocratic, and there is an urgent need for engaging stakeholders in ecosystem service research;
- *Integrated research effort*. Transdisciplinary research efforts are needed. Without them, capturing the full diversity and richness of ecosystem service provision by green infrastructure will be impossible;
- *Closing the feedback loop between urban ecosystem service appropriation and the management of urban ecological structures*. Research and assessment has to be properly connected to the management of urban ecological components.

A good example of existing solutions of legislative integration is the Bern Convention on the Conservation of European Wildlife and Natural Habitat (1979) that has been implemented in the European Union (EU) by the EU Nature Directives. The Nature Directives provide a prime example of strong nature conservation legislation (Born and others, 2015). In the opinion of Sirakaya, Cliquet, and Harris (2017) regarding biodiversity, the SDGs are still in their infancy with no clear indication as yet on urban biodiversity conservation; nor is there information on national implementation at this point. Setting global targets can promote collaboration and agreement on ecosystems and their services (Maxwell and others, 2015), but without detailing these targets and methods of implementation, there is a high risk of not attaining intended goals (Maxwell and others, 2015).

A broad overview of the international biodiversity-related conventions (The Energy and Biodiversity Initiative, 2003) includes the Convention on International Trade in Endangered Species of Wild Flora and Fauna (1973); the Ramsar Convention on Wetlands (1971); the World Heritage Convention (1972), which covers sites of natural or cultural value; the Convention on Migratory Species (1983); and the Convention on Biological Diversity (1992). One of the highlighted gaps here is that, in contrast to other issues (e.g., trade), there is no single international body dealing with the environment, and all five biodiversity conventions operate independently with separate secretariats (The Energy and Biodiversity Initiative, 2003). In addition to the key international conventions related to biodiversity, the authors provide an overview of more specific legislation related to region and nature of potential impact, covering more than 30 conventions and 8 categories (nature conservation; coastal and marine areas; rivers and lakes; wetlands; birds; mammals; pollution prevention; and endangered species). While regional specifics is of great importance (Luederitz and others, 2015), this level of dispersion might point to the need for consolidation of the agreements, with clear separation between the framework and legally binding implementation documents focusing on implementable actions to attain quantified goals within a given time frame.

As SDT 15.1 on terrestrial ecosystems is explicitly mentioning inland freshwater ecosystems that are not covered by other SDTs, a brief look at this topic is included here. An overview paper by Green and others (2015) states that nearly the entire world is serviced by freshwater sources, compromised to a moderate extent by human activities, with 82 per cent of the world's population served by upstream areas exposed to high levels of threat; this analysis further suggests that better management of upstream source areas in poorer countries represents an opportunity to reduce threat, lessening reliance on costly engineering solutions. The authors highlight the practical need for water service management strategies, including service area conservation, threat reduction and both green and gray infrastructure investments. The value of such green technologies and ecosystem services goes beyond traditional infrastructure investment, yet requires systematic evaluation (Green and others, 2015) that implies additional funding needs and an extension of the planning/implementation time horizon. In the context of building and maintaining existing infrastructure, Birnie-Gauvin and others (2017) states that barriers created by the infrastructure may have severe repercussions on population densities and dynamics of aquatic animal species; it further argues that adaptive management provides a relevant approach to managing barriers in freshwater ecosystems, although this approach may not be suitable in all instances. Lira-Noriega and others (2015) presents an example of a first priority assessment of freshwater ecosystems at a national scale in Mexico; the analysis highlights the importance of conducting conservation prioritization assessments

at a higher spatial resolution, using information that is up to date to bridge the existing research–implementation gap in conservation planning. A report on protection tools for freshwater ecosystems in Tasmania (Dunn, 2003) presents a broad range of identified tools—legislative, policies and strategies, voluntary and incentive. The analysis further emphasizes that individual sites require assessment of threats and tools with reference to the particular conservation values present. The study demonstrates gaps in legislation (e.g., absence of protection of the riparian zone), gaps in application of key tools (e.g., difficulties in definition of environmental flow requirements to protect estuaries or wetlands), limited staffing for protection activities, and enforcement of legislated controls (Dunn, 2003). We believe the highlighted gaps are universally valid.

15.2. By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

An overview of the state of measurement and monitoring capabilities for forests in the context of Reducing Emissions from Deforestation and Degradation (REDD+) is presented in Goetz and others (2015). The authors explore existing possibilities, analyze the needs for further improvements, and provide a near-term projection on perspectives of new technologies. Satellite- and aircraft-based technologies are applied for monitoring of forests measuring (a) changes in their extent, (b) carbon stock density (estimating areas that are deforested or degraded) and (c) regrowth dynamics following a disturbance. While the technologies currently applied have reached a certain level of maturity, the authors emphasize the synergistic role of integrating field inventory measurements with remote sensing for best practices in monitoring, reporting and verification. This means that existing remote-sensing-based solutions that are extremely cost efficient in covering wide geographical areas still need support by in-situ measurements that incur considerably higher costs. This is one of the examples where existing limits in technology create a potential gap in finance. So, as safeguards for natural forests and biodiversity, the existing monitoring capabilities are approaching operational status in the near term (Goetz et al. 2015) and, as projected for REDD+ needs, measurement capabilities will rapidly advance in the next few years because of new technology.

An important aspect supporting technological development is the expected advances in capacity-building, both within and outside of the tropical forest nations on which REDD+ is primarily focused (Goetz and others, 2015). An example solution of using satellite-based observation systems for support of the enforcement of domestic forest protection policies is Brazil's alert system that utilizes a range of satellite imagery to target illegal logging and forest conversion activities (Goetz and others, 2015; EARSC, 2011). However, on a global scale, there is a considerable gap due to much disagreement in the scientific community about the magnitude and extent of deforestation worldwide (Fonseca, Davis, and Câmara, 2009). An intermediary solution (both in terms of cost and geographic coverage) between in-situ and satellite technologies is the aircraft acquired light detection and ranging (LiDAR) data, which is valuable for estimates of canopy height, cover and vertical structure. There are two challenges connected to the wide application of this technology. First, the errors in LiDAR-based estimates have a mean of about 20 per cent, yet vary with the magnitude of field biomass reported (Goetz and others, 2015). Second, mapping of all tropical areas with aircraft would cost about $250 million, which is deemed rather expensive, even though this sum is only 5 per cent of total current pledged funding for REDD+ (Mascaro and others, 2014). This gap can be filled by approaches linking samples of LiDAR acquisitions with continuous coverage satellite data as suggested in Goetz and others (2015).

An important aspect of monitoring forest loss is the problem of attributing the loss to land uses and owners. A study in Bolivia (Killeen and others, 2008) presents a case where land-use change was analyzed for several groups of land owners. A much more granular case is reported in Copernicus Sentinels' products economic value: a case study of forest management in Sweden (EARSC, 2016), which presents an economically sound case of tracking the changes in Swedish forests down to a particular forest owner and triggering certain actions from the Swedish authorities. One of the possible innovative approaches to solving this issue is providing affordable land-rights documentation to rural communities—especially in developing countries, as Landmapp is doing through its operations in Ghana and other countries. These cost-effective solutions utilize a combination of technologies rapidly developed over the past decade: mobile applications on smartphones supporting geolocation services (e.g., via GPS sensors) and remote sensing/satellite information (e.g., imagery); creating user communities/networks (e.g., land owners and their neighbors); and, most importantly, linking to authorities to

make sure the final intellectual product has a legally binding status.

On the technological side of forest management, investment into the newer management/harvesting technologies to better comply with sustainable forest management requirements does not seem to be a hot topic, as the largest share of total investments goes into building and maintaining the forest road network. There are not many technical possibilities to change the technology in the tropics (e.g., chainsaw felling to harvesters) due to the large size of the trees. Similar limitations and conclusion are valid for moving from manual planting to automatic planting. Overall, there is more need for capacity-building and exercising good practices, which are not directly related to technology and are considered to be a minor investment.

15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world

As stated by the United Nations Convention to Combat Desertification (UNCCD) secretariat, land and the fertility of its soil are critical natural capital, essential for sustainably ensuring food, renewable energy and water security while eradicating rural poverty, conserving terrestrial biodiversity, and building the resilience of our agricultural systems to climatic shocks. Desertification, land degradation and drought are challenges of a global dimension that pose serious obstacles to sustainable development in all countries, especially for the rural poor in developing countries. Targets require indicators and mechanisms to establish baselines and monitor progress in order to demonstrate to governments, businesses, communities and individuals the consequences and impacts of their actions. In addition to having the capacity to measure trends in land degradation and restoration, biophysical and socioeconomic indicators should be linked in order to capture the complexity of desertification, land degradation and drought (DLDD) processes and impacts (UNCCD secretariat, 2013).

Adopting and scaling up sustainable land-management practices, both in terms of area and effectiveness, and improving land-use planning and governance structures at the national and local levels are often the most effective ways to overcome these challenges. The increased use of strategic and environmental impact assessments leading to the adoption of new technologies and innovative land- and water-use policies, planning and practices will also serve to further mitigate the extent and degree of land degradation (UNCCD secretariat, 2013).

Sustainable land management (SLM), with its focus on improving soil structure, land cover and water efficiencies, also contributes to progress in achieving three critical global sustainability goals, namely food security, renewable energy and water availability. SLM practices enhance soil water retention capacity and improve water availability by replenishing and elevating groundwater tables. Many renewable energy sources, such as timber, hydroelectricity and biofuels, depend on productive land and well-functioning hydrological regimes.

Conservation and SLM practices alone are not sufficient to stem the loss of biodiversity and ecosystem services that result from DLDD processes. Thus, a third critical pathway of action calls for increasing health and productivity by restoring and rehabilitating land that is already degraded. Global assessments estimate that there are more than 2 billion hectares of degraded lands worldwide that have the potential for forest, landscape and mosaic restoration in which forestry is combined with other land uses, such as agroforestry and smallholder agriculture (UNCCD, secretariat 2013).

The slow uptake of SLM practices is often due to a lack of market incentives, insecure land tenure and resource-use rights, high upfront costs and labour intensity, and limited access to education, information, vocational training and extension services. A target-setting approach would foster institutional and technical capacities to assist local communities and inspire action on the ground (UNCCD secretariat, 2013).

There are some countries in the world, such as Australia and Iceland, which have long-standing traditions of land restoration and often apply very effective participatory approaches involving the local populations. In general, however, land restoration has only been applied in very limited areas and without an overall implementation framework. Adopting a sustainable development goal regarding land degradation neutrality will require an in-depth analysis of land restoration practices and the development of clear criteria for their evaluation and impact assessments (Montanarella, 2016). In different parts of the world, degradation processes are different, requiring approaches tailored to local conditions. It is clearly demonstrated that local communities can effectively restore degraded areas by implementing relatively simple and effective management practices (Montanarella,

2016). Although the EU established the Thematic Strategy on Soil Protection, the existing EU legislation varies in scope and objective and does not sufficiently address significant soil problems as it does not cover all soils and does not address all soil threats (European Commission, 2006).

An overview of restoration practices in degraded landscapes of Eastern Africa that is based on a set of case studies (Chirwa, 2014) presents an approach to restoration of degraded landscapes and woodlands—referred to as exclosure, which is a practice of land management that involves the exclusion of livestock and humans from openly accessing an area that is characterized by severe degradation. Under these conditions, the options to be implemented are (i) natural regeneration, that is, protecting rehabilitation sites from external interference to facilitate natural regeneration and (ii) aided regeneration, which involves planting indigenous tree species that can dominate the degraded sites during early stages of secondary forest succession. The trees planted are intended to act as nurse trees that provide shade, enrich the soil and support the microhabitat in naturally recruiting woody species. The technique is employed in situations where deforestation has led to loss of seed sources and in areas where harsh site conditions are unfavorable for natural regeneration. Another approach to rehabilitation of the land is agroforestry, which is the most common in human-dominated landscapes where trees with multipurpose characteristics are used, including some nitrogen-fixing species for soil fertility improvement, as well as wood and fiber and fruit trees. The most common agroforestry technologies promoted in Eastern Africa include improved fallows in Western Kenya and rotational woodlots in the western dryland areas of the United Republic of Tanzania. Some traditional agroforestry systems consist of the multistory tree garden, which involves the mixing of trees and farm crops in a spatial arrangement. As regards plantations and woodlots, the major problems identified in tree planting include poor land tenure, limited extension services and financing mechanisms, and low quality germplasm.

In the United Republic of Tanzania, techniques already in use include plantations, natural regeneration, agroforestry and various soil and water conservation techniques (Chirwa, 2014). Plantations are too restricted in extent to provide sustainable livelihoods and environmental services for the large land areas demanding restoration, while assisted natural regeneration and enrichment planting have been tried only in research activities. Several reports have indicated that natural regeneration through active involvement of local communities promoted under participatory forest management, and supported by the new forestry legislation and programme, is by far the most promising option for restoration of the large areas of degraded land in the United Republic of Tanzania. This community-based forest management is regarded as the most appropriate way to achieve forest landscape restoration and is expected to be successful because local communities are allocated forest land rights that are clear, and traditional knowledge and practices are taken into account.

In summary, regarding the issue of combating land degradation, the most needed measures (e.g., good practices, funding work on the ground, active involvement of local communities, etc.) are not directly related to specific technologies, even though some solutions—those related to land rights, for example—can be supported by those measures, as mentioned earlier in this document (e.g., provision of land-use rights documentation to the poor, as done by Landmapp).

15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development

Conservation and sustainable use in mountain ecosystems present special challenges because of the harsh climatic conditions, the fragility of mountain soils and the increasing threat of habitat fragmentation and degradation (Mackinnon and others, 2002).

The World Bank reports on a wide range of projects supporting mountain ecosystems that include establishment and strengthening of new protected areas and biological corridors (in Central America, Colombia, Georgia, Laos); improved management of existing protected areas (in Ecuador, Indonesia, Madagascar, Mexico, Uganda, Venezuela (the Bolivarian Republic of)); conservation of medicinal plants (in Ethiopia); and promoting community management of mountain-protected areas and indigenous reserves (Colombia, Ecuador, Peru); watershed projects (in the Middle East and Northern Africa) incorporating natural forests and endemic riparian woodlands as part of microcatchment vegetation management with local communities (Mackinnon and others, 2002). Due to the wide variety of ecosystems and the different priorities among targets, the projects use tailored approaches.

As reported by the World Bank (Mackinnon and others, 2002), the Kyrgyz Republic's Sheep Development Project, targeting the improvement of rangeland management in mountain ecosystems, has piloted new models of rangeland tenure, management, and monitoring to address the problems of environmental degradation and improve livelihoods. The resulting improvements in pasture use also reverse biodiversity degradation resulting from decades of severe overgrazing. Under the project's pilot programme in sustainable pasture management, pilot leasing rights were defined for local communities and households; rangeland management plans were drawn up that identified grazing loads and protection zones; and technical assistance was provided to farmers on rangeland management and forage improvement. The project has developed a geographic information system-compatible database for the country's rangelands, including degraded ranges that require protection from further overgrazing (Mackinnon and others, 2002).

The approaches that are rather indirect can help protect mountain ecosystems by, for example, providing financial and technical assistance to buffer-zone communities and community-based organizations to finance demand-driven activities in sustainable agriculture; developing alternative livelihoods (e.g., honey and medicinal plants, tourism); and using alternative energy systems. All these activities are designed to reduce pressures in and around the protected areas (Mackinnon and others, 2002). In addition to national-level activities, projects may need to support a strong regional cooperative component, including development of framework laws on protected areas (Mackinnon and others, 2002).

The aspects highlighted above are relevant for the long-range success of conservation measures in mountain regions, as such success requires that the following discrete but interconnected interventions be pursued concurrently: (i) the protection of biodiversity and ecosystem services; (ii) an empowerment of mountain communities (including family farming); and (iii) elaboration of more thoughtful, context-specific policy environments for sustainable mountain development (Foggin, 2016).

While virtually all mountain biodiversity initiatives documented in Chettri and others (2012) emphasize community involvement, a few have also leveraged local institutions and indigenous knowledge systems, blending them with scientific knowledge to find a way forward. Most case studies capture good practices that can be replicated and scaled up, as well as lessons learned, thereby contributing to the Programme of Work on Mountain Biodiversity adopted by the Conference of the Parties to the Convention on Biological Diversity.

One of the projects presented in Chettri and others (2012) reports on innovation through a pilot fodder bank model using fast-growing and high biomass-yielding nutritious species (both indigenous and introduced) to reduce the drudgery women experience by decreasing fodder collection time and distance travelled. Another innovation reported consists of improving a traditional soil conservation system practiced by the farmers in districts of Nagaland, India. This system has historically involved placing bamboo or logs randomly across the slope in the fields. The logs conserve the soil and are replaced after two or three years, depending on the durability of the logs. This method has been scientifically modified so that logs are now placed across the slope along the contour line at a vertical interval of 3 metres, depending upon the slope. Results reveal that this configuration significantly minimizes soil loss.

The broad analysis of 15 case studies (Chettri and others, 2012) concludes that the following aspects are of primary importance:

- Conservation measures should enhance local people's livelihoods, technical and management capacities, and decision-making roles. Otherwise, sustainability can prove elusive;
- The best hope for conservation may come from the fusion of traditional/indigenous knowledge and science;
- There is need for good governance and for regional and sometimes transboundary cooperation;
- Focusing on a long-term, integrated landscape approach to conservation with long-term monitoring can have lasting positive impacts;
- Putting in place mechanisms such as payment for ecosystem services (PES), and appropriate strategies promoting a green economy can further build the resilience of socioeconomic and ecological systems in the landscape.

The PES mechanism assumes quantification and valuation of the targeted services and can help set priorities and incentivize investors. There are some vivid case studies on this type of assessment (even though not specifically related to mountain ecosystems) on China and New Zealand (Moran, Cullen, and Hughey, 2005; Xu, Ding, and others, 2006).

15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species

Threats to biodiversity vary both within and between species groups (Craig Hilton-Taylor, 2007). Although habitat destruction is universally the most dominant threat, over-exploitation (harvesting, trade, etc.) is a major threat to mammals, affecting 33 per cent of threatened species. For birds, over-exploitation and invasive alien species both affect about 30 per cent of threatened species. Of the amphibians, 29 per cent of species are affected by pollution (including climate change) and 17 per cent by disease (particularly chytridiomycosis). The interaction between disease and extreme climatic events (drought) is the leading theory behind widespread amphibian declines. Threats in marine and freshwater systems are poorly understood but it appears that over-exploitation is presently the greatest threat to marine species, followed by habitat loss. There are many examples of the effects of climate change on species from around the world that, taken together, provide compelling evidence that climate change will be catastrophic for many species (Craig Hilton-Taylor, 2007). This means that this SDT directly links to a broad problem of climate change.

As for geographic distribution, most threatened species occur in the tropics, especially on mountains and on islands. Most threatened birds, mammals and amphibians are located in Central and South America; Africa south of the Sahara; and tropical South and Southeast Asia (Craig Hilton-Taylor, 2007). Globally threatened species frequently require a combination of conservation responses to save them. These responses encompass research, species-specific actions, site- and habitat-based interventions, policy responses and communication and education. It is much more effective and economical to protect a habitat in the first place than to try to restore it after it has been destroyed or to reintroduce a species that has disappeared.

The tools in the conservation arsenal are many and varied (Craig Hilton-Taylor, 2007), and are in agreement with practical strategies (see Natural Resource Management Ministerial Council of Australia, 2010).

They include:

- Effective management and restoration of habitats and ecosystems (including establishment of protected areas and protected area networks);
- Limiting the use of pesticides, herbicides and other chemical pollutants;
- Enforcement of key agreements such as the Convention on Biological Diversity, Convention on Migratory Species, Convention on International Trade in Endangered Species of Wild Fauna and Flora;
- Creating incentives and finance for conservation;
- Equitable sharing of costs and benefits of conservation;
- Assessment of biodiversity and the social and economic factors affecting it;
- Captive breeding and reintroduction, including seed banks;
- Conservation information management and communication;
- Training and technical capacity-building.

An important practical aspect relevant to protecting both forests and biodiversity on a large scale is the monitoring of forests, making a distinction between natural and plantation forests, as the biological diversity and ecosystem services provided by the two systems differ greatly (Goetz and others, 2015). This monitoring issue has a clear technological component. The body of literature addressing the identification and monitoring of the extent and change of plantation forests by using remote sensing has been limited; this creates another practical challenge that can potentially be addressed by automated approaches emphasizing multitemporal and multi-sensor data fusion techniques (e.g., RaDAR-optical-LiDAR) (Goetz and others, 2015).

15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed

In the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization to the Convention on Biological Diversity[2], article 17 specifies the approach to monitoring the utilization of genetic resources; this includes designation of checkpoints that collect/receive relevant information related to (a) the source of the genetic resource; (b) the establishment of mutually agreed terms; and/or (c) to the utilization of genetic resources. The checkpoints should be relevant to the collection of information at, inter alia, any stage of research, development, innovation, pre-commercialization or commercialization. Financial mechanism and resources for implementing the Nagoya Protocol take into account the provisions of article 20 of the Convention on Biological Diversity and, according to article 25 of the Nagoya Protocol, the financial mechanism of the Convention shall be the financial mechanism for the Nagoya Protocol. As noted in Greiber (2012), the Nagoya Protocol builds the basis for providing financial assistance to developing-country Parties and to Parties with economies in transition for the implementation of the Protocol. The underlying rationale of this provision is that Parties with limited capacity need assistance if they are to comply with their obligations under the Protocol. Such compliance is in the interest not only of the Parties concerned but also of the entire community of Parties to the Nagoya Protocol. In order to operationalize the Nagoya Protocol, all Parties need to be in a position to implement it at the national level.

The extreme importance of international collaboration is outlined in Antons (2010), which concludes that national development goals and interests in royalty collection frequently dominate the discussion and that key concepts are still not sufficiently defined to avoid overlaps and conflicts. Genuine local support for conservationist aims will depend on whether a benefit flow to communities can be ensured and if the original role of benefits to act as incentives can be realized. International collaboration is important in avoiding disputes concerning biodiversity-related knowledge held across borders.

From this perspective, exploration of the available (bio-) technologies serving the purposes of (back) tracking products to genetic resources (which is not mentioned in the Nagoya Protocol) is left beyond the scope of this paper. On a more explicit technological side, the Nagoya Protocol is to a certain degree centered on data collection (and monitoring) as it is encouraging the use of cost-effective communication tools and systems. These systems, however, are part of a large international organizational framework and subject to compliance with policies accepted at that level; hence, these systems are a tool rather than a driving factor and therefore left out from further analysis here.

15.7 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products

As reported by the American Wildlife Association, building on its decades of experience combating rhino and elephant poaching in Africa (African Wildlife Foundation, 2014), the global nature of this crisis is being addressed through a multi-tiered effort to:

- Support the work of protected-area authorities and other anti -poaching efforts on the ground;
- Increase global awareness of the urgency of reducing demand;
- Expand law enforcement efforts to crack down on illegal wildlife trafficking and engage with partners and policymakers to ensure broad support in combating this serious issue.

These tasks are in full agreement with the US national strategy for combating wildlife trafficking, which aims to strengthen enforcement, reduce demand and increase cooperation to address these challenges (The White House, 2014).

The methods used to protect animals include creation of artificial water points during the dry season to keep elephants within protected areas; aggressive anti-poaching protection so that conservancy has minimal poaching losses and poachers are being arrested; coordination of trans-border patrols and other scout support in the cross-border region; supporting sniffer dogs and other enhanced law enforcement efforts to increase the rate

2 See https://www.cbd.int/abs/about/default.shtml/.

of detection of contraband wildlife products before they leave African ports; tracking teams to patrol regions of interest regularly (e.g., monthly) to identify individual animals and collect ecological data; professional training (e.g., a three-month, physically strenuous programme that equips community scouts and rangers with the necessary skills and knowledge to protect themselves and wildlife); implement anti-poaching efforts, plan patrols, and more (African Wildlife Foundation, 2014).

To halt the poaching epidemic in Africa, consumer countries must institute national bans on the ivory trade to prevent illegal ivory from being laundered into the legal domestic markets (African Wildlife Foundation, 2014). With its connections to organized crime, terrorism and corruption, combating elephant poaching and ivory trafficking is no longer the sole concern of the conservation community. Governments, international law enforcement agencies, the private sector, revenue agencies, global financial institutions and others have joined the fight, and many countries are deploying new legislative and law enforcement tools to fight wildlife crime. Several countries, including China and the United States of America, have also destroyed their stockpiles of confiscated ivory, sending a clear message that there is no economic future in ivory (African Wildlife Foundation, 2014).

In the review of the academic and grey literature on the links between poverty, poaching and trafficking, Duffy and St. John (2013) concludes that (i) poaching and trafficking of ivory and rhino horn from sub-Saharan Africa are directly and indirectly linked to poverty; (ii) poaching and trafficking of ivory and rhino horn are ultimately driven by wealth and not by poverty per se; and (iii) there are direct links between conflict zones, illegal killing of wildlife, trafficking and poverty. From this perspective, addressing the economic situation of the population in problem areas, especially in zones of armed conflict, seems to be an important part of the problem's solution.

On the technological side, there are reports of successful application of citizen science methods to address various problems, including poaching and trafficking of protected species, like those provided by CyberTracker ecological monitoring units (African Wildlife Foundation, 2014).

Scientific literature presents examples that examine the role of citizen science in monitoring biodiversity, concluding that some of the data collected in these networks can be used to fulfil national statutory obligations for nature conservation (Donnelly and others, 2014). Other results (Chandler and others, 2017) show that existing citizen science and community-based monitoring data provide large-scale data on species distribution and population abundance; species traits, such as phenology; and ecosystem function variables, such as primary and secondary productivity. Most citizen science schemes are found in Australia, Europe, India, North America and South Africa. Chandler and others (2017) explores what can be learned from successful programmes that would facilitate the scaling up of current efforts, how existing strengths in data coverage can be better exploited, and the strategies that could maximize the synergies between citizen science/community-based monitoring and other approaches for monitoring biodiversity—from remote sensing, in particular. The authors conclude that more and better targeted funding will be needed, if citizen science/community-based monitoring are to contribute further to international biodiversity monitoring.

15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species

A report of the Global Invasive Species Programme (GISP) (Barnard and Waage, 2004) synthesizes a series of eight regional workshops held around the world where a total of 99 nations and territories met to discuss questions including regions' priorities, gaps, and unmet needs for effective management. The document states that the overriding need expressed by most regions is the capacity to tackle invasive alien species (IAS) effectively. Much better capacity for IAS prevention, eradication and control is the bottom-line need—technical capacity (scientific, policy, economic, legal), institutional capacity (including educational), and logistical capacity. This includes phytosanitary and quarantine control, early detection and rapid-response systems, better field equipment, intersectoral planning, economic valuation, and the integrated policy and legal frameworks needed to underpin effective control. GISP reports that many countries and regions have started to secure financing and mobilize trained and equipped teams so that regionally appropriate solutions are found (Barnard and Waage, 2004).

Invading alien organisms are widely regarded as the second greatest threat to biodiversity after direct habitat

destruction. This is a biodiversity problem that affects all countries, developing and developed, rich and poor. Invasive species (plant and animal) are not only a serious threat to biodiversity, but also threaten ecosystem services and sustainable development with serious economic and environmental costs (Mackinnon and others, 2002). An example from South Africa demonstrates that in mountain regions and catchments, the invasive exotic trees have been shown to reduce water flow and smother native vegetation. They convert species-rich vegetation to single-species stands of trees, increasing biomass and decreasing stream flow dramatically. It has been estimated, for example, that invasion of the catchment areas surrounding Cape Town, if left to spread at current rates, could reduce water resources for this rapidly growing city by 30 per cent. Additionally, invasive plants in indigenous grasslands and shrublands increase fuel loads and fire risk which leads to increased soil erosion and degradation of mountain catchments (Mackinnon and others, 2002). This study is one of a few providing economic costs of invasive alien plants and, therefore, a direct link to financing opportunities.

A study on ecological and environmental consequences of IAS in China (Xu and others, 2006) concludes that quarantine measures should be strictly implemented. Meanwhile, the intentional introduction of alien species should be strictly managed and a system of risk assessment should be implemented. This broad study is based on data of classification, origin, pathway and environmental impacts of invasive alien microorganisms, invertebrates, amphibians and reptiles, fish, birds, mammals, weeds, trees and marine organisms in the terrestrial, aquatic and marine ecosystems of China.

Addressing at a regional level the problem of scientific and economic assessments mentioned above, a case study including an assessment of total economic losses caused by IAS in China in 2000 estimates those losses to be $14.45 billion, with direct and indirect economic losses accounting for 16.59 per cent and 83.41 per cent of total economic losses, respectively (Xu and others, 2006). This figure accounts for 1.36 per cent of China's gross domestic product.

As impacts and solutions are both determined by local conditions and particular invasive species, there is no one-size-fits-all solution. Therefore, targeted research is needed on a case-by-case basis. Quarantine control and early detection seem to be justified preventive approaches.

15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts

The United Nations Environment Programme (UNEP) Ecosystem Management subprogramme provides core services to regions and national Governments around the world. UNEP (2009) provides a list of relevant projects of global, national and regional scope. The document further states that protection and sustainable management of ecosystems is a critical element of poverty reduction strategies, as it helps maintain or enhance delivery of the water, food and other ecosystem services poor people rely on. UNEP works with ministries of environment, planning and finance to promote the incorporation of the ecosystem approach into national development planning and investment strategies.

UNEP is working with national and regional governments, developing tools and methodologies for valuing ecosystem services, and helping to incorporate these values into planning decisions, the design of policy instruments such as taxes or payments for ecosystem services, and national systems for accounting, planning, and management (UNEP, 2009).

Australia's biodiversity conservation strategy 2010-2030 (Natural Resource Management Ministerial Council of Australia, 2010) can serve as an example of a detailed national plan. The strategy consists of three sections: (i) setting the context, (ii) priorities for action, and (iii) implementation and action. This document presumably can be used for the purposes of benchmarking other similar initiatives when needed.

There is a need to link national and international levels in order to allow more flexibility in finance. REDD+ can serve as an example of this approach (Lubowski and Rose, 2013; Golub, Lubowski, and Piris-Cabezas, 2017).

15.c Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities

The EU Approach to Combat Wildlife Trafficking (European Commission, 2017) states that wildlife trafficking has become one of the most profitable criminal activities worldwide, with devastating effects for biodiversity and negative impacts on the rule of law due to its close links with corruption. The European Commission recognizes that the EU has an important role to play in addressing this, as Europe is currently a destination market, a hub for trafficking in transit to other regions, as well as, for some species, the source region for illegal trade. In February 2016, the European Commission adopted a Communication on the EU Action Plan against Wildlife Trafficking, which sets out a comprehensive blueprint for joined-up efforts to fight wildlife crime inside the EU, and for strengthening the EU role in the global fight against these illegal activities. The Action Plan has three main strands:

i. Greater enforcement;

ii. Better cooperation;

iii. More effective prevention.

The Action Plan, implemented jointly by the EU (Commission services, EEAS, Eurojust, Europol) and its member States, covers the five years from 2016-2020. Numerous actions and initiatives have been taken by EU member States and the European Commission since the inception of the Action Plan (European Commission, 2017), indicating importance of coordinated efforts on both international and national levels.

Ranging from the international policy level to approaches for fighting wildlife crime on a case-by-case basis, a review based on the fact that various types of wildlife crimes concentrate in time and space suggests that crime scientists may be able to collaborate with conservationists to improve the overall efficiency of combating the problem (Kurland and others, 2017)—a potentially promising approach. Crookes (2017) provides an insight on the efficiency of curbing poaching via economic means and implications for methods proposed for reducing the value of rhinos. This type of analysis may potentially inform on the viability of particular solutions targeted for funding.

In this context we would like to re-emphasize the conclusions of the research mentioned earlier: (i) poaching is linked to poverty; (ii) poaching and trafficking are ultimately driven by wealth; and (iii) there are direct links between poaching and trafficking and conflict zones (Duffy and St. John, 2013). These findings stress the need for solving issues (i) and (iii) and strongly link to SDGs other than SDG 15. On the solutions/technology side, the potential role of citizen science in monitoring is worth mentioning here (Donnelly and others, 2014; Chandler and others, 2017).

III.2 *Financing and other obstacles to technology adoption and scaling up*

15.a Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems

15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation

The monetary value of goods and services provided by ecosystems is estimated to amount to some 33 trillion dollars per year—nearly twice the global production resulting from human activities (Craig Hilton-Taylor, 2007). Despite the considerable estimated value created by ecosystems, there are obvious problems with maintaining the source of that value being created.

A detailed analysis carried out in New Zealand reports an obvious gap: total annual funding allows 15 per cent of the 2,400 threatened species to be targeted for management, whereas estimates of costs are not usually included in applications for funding or in the preparation of recovery plans (Moran, Cullen, and Hughey 2005). Cost is also not generally a factor in priority-ranking systems, and cost-effectiveness analysis is rarely conducted. Yet, although basic estimates of the costs of single-species programmes can be calculated, they often

remain unquantified. The task can be complex, particularly if there is limited knowledge about a species, and, as a result, cost estimates are subject to a great deal of uncertainty. Given the importance of cost information, however, this does not provide sufficient justification for such an exercise not to be undertaken. Estimating the costs of programmes is, in itself, likely to be useful because it requires systematic consideration of the plan of actions to be undertaken and how these are linked to the objectives and goals of a programme.

An example from New Zealand that is relevant to many other countries shows that the management of threatened species is limited by budget constraints (Moran, Cullen, and Hughey, 2005). The impact of the budget constraints is that a decision to implement a programme for one species will have an opportunity cost in terms of the management of other species at risk. This impact is apparent both in the persistent underfunding of programmes for some species and a complete lack of funding for those still on the waiting list.

While REDD has a clear connection to the climate agenda, the topic is fully relevant to SDG 15, as the ultimate REDD targets are reduction of deforestation and forest degradation. A paper by Bosetti and others (2011) provides an analysis of potential implications of linking REDD credits stemming from developing countries to a global carbon market. Even though the authors conclude that integrating REDD into a global carbon market lowers the estimated total costs of a policy to achieve 535 parts per million by volume of CO_2-equivalent concentrations in 2100 by up to 25 per cent, there are obvious obstacles to this approach. The results reported in the paper indicate that market linkage of REDD induces reductions in clean energy innovation overall, but only slightly enhances development of particular technologies, including carbon capture and storage. The impact of REDD on innovation and transition to new technologies still remains a subject of debate with the major concern that inclusion of REDD credits may lead to unwanted crowding out effects (Beltran and others, 2013). Among the suggested solutions to this problem (Bosetti and others, 2011) is a combination of REDD with credit banking that encourages greater mitigation in the near term, enhancing the flexibility to potentially tighten emission targets at lower cost in response to future information. Inclusion of REDD credits as part of the international carbon market can mobilize the funding needed to realize the full REDD potential (Beltran and others, 2013). Analyses of implementation uncertainties and challenges suggest a more limited and nuanced mitigation role for REDD+, especially in the near future (Lubowski and Rose, 2013). These insights, as well as modeling challenges, suggest that the actual costs and environmental benefits of REDD+ are uncertain and highly dependent on policy and implementation features (Lubowski and Rose, 2013).

Taking the great potential of REDD into account and the need to resolve a range of complex problems associated with its implementation, a promising approach to promoting REDD on a global scale could be raising awareness of its double benefit on both climatic and ecosystems sides, since these benefits seem to be perceived in isolation from each other and generally dealt with by two separate scientific communities. This view is supported by the findings of Laing, Taschini, and Palmer (2016), which argue that as a carbon offset, REDD+ provides insufficient motivation for investment, particularly if cheaper alternatives exist. Co-benefits such as biodiversity conservation and community development are more important when traditional corporate social responsibility motivations play a role.

On a local scale, this study analyzed the motivation of private sector stakeholders to engage in REDD+ and the respective critical obstacles to doing so. The study highlighted that although smaller projects are viewed as offering more visible benefits to stakeholders, in terms of having more control over risks on the ground, they pose a challenge for the design of jurisdictional REDD+ (Laing, Taschini, and Palmer, 2016).

Many stakeholders, especially those anticipating regulatory markets, view a lack of regulatory frameworks and a lack of clarity regarding future regulations as a major barrier to investing in REDD+ (Laing, Taschini, and Palmer, 2016). Concerns were also raised by both potential purchasers and suppliers over actual emergence of regulatory markets and the eligibility of REDD+ in such markets. Emerging pilot institutions and procedures to register projects were perceived by project developers as being too bureaucratic, with a lack of clarity regarding the types of projects that would be allowed to generate credits and conditions under which they might be created. The importance of REDD+ eligibility (acceptance) is explored in detail in Krasovskii and Khabarov (2017). The authors demonstrated quantitatively (illustrative example) the impact of REDD fungibility uncertainty and concluded that, due to a possible partial acceptance, the contracted amounts and prices are lower (by approximately 25 per cent and 35 per cent, respectively, meaning an overall 50 per cent reduction of potential REDD finance). The study demonstrates an objective reduction of financial potential of REDD due to policy uncertainty.

III.3 *Existing and novel approaches for addressing financing shortfalls*

A review and assessment of the legally binding instruments on biodiversity presents some international regional examples, but also highlights the need for the protection at multiple levels, including legal and policy commitments at global, regional, national and local levels (Sirakaya, Cliquet, and Harris, 2017).

A report by the World Bank (Mackinnon and others, 2002) on long-term funding for conservation in mountain and other ecosystems states that, with Global Environment Facility (GEF) resources, the Bank has helped to establish several trust funds to support protected-area management and other conservation activities. In Uganda, the Bwindi Trust was the first conservation trust established in Africa with GEF funding. The Trust, established in 1995, provides long-term funding for the conservation of the Mgahinga Gorilla National Park and Bwindi Impenetrable Forest National Park, home to one third of the remaining mountain gorillas. The trust fund provides resources for park management to strengthen protection of the gorilla population and for research to better understand the ecology and social behaviour of the gorillas and other native wildlife. The majority of the income (60 per cent), however, is used to support community development for local people to provide sustainable livelihoods as an alternative to agricultural encroachment into the park.

Another example of long-term financing is the Malawi Mulanje Mountain Biodiversity Conservation Trust (MMCT) (Mackinnon and others, 2002). The MMCT was established through funding from the GEF in 2001. The aim of the project is to establish an endowment aimed at providing long-term conservation finance for the conservation and management of the Mulanje Mountain ecosystem. The project and long-term funding from the Trust focus on three main activities: (i) biodiversity conservation, research and monitoring; (ii) environmental education; and (iii) forest co-management and sustainable livelihoods. The objective of the MMCT is to provide support to the government of Malawi, the Forest Department and the local communities, and to conserve the globally significant biodiversity and the unique ecosystems of the Mulanje massif.

An example of a long-term conservation trust fund in the United Republic of Tanzania is the Eastern Arc Forests Conservation and Management Project (Mackinnon and others, 2002). The mountain rain forests in the eastern region of the country are one of the most important sites for forest biodiversity in continental Africa. These forests lie on ancient hills and are recognized as a biodiversity hotspot and center of endemism, especially for plants, birds, amphibians and primates. The World Bank is supporting a major forest management and conservation project in the United Republic of Tanzania and an associated GEF-funded project specifically designed to provide a long-term conservation trust fund for biodiversity conservation activities in the Eastern Arc Mountains. A partnership between the World Bank and the United Nations Development Programme, the project aims at developing an integrated conservation strategy for the Eastern Arc Mountain Forests to be implemented through funds generated under the endowment. Other examples focused on establishing long-term support (all based on trust funds (endowments).

It is necessary to mention that, in many cases, research has to be carried out to understand the needs, suitable approaches and necessary actions for solving apparent ecosystems problems that, within themselves, contain the complexity of many interacting subsystems. For instance, the World Bank provided a five-year grant to the Mongolian Academy of Sciences for a study entitled "Dynamics of Biodiversity Loss and Permafrost Melt in Hövsgöl National Park, Mongolia" (Mackinnon and others, 2002). The objectives of that study were to identify the impacts of pasture use and forest cutting on the dynamics of forest, steppe, riparian zones and streams in tributary valleys of Lake Hövsgöl; to define how those impacts interact and are affecting the melting of permafrost, soil characteristics, and plant and animal biodiversity; to inventory climate change effects in the National Park; to determine sustainable resource-use patterns that will also protect biodiversity, permafrost and soil sequestration of carbon; and to estimate costs and benefits of alternative land-use practices, especially as related to pastoral nomads. This set of questions is a good candidate for an STI research project related to ecosystems; addressing them is a necessary prerequisite for further successive actions to be funded.

According to (Greiber, 2012), the Nagoya Protocol Implementation Fund (NPIF) is a multi-donor trust fund that started operations in May 2011. The World Bank serves as the trustee of the NPIF, which supports signatory countries, and those in the process of signing the Nagoya Protocol that intend to ratify it, in order to accelerate its ratification and implementation. It also supports existing opportunities leading to development and implementation of concrete Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from

their Utilization (ABS) agreements with involvement of the private sector. The projects funded under the NPIF encourage engagement with private sector entities interested in exploring the economic potential of genetic resources and facilitating the transfer of appropriate technologies. Through this type of project, countries should be generating additional information that can help them understand their capacities and needs on ABS, with a focus on the provisions from existing policies, laws and regulations affecting genetic resources.

In the climate change context, the potentially unique role of tropical forest protection—unique, that is, by providing a cost-effective "buffer" of near-term emissions reductions at a globally significant scale—is highlighted in Golub, Lubowski, and Piris-Cabezas (2017). This work also explores a promising private finance instrument in the form of long-dated call options on verified reductions in emissions from deforestation and forest degradation. Options on REDD could aid both regulated businesses and tropical nations to manage their respective risks. The authors further conclude, that REDD+ options could deliver sufficient abatement to significantly hedge exposure of regulated entities to potential corrections in climate policy while channeling financial resources to defer deforestation even as climate policies continue to evolve (Golub, Lubowski, and Piris-Cabezas 2017).

Golub, Lubowski, and Piris-Cabezas (2017), which focuses on the economics at small to medium scale, considers both a forest owner—that is, the REDD credits supplier—and a consumer, when each is evaluating the credits (REDD-based offsets), in terms of an enabled benefit-sharing mechanism—meaning that contracted but unused credits will be sold to a third party later and the profit from that sale will be shared between the initial supplier and consumer. The analysis demonstrates that, under future uncertain CO_2 prices, the approach based on benefit-sharing facilitates mobilization of private finance and allows for maximizing the contracted amount of REDD.

III.4 *The potential for STI road maps based on concrete examples*

A successful project reported by Mackinnon and others (2002)—the Turkey Eastern Anatolia Watershed Rehabilitation Project (US$115 million)—had two objectives: (i) restoring sustainable land-use management of degraded watersheds in three provinces of the Upper Euphrates River Basin and (ii) increasing the incomes of the local population living in these areas, among the poorest in Turkey. This is an example of community-based natural resources projects that empower local communities in managing their use of natural resources (forests, pastures, soils and agriculture, water, and wildlife); it demonstrates that ecosystem restoration projects have to be designed with a focus on the economic situation of the local population. Villagers participate in the design of investments for their specific microcatchment. Based on their specific problems and opportunities, they select the most appropriate investments from a menu of interventions and contribute to implementation through provision of labour, working in an integrated fashion with sectoral agencies (agriculture and forestry). To date, investments include rehabilitation of degraded slopes by planting trees, especially fruit and nut trees; conversion of marginal croplands to pasture or hayfields; reduction of grazing intensity through prohibition (e.g., fencing) and positive incentives; small-scale irrigation works for mountain agriculture; conversion of rainfed croplands to irrigated orchards using indigenous fruit and nut trees; and beekeeping. Social and economic benefits of the project include improved rural employment; better income and living standards; enhanced skills and confidence of communities and government agencies in natural resources management; strengthened interagency collaboration; and new opportunities for women. Environmental benefits include improved land use and soil conservation and flood prevention as well as ecological balance and restoration of degraded habitats and increased biodiversity.

In a very similar way, as reported by the biodiversity project in the highlands of northeastern Cambodia (Mackinnon and others, 2002), a project supporting the protection and management of Virachey National Park in the Ratankiri province finds the socioeconomic aspects to be a high priority because of human-driven pressures, including increasing demand for agricultural land; hunting pressures, both for subsistence needs and to fuel the rapidly changing demand for wildlife through black markets; logging, which remains a major medium- to long-term threat despite having slowed in recent months; the pressures for major development initiatives such as national road construction and hydropower development projects.

Silvo-pastoral approaches combined with indicator-based payments might have good potential for promoting environmentally friendly changes in land use. According to the World Bank report (Mackinnon and others, 2002),

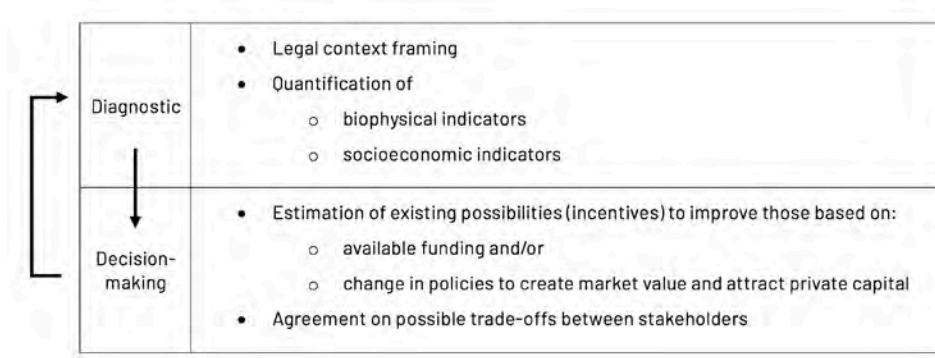
a regional project was launched in July 2002 in Colombia, Nicaragua and Costa Rica to promote and measure the effects of the introduction of payment systems for environmental services to farmers in degraded pasture systems. This innovative pilot project worked with about 300 farmers in 6 watersheds who were paid on the basis of environmentally friendly changes in land use resulting from the silvo-pastoral approaches implemented on their farms. Silvo-pastoral approaches focus on the promotion of multiple species vegetation (trees, shrubs, grasses and leguminous plants) and multiple use (grazing, cutting for fodder, soil fertility improvement, wood production), replacing the monoculture grass vegetation of the degraded pastures of the region. A baseline study has determined a current "land-use index" against which future changes on the 300 ranches can be assessed. Farmers are paid on a sliding scale and each incremental land-use point has an annual value of $50. Under current assumptions of carbon fixation of different land-use types, this value equals $5 per ton of carbon sequestered. Values are also allocated for improved biodiversity benefits. Since the shift in vegetation provides local environmental benefits—such as the reduction in erosion, improvement in soil and water quality, increased production, higher income and employment in rural areas—the payment for environmental services is only "to tip the balance," the objective being to provide incentives to induce farmers to shift from expanding ranching into tropical forests to the restoration and intensification of degraded pasture to woodlands and improved pasture under the silvo-pastoral system.

The analysis (Chirwa, 2014), along with examples of successful practices in sub-Saharan African countries, presents preconditions for upscaling. Whereas the most promising adaptation strategies to declining tree resources in sub-Saharan African countries include natural regeneration of local species, sustainable forest management and community-based natural resources management (CBRM), the success of such strategies generally depends on the ability of local people to exercise the power to inventory and manage local resources in systems of CBNRM. Most of the national appropriate mitigation actions in Eastern Africa identified agricultural expansion and overgrazing as some of the causes of deforestation. One of the factors that has contributed to forest degradation in Ethiopia, Rwanda and Uganda was frequent drought. Different countries seem to have different forms of practices for restoration. For example, Ethiopia and the United Republic of Tanzania seem to promote exclosures and natural regeneration in areas associated with overgrazing. Artificial regeneration is advocated for community woodlots in Rwanda and the United Republic of Tanzania, reforestation of degraded hill areas in Ethiopia, and farm forests in Uganda.

Based on these examples, and also those mentioned earlier in this document, a concise image of the components an STI road map (case/project/higher-level) should include is shown in figure II.4.1.

Figure II.4.1

STI road map for diagnostics and decision-making related to SDG 15



Source: UN/DESA.

Supported by the cited literature, creating a market value to attract private capital has promising potential for financing SDG 15 in particular.

An extremely important component in attaining SDG 15 targets is the temporal component. The feasibility of meeting SDTs in the agreed time is in doubt, considering projected population growth and growing pressures on ecosystems stemming from current limitations in technological/environmental possibilities and, in particular,

from limits to intensification of agricultural production. The quantitative estimates (World Wide Fund for Nature and International Institute for Applied Systems Analysis, 2015) carried out within a similar context are already vividly showing the infeasibility of zero net deforestation and biodiversity targets in 2030-2050, unless new technologies emerge that would provide additional sources of (substitutes for) animal protein, or traditional food consumption patterns shift substantially (i.e., less future demand for animal calories). This consideration directly links to SDG 12 on sustainable consumption and production patterns. The analysis of the SDG framework presents further detail on how coherent policy combinations can manage trade-offs among environmental conservation initiatives and food prices, concluding that investments in resilient and high-intensity production systems, waste reduction, and reduced meat consumption can reduce pressures by improving resource-use efficiency (Obersteiner and others, 2016). Hence, behavioural change (food consumption patterns) and new emerging and revolutionary technologies are likely to be an important part of the solution.

IV. Conclusion and suggestions for a way forward

Based on the analysis presented in this document, a few aspects crucial to the achievement of SDG 15 become quite prominent. We have seen the importance of the legal context created by binding agreements at various levels. Regarding payment for performance, a quantification based on a set of biophysical and socioeconomic indicators is a prerequisite.

These are necessary elements for creating market incentives that attract private finance. This source of finance seems to be a promising solution for improving socioeconomic situations and securing long-term funding (which is key to many SDTs of SDG 15), as compared to endowments-based funding, which has obvious limits in upscaling. This is supported by the fact that, in many cases, under a business-as-usual scenario, there is a clear trade-off between environment and economics.

Because of the high complexity of the problem (location-specific, complex interactions between subsystems, inherent to ecosystems), there are many gaps regarding scientific and economic assessments. These gaps can serve as a starting point in solving existing issues and therefore be a primary target for funding.

Cost-efficient, large-scale monitoring technologies (remote sensing) still have limits in accuracy and supplied indicators, implying the need for costly in-situ measurements, The emergence of a global carbon market could foster valuing ecosystems via REDD and create financial inflow to support actions that lead to the achievement of SDG 15. However, actual costs and environmental benefits of REDD are uncertain. Nevertheless, the approach can serve the purposes of linking national and international levels in order to allow more flexibility in finance.

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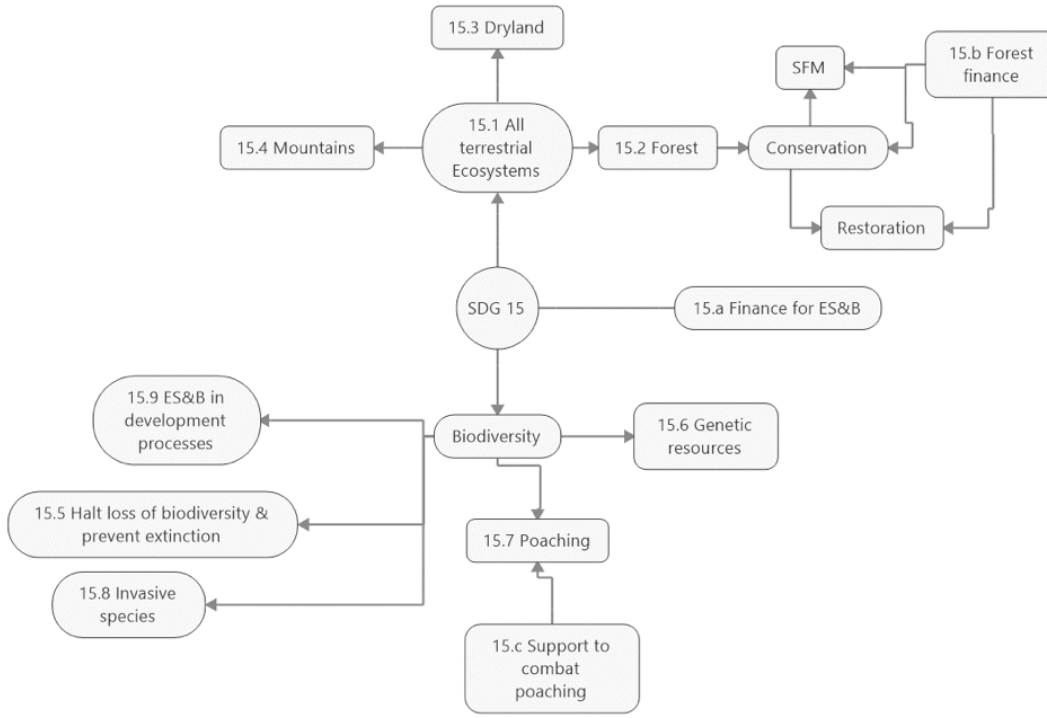
Annex I

SDG 15 and its targets

SDG 15	Targets
Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertificatio n, and halt and reverse land degradation and halt biodiversity loss	15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements 15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally 15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world 15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development 15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species 15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed 15.7 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products 15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species 15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts 15.a Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems 15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation 15.c Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities

Annex II

Mind map of SDG 15



CONTRIBUTION OF ISLAMIC FINANCE TO THE 2030 AGENDA FOR SUSTAINABLE DEVELOPMENT

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Executive Summary

In line with the theme of the High-level Political Forum (HLPF) 2018, this paper studies the role of Islamic finance in promoting the Sustainable Development Goals (SDGs) by increasing investment in sustainable infrastructure. Most infrastructure projects are of great scale and scope, involving many stakeholders and investment arrangements that entail complex legal documentations and intricate financial planning. Infrastructure investment requirements are usually enormous and have long timespans, making them less liquid. The legal contracts have to ensure proper allocation of risks and returns to create the right incentives for attracting capital.

Bielenberg and others (2016) estimates that, to close the financing gap for the SDGs, investments of $US 93 trillion would be needed in sustainable infrastructure projects during 2015-2030, with the bulk going to the energy sector ($40 trillion or 43 per cent), followed by transport ($27 trillion or 29 per cent), water and waste ($19 trillion or 20.4 per cent) and telecom ($7 trillion or 7.5 per cent). The funding gap for the period is estimated to be between $39 trillion (with aggressive investment growth scenario) to $51 trillion (with conservative investment growth assumption).

While the public sector has traditionally provided infrastructure investments, its role in filling the gaps is becoming limited due to the large sums needed on the one hand and budget constraints and deficits that Governments face on the other. The huge demand for investments in infrastructure thus necessitates seeking funding from different sources. The broad categories of infrastructure financing sources are public-domestic, public-international, private-domestic and private-international. Given the large investments needed for infrastructure projects, investments also take the form of private-public partnerships (PPP) and blended finance.

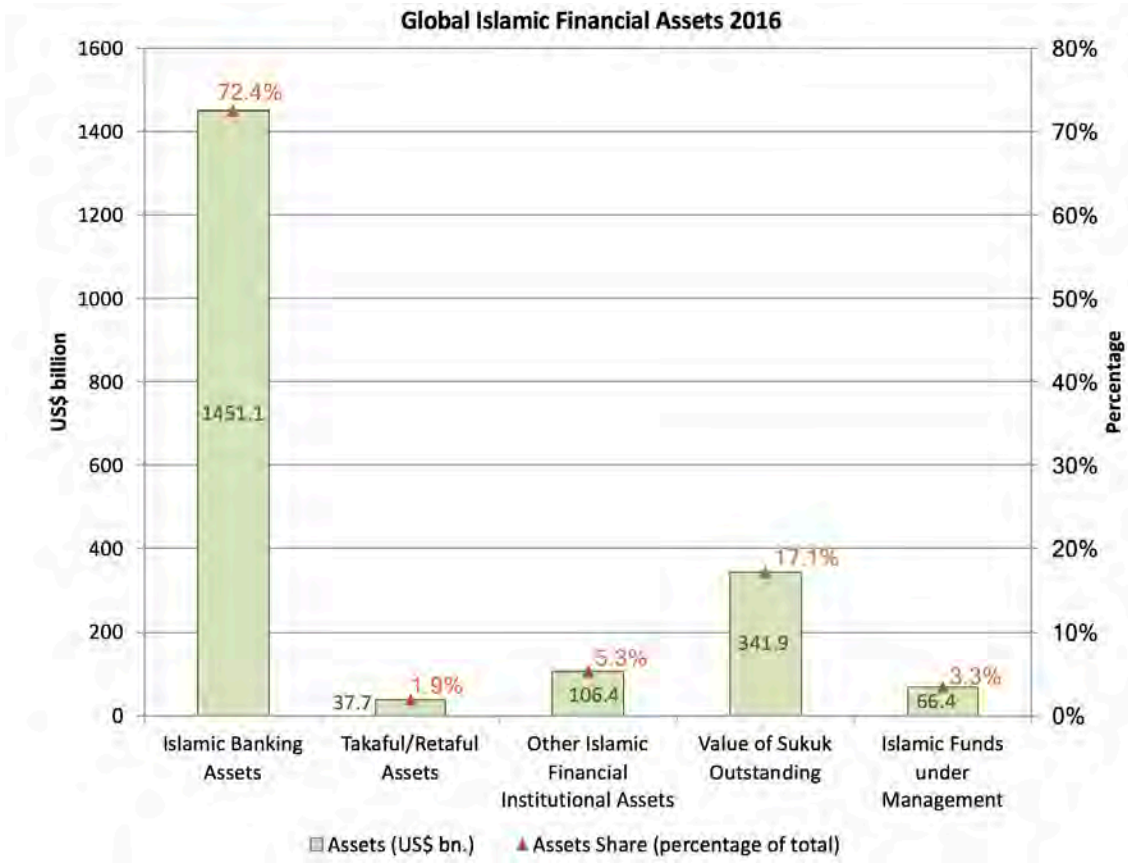
Many countries with sizable Muslim populations have high levels of poverty and score low in terms of progress towards achieving the SDGs, implying that they would require huge amounts of investment in the infrastructure sector. While the financial sector can play a vital role in the promotion of the SDGs, Muslim countries can face some limitations in mobilizing resources due to cultural and religious factors. Since interest-bearing transactions are prohibited under Islamic teachings, many Muslims do not engage with the conventional financial sector because of their religious convictions. Providing Islamic financial services in Muslim countries thus becomes an issue of financial inclusion at the micro level and economic development at the macro level. More generally, Islamic finance can also be used as an alternative source of funds to cater to the high demands for infrastructure financing.

Guided by values and principles of Shariah, Islamic finance provides an alternative source of resources that are compatible with Islamic law and ethics. The overall goals of Shariah entail realizing human well-being by enhancing welfare or benefit (maslahah) and preventing harm (mafsadah). Other than avoiding exploitative practices and prohibited activities, such as alcohol, pork products and gambling, key features of the Islamic financial

system include risk sharing and materiality in terms of links with the real economy. At the operational level, Islamic finance uses contracts that are devoid of *riba* (which includes interest in loan transactions) and *gharar* (legal ambiguity or excessive risk). Instead, the industry uses contracts that can be broadly classified as sale (*murabahah, salam*, and *istisna*), leasing (*ijarah*), partnership (*mudarabah* and *musharakah*) and agency (*wakala*).

Since its inception in the 1970s, the Islamic financial sector has grown rapidly to become systemically significant in many jurisdictions. With an estimated value of $2 trillion in 2016, the banking sector dominates the Islamic finance industry, amounting to 72.4 per cent of total assets, followed by *sukuk* (or Islamic bonds) at 17.1 per cent (figure I). The non-bank financial institutions and *takaful* (Islamic insurance) sectors are relatively small. Other than asymmetrical growth across sectors, the development of Islamic finance has been uneven in different countries. While in some countries the industry has become a significant part of the financial sector, in many other countries it is nascent and emerging.

Figure I



Source: ICD and TR (2016).

Given the social and ethical ethos and emphasis on risk sharing and asset-backed financing, Islamic finance can play an important role in contributing to the achievement of the SDGs. However, since infrastructure investment requirements are large and Islamic banks are relatively small, infrastructure is usually financed in smaller tranches. Although most Islamic project investments in the past would finance one part of a larger conventional financing structure, recently, with the growth of the sector, some infrastructure projects have been financed wholly through Islamic syndications. Examples include the Doraleh Container Terminal in Djibouti and Madinah International Airport in Saudi Arabia.

Sukuk can also be used to mobilize funds from capital markets to finance infrastructure. Several projects have been financed wholly or partially by raising funds using various *sukuk* structures. Some examples include Neelum Jhelum *sukuk*, which raised PKR 100 billion to finance a hydroelectric dam in Pakistan, and the East Klang Valley Expressway *sukuk* which mobilized RM 1 billion to fund the building of a toll road in Malaysia.

DanaInfra Retail *sukuk* in Malaysia raised funds to finance Kuala Lumpur's Mass Rapid Transit (MRT) project by issuing a series of retail *sukuk*.

There have been some recent developments in promoting sustainable infrastructure by the Islamic financial sector. While Master Wind Energy got financing of $100 million from an Islamic banking syndication to finance wind turbines that would generate 50 megawatts (MW) of electricity in Pakistan, a Khazanah sustainable responsible investment (SRI) *sukuk* issued two series of impact bonds to enhance education standards in Malaysia.

The evidence shows that Islamic finance is used for infrastructure projects in countries where the industry is more developed. Other than implementing policies to provide an enabling environment in which Islamic finance can grow, increasing further infrastructure investments by the financial sector would require a sound macroeconomic and legal/regulatory framework at the national level and good governance and risk management at the organizational levels. This paper provides the following recommendations to enhance the role and contribution of the Islamic finance industry in promoting infrastructure development.

- **National SDG strategy and infrastructure-related policies**

  To ensure achievement of the 2030 Agenda for Sustainable Development, there is a need for a transparent, national-level SDG strategy that entails the creation of an infrastructure plan and the accompanying financial policy. The infrastructure plan would list the projects that need to be developed in different sectors, including energy, transport, water and communications.

- **Financial policy**

  After assessing the sustainability features of the projects, the financial plan would outline how these would be financed from different international-domestic and public-private sources. The financial policy should also lay out a framework of aligning environment, social and governance (ESG) and sustainability issues with the financial sector practices. Within the private sources, the role and participation of Islamic finance in infrastructure development can be identified. Another outcome of including the Islamic financial sector in financial policy would also be diversification within the financial sector to enhance its resilience against negative shocks.

- **Legal and regulatory framework**

  A stable and predictable legal and regulatory regime that provides and enforces regulation related to all aspects of infrastructure investment is necessary for creating the right incentives and instilling the confidence among investors to support long-term projects. Since most countries where Islamic finance operates have either common law or civil law regimes, it is necessary to provide a supporting legal and regulatory framework that can cater to the needs of Islamic infrastructure financing. Specifically, there is a need to introduce enabling Islamic financial laws that would address the unique issues in Islamic financial contracts and reduce legal uncertainty in disputes. Legal frameworks for capital markets should accommodate issuance of different types of *sukuk*. Other than ensuring transparency and disclosure, the laws should recognize the rights of *sukuk* holders, including reorganization and liquidation rights.

  The tax regime should recognize the tax implications of different Islamic financial contracts and change relevant tax laws to level the playing field between Islamic and conventional finance. Tax laws should also address the favourable treatment of debt-based financing over equity to bring balance to debt and equity modes of financing. Furthermore, a concession law that is flexible enough to deal with Shariah-related issues is also needed. Finally, there is a need to introduce enabling laws and regulations that encourage use of green and social investments in the infrastructure sector. For example, the introduction of the SRI *sukuk* framework in Malaysia in 2014 facilitated the issuance of green *sukuk* and impact *sukuk* in the country.

- **Public-private partnerships (PPP)**

  Since the size of investment in infrastructure needed to achieve the SDGs is so large, one option of financing infrastructure projects would be to use a PPP framework whereby the private sector develops and operates the project for a limited time under a concession agreement. Certain Shariah issues—such as rights and obligations of the parties and ownership of assets—have to be resolved to enhance the in-

volvement of Islamic finance in PPP projects. This can be done by raising awareness of these contracts and instituting a supportive legal and regulatory framework for PPPs. Since infrastructure projects are complex and Islamic finance is relatively new, standardizing the documentation and developing Shariah-compliant products that address specific issues—such as transfer of ownership and the responsibilities of different parties—would facilitate the involvement of the Islamic financial sector in newer projects.

- **Capital markets**

  Capital markets play an important role in mobilizing funds from both institutional and retail investors. While *sukuk* have been used to raise funds for some projects, the overall share of Islamic capital markets is still small and the sector is underdeveloped in many countries. Developing the Islamic capital markets in general and the *sukuk* sector in particular would require strengthening the Islamic capital market infrastructure. Such strengthening would include creation of an appropriate legal and regulatory framework, as noted above, and other supporting institutions such as liquidity providers and brokers and dealers who facilitate transactions in secondary markets.

  Developing the *sukuk* market to raise funds for infrastructure projects will also help support the growth of a liquid secondary market that would increase the asset choices for institutional investors. Governments can promote Islamic capital markets not only by providing the necessary legal and regulatory frameworks and market infrastructure, but also by taking the initial lead to issue sovereign *sukuk* for different infrastructure projects. A sound national level Shariah governance regime that reduces diversity of *fatwas* (Shariah rulings) can reduce the legal risks and build confidence among stakeholders. In this regard, standardized *sukuk* structures that are well understood by different stakeholders—including the investors—are needed for an efficient *sukuk* market.

- **Financial institutions**

  Islamic banks dominate the Islamic financial industry and the non-bank financial institutions sector is very small compared to its conventional counterparts. Since the bulk of the funds for infrastructure finance come from non-bank financial institutions, such as insurance companies and pension funds, the scale of Islamic infrastructure financing can be increased if the industry becomes more diverse. Although it is expected that the share of Islamic non-bank financial institutions will increase with the growth of the Islamic financial industry, this can be facilitated by instituting a supportive legal and regulatory framework. Promoting the institution of *waqf* also has the potential to contribute to the development of social infrastructure in many countries. The growth of Islamic non-bank financial institutions is also contingent on a robust Islamic capital market that creates Shariah-compliant investment opportunities. In this regard, infrastructure projects not only provide new investment opportunities, but also create synergies that allow Islamic non-bank financial institutions and capital markets to grow together.

- **Products**

  Infrastructure can be considered as a separate product class that conforms to the values and principles of Islamic finance. However, to enable stakeholders to invest in this asset class would require developing Shariah-compliant products and instruments for both retail and institutional investors. Developing products that are acceptable to investors would require increasing the number of professionals who have the knowledge and skills of both Islamic law and complex infrastructure products.

  Islamic banks can increase their share of financing infrastructure projects by transforming investment accounts that reflect risk-sharing features. For example, the Islamic Financial Services Act 2013 of Malaysia separated investment accounts from deposits and therefore investors take on risks. Since the banks are not burdened with additional capital charges, they will be more inclined to invest in infrastructure projects. Introducing some features in *sukuk* that can increase their liquidity and tradability would also increase their use in funds in infrastructure projects. Since debt-based products cannot be traded, there is a need to increase the share of *sukuk* that is asset- and equity-based to enhance liquidity. While there have been some developments in ESG-related investments in Islamic finance, it is necessary to come up with new, innovative products that can finance sustainable infrastructure projects. Recent examples from Pakistan and Malaysia show that a supporting legal and regulatory framework is needed for these

products to grow further.

- **Multilateral institutions (MLIs)**

  Given that the 2030 Agenda for Sustainable Development is a global initiative, there are different ways in which MLIs can help promote the SDGs. Along with being key sources of investment for sustainable infrastructure development, multilateral development banks (MDBs) can also contribute to the sector by setting up infrastructure funds. Other than funding infrastructure projects, MDBs, along with MLIs, can play a key role in building capacity, sharing experiences and providing operational models of project financing. To overcome the constraint of having too few professionals with knowledge and skills to implement the infrastructure projects, MBDs such as Islamic Development Bank (IsDB) and the World Bank Group can provide technical assistance to train and build human capital in Islamic infrastructure financing.

  An important aspect of increasing investments in sustainable infrastructure projects is to come up with a standardized definition of sustainability and normative approaches to dealing with ESG-related issues. This is a particularly useful practice in the context of Islamic syndications and PPP structures where unique and specific issues arise. IsDB and other organizations, such as the Islamic Financial Services Board (IFSB) and International Islamic Financial Market (IIFM), can enhance Islamic finance industry contribution to infrastructure investments by providing standardized templates of Shariah-compliant structures for sustainable project financing that can be used by different countries. Furthermore, countries with a large and growing Islamic finance industry need to promote and champion the incorporation of discussions on the role of Islamic finance in contributing to achievement of the SDGs in different international forums, including the annual Economic and Social Council (ECOSOC) Financing for Development (FfD) Forum.

- **Conceptual outlook and mindset**

  There are four areas in which a change in mindset is needed to increase the participation of the financial sector in sustainable infrastructure development:

  i. *Decision-making.* Sustainability can be integrated into the decision-making process by moving from an exclusive focus on economic considerations to inclusion of social and environmental dimensions in due diligence of projects. MLIs, among others, can provide a framework for use at the operational level.

  ii. *Long-term investing.* A change from the current preference for short-term financing to a longer-term investment perspective would allow for a greater volume of infrastructure investment. This would, however, require a supportive legal and regulatory environment that mitigates risks and creates the incentives for long-term investments.

  iii. *Perception of Islamic finance.* Islamic finance is not only for Muslims, but can be used by all as an alternative ethical source of funding to finance the SDGs.

  iv. *Broadening Islamic finance approaches.* For Islamic finance, there is a need to move from legalistic compliance with Shariah to fulfilling broader social and ethical objectives and using more participatory forms of financing. Considering the overall goals of Shariah (*maqasid*) in operations of Islamic finance will enhance its contribution to the SDGs in general and to sustainable and social infrastructure in particular.

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I. Introduction

"This Agenda is a plan of action for people, planet and prosperity. It also seeks to strengthen universal peace in larger freedom. We recognize that eradicating poverty in all its forms and dimensions, including extreme poverty, is the greatest global challenge and an indispensable requirement for sustainable development." (United Nations, 2015a, Preamble)

With the expiration of the Millennium Development Goals (MDGs) in 2015, the United Nations adopted the 2030 Agenda for Sustainable Development in September 2015 as "a plan of action for people, planet and prosperity" (United Nations, 2015a, Preamble). The declaration identified 17 Sustainable Development Goals (SDGs), their means of implementation, and provided a framework for review of and follow-up on the progress. Building on the success and experience of the MDGs, the SDGs are more ambitious and universal, integrating sustainability with development. While the SDGs would require economic growth and development, the notion of sustainable development shapes their quality and ties them to other international conventions and frameworks. For example, the environmental aspects of the SDGs reflect, inter alia, the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity; the economic and social dimensions link to the United Nations Guiding Principles on Business and Human Rights, the Core International Labour Organization (ILO) Conventions, and the International Bill of Human Rights (Principles for Responsible Investment, 2016, p. 7). Thus, SDGs harmonize the three dimensions of sustainable development: economic, social and environmental.

The means of implementation of the 2030 Agenda for Sustainable Development are contained in the Addis Ababa Action Agenda (Addis Agenda) adopted at the Third International Conference on Financing for Development, held in Addis Ababa from 13-16 July 2015. Other than identifying the policies and strategies that can be undertaken, the Addis Agenda emphasized the roles of national and international stakeholders in contributing to the achievement of the SDGs. Given the high expectations and extensive scale of coverage of the 2030 Agenda for Sustainable Development, realization of the SDGs would require involvement from multilateral bodies and development banks, official development assistance, foreign direct investment at the international level, and governments (national, state and local), the private sector and civil society at the national level.

Achieving the SDGs will require huge amounts of resources and investments from different sources. In this regard, the financial sector has a key role to play to in mobilizing resources to advance the SDGs. United Nations and KPMG International (2015, p. 8) identifies two broad themes under which the financial sector can contribute to the SDGs. First, the sector can increase financial access and inclusion for individuals (SDGs 1, 2, 3, 4, 10), small and medium-sized enterprises (SDGs 5, 8) and Governments (SDG 13). Second, the industry can help generate resources for investment in renewable energy (SDGs 6, 13) and infrastructure projects (SDGs 6, 9). Given the themes of the SDGs in the High-level Political Forum 2018 (SDGs 6, 7, 9, 11, 13), the focus of this paper is to explore ways in which the financial sector can promote investments in sustainable infrastructure.

The global financial crisis of 2008, however, has shown that the financial sector is exposed to risks that can have detrimental effects on economies and hamper the achievement of the SDGs. With the monetary cost of the crisis estimated to be as high as $15 trillion (Yoon, 2012), there is a need to reduce the fragility of the financial sector.[1] Addressing vulnerabilities of the sector, the Addis Agenda suggests taking steps to enhance its resilience and strengthen financial and economic stability (United Nations, 2015b, paras. 4 and 104).

Recognizing the important role sustainable infrastructure plays in achieving the SDGs, the Addis Agenda calls for "investing in sustainable and resilient infrastructure, including transport, energy, water and sanitation for all" and considers them to be "a pre-requisite for achieving many of our goals" (ibid., para. 14). Infrastructure is "a basic requirement for a proper functioning economy" as it facilitates "production and exchange of goods and services" (UNEP, 2016, p. 6). Infrastructure investment promotes economic growth and poverty reduction in two important ways. First, it provides essential products and services like power, water, sanitation, etc., to the citizens. While infrastructure—such as clean water and sanitation—are key to health and services, provision of transportation, schools, energy and telecommunications increase job availability and overall productivity. Second, infrastructure expands capital stock that reduces the costs of production in other sectors. Transport, electricity and water are key inputs in production, which helps promote production and increases productivity

1 Researchers from the Federal Reserve Bank of Dallas estimate the losses from the global financial crisis in the United States of America to be in the range of $6 trillion to $14 trillion. See Atkinson and others, 2013.

of other factors of production. A direct implication of lack of infrastructure is that it leads to higher costs of services, such as power, water, freight, mobile telephones, etc., making countries less competitive and hindering economic growth.

Most infrastructure projects have positive externalities from which an economy benefits, but these are difficult to measure. Some projects, however, can also have negative externalities that lead to direct and indirect detrimental impacts on society and environment. For example, coal- and fuel-powered power plants can cause air, soil and water pollution that can adversely affect the environment and people's health. Furthermore, infrastructure such as hydroelectric dams and oil platforms can potentially harm the ecosystems. From a sustainability perspective, infrastructure investment needs both an increase in quantity and an improvement in quality in order to avoid negative externalities. Sustainable infrastructure would constitute projects that integrate the environment, social and governance (ESG) aspects into all phases of project implementation and are "socially, economically, and environmentally sustainable" (Bielenberg and others, 2016, p. 8).

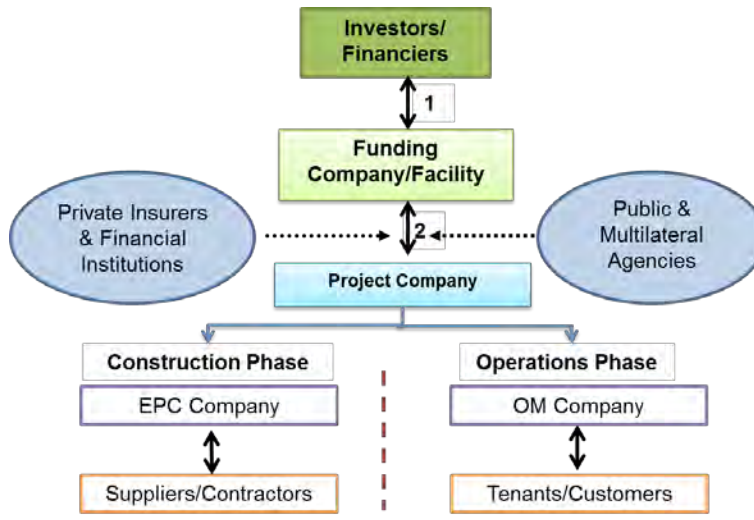
I.1 Infrastructure finance: features, sources and issues

Figure I.1.1 shows the basic infrastructure investment framework and identifies the relationship between key stakeholders. The private sponsors of the project establish a special purpose vehicle (SPV) as a Project Company, which acts as a separate bankrupt remote legal entity. The investors finance the project through a Funding Company, which acts as an agent for the investors. The investors provide funds to the Funding Company that finances the Project Company. Arrow 1 indicates the contractual relationship between the investors/financiers and the Funding Company; arrow 2 shows the relationship of the Funding Company and the Project Company.

Other than planning for the project, infrastructure implementation is differentiated into construction and operational phases. In the former phase, the Project Company undertakes the construction of the project by using the services of a construction arranger or an engineering, procurement and construction (EPC) company. The EPC Company in turn deals with suppliers of inputs and contractors to construct the project. In some cases, the Project Company may take the role of the EPC Company and undertake the construction responsibilities. After the project is completed, the Project Company may use the services of an operations and management (OM) company. The OM Company operates and manages the project by selling the services to the ultimate customers.

Figure I.1.1

Stakeholders and relationships in infrastructure finance



Source: Adapted from Miller and Morris (2008).

In order to encourage the private sector to invest in infrastructure projects, the Government can provide different kinds of incentives. One option is to provide price support and/or guarantees to minimize risks and

ensure a stable revenue stream. Incentives can include guarantees of supply of inputs, the purchase of output at certain fixed prices, and/or providing subsidies. Bilateral and multilateral development agencies also provide partial credit guarantees and partial risk guarantees to financial institutions investing in infrastructure projects. Furthermore, multilateral insurance agencies like Multilateral Investment Guarantee Agency of the World Bank Group provide political risk insurance for both debt and equity (Matsukawa and Habeck, 2007). Some public national bodies provide additional guarantees and insurance to cover equity and debt investments and trade.

Other than guarantees and price support, project companies manage other commercial risks associated with infrastructure projects and use different mechanisms and instruments to mitigate these risks. This may involve seeking the services of private financial institutions and insurers that provide coverage for various commercial and political risks. Provision of guarantees and insurance can improve the credit rating, which not only can encourage private investment, but also lead to lowering borrowing costs and enabling securitization of assets.

Infrastructure finance: sources and types

Ehlers (2014, p. 5) identifies the financial arrangements that can arise in different phases of implementation. The planning stage would require equity investors who would then arrange more funds in the form of debt. Due to the long period of investment, the early debt investors would require higher returns. The construction phase is most risky, and risks increase with the complexity of the projects. This stage is funded by equity and debt raised in the planning stage. Any cost overruns would have to be covered by raising either more equity or debt. In the operational phase, there are risks related to cash flow, but the default risk diminishes. Refinancing of debt can be done in the planning stage by raising funds either through bank loans, government funds or issuing bonds.

The sources of infrastructure finance are broadly classified in two dimensions: public/ private and domestic/international. Table I.1.1 shows the various elements in the broad categories of infrastructure financing sources: public-domestic, public-international, private-domestic and private-international.

Table I.1.1

Sources of SDG financing

	Public	Private
Domestic	•Government Revenue (tax/duties) •Natural resource concessions •User fees •Public borrowing	•Domestic Private investments •Non-governmental organizations •Philanthropy/social responsibility
	Public-private partnership (PPP)	
	Blended Finance	
International	•Official development assistance (ODA) •Climate Finance •Multilateral development banks (MDBs) •Sovereign wealth funds	•Foreign direct investment (FDI) •Multilateral infrastructure funds •Remittances •Foreign pension funds •International bank loans

Figure I.1.2 shows the key components of the domestic financial sector and instruments used to raise funds for investments in infrastructure. The key sectors providing funds are households, the business sector, the non-profit sector and the government sector. The sources of funds from these sectors are savings and surpluses, which include retail savings and long-term investment products such as household pensions, business sector savings and taxes, and other revenues of government.

The financial sector constitutes two broad segments: financial intermediaries and financial markets. The former have different financial institutions such as banks, insurance companies, pension funds, sovereign wealth funds, and other financial institutions (investment companies, private-equity funds, development banks and infrastructure developers and institutions, inter alia). Different financial markets exist for stocks, bonds and

other financial instruments such as derivatives.

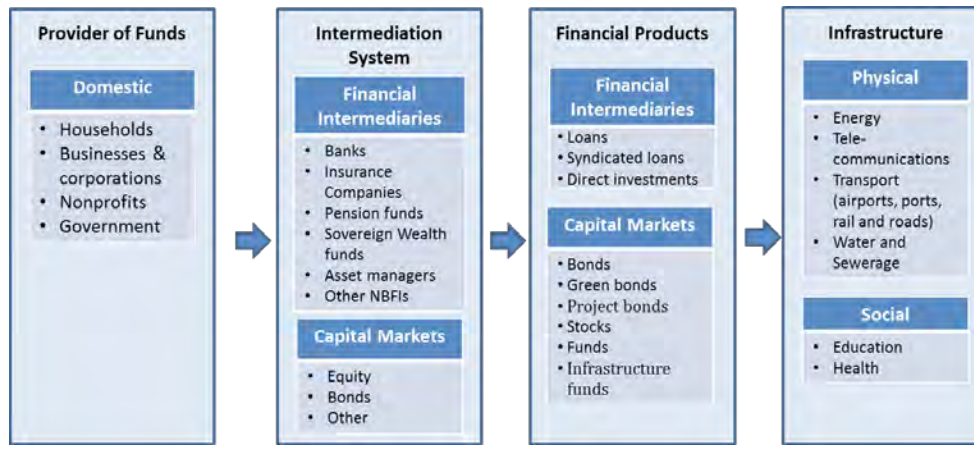
Different financial segments offer a variety of products that can be broadly classified as debt and equity. For infrastructure financing from financial institutions, debt-based products take the form of loans; in capital markets, various types of bonds are used. Equity-based financing in the case of financial institutions consists of direct investments; in capital markets, investments are made in stocks and funds.

The private sector can participate in infrastructure projects through PPPs, whereby investment projects that are traditionally financed by the public sector are transferred to the private sector. Under PPPs, the ownership of a public asset is temporarily transferred to the private sector through a concession arrangement. The concession agreement determines the roles of the public and private sectors under PPPs and identifies the ownership and the control rights of the projects of the parties during the concession period (Lienert, 2009). While there are a variety of PPP models suited to the local political, economic and legal environments, some common elements are necessary for an efficient and effective PPP framework. Jomo and others (2016) identify the necessary elements of an enabling PPP framework as (i) project selection and implementation (using credible cost-benefit analysis); (ii) contracts that ensure appropriate pricing and transfer of risks (for optimum risk allocation); (iii) fiscal accounting and reporting standards (to provide transparency on fiscal implications); and (iv) legal, regulatory and monitoring frameworks (to safeguard welfare of citizens and sustainable development).

There are different ways in which private participation can take place in infrastructure projects. While figure I.1.2 identifies different stakeholders, institutions and markets that play a role in providing financing for infrastructure projects, figure I.1.3 shows the relative size of different institutional investors globally. The largest three institutional players are banks, which hold 33.5 per cent of the total global assets of $200 trillion, followed by investment companies with 24.2 per cent and insurance and pension funds with 22.1 per cent.

Figure I.1.2

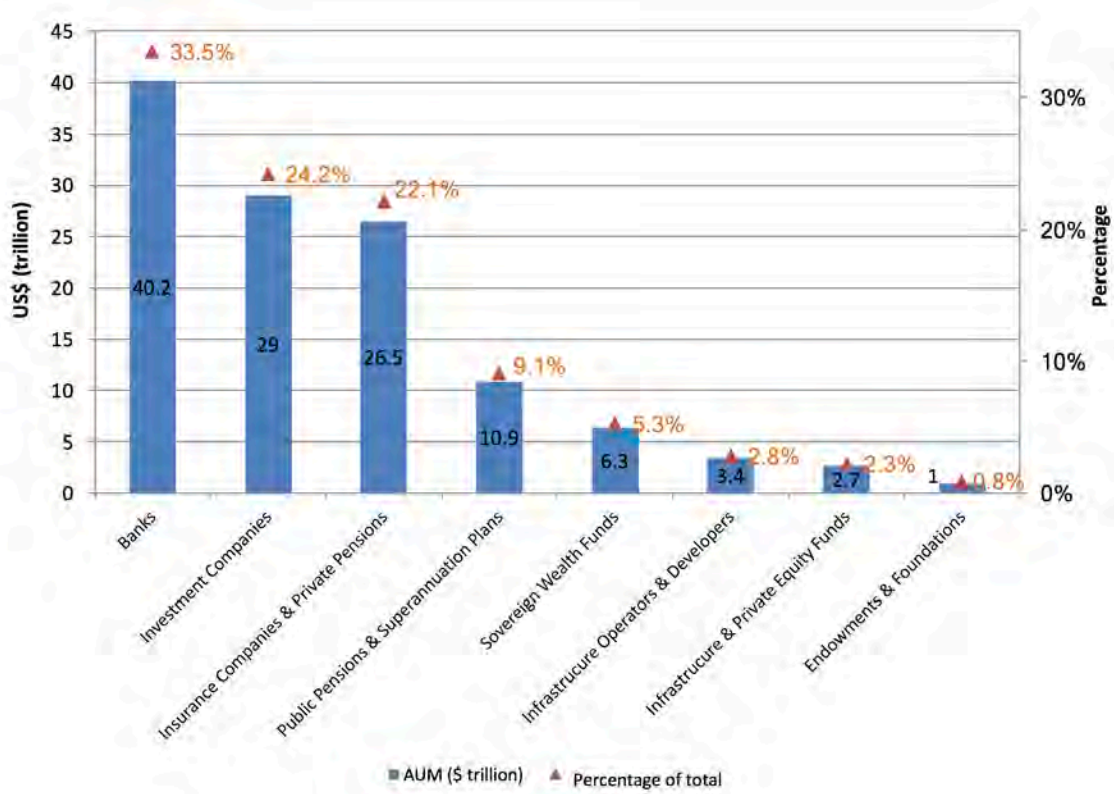
Stakeholders and instruments in private sector financing of infrastructure



Source: Adapted from Group of Thirty (2013).

Figure I.1.3

Assets under management of institutional investors



Source: Bielenberg and others (2016, p. 16).

Infrastructure finance: features and constraints

Infrastructure can be considered a separate investment class with risks and returns lower than equities and higher than debt. Infrastructure assets, however, have some unique features that affect investment decisions. Infrastructure projects are very large, involving many stakeholders and investment arrangements, and entailing complex legal documentations and intricate financial planning. The legal contracts have to ensure proper allocation of risks and returns to create the right incentives for attracting capital. The long timespan of infrastructure projects also makes them less liquid. Investment in sustainable infrastructure projects would also appeal to ethical, green and impact investors. Some infrastructure projects, such as highway or water supply, can be natural monopolies and Governments would control them directly or indirectly to ensure that monopoly power is not abused. Some of the barriers that inhibit private sector financing of infrastructure projects are identified below:[2]

- *Uncertain legal and regulatory environment.* The long-term nature of infrastructure investment creates the need for legal and regulatory certainty to reduce the risks. In many countries, a coherent and predictable legal framework for infrastructure investments is lacking. Furthermore, with the implementation of Basel III standards in the post-crisis period, regulatory regimes will potentially create disincentives to investment in long-term projects, as they require higher capital charges.
- *Lack of policies and institutional capabilities.* The enormity of the investment required and the long-term nature of infrastructure financing necessitate appropriate policies and capabilities for implementation. An absence of policies makes it difficult to create an enabling environment, build pipelines of sustainable and viable infrastructure projects, and it increases the transactions and development

2 This section is based on Ehlers (2014), Bielenberg and others (2016), and GCEC (2016).

costs, creating disincentives for private sector investments.

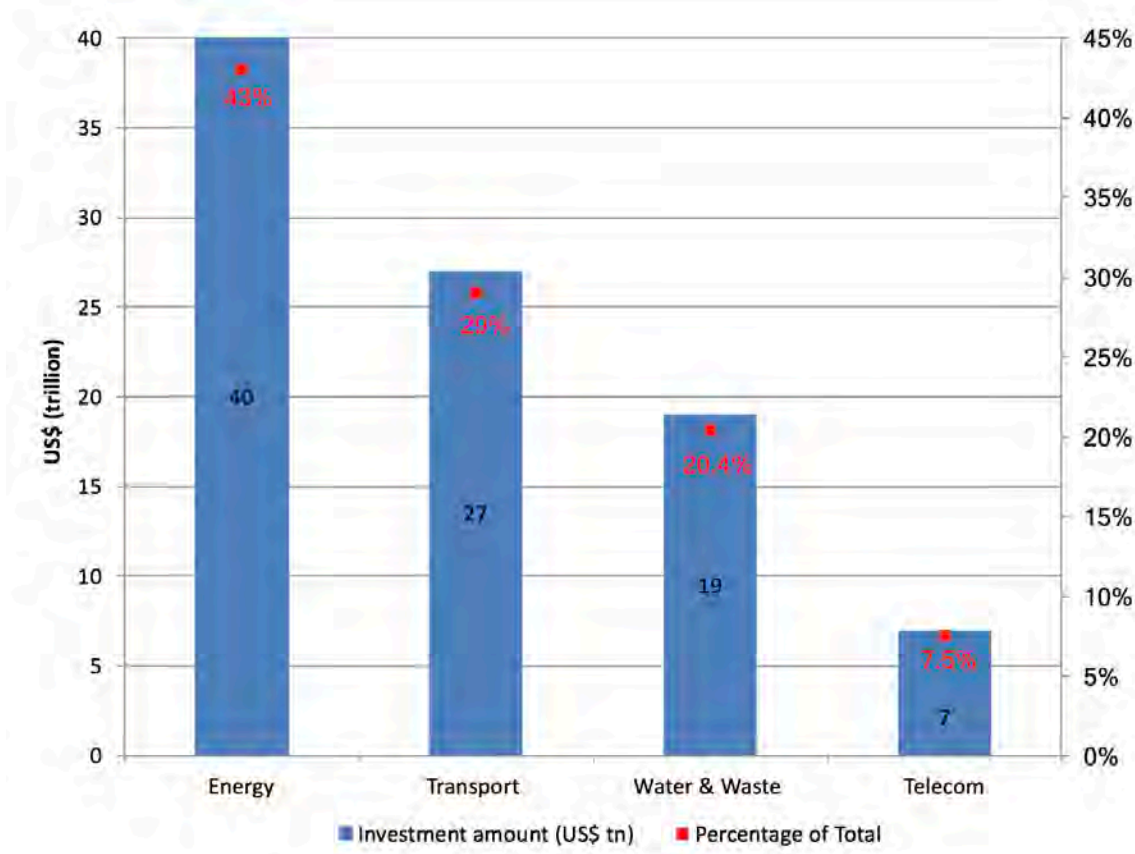
- *Insufficient pipeline of bankable projects*. There is a lack of bankable pipelines of infrastructure projects in many countries, making it difficult to estimate the demand and needs. The problem extends beyond developing countries; only half of G20 countries publish infrastructure pipelines (Bielenberg and others, 2016, p. 3).
- *High development and transaction costs*. Many sustainable infrastructure projects are capital intensive and can drive up the upfront costs. For example, transport investments require high upfront capital costs, long timelines and produce relatively low financial returns (IDFC, 2014, p. 5). Furthermore, administrative costs can be high in the energy sector due to difficulties and delays in procedures and approving concessions (IDFC, 2014, p. 5).
- *Inadequate risk-adjusted returns*. Because they require large and long-term investments, infrastructure projects are prone to government interference and corruption, which can increase the political risks. Furthermore, due to the limited number of projects and the uniqueness of each one, there is a lack of historical data and information on risk-adjusted returns, causing difficulty in decision-making. While investors would expect higher risk-adjusted returns, in many infrastructure projects the returns may be low. For example, tariff levels are usually low in water and energy sectors. Further, enough revenues cannot be generated in many developing countries due to leakage and stealing of water and electricity that limits the ability to maintain and expand the services. For instance, up to 70 per cent of the water provided in sub-Saharan Africa is unmetered, lost through leaks or stolen (Bielenberg and others (2016, p. 3).
- *Human capital*. The size and complexity of infrastructure projects leads to the involvement of many parties and people with different skills and expertise. Structuring financial contracts for infrastructure projects is complicated and requires not only financial expertise but also an understanding of the project features and their implications for risk and return. A key constraint is the lack of professionals with knowledge and experience of structuring and financing large infrastructure projects.

I.2 Gaps and scope in infrastructure investment

Estimates for infrastructure investment required to fulfil the 2030 Agenda for Sustainable Development vary. The Global Commission on the Economy and Climate estimates that $90 trillion (or $6 trillion a year) would be needed for investments in urban, land-use and energy systems globally during 2015-2030 (GCEC, 2014, p.8; GCEC, 2016, p. 8). Bielenberg and others (2016, p. 10) estimates $93 trillion would be needed to finance sustainable infrastructure to meet the SDGs by 2030. Figure 1.2.1 shows the breakdown of the investment in different sectors. The bulk of the investments would be needed in energy ($40 trillion or 43 per cent), followed by transport ($27 trillion or 29 per cent), water and waste ($19 trillion or 20.4 per cent) and telecom ($7 trillion or 7.5 per cent) (ibid., 2016, 12).

Figure I.2.1

Investment needs for infrastructure to achieve the SDGs, 2015-2030



Source: Bielenberg and others (2016).

An estimated gap in demand and supply of infrastructure funding for the period 2015-2030 is from $39 trillion or $2.6 trillion annually (aggressive investment growth scenario) to $51 trillion or $3.4 annually (conservative investment growth scenario) (Bielenberg and others, 2016, p. 24). Furthermore, institutional investors currently invest on the average 5.2 per cent of their assets in infrastructure, amounting to $300 billion to $400 billion (ibid., p. 27). With this rate of investment and a projected increase of assets under management (AUM) of 6 per cent annually, there will be an additional $8.6 trillion (or $575 billion annually) invested in infrastructure between 2015 and 2030. If the allocations for infrastructure were increased to 8 per cent of AUM, this would translate to additional $325 billion per year.

The extent to which the financial sector would be able to contribute to closing this huge gap in infrastructure financing will depend on various factors. At the macro level, the legal and regulatory environment along with government policies provide the framework under which the financial sector operates. At the project level, the long timespans, cash flow profiles, high risks and illiquidity of infrastructure projects discourages private investment (Ehlers, 2014, p. 4).

At the operational level, adding sustainability dimensions to the financing decision-making process would entail integrating economic considerations with social and environmental risks and externalities. Economic, social and environmental returns will determine the extent to which the private and public sectors would get involved with infrastructure projects. While projects with a relatively high risk-adjusted economic return are expected to attract capital from the financial sector, the public sector would need to invest in projects that produce high social and environmental impact.

The Organization for Economic Cooperation and Development (OECD) (2014) identifies three types of infrastruc-

ture projects in terms of financial features and involvement of the private sector. First, fully self-sustainable infrastructure generates sufficient revenue from markets to recover costs and provide investors a positive return. Examples of this category would be projects in the telecommunications and energy and power sectors. The second group entails projects that are not financially sustainable. Social infrastructure such as health and education falls into this category. Finally, partially self-sustainable infrastructure generates revenue from tariffs and fees from end users, but the prices are set at levels that cannot make the projects fully sustainable. To attract private investors in these projects would require providing incentives such as grants during the construction period, and other kinds of support such as tax relief or subsidies during the operational phase. Examples of infrastructure in this category include water and sewerage and light railways.

I.3 Islamic finance and infrastructure investment

Many Muslim countries have pervasive poverty, with estimates of 700 million people living on less than $2 a day (World Bank, 2014, p. 38). While the financial sector can play a vital role in the promotion of the SDGs in developing countries, Muslim countries may face some limitations in mobilizing resources for development because of cultural and religious factors. Since interest-bearing transactions are prohibited under Islamic teachings, many Muslims would not engage with the conventional financial sector (box I.3.1). Providing Islamic financial services in Muslim countries, thus, becomes an issue of financial inclusion at the micro level and economic development at the macro level.

Islamic finance is a relatively new industry with the first Islamic bank starting operations in 1975. The pioneers of Islamic economics envisioned that a financial system based on Islamic principles and ethos would serve all sections of the population, thereby bringing about equity, stability and growth in the economy. Being a part of a moral economy and, given the basic objectives of Shariah of enhancing welfare (*maslaha*) and preventing harm (*mafsada*), the practices within the Islamic finance industry are expected to reflect these ethical and social characteristics. Other than avoiding exploitative practices and prohibited activities, such as alcohol, pork products, gambling, etc., the key features of the Islamic financial system include risk sharing and materiality in terms of links with the real economy (El Hawary and others, 2004, p. 5).

Box I.3.1

Voluntary financial exclusion for religious reasons in Muslim countries

Karim, Tarazi and Reille (2008) find that 72 per cent of people living in Muslim countries do not use formal financial services, and a large percentage of the population (ranging from 20 per cent to more than 40 per cent) would not avail themselves of conventional microfinance to avoid interest. Similarly, in a survey of 66,484 adults from 64 countries conducted in 2011, Demirgüç-Kunt, Klapper and Randall (2013, p. 4) report that Muslims are less likely than non-Muslims to have an account and save at a formal financial institution, and more likely to identify religion as a reason for not having an account. In a smaller survey of 5,071 respondents in five Arab countries (Algeria, Morocco, Tunisia and Yemen), 45 per cent of the respondents reported preferring a loan from an Islamic bank than a conventional bank, even if they had to pay 5 per cent more annually for the Islamic bank loan. In another survey of nine countries in the Middle East and North Africa region, the International Finance Corporation (2014, p. 39) finds that, on average, 32.2 per cent of the small and medium enterprises in these countries prefer to have Shariah-compliant products.

Given the social and ethical ethos and emphasis on risk-sharing and asset-backed financing, Islamic finance can play an important role and has great potential in contributing to the achievement of the SDGs. As many infrastructure projects benefit the community at large, financing these projects by the Islamic financial sector would comply with its ideological standing (Miller and Morris, 2008).

The aim of this paper is to explore and analyse the role of Islamic finance in providing infrastructure finance to advance the 2030 Agenda for Sustainable Development and the SDGs. After providing an overview of the basic principles of Islamic commercial law and contracts used in Islamic finance, followed by information on the

current status of the Islamic finance industry in section II, section III discusses the ways in which different segments of Islamic finance can contribute to infrastructure investments. The last section presents some policy recommendations for enhancing the contribution of Islamic finance to the SDGs in general and infrastructure investments in particular.

II. Islamic finance: principles and practice

The essential goals of Shariah (*maqasid al Shariah*) constitute safeguarding the faith, life or self, intellect, posterity, wealth and personal honour or human dignity (Chapra, 2008; Kamali, 2007). Based on Islamic principles and values, an Islamic economy would strive to protect and enhance one or several of the *maqasid*. The implications of *maqasid* for an economy and the financial sector can be viewed at different levels. *Maqasid* at the broadest level would involve realizing the human well-being by enhancing welfare or benefit (*maslahah*) on the one hand and preventing harm (*mafsadah*) on the other (Laldin and Furqani, 2012).

Abozaid (2010, p. 67) views macro-level implications of *maqasid* as a practice that would protect and preserve public interests in all aspects and segments of life. Fulfilling the *maqasid* at this level would imply that an economy ensures growth and stability with equitable distribution of income, where all households earn respectable income to satisfy basic needs (Chapra, 1992). The micro-level *maqasid* relates to specific issues arising in operations and transactions of the Islamic financial sector. Using various Islamic legal maxims, Dusuki and Abdullah (2007) and Dusuki and Bouheraoua (2011) conclude that prevention and minimizing harm should be a key objective of an Islamic firm. These would include not engaging in harmful activities, such as selling products that harm consumers and dumping toxic waste harmful to the environment or residential areas.

II.1 Islamic financial contracts

Islamic financial products are governed by Islamic commercial law, which prohibits *riba* (literally meaning "excess") and *gharar* (legal ambiguity or excessive risk) in transactions. While *riba* is usually translated into interest, it has wider connotations such as prohibition of sale of debt. Similarly, contemporary derivatives (forwards, futures, swaps, etc.) are not permissible as they have elements of both *riba* and *gharar*. Since interest is prohibited, Islamic finance uses various other permissible contracts to structure financial products. The contracts used in practice can be broadly classified as sale, leasing, partnership and agency. The basic features of the key contracts used in Islamic finance are as follows:[3]

(a) *Murabahah* is a cost-plus sale where the seller adds a profit component (markup) to the cost of the item being sold.

(b) *Bai-muajjal* is a contract wherein the purchase is on credit and the payment for a good/asset is delayed. A variant would be a sale where the payments are made in instalments. These contracts create debt and can have both short- and long-term tenors.

(c) *Salam* sale is a pre-paid or product-deferred sale of a generic good. In a *salam* contract, the buyer of a product pays in advance for a good that is delivered at a later agreed upon date. The contract is applied mainly in financing agricultural goods.

(d) An *istisna* contract is similar to a *salam* contract with the difference being that, in *istisna*, a good/asset is produced according to the specifications given by the buyer. This contract mainly applies to manufactured goods and real estate. Furthermore, in *istisna*, the payments can be made in instalments over time with the progression of the production.

(e) *Ijarah* is a lease contract in which the lessee pays rent for use of usufruct. In *ijarah*, the ownership and right to use an asset (usufruct) are separated. It falls under a sale-based contract as it involves the sale of usufructs. A lease contract that results in the transfer of an asset to the lessee at the end of the contract is called *ijarah wa iqtina* or *ijarah muntahia bittamleek*. *Ijarah wa iqtina* combines sale and leasing contracts and uses the hire-purchase principles. After completion of payments during the contract period, the lessee assumes the ownership of the asset.

(f) *Musharakah* is a partnership between parties in which financial capital and labour/management act as

3 For a discussion on Islamic modes of financing see Ayub (2007), Kahf and Khan (1992) and Usmani (1999).

shared inputs in a project and profit is distributed among partners at an agreed upon ratio. The loss, however, is distributed according to the share of the capital.

(g) *Mudarabah* is a silent partnership in which financial capital is provided by one or more partners (*rab ul mal*) and the work is carried out by the other partner(s) (*mudarib*). While the financiers and managers of the project share the profit at an agreed upon ratio, the loss is borne by the former according to their share in the capital. Being a silent partner, the financiers (*rab ul mal*) do not have any say in the management of the firm.

(h) *Tawarruq* is used when a client needs cash. The financial institution buys a certain commodity and then sells it to the client at a markup, with the price payable in the future. The client assigns the financial institution as an agent to sell the commodity back to a broker on the spot and transfer the proceeds of the sale to the client.

II.2 *Sukuk*: features and types

The Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) defines *sukuk* as "certificates of equal value representing, after closing subscription, receipt of the values of certificates and putting it to use as planned, common title to shares and rights in tangible assets, usufructs and services, or equity of a given project or equity of a special investment activity." (AAOIFI, 2003, p. 298) Thus, *sukuk* are securities representing ownership in equity, real assets, usufruct, money or debt, or any combination of these. AAOIFI identifies various types of *sukuk* that can be classified based on assets, debt, equity, and services.

Asset-based *sukuk* include *ijarah sukuk,* which are certificates issued against an existing tangible asset, leased asset, and/or promise of leasing an asset in the future. *Sukuk* of *manfah* (usufructs) are also considered asset-based securities issued by owners of usufruct of existing or future assets. By purchasing the *sukuk*, holders become owners of the assets or usufructs. Debt-based *sukuk* arise from transactions that create debt. *Murabahah sukuk* are used to collect funds that are used to purchase goods or assets that are sold at a markup. Holders of *istisna sukuk* provide funds that are used in the construction of real estate, and become the owners of the real estate upon completion. Equity-based *sukuk* arise when funds raised are used in profit/output-sharing contracts. The holders of *mudarabah sukuk* participate in a project by appointing a manager on a profit/loss-sharing basis. *Musharakah sukuk* holders invest and manage the project and share the profit according to a pre-agreed ratio. Under the agency-based *sukuk* such as *wakala*, the holders of the certificates provide funds that are managed by an investment agency in some income-generating activity. The manager or agent gets paid a certain fee for the services provided. The features and properties of various types of *sukuk* are shown in table II.2.1.

Table II.2.1

Sukuk types and features

Sukuk types	Underlying contract	Nature of return	Risk attribution	Returns (fixed/ variable)	Tradability
Asset-backed	Leasing	Rent	Assets	Fixed/variable	Yes
Debt	Sale	Profit	Obligor	Fixed	No
Equity	Partnerships	Profit	Project	Variable[a]	Yes
Investment agency	Agency contract	Profit	Project	Variable[a]	Yes

[a] The return can be fixed if the underlying assets of the project (e.g., real estate) yields a fixed return.

Sukuk investors own the rights and bear the risks that these instruments represent. Depending on the contractual basis used, *sukuk* can have fixed or variable returns and may be tradable. *Sukuk* that represent debt or money are not negotiable and can be exchanged at par value only. Along with equity shares, instruments can be securitized and traded at negotiable prices if these represent real physical assets or usufruct.[4]

4 The Islamic Fiqh Academy has a ruling along similar lines (see Ruling No. 30 (5/4), IFA and IRTI, 2000, p. 63).

II.3 Social finance and charitable sector

Islamic teachings have introduced institutions of *zakat* and *waqf* for poverty alleviation and promoting social welfare.[5] *Zakat*, obligatory for all Muslims, is one of the pillars of Islam that has direct economic bearing on the distribution of income and emancipation of the poor. Considered among one of the essential forms of worship, it requires Muslims whose wealth is more than a specific threshold (*nisab*) to distribute a percentage of their wealth and annual income.[6] Early Islamic history demonstrates that *zakat* was used as an effective distributive scheme in taking care of the poorer sections of the population in Muslim societies.

W*aqf* (plural *awqaf*) is a voluntary charitable act that has wide economic implications and can play an important role in increasing sources of welfare. While the main endowment in creating *waqf* was usually immovable assets, such as land and real estate, moveable assets, such as cash, grain to use as seeds, etc., were also used for its creation. Other than providing support in religious matters, *waqf* can be established for provision of socio-economic relief to the needy and the poor, including education, health care and other social purposes. Various *awqaf* were also established for public utilities and research as well as to serve animals and the environment. Examples of the latter types of *waqf* include those created to preserve forests, feed birds and maintain the health of animals such as horses and cats (Kahf, 2000 and 2004).

The *waqf* sector grew significantly in Muslim societies and became the most important institution for poverty alleviation (Cizakca, 2002). The large investments in the social sector empowered the poor and succeeded in transforming the society. The historical significance of the *waqf* in Muslim societies is evident: Schoenblum (1999) reports that in the nineteenth century, three quarters of the arable land of the Ottoman empire was dedicated to *waqf*—including one half of the arable land in Algiers and one third in Tunis. The status of *waqf*, however, has deteriorated in many Muslim countries during contemporary times. Not only have the existing *waqf* become inefficient and unproductive, fewer new *waqf* are being established (Ahmed, 2004). While there are no updated statistics on *waqf* assets in different countries, one estimate shows the total in Indonesia to be $60 billion.

II.4 Evolution of Islamic finance and international infrastructure institutions

The first contemporary Islamic financial institution operated as a savings and investment cooperative in Mit Ghamar, Egypt, in 1963. The first Islamic bank was launched in Dubai, United Arab Emirates (UAE), in 1975. In the same year, the Islamic Development Bank was established in Jeddah, Saudi Arabia, as a multilateral development bank. In the late 1970s, two Islamic insurance (*takaful*) companies started operations, one in the UAE and the other in Sudan.

The first capital market product was initiated in 1986 in the United States of America with the launching of an Islamic mutual fund (Amanah Mutual Fund). The 1980s also witnessed the establishment of other Islamic non-bank financial institutions including *modaraba* companies in Pakistan, investment banks in Bahrain, microfinance institutions in Bangladesh, credit unions in Trinidad and Tobago and cooperatives in Canada and Thailand.

Islamic banks ventured into large-scale project financing for the first time in Pakistan in 1993 and then in Kuwait in 1996. The growth of other non-bank financial institutions and capital market products continued in the 1990s. Islamic alternatives for conventional pawn shops were established in Malaysia in 1992. In capital markets, the first Islamic index was initiated and a corporate sukuk was issued in Malaysia. The trends continued in the 2000s when more non-bank financial institutions such as the Awqaf Properties Investment Fund, infrastructure funds and leasing companies were established and the capital markets saw the initiations of sovereign *sukuk*, hedge funds and real estate investment trusts (REITs).

Other than increasing the numbers of Islamic banks, non-bank financial institutions and capital markets in different jurisdictions, the 2010s witnessed further developments. A few fintech institutions, such as Shariah-compliant crowdfunding and asset management platforms, have been launched recently. In capital markets, a few new types of social and green *sukuk* were issued. A brief overview of the developments of Islamic finance over the years is shown in table II.4.1.

5 For detailed discussions see Ahmed (2004), El Asker and Haq (1995) and Cizaka (1996, 1998).

6 The percentage of zakat varies from 2.5 per cent paid on assets—such as cash, gold, silver, goods for trade, etc.—to 5 per cent on agricultural products if the crops are irrigated or 10 per cent if they use water from natural sources such as rain, rivers or springs.

Table II.4.1

Evolution of Islamic financial institutions and markets

Period	Financial institutions	Financial markets
1970s	• Banks • Takaful	
1980s	• *Retakaful* • Mudarabah companies • Microfinance institutions • Cooperatives/Credit unions • Investment banks	• Mutual funds
1990s	• Private equity and venture capital firms • Project finance • Pawn shops	• Islamic indices • Corporate *sukuk*
2000s	• Awqaf Properties Investment Fund • Infrastructure fund • Leasing companies	• Sovereign *sukuk* • Hedge funds • Islamic real estate investment trust
2010s	• Crowd funding platforms	• Social sukuk • Green sukuk

Source: Adapted from COMCEC (2016) and modified.

The evolution of different international institutions related to the Islamic finance industry is shown in table II.4.2. The Islamic Development Bank (IsDB) was established in 1975 to foster development in member countries and Muslim communities on non-Muslim countries. Other than having different affiliates such as Islamic Corporation for the Development of the Private Sector (ICD) and Islamic Research and Training Institute, IsDB has been instrumental in establishing other Islamic finance-related supporting institutions such as the Islamic Financial Services Board (IFSB), the International Islamic Financial Market (IIFM), the International Islamic Liquidity Management Corporation (IILM) and the International Islamic Centre for Reconciliation and Commercial Arbitration (IICRCA).

In 1981, Islamic Fiqh Academy (IFA) based in Jeddah, Saudi Arabia was established as an organ of the Organisation of Islamic Cooperation with the key role of issuing legal rulings on contemporary issues. IFA has issued many resolutions related to Islamic finance that have helped set the direction of the industry. Under the patronage of IsDB, AAOIFI was established in Bahrain in 1991 to develop accounting, auditing and Shariah standards for the Islamic finance industry.

The first decade of the 2000s witnessed the establishment of several standard-setting bodies and supporting institutions. Other than establishing the IFSB in Malaysia in 2002 as the regulatory standards-setting body for Islamic banks, *takaful* and capital markets, the IIFM was formed in Bahrain in the same year to develop standardized contracts for Islamic capital markets, corporate finance and trade finance. In 2004, the IICRCA was launched in Dubai, UAE, as an alternative dispute resolution platform for Islamic finance using Islamic law.

Three international institutions were established in Bahrain in the early 2000s with different purposes: the General Council of Islamic Banks and Financial Institutions was launched as a global trade association of Islamic financial institutions to adopt best practices; the Islamic International Rating Agency provides credit and Shariah ratings; and the role of the Liquidity Management Centre (LMC) is to develop Islamic interbank money markets and liquidity instruments. To reinforce the efforts of LMC, the IILM was founded in Kuala Lumpur, Malaysia, in 2010 to develop and issue short-term Islamic instruments for cross-border liquidity management that Islamic financial institutions can use globally.

Table II.4.2

Global institutions for Islamic finance

Period	Legal/Regulatory/Standard-setting institutions	Supporting institutions
1970s		➢ **Islamic Development Bank (IDB)**, (1975) Jeddah, Saudi Arabia (promote economic development and Islamic finance)
1980s	➢ **Islamic Fiqh Academy (IFA),** (1981) Jeddah, Saudi Arabia (issue Islamic legal resolutions on different issues including Islamic finance)	
1990s	➢ **Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI)**, (1991) Bahrain (develop accounting, auditing, and Shariah standards for Islamic finance)	
2000s	➢ **Islamic Financial Services Board (IFSB)**, (2002) Kuala Lumpur, Malaysia (standard-setting body for regulations and supervision of Islamic banking, *takaful* and Islamic capital markets) ➢ **International Islamic Financial Markets (IIFM)**, (2002) Bahrain (develop contracts for Islamic capital markets, corporate finance and trade finance) ➢ **International Islamic Centre for Reconciliation and Commercial Arbitration (IICRCA)**, (2004) Dubai, UAE (alternative dispute resolution platform for Islamic finance using Islamic law)	➢ **General Council of Islamic Banks and Financial Institutions (CIBAFI),** (2001) **Bahrain** (trade association of Islamic financial institutions to enhance best practices) ➢ **Islamic International Rating Agency (IIRA)**, (2002) Bahrain (provide credit and Shariah ratings) ➢ **Liquidity Management Centre (LMC),** (2002) Bahrain (develop Islamic inter-bank money markets and liquidity instruments)
2010s		➢ **International Islamic Liquidity Management Corporation (IILM),** (2010) Kuala Lumpur, Malaysia (develop and issue short-term Islamic instrument for cross-border liquidity management)

Source: Adapted from COMCEC (2016).

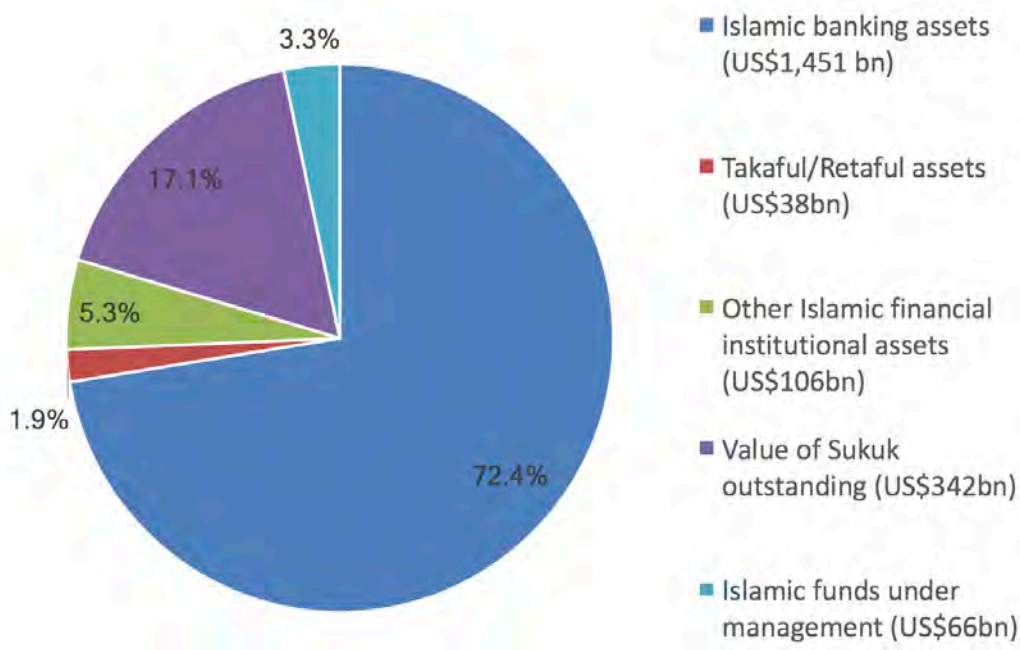
II.5 Volume and features of Islamic finance

IFSB (2017) estimates the total global Islamic finance assets in the first half of 2016 to be $1.89 trillion, and ICD and TR (2016) puts the value at $2.003 trillion for the year. Figure II.5.1 shows the distribution of Islamic finance assets across different sectors. The Islamic banking sector dominates the industry, with $1.451 trillion assets constituting 72.4 per cent of the total followed by *sukuk* issuances of $341.92 billion (or 17.1 per cent of total assets). While the *takaful* industry is relatively small with $37.745 billion (or 1.9 per cent of assets), the non-bank financial institutions have assets worth $106.35 billion, constituting 5.3 per cent of the total. Islamic funds under management comprise 3.3 per cent of the industry with assets under management of $66.436 billion.

Figure II.5.2 shows the regional distribution of Islamic finance assets. The Gulf Cooperation Council (GCC) region leads with assets worth $801.1 billion (or 42.3 per cent of the total), followed by the non-GCC Middle East and North Africa region with assets of $565.7 (or 29.9 per cent of the total). Whereas Asia also has significant Islamic finance assets amounting to $425.5 billion (or 22.5 per cent of the total), Africa has a relatively small share of 1.6 per cent of global assets, valued at $30.6 billion.

Figure II.5.1

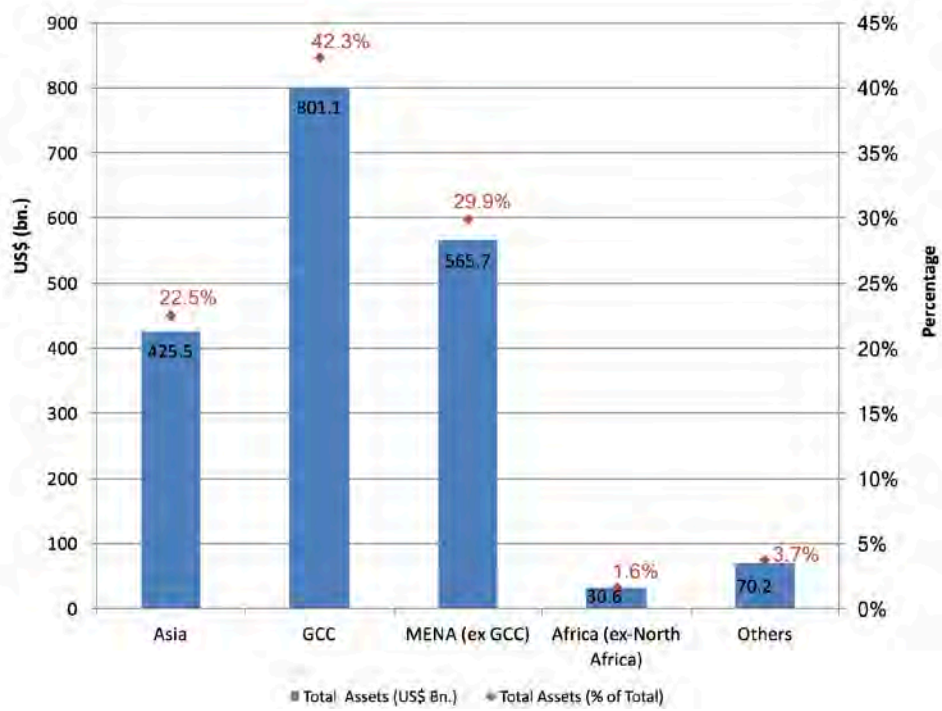
Global distribution of global Islamic financial assets



Source: ICD and TR (2016).

Figure II.5.2

Regional distribution of global Islamic financial assets



Source: IFSB (2017).

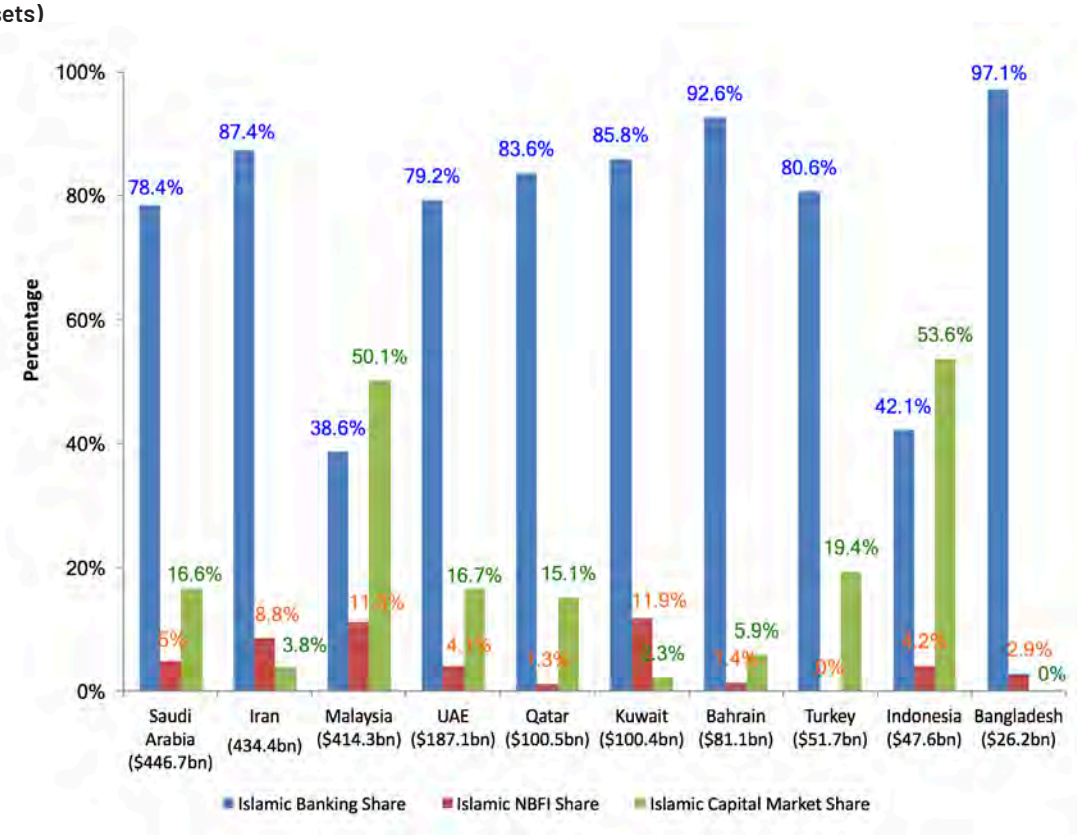
Figure II.5.3 shows the distribution of the Islamic finance industry across different sectors for the ten largest

Islamic finance countries. The figure highlights the relative sizes of the Islamic banking, non-bank financial institutions (which includes *takaful* and other financial institutions) and capital market segments in different countries. The banking sector appears to be dominant in most countries and the capital market is relatively small. For example, while the banking sector in Saudi Arabia—the largest Islamic finance country—comprises 78.4 per cent of the total Islamic finance assets of $446.7 billion, the capital markets and the non-bank financial institutions represent 16.6 per cent and 5.0 per cent respectively.

The Islamic finance industry in Malaysia appears to be the most balanced, with the banking sector constituting 38.6 per cent of the assets, the capital markets about 50.0 per cent and the share of non-bank financial institutions standing at 11.3 per cent. Other than Malaysia, Indonesia is the only other country that has a larger share of the Islamic capital markets compared to the banking sector. A few countries have not developed certain segments of the industry. For example, in Turkey, the Islamic non-bank financial institutions sector is absent; in Bangladesh, the Islamic capital markets segment does not exist.

Figure II.5.3

Sectoral composition of Islamic finance in countries with the most Islamic finance (percentage of total assets)



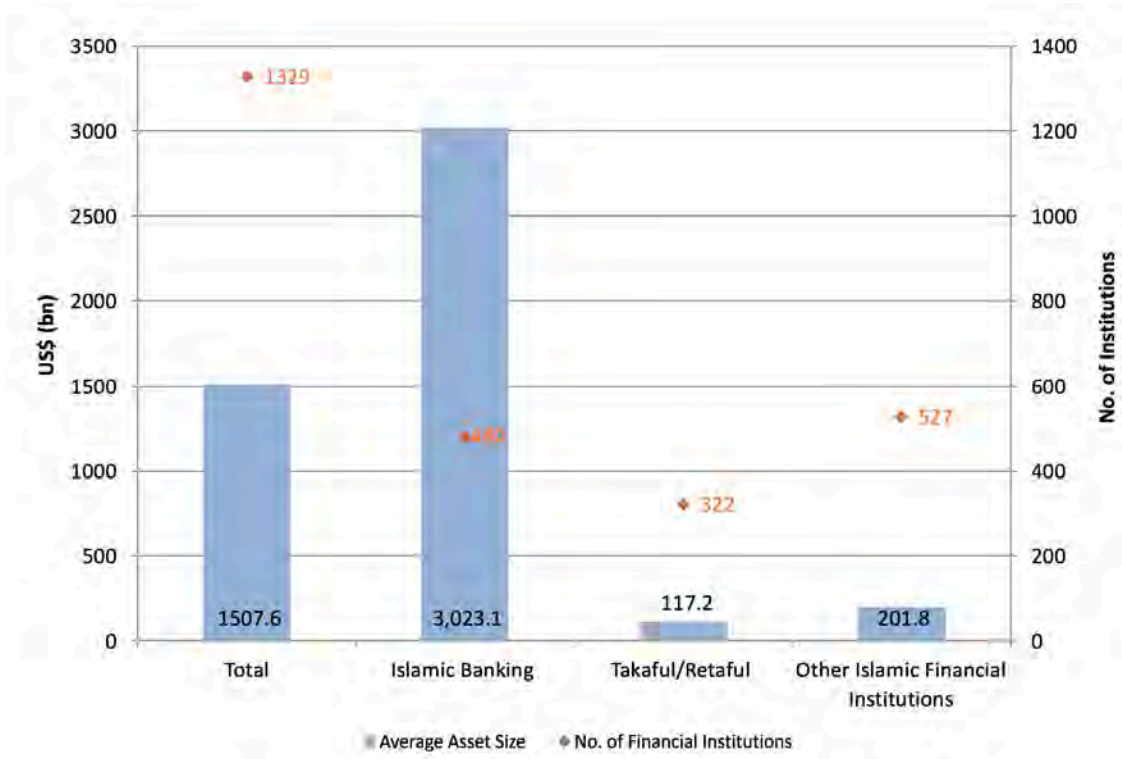
Source: Estimated from ICD and TR (2016).

Islamic financial institutions

Figure II.5.4 shows the number of Islamic financial institutions and their average asset sizes globally in 2016. There were a total of 1,329 Islamic financial institutions with an average of $1.507 billion in assets. Interestingly, non-bank financial institutions (other than *takaful*) constituted the largest number of Islamic finance institutions, but had a relatively smaller average asset size of $201.8 million. The Islamic banking sector constituted 480 banks globally and had an average asset size of $3.023 billion. The number of *takaful* operators stood at 322 and had the lowest average asset size of $117.2 million.

Figure II.5.4

Number of institutions and average asset size, 2016



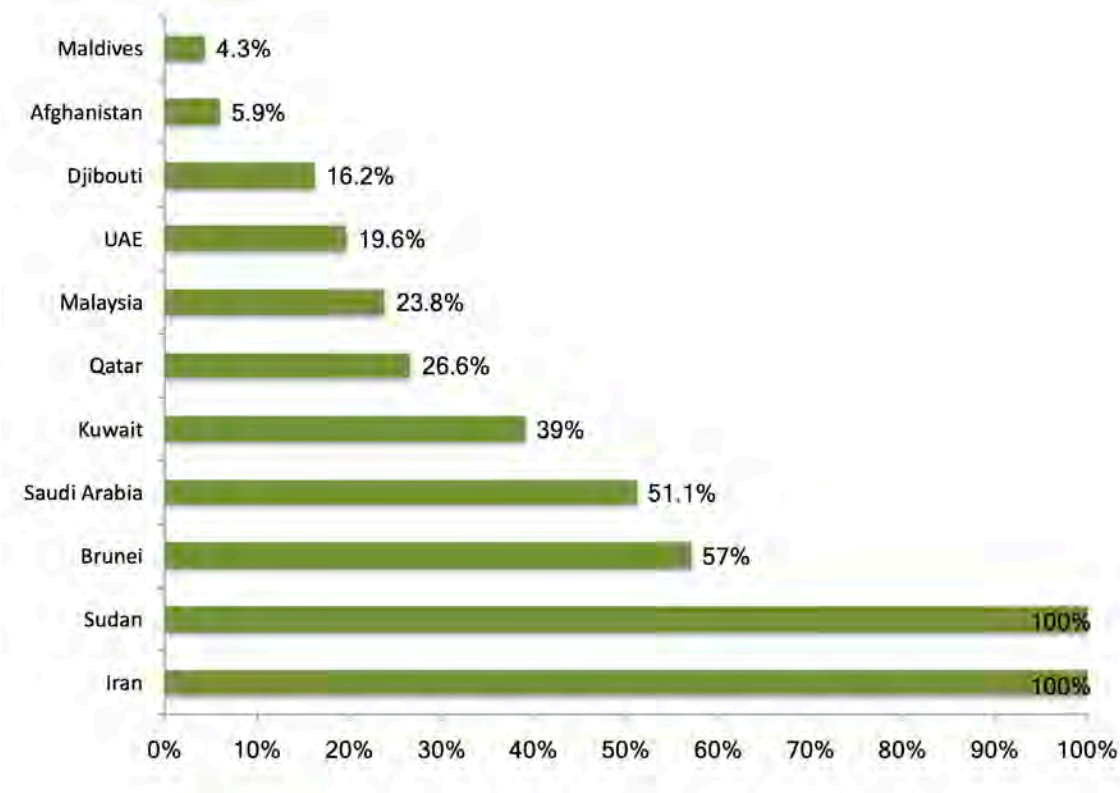
Source: Estimated from ICD and TR (2016)

Figure II.5.5 shows the share of the Islamic banking sector relative to the overall banking sector for a sample of countries. While the whole banking sector in two countries (Iran (Islamic Republic of) and Sudan) is Islamic, in other countries Islamic banking operates along with the conventional banking sector. In two countries (Brunei Darussalam and Saudi Arabia), Islamic banking assets exceed those of their conventional counterparts. The figure shows that in many other countries, the Islamic banking sector has become systemically important with its share of the total banking assets exceeding 15 per cent.[7]

7 IFSB (2017) categorizes Islamic banking to be systemically important when its share exceeds 15 per cent of total banking assets.

Figure II.5.5

Islamic banking share



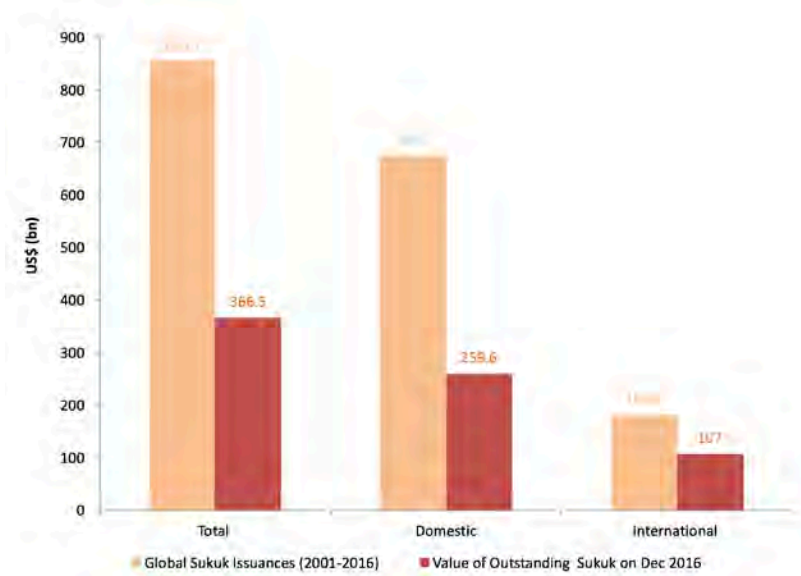
Source: IFSB (2017).

Capital markets

The second largest segment of Islamic finance is the *sukuk* sector. Figure II.5.6 shows the total *sukuk* issuances during the period 2001-2016 and the total outstanding *sukuk* in December 2016. The figure reveals that the bulk of the *sukuk* (78.7 per cent) issued during the period is domestic and more than a fifth was international. Figure II.5.7 shows the issuance of *sukuk* according to issuer type. Most of the *sukuk* issued during the period was sovereign followed by corporates. While quasi-sovereign entities issued relatively less *sukuk*, most of their issuances were international.

Figure II.5.6

Total issuances and outstanding sukuk



Source: Calculated from IIFM Sukuk Report 2017.

Figure II.5.8 provides a breakdown of the share of domestic and international *sukuk* according to the Islamic contracts used for the period 2010-2015. While the bulk of the domestic *sukuk* was *murabahah* (debt-based) (64 per cent) and *ijarah* (14 per cent), most of the international *sukuk* used the *wakala* (43 per cent) and *ijarah* (35 per cent) structures. It should be noted that risk-sharing contracts of *musharakah* and *mudarabah* have not been used extensively in *sukuk* during the period under consideration.

Figure II.5.7

Total sukuk issuances, 2001-2016

Source: Calculated from IIFM Sukuk Report 2017.

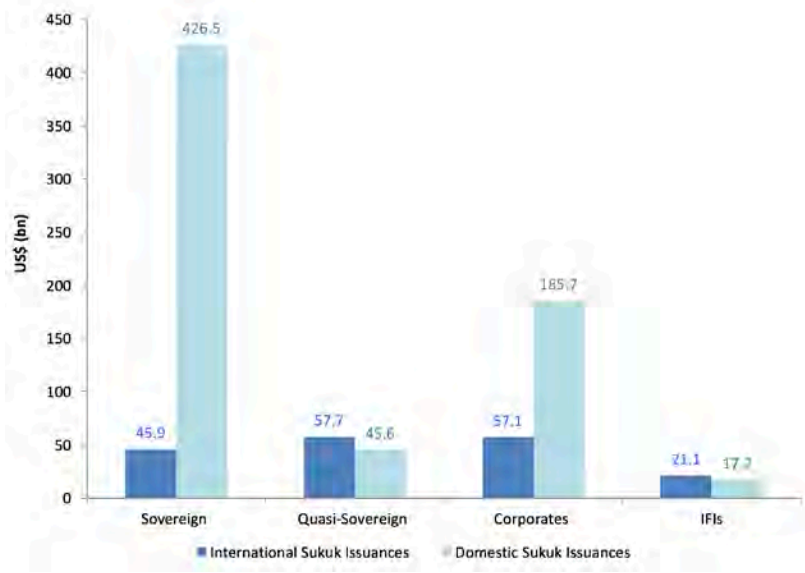
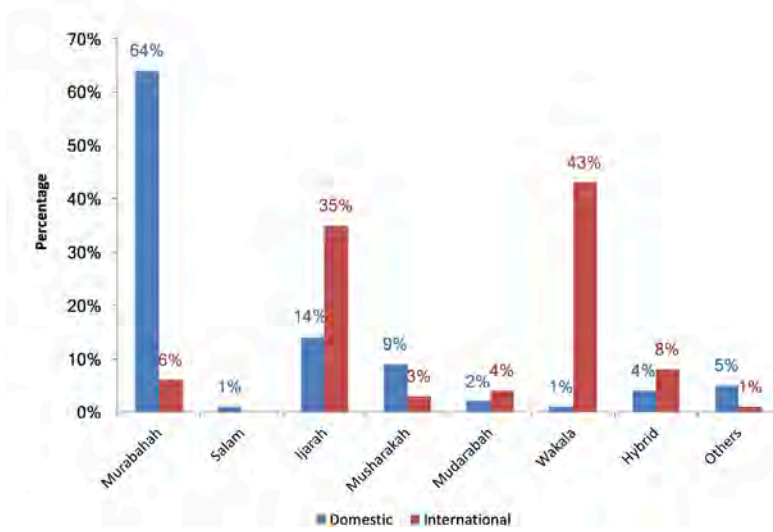


Figure II.5.8

Share of sukuk issuances by contract structure, 2010-2015



Source: Calculated from IIFM Sukuk Report 2017.

III. Islamic finance contribution to infrastructure development

Islamic finance can be considered as an alternative ethical source of finance that can be used by all, irrespective of their religious beliefs. There is, however, a misconception that Islamic finance is for Muslims only. This is far from the truth. For example, Al Rayyan Bank markets itself as an alternative ethical banking option to non-Muslims in the United Kingdom of Great Britain and Northern Ireland and many Malaysian Islamic banks have a significant number of non-Muslim clients. Similarly, many non-Muslim countries, such as Hong Kong SAR, Luxembourg, South Africa and the United Kingdom, have tapped into the *sukuk* market. Many issuances were oversubscribed, indicating high demand for alternative financing sources. For instance, the $1 billion Hong Kong SAR *sukuk* attracted $4.7 billion in orders from both Islamic and non-Islamic investors; the $500 million South African *sukuk* drew $2.2 billion orders; and the £200 million United Kingdom *sukuk* garnered orders of £2 billion (Timmons, 2014; Wigglesworth, 2014). Furthermore, a $500 million socially responsible *sukuk* was issued in 2014 by the International Financial Facility for Immunization to raise money for a vaccine fund (Chew, 2014a).

Although Islamic finance is not restricted to Muslims or countries with sizable Muslim populations, it is more likely to be used in countries with larger Muslim populations. To explore the potential contribution of Islamic finance to the Sustainable Development Goals (SDGs), the countries considered in this section belong to the Organisation of Islamic Cooperation (OIC). After identifying the infrastructure needs of a sample of OIC member countries, this section discusses the role that different sectors of the Islamic finance industry can play in contributing to project development.

III.1 Infrastructure financing needs

The SDG Index (SDGI), based on official indicators that assess SDG achievement, provides a "quick metrics" of the status of the SDGs.[8] The SDGI uses 77 indicators to develop an indicator that varies from 0 to 100, with higher scores representing better SDG achievement. Estimated for 149 United Nations member countries that had adequate data, the SDGI includes 44 OIC countries in the sample. To assess the status of the SDGs in OIC member countries, 4 groups of 11 countries are arranged according to their SDGI rankings. Table III.1.1 shows the average SGDI status for four OIC country groupings along with averages of the ten best and ten worst scoring countries

8 The SDG Index is jointly developed by Bertelsmann Stiftung and Sustainable Development Solutions Network (SDSN). SDSN is an initiative of the United Nations to mobilize "global scientific and technological expertise to promote practical solutions for sustainable development" (see http://unsdsn.org/about-us/vision-and-organization/).

to give perspective on their relative status.

Table III.1.1 shows that while the OIC countries in the first and second quarters have relatively higher scores (63.1 and 57.5, respectively), the average SDGI for the third- and fourth-quarter countries (43.9 and 36.1, respectively) are significantly lower than that of the 10 highest scoring countries (80.8). The mean score of SDGI of 11 OIC fourth-quarter countries is close to the score of the ten lowest-ranked countries (32.9), with some countries in the former grouping belonging to the latter. The overall status of the 44 OIC countries shows an average SDGI score of 50.1, indicating the need for massive investment to improve their status.

Table III.1.1

Average SDG Index by different country groupings, 2016

Country groups	Mean SDGI score
Ten highest-scoring countries (Sweden, Denmark, Norway, Finland, Switzerland, Germany, Austria, Netherlands, Iceland, United Kingdom)	80.8
44 OIC member countries	50.1
OIC first-quarter countries (Turkey, Qatar, Tunisia, Kazakhstan, United Arab Emirates, Jordan, Malaysia, Morocco, Azerbaijan, Egypt, Kyrgyzstan)	63.1
OIC second-quarter countries (Albania, Tajikistan, Oman, Iran (Islamic Republic of), Algeria, Saudi Arabia, Lebanon, Suriname, Gabon, Kuwait, Guyana)	57.5
OIC third-quarter Countries (Iraq, Cameron, Senegal, Pakistan, Bangladesh, Uganda, Cote d'Ivoire, Sudan, Togo, Benin, Mauritania)	43.9
OIC fourth-quarter countries (Mozambique, Mali, Gambia, Yemen, Sierra Leone, Afghanistan, Nigeria, Guinea, Burkina Faso, Chad, Niger)	36.1
Ten lowest scoring (Nigeria, Guinea, Burkina Faso, Haiti, Chad, Niger, Democratic Republic of the Congo, Liberia, Central African Republic)	32.9

Source: Bertelsmann Stiftung and Sustainable Development Solutions Network (2017).

Figure III.1.1

Ratio of infrastructure investment gaps to GDP, 2016

Source: Estimated from data from Global Infrastructure Hub, available from https://outlook.gihub.org/, and World Development Indicators, available from https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.

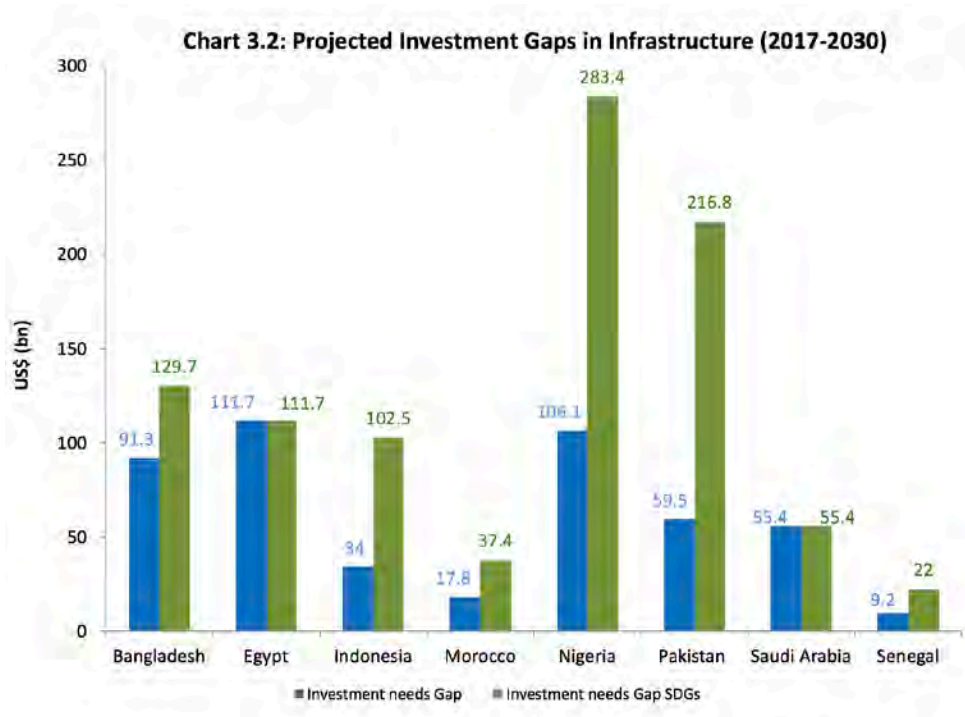
Figures III.1.1 and III.1.2 show the projected gaps in infrastructure investment for selected countries. To have a perspective of the relative size and scale of investment needs and gaps, figure III.1.1 presents the need for annual investment as a percentage of gross domestic product (GDP) for 2016 for selected countries. The figures show that some countries would need to invest significantly more to attain the SDGs. For example, for the next 14 years, Senegal would have to invest about 25 per cent of its 2016 GDP and Bangladesh about 17 per cent of its 2016 to achieve the SDGs. For some countries, such as Indonesia and Saudi Arabia, however, the infrastructure investment requirements appear to be low and manageable.

Figure III.1.2 shows infrastructure investment gaps related to the financing needed for normal growth and that needed for meeting the SDGs.[9] A few countries, such as Nigeria and Pakistan, would require huge amounts of additional infrastructure investment to fill the gaps. At current levels of investment, the projected gaps for these countries would be $22 billion in Senegal and close to $130 billion in Bangladesh.

9 For Egypt and Saudi Arabia data on investment gaps for both cases are the same.

Figure III.1.2:

Projected investment gaps in infrastructure, 2017-2030



Source: Estimated from data from Global Infrastructure Hub, available from https://outlook.gihub.org/.

Most countries have to raise funds in the coming years to fill the investment gaps in sustainable infrastructure to attain the SDGs. While traditionally the public sector has provided infrastructure investments, it will become difficult for it to fill the gaps due to both the large sums needed and the budget constraints confronting governments. The private sector can play an important role in financing bankable projects in some form of public-private partnership (PPP) framework.

Given the Islamic finance emphasis on real economy, risk sharing and social orientation, one option would be to tap into the private sector to generate the resources. The ways in which different Islamic financial sectors can help increase infrastructure investment are presented below.

III.2 Islamic banking sector and infrastructure financing

Since infrastructure financing involves large amounts of funding, bank financing usually takes the form of syndication (i.e., a group of banks pooling resources to finance projects). Conventional syndication would involve one or a few lead banks acting as an arranger and other banks contributing to financing projects using interest-based loans. The arranger is responsible for assessing different aspects of the project and managing the deal. Although Islamic finance syndications would have similar operational formats and procedures as their conventional counterparts, contracts for syndicate formation and financing the project would differ. The relationship between the lead bank and the other banks will take either a *wakala* or *mudarabah* format, and financing of projects would use one of the Shariah-compliant contracts, such as *istisna*, *murabahah*, *tawarruq*, *ijarah*, *mudarabah* or *musharakah*.

Contracts that create debt (*murabahah, istisna* and *tawarruq*) are commonly used in syndicate financing. Under *murabahah*, the syndicate purchases the asset being financed and then sells it to the project company at a markup. *Istisna* is used in projects involving construction, whereby the banks advance funds for the project that is delivered at a later date. *Tawarruq* is used when the project company needs cash. Since debt is created by buying and selling of commodities, no direct linkages exist between the financing and project assets. Debt-

based structures are not liquid as they cannot be sold, cannot be repriced and are usually used for transactions with relatively short-term tenors.

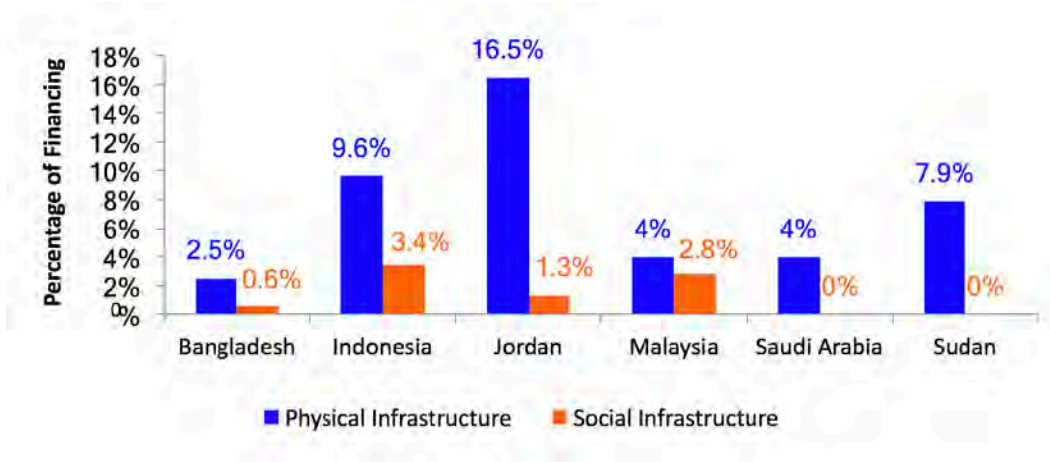
Ijarah-based instruments can have adjustable returns and be used for long-term financing. In principle, both *mudarabah* and *musharakah* can be used in syndicated financing; however, they are employed infrequently due to the inherent risks involved. Since infrastructure project structures are complex, a combination of different contracts is used to satisfy the risk-return preferences of different stakeholders. For example, a common structure used is *istisna-ijarah*, whereby the *istisna* is used for financing the project assets; those assets are then leased to the financee using the *ijarah* contract.

Islamic banks and infrastructure finance

The Islamic banking sectors' contribution to infrastructure-related sectors for a sample of countries in 2016 is shown in figure III.2.1. Although the results show variations in financing for the physical and social infrastructure sectors, the overall contribution to these sectors appears to be low.

Figure III.2.1

Financing of physical and social infrastructure by Islamic banks in selected countries, 2016

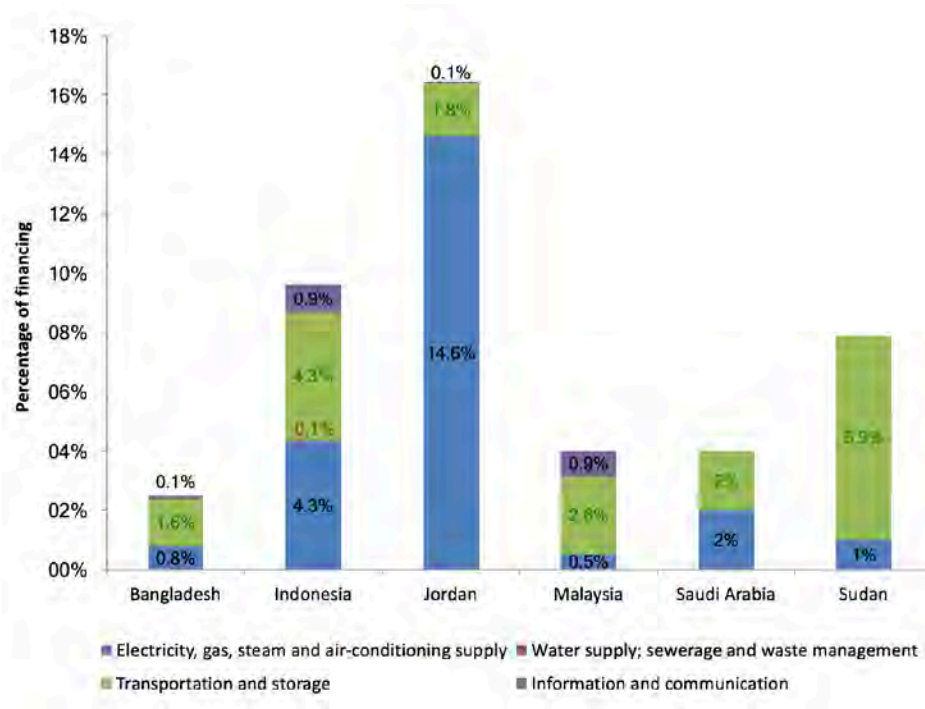


Source: Estimated from IFSB PSIFIs data, available from http://www.ifsb.org/psifi_03.php?selfolder=.

A further breakdown of financing according to specific sectors is shown in figures III.2.2 and III.2.3. Figure III.2.2 shows that most of the physical infrastructure financing by Islamic banks goes to the transportation and electricity and gas sectors. Investments in water and information and communications sectors appear to be relatively small with no financing of these sectors undertaken by Islamic banks in Saudi Arabia and Sudan.

Figure III.2.2

Financing of physical infrastructure by Islamic banks in selected countries, 2016

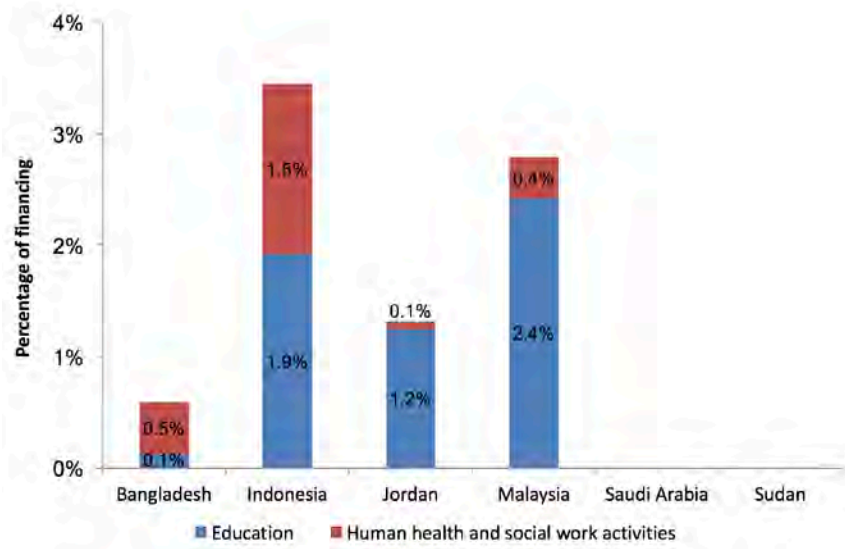


Source: Estimated from IFSB PSIFIs data, available from http://www.ifsb.org/psifi_03.php?selfolder=.

Figure III.2.3 shows the breakdown of financing of the social infrastructure sectors of education and health. Islamic banks in Indonesia invest in both social sectors; in Jordan and Malaysia, the focus is more on education. The figure shows no involvement of Islamic banks with the social sectors in Saudi Arabia and Sudan.

Figure III.2.3

Financing of social infrastructure by Islamic banks in selected countries, 2016



Source: Estimated from IFSB PSIFIs data, available from http://www.ifsb.org/psifi_03.php?selfolder=.

Given that Islamic banks are young and smaller in size, they participate in projects by financing a tranche in a larger project. Many projects are predominantly financed by conventional banks, with Islamic banks financing a portion. For example, one of the first Islamic project financing deals in 1994 involved a $92 million bridge financing tranche, with limited recourse, in a $1.8 billion Hub River project in Pakistan by Al Rajhi Bank and Investment Corporation and the Islamic Investment Bank. The Islamic facility was used to procure and install power turbines for the hydroelectric project (Clifford Chance, 2009). However, as the Islamic finance industry expands, the opportunities for financing larger shares of projects using *Shariah*-compliant financing may grow. Two cases in which syndicated financing were wholly done by Islamic banks are presented in boxes III.2.1 and III.2.2.

Box III.2.1

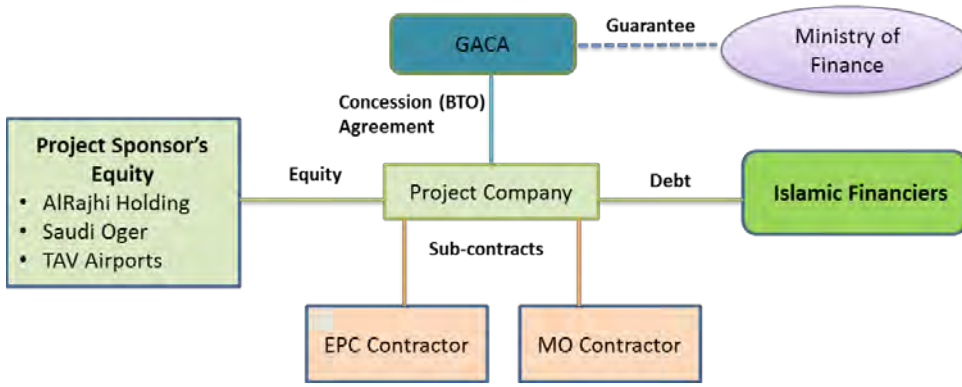
Case 1: Madinah International Airport, Saudi Arabia*

In line with its privatization policies, the General Authority of Civil Aviation (GACA) of Saudi Arabia decided to involve the private sector in the expansion of the Prince Mohammad bin Abdulaziz International Airport in Madinah. The airport is located 12 kilometres from Madinah, one of two holy cities in Saudi Arabia that is frequented by millions of *umrah/hajj* pilgrims every year. The capacity of the airport was five million passengers when the project was initiated. Since traffic grew at the rate of 17 per cent per annum during 2004-2009, reaching 3.5 million passengers in 2009, GACA expected the traffic to increase to 9 million in 2025 and 15 million in 2035. The goal of expanding the airport was to accommodate the expected increase in passenger numbers and promote Madinah as an entry/exit hub for pilgrims.

The expansion of the airport was planned in two phases, with the first phase targeted to increase the capacity to eight million passengers by 2015. The new project involved building a brand new terminal, apron and taxiways; extending runways and access roads; creating a new airport system; and building other ancillary buildings (all together, referred to as "airport assets"). As GACA planned to develop the airport with the private sector using a public-private partnership structure, project proposals were solicited in 2010 and GACA selected the TIBAH consortium (Al Rajhi, Saudi Oger and TAV Airports, Turkey) for construction and operation of the new airport. A build, transfer and operate (BTO) contract was signed with the project company, Tibah Airport Development Company, in October 2011 that included a concession period of 25 years starting 20 June 2012. The project company would transfer management of the airport to GACA upon its completion, while retaining the operating rights during the concession period.

Figure III.2.1A

Madinah International Airport financing structure



The project was implemented by establishing an Islamic Facility Agent (IFA) that acted as the facility agent and owned the rights of building the project assets. While Islamic banks entered into an investment agency (*wakala*) agreement with the IFA, the IFA had an *istisna* arrangement with the project company to construct the airport assets. The estimated cost of the project was $1.141 billion, financed by sponsors' equity ($357 million), senior Islamic facility ($701 million) and pre-completion revenue ($80 million).

An equity bridge facility tranche of $436 million was provided by Islamic banks to cover sponsors' equity contribution and pre-completion revenues. The National Commercial Bank provided funding of $300 million in the senior Islamic facility and $145 million in the sponsors' equity contributions. With 18 years of financing tenor, the average debt service coverage ratio was estimated at 1.55x and a minimum of 1.35x. The BTO contract stipulated revenue-sharing arrangements between the project company and GACA. Under the contract, GACA was obliged to pay 90 per cent of the senior facility in case of termination of the contract prior to completion and 100 per cent for termination after the completion. The Ministry of Finance provided guarantee for paying GACA termination payments obligations.

Source: World Bank and others (2017); Duranni (2012).

*Mansoor Durrani, Head of Project Finance, National Commercial Bank provided slides and details of the project.

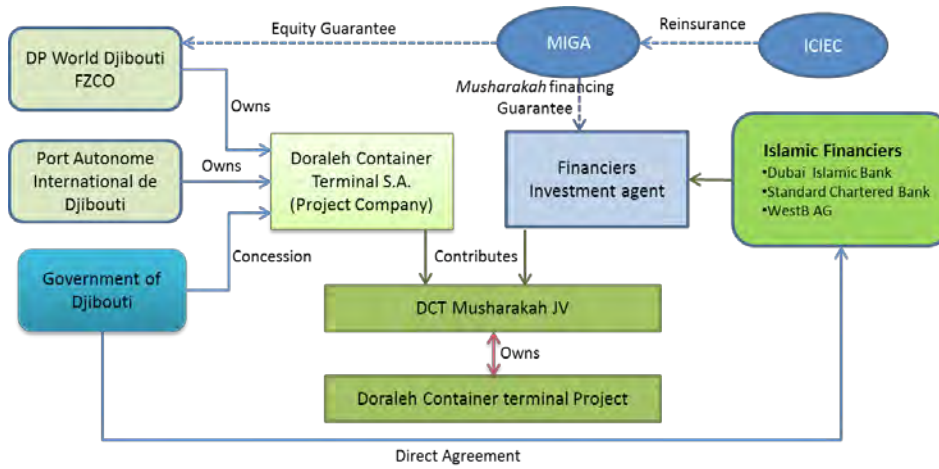
Box III.2.2

Case 2: Doraleh Container Terminal

Djibouti's Doraleh Container Terminal project was initiated in 2007 and wholly financed by Islamic syndication. DP World of the United Arab Emirates and Port Autonome International of Djibouti were the key sponsors of the project and they established Doraleh Container Terminal S.A. (DCT) as the project company. The port was developed under a 30-year concession agreement. DP World provided $5 million in equity for the project and $422 million was raised through Islamic syndication. Dubai Islamic Bank, Standard Chartered Bank and WestLB AG provided the funds in the syndicate through an investment agent.

Figure III.2.2A

Doraleh Container Terminal financing structure



The Islamic project financing combined four contracts of *musharakah, istisna, ijarah* and *takaful*. *Musharakah* was used by the project company (DCT) and the financiers to form a partnership to procure the assets of the project. The partnership appointed DCT as their agent to construct the terminal within the stipulated time by using the *istisna* contract. The payments for the construction were made from the *musharakah* to DCT as multiple drawdowns. The *ijarah* agreement was used to lease the financier's co-ownership interests in the project to DCT in return for periodic rental payments. The financiers received advance rental payments during the construction period and after the completion of the terminal they received rental payments that had both fixed and floating components.

The Multilateral Investment Guarantee Agency (MIGA) provided the guarantees to the investors for $427 ($5 million to DP World and $422 million to the financiers) against risks of breach of contract, restrictions on currency transfers, expropriation, and civil disturbance and war. Islamic Corporation for the Insurance of Investment and Export Credit in turn provided reinsurance for $50 million to MIGA.

Source: World Bank and others, (2017); MIGA (2008).

Case 3 presents Master Wind Energy Limited (box III.2.3), the first green syndicated financing undertaken by Islamic banks, done in partnership with an international conventional financing facility in Pakistan to finance wind turbines for electricity generation.

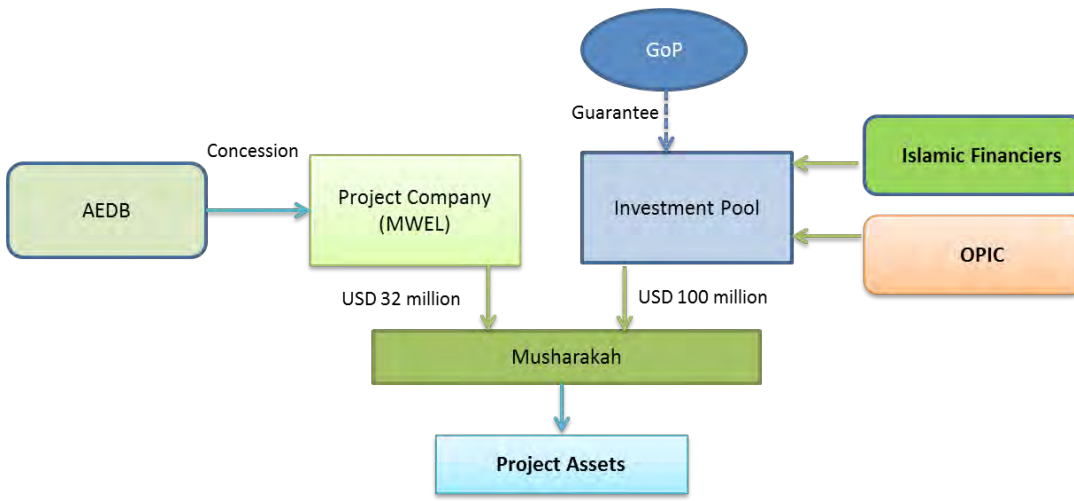
Box III.2.3

Case 3: Master Wind Energy Limited, Pakistan

Master Wind Energy Limited (MWEL) was established by Master Group in Pakistan to initiate a wind farm consisting of 33 wind turbines to generate 50 megawatts of electricity. The goal was to implement the Government of Pakistan's desire to increase the share of renewables and reduce dependence on thermal generation in the energy sector. The Alternative Energy Development Board provided 1,408 acres of land in Jhimpir, Sindh, for the wind farm on a 20-year concession period. The total project cost was $132 million out of which $100 million was raised from external sources. External financing was split equally between the US-based Overseas Private Investment Corporation and a syndicate of Islamic banks (Meezan Bank Limited, Habib Metropolitan Bank Ltd. and the Bank of Punjab). The project benefitted from the Upfront Tariff Regime announced by the Government in 2013. The feed-in-tariff (along with permitted indexations and escalations) was applicable throughout the twenty-year concession period. The concession was backed by sovereign guarantees given by the Government under the concession agreements.

Figure III.2.3A

Master Wind Energy Limited sukuk structure



The Islamic component of the financing used *musharakah* in the construction phase and *ijarah* in the operation phase. In the construction phase, Islamic financiers and project sponsors entered into a partnership with MWEL to co-own the project assets on an agreed upon ratio. The financiers appointed Meezan Bank to act as their agent and the *musharakah* agreement appointed MWEL to construct the project assets. MWEL is responsible for operations and maintenance of the assets. After the completion of the project in October 2016, the *ijarah* contract became active and MWEL leased the assets of financiers and paid lease rentals on a quarterly basis. The project assets are insured and in case of total loss the insurance claims will be distributed among the financiers and project sponsors according to their shares of *musharakah* assets.

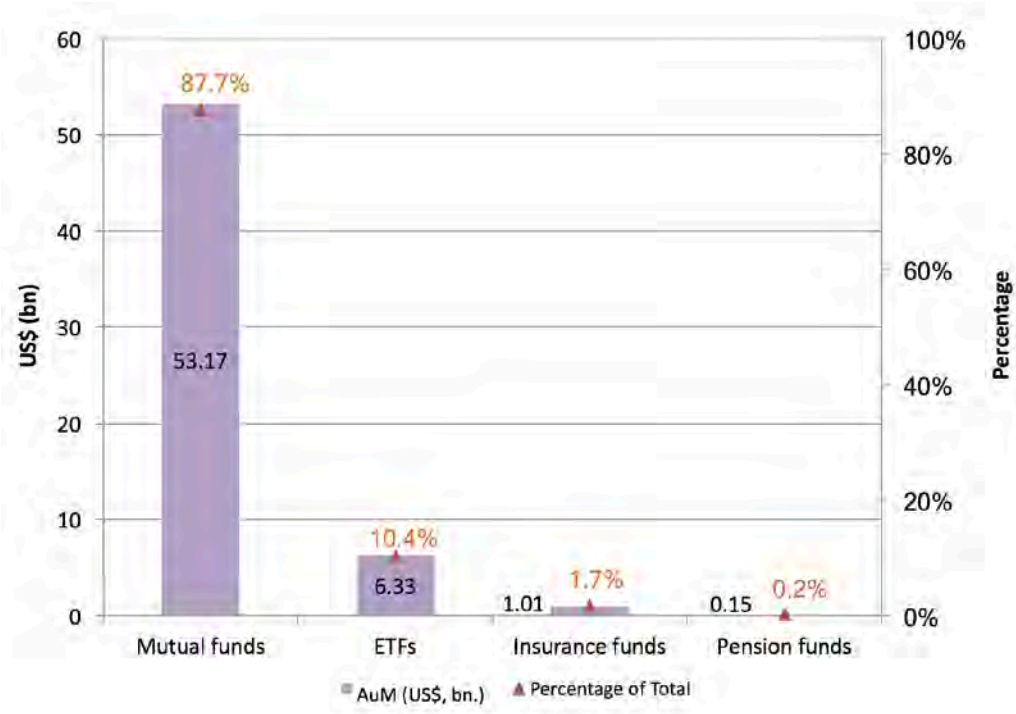
Source: World Bank and others, (2017); Daily Time (2016); Master Wind Energy Limited (undated).

III.3 Non-bank financial institutions/philanthropic sector

The non-bank financial institutions form a small segment of the Islamic finance industry. While data on *takaful* and non-bank financial institutions in section II reveals their relative small size, figure III.3.1 shows the size of different types of global Islamic funds. The bulk (87.7 per cent) of the Islamic funds is in the form of mutual funds followed by exchange-traded funds (10.4 per cent). Insurance and pension funds constituted a very small part of the Islamic funds, with the former being 1.7 per cent of the total and the latter negligible at 0.2 per cent.

Figure III.3.1:

Global Islamic funds: fund types, 2014



Source: Calculated from TR Global Islamic Asset Management Outlook 2015, available from https://www.scribd.com/document/273997472/Global-Islamic-Asset-Management-Outlook-2015.

Although no specific information is available on the scope of involvement of the funds in infrastructure-related sectors, the small size of Islamic funds would imply that investment in these sectors would be low. Other than the size of Islamic funds, the issue of quality is also important when it comes to sustainable investments that can contribute to achieving the SDGs. One of the criticisms of the Islamic funds industry is that it does not consider sustainable and impact investments. *Shariah*-compliant stocks are screened for legal compliance in terms of prohibited industries and fulfilling certain financial screening criteria. Since ESG issues are not included in screening to identify Islamic stocks, screening-related sustainability features are absent in Islamic investment universe (BinMahfouz and Ahmed, 2014). Given the small size of the non-bank financial institutions in general and Islamic funds in particular, along with the absence of ESG-related screening to identify stocks, the impact of these sectors on SDGs has been relatively small.

The non-profit sector can play an important role in contributing to infrastructure in many Muslim countries. As indicated in section II, *waqf* is a significant sector in many Muslim countries and can potentially be used to support some of the infrastructure projects. Newer types of *waqf* that use cash have been created in the form of endowments, which can be a source of funds for investment in sustainable infrastructures. Furthermore, some *waqf* can also provide social infrastructure, such as in the areas of health and education. Case 4 on Waqaf An-Nur, which provides health services to the poor in Malaysia, is an example of the contribution of *waqf* in enhancing social infrastructure and services.

Box III.3.1

Case 4: Waqaf An-Noor, Malaysia

Johor Corporation (JCorp) is the investment organization for the state of Johor, Malaysia. Since its establishment in 1968, JCorp has become one of the largest conglomerates in the country with businesses in oils, food, restaurants, hospitality, property, logistic services and health services. It also has different activities covering corporate social responsibility, including a corporate *waqf* that was initiated with an initial contribution of RM 200 million from JCorp. Waqaf Al-Nur Corporation Berhad (WANCorp) was registered in 2006 as a limited liability company with assets and stocks kept as endowment. WANCorp holds equity of several listed companies in the endowment and derives income from the dividends distributed annually. After keeping a part for reinvestment, the remaining income is used for different corporate social responsibility programmes.

An important initiative of WANCorp is the network of Waqaf An-Nur clinics and a hospital to serve the health-care needs of the poor. Joining hands with a sister organization of JCorp KPJ Healthcare Berhad, WANCorp has established 18 health clinics (Klinik Waqaf An-Nur or KWAN) across the country, four mobile clinics in Kuala Lumpur, Selangor and Johor and Hospital Waqaf An-Nur (HWAN) in Pasir Gudang, Johor. People from all walks of life can avail outpatient treatments from KWAN by paying a minimum fee of RM 5 only. A total of 1.398 million treatments were provided by clinics and hospital until December 2016. Subsidized treatment for kidney-related problems are provided through dialysis centres, among others, that operate alongside clinics.

Source: World Bank and IDB (2016); JCorp (2016).

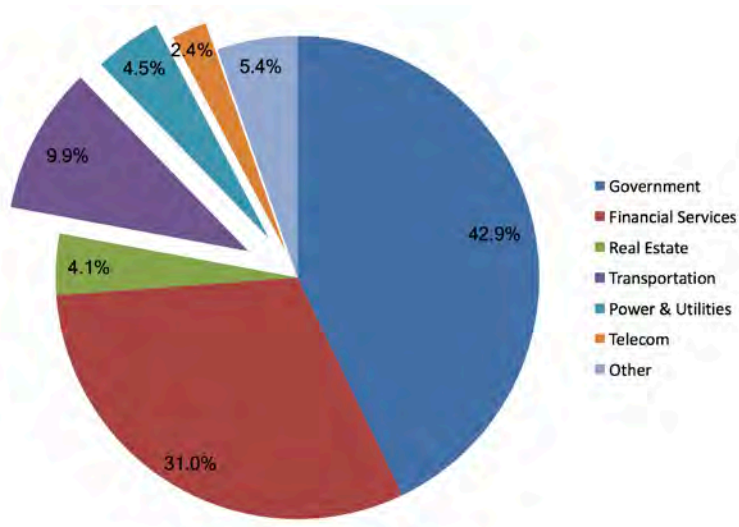
III.4 Islamic capital markets/*sukuk* and infrastructure financing

Although equity takes the form of initial capital for project companies, it is usually not tradable unless the project company is listed. *Sukuk* can be used to raise funds from different sources to finance infrastructure projects. Figure III.4.1 depicts the share of *sukuk* issuances during 2016 by different sectors. While Governments are still the largest issuers of *sukuk*, accounting for about 43 per cent of the issuances, the financial services sector comes in second with 31 per cent of the issuances. The issuances for the infrastructure sectors are relatively small, with the transport sector issuing 9.9 per cent of the securities, followed by power and utilities (4.5 per cent) and telecom (2.4 per cent).

Figure III.4.2 shows the distribution of the total *sukuk* issuance during 2001-2016 according to their maturities. Nearly 60 per cent of the *sukuk* issued were long term (i.e., had maturities of more than one year). The share of the short-term *sukuk*, however, indicates that there were significant issuances of *sukuk* for money market and liquidity management purposes. This also may be an indication of the preferences of both the issuers and investors towards short-term investments.

Figure III.4.1

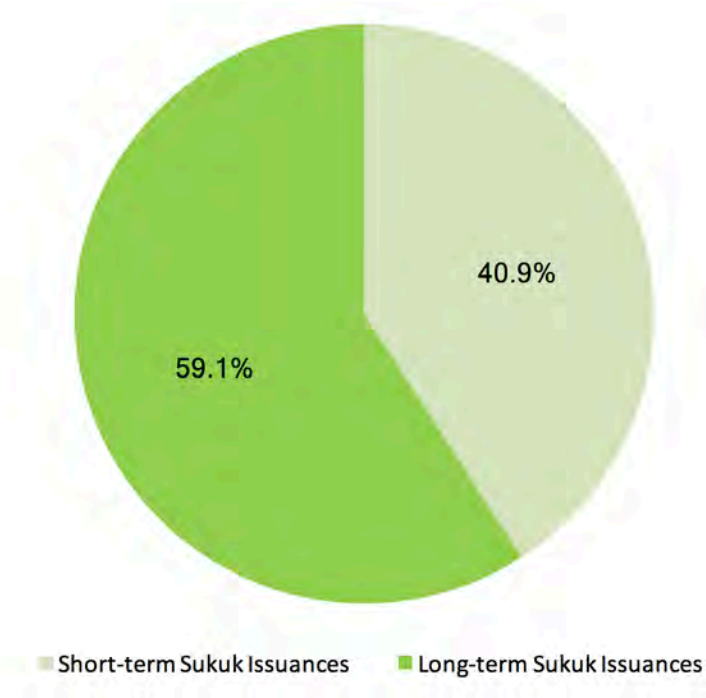
Sukuk issuances by sector, 2016



Source: IFSB (2017).

Figure III.4.2

Short- and long-term sukuk issuances, 2001-2016



Source: IIFM (2017).

The percentages shown in figure III.4.1 indicate that *sukuk* have not been used to their fullest potential for investment in infrastructure. Moving forward, however, *sukuk* can be used by the private sector to tap funds for financing infrastructure. Some case studies below show successful examples of *sukuk* issuances that were used to finance infrastructure projects. While cases 5, 6 and 7 are examples of *sukuk* used to raise funds for investments in physical infrastructure projects, case 8 is an example of a social impact *sukuk*.

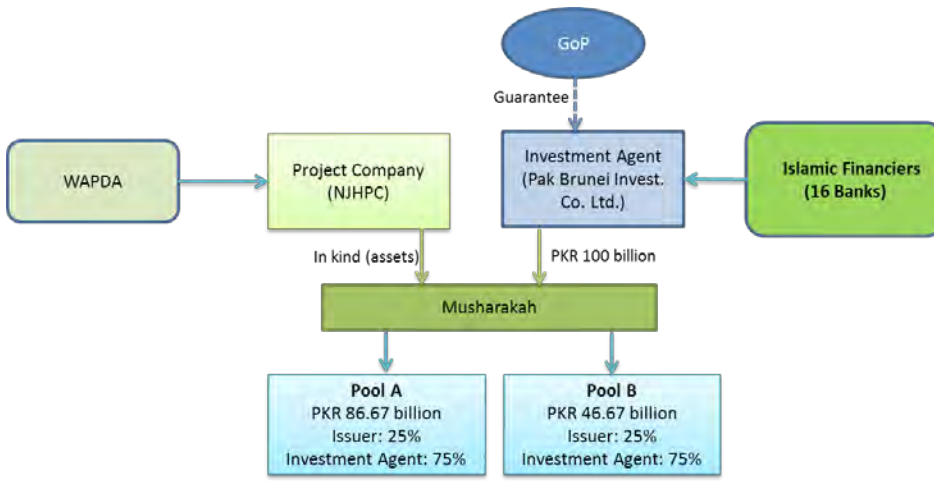
Box III.4.1

Case 5: Neelum Jhelum Sukuk, Pakistan

Water and Power Development Authority (WAPDA) is a government-owned public utility responsible for power and water in Pakistan. The authority planned the construction of the 969 megawatt Neelum Jhelum Hydropower dam and decided to issue *sukuk* to partially finance the project. To this effect, it established the Neelum Jhelum Hydropower Company (Private) Limited (NJHPC) that issued *sukuk* certificates worth PKR 100 billion to fund the project, making it the biggest funds mobilization for a public sector entity. Pak Brunei Investment Company Limited acted as the investment agent for the investors, a consortium of 16 banks led by the National Bank of Pakistan. The *sukuk* had a maturity of eight years with a two-year grace period, and received a AAA rating by JCR-VIS, a local credit rating agency.

Figure III.4.1A

Neelum Jhelum *sukuk* structure



NJHPC and an investment agent formed a *musharakah* wherein a 75 per cent share of the musharakah assets were sold to the investors and the issuer contributed the remaining 25 per cent in kind. The asset share of the investors was structured as beneficial interest of the project and distributed into two pools (A and B) of *musharakah* assets worth PKR 100 billion. The project's assets were held in a trust and the investment agent acted as a trustee to ensure that they were held for the benefit of the investors. An *ijarah* contract leased the investors' share of the assets to NJHPC and the Payments Agreement details the semi-annual variable rental flows from the latter to the former. Structured as a diminishing *musharakah*, the *sukuk* have an amortizing structure with the principal redemption starting from the third year. The investment agent was responsible for taking out *takaful* to cover the ownership-related risks.

Source: World Bank and others (2017); IIFM (2017).

Box III.4.2

Case 6: DanaInfra Retail Sukuk

DanaInfra Nasional Berhad (DanaInfra), a company owned by the Ministry of Finance of Malaysia was established in 2011 to undertake funding of infrastructure projects assigned by the Government of Malaysia. The first infrastructure project initiated by DanaInfra was the Klang Valley Mass Rapid Transit (KVMRT) Project. The population in the Klang Valley was projected to grow from 6 million to 10 million by 2020. Avoiding gridlocks on roads, the rail-based public transport provides a sustainable transportation system moving large numbers of people quickly and efficiently. With the increase in productivity from better mobility in total, an average of RM 24 billion in gross national income per year will be generated over the next ten years.

Figure III.4.2A

DanaInfra retail *sukuk* structure

DanaInfra has raised a total of RM 2.5 billion ($789.14 million) by selling different tranches of *sukuk*. One series of *sukuk* used included retail *sukuk* targeted towards retail investors. The series comprised three *sukuk* of RM 300 million (10 year issued February 2013), RM 100 million (15 year issued October 2013) and RM 100 million (7 year issued July 2014) paying profit rates of 4.0 per cent, 4.58 per cent and 4.23 per cent, respectively. The *sukuk* was structured using a commodity *murabahah* (*tawarruq*) contract and coupon payments are made semi-annually. Priced at MYR 100 per unit and requiring a minimum subscription of MYR 1000. Investors can buy the *sukuk* by using, among other modes, internet banking or automated teller machines (ATMs) of participating banks and financial institutions (Star, 2014; DNB, 2014). DanaInfra Retail Sukuk is listed and traded on Bursa Malaysia.

Source: DINB (2014a and 2014b); Haneef (2016).

Box III.4.3

Case 7: East Klang Valley Expressway Sukuk, Malaysia

East Klang Valley Expressway (EKVE) is planned to be a 36.16 kilometre expressway with a dual two-lane tolled highway between Bandar Sungai Long and Ukay Perdana. The expressway forms the eastern segment of the Kuala Lumpur outer ring road connecting the southern and eastern part of the Klang Valley. Ahmad Zaki Resources Bhd (AZRB) won a contract to construct the expressway from the Government in 2008 and signed a 50-year concession agreement using the build-operate-transfer concept with the Government to design, construct, operate and maintain the expressway in 2013.

With an estimated cost of RM 1.55 billion to finance the project, AZRB issued a RM 1 billion *tawarruq*-based *sukuk* with a tenor of 22 years to partly finance the expressway's construction. A special purpose vehicle called EKVE Sendirian Berhad (EKVESB) was established to become the agent of the *sukuk* holders to manage their interests. EKVESB carried out the *tawarruq* transactions with a commodity-trading participant to purchase and sell commodities, resulting in RM 1 billion in cash for EKVESB and creating an obligation of paying a deferred sale price to the sukuk holders in periodic instalments over the tenor of the contract.

Figure III.4.3A

East Klang Valley Expressway *sukuk* structure

The *sukuk* are guaranteed by Bank Pembangunan Malaysia Bhd and Maybank Islamic Bhd. and got a rating of AAA (bg)/Stable from RAM Ratings. The rating is better than the company's stand-alone rating and reflects the AAA-ratings of the guarantors Maybank Islamic Berhad and Bank Pembangunan Malaysia Berhad.

References: World Bank and others (2017); RAM (2017).

Box III.4.4

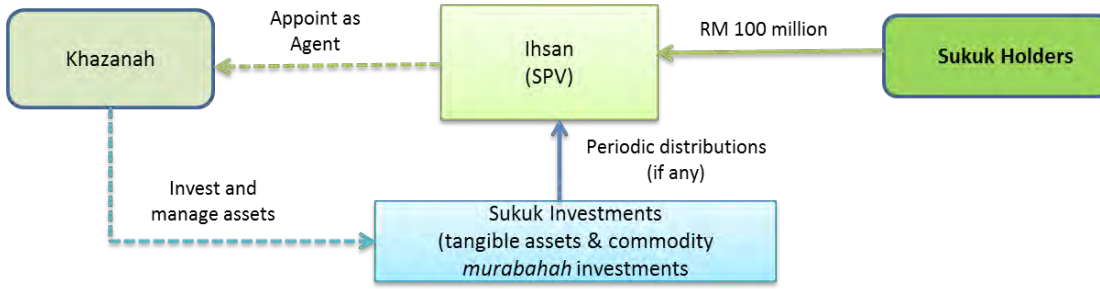
Case 8: Khazanah sustainable and responsible investment *sukuk*

Khazanah Nasional Berhad (Khazanah) issued a RM 100 million sustainable and responsible investment *sukuk* in 2015 to fund schools through the non-profit foundation Yayasan AMIR (YA) Trust School Programme. YA was founded by Khazanah to improve the accessibility of quality education in Malaysian government schools through a public-private partnership arrangement with the Ministry of Education. The first of its kind, the seven-year tenor *sukuk* was issued via an independent special purpose vehicle Ihsan Sukuk Berhad (Ihsan) which plans to raise a total of RM 1 billion through its *sukuk* programme. The sustainable responsible investment (SRI) *sukuk* was fully subscribed, with participation from foundations, corporations, banks, pension funds and management companies. CIMB Investment Bank Berhad was the lead manager and the *sukuk* was structured using the principle of *wakalah bil Istithmar*.

The *sukuk* was priced with a price guidance of 4.30 per cent per annum. Key performance indicators (KPIs) that would be assessed over a five-year timeframe were identified to measure social impact. If the KPIs were to be fully met at maturity, the investors would forgo or contribute up to 6.22 per cent of the nominal value due under the *sukuk*. This would reduce the effective yield to 3.5 per cent and be considered as payment for success, recognizing the positive social impact produced by YA, and reflecting the social responsibility of the *sukuk* holders. If KPIs are not met or met only partially, investors receive up to the nominal value of the *sukuk* as agreed upon at issuance. The *sukuk* also had the option of converting the investment into a donation at any point during the tenure of the instrument. By the end of 2016, the Trust Schools Programme was implemented at 83 schools in 10 states, providing better outcomes for over 65,000 Malaysian students.

Figure III.4.4A

Khazanah



In 2017, Khazanah issued the second tranche of RM 100 *sukuk* that also has a retail component allowing individuals to participate in the scheme. The *sukuk* have features of the step-down of returns upon achieving KPIs and the option to donate the principal to the Trust School Programme.

Source: Khazanah press releases, 2015 and 2017.

IV. Conclusion and recommendations

Development of sustainable physical and social infrastructure will be key to achieving the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs). This paper highlighted the huge infrastructure investment needs and the gaps in fulfilling them. While Governments have traditionally been responsible for developing infrastructure, most of them are burdened with large deficits and debt limiting their ability to generate further resources. There is, therefore, a need to come up with innovative ways in which new players and financiers can fill the gaps and contribute to the development of sustainable infrastructure. The private and non-profit sectors can contribute to the development of different types of sustainable infrastructure. In particular, the financial sector can play an important facilitating role in mobilizing funds for infrastructure projects.

This paper examined the role that Islamic finance can play in promoting infrastructure financing. The current status of the SDGs in many OIC member countries is poor and the infrastructure investment gaps are huge. Achieving the SDGs would therefore require mobilizing a vast amount of resources to fill the gaps. In this regard, Islamic finance can play a facilitative role. Not only is Islamic finance more acceptable and conducive to the cultural and religious norms of populations in Organisation of Islamic Cooperation (OIC) member countries, the principles and values of Islamic finance, such as emphasis on risk sharing, links to real economy and social orientations, conform with investments in infrastructure projects.

The paper shows that while the industry as a whole has made relatively small contributions to the infrastructure sector, there is growing use of Islamic finance in countries where the industry is more developed. Other than the small size, other factors that inhibit the financial sector's role in infrastructure financing also apply to Islamic

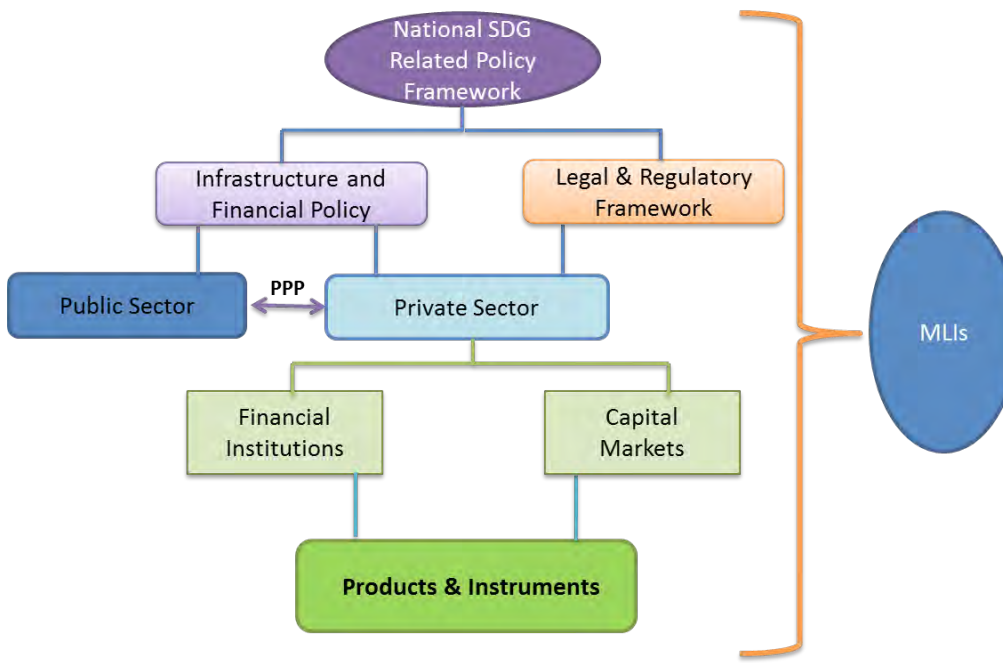
finance. Figure IV.1 presents a framework for policy recommendations at different levels that will be needed to increase sustainable infrastructure financing by the domestic private sector to promote the SDGs.

Given the ambitious and comprehensive nature of the 2030 Agenda for Sustainable Development, a national strategy to achieve the SDGs is necessary. This national strategy must drive infrastructure development plans as well as set up policies to create an enabling legal and regulatory framework. The former will identify, inter alia, the role of the private sector in contributing to the infrastructure development projects and the latter will create the environment under which the private sector can operate and finance these projects. A key aspect of the private sector's contribution to infrastructure development will be to have a financial policy that identifies the role of the financial sector, which has two broad segments: financial institutions and capital markets. The financial sector segments have to use appropriate products and instruments for financing infrastructure projects.

At the international level, multilateral institutions (MLIs) such as the United Nations, the World Bank Group and the Islamic Development Bank also have important roles to play in strengthening the national-level framework and capacities of infrastructure finance. Some specific issues that arise at different levels and are relevant to enhancing the role of Islamic finance in contributing to financing infrastructure investments are discussed below.

Figure IV.1

Policy recommendations framework related to sustainable infrastructure financing



IV.1 National SDG strategy and infrastructure-related policies

Given the importance and urgency of the SDGs in many developing countries, the economic and financial policies have to be more aligned with the SDGs at the national level. To ensure achievement of the 2030 Agenda for Sustainable Development and the SDGs there is a need to have a national-level strategy that will include an infrastructure plan and an accompanying financial policy. As indicated in section I, a limiting factor that inhibits infrastructure investments in many countries is the lack of a list of bankable projects. Governments need to identify the infrastructure needs, develop long-term plans and communicate these in a transparent way. The infrastructure plan would entail a sectoral-level plan that identifies projects needed for different sectors such as energy, transport, water and communication. For each of these sectors, a pipeline of projects has to be developed. A clear infrastructure plan should not only have a list of infrastructure projects in the pipeline, but also

a clear financial plan and policy on ways these projects will be financed from various sources.

IV.2 Financial policy

Other than providing the pipeline of the projects, the infrastructure financing plans must be transparent with well-defined roles of international, domestic, public and private sectors. The financial policy would consider projects according to their economic, social and environmental features. While infrastructure projects that are more bankable from an economic perspective will be suitable for the private sector, projects with more social returns will be better addressed by the public sector. In the context of financial planning, the role of Islamic finance can be factored in. Although both the public and private sectors can tap into Islamic capital markets, the role of Islamic financial institutions would be more appropriate in infrastructure financing taken up by the private sector or undertaken under public-private partnership (PPP) arrangements.

Financial policy should incorporate sustainability and environment, social and governance (ESG) issues in order to align the financial systems with sustainability goals. Other than focusing on the quantitative issues of raising funds, new policy frameworks would also include social and environmental factors. This would involve, inter alia, focusing on policies that encourage long-term investments in environmentally friendly green infrastructure projects.

For the financial sector to contribute to sustainable development, the industry itself has to be resilient and be able to reduce its own risks. Recognizing the vulnerabilities of the financial sector and its detrimental impact on output and welfare as highlighted by the global financial crisis, the Addis Ababa Action Agenda suggests taking steps to enhance its resilience and strengthen financial and economic stability (United Nations, 2015b). The Shariah principles of risk sharing and linking finance to the real economy can, in this regard, contribute to a resilient and stable financial system. The evidence shows that Islamic banking withstood the shocks of the global financial crisis much better than its conventional counterpart.[10] Thus, the goal of including the Islamic finance industry in financial policy would be diversification of the overall financial sector in order not only to have alternative sources of financing, but also to increase resilience against negative shocks.

IV.3 Legal and regulatory framework

Infrastructure investments are long term and complex, involving many parties and having a cobweb of contracts creating different types of risks. The private sector will get involved in infrastructure development if laws can protect the interests of the stakeholders and mitigate the legal and political risks. Given the long-term nature of most infrastructure projects, they also need to be confident of the constancy of the rules and laws governing the project. Thus, a stable and predictable legal and regulatory system that can enforce the various contracts will be a necessary condition to give investors confidence that their rights are protected over the longer term and to create the right incentives for investing in infrastructure projects.

In the absence of laws that recognize and can enforce Islamic finance contracts, Islamic financing of infrastructure will not be forthcoming. Most countries in which Islamic finance operates have either common law or civil law legal systems. If supportive laws for Islamic finance are not introduced, problems can arise in settling disputes involving Islamic contracts, thereby creating uncertainty about Islamic financial transactions. Thus, there is a need to have a supporting legal regime that can cater to the needs of Islamic finance in general and infrastructure financing in particular, and that reduces uncertainty and instils confidence among investors.

Growth of capital markets would require securities laws and regulations that ensure fair, efficient and transparent markets, protect investors and reduce systemic risks.[11] To have a robust *sukuk* market, detailed codified securities, disclosure and bankruptcy laws from an Islamic framework are also required. These laws should in-

10 Hasan and Dridi (2010) show that during the years immediately after the crisis, Islamic banks were more resilient and their credit and asset growth were relatively higher compared to conventional banks. As a result, Islamic banks were assessed more favourably by ratings agencies in the post-crisis era. Beck, Demirguc-Kunt and Merrouche (2010) studied the status of Islamic and conventional banks for the period prior to the crisis (1995-2007) and found that Islamic banks had higher capitalization and liquidity reserves relative to conventional banks, indicating more stability.

11 These are broad objectives of the International Organization of Securities Commissions (IOSCO). See IOSCO (2003).

clude specific rules and requirements regarding *sukuk* holders' rights, reorganization and liquidation rights (of creditors), transparency and disclosure, and comprehensive accounting standards.

Other than finance laws, other laws also affect financial transactions and products. Tax laws play an important role in determining the product types affected. There are tax implications for most Islamic financial contracts since they are either asset or equity based. For example, a *murabahah* contract that involves buying and selling of an asset would lead to double taxation, making Islamic financial products more expensive unless the tax laws are changed. The current tax regimes also seem to favour debt over equity, which inhibits the use of the latter. For sustainable infrastructure projects, there may also be issues about providing tax relief or subsidies. Since Islamic finance has a preference for asset-based and equity financing, levelling the tax regimes for debt and equity will encourage the use of these modes.

A key law relevant to infrastructure financing is the concession law that defines the rights and obligations of different parties at various stages of the transaction of a project, particularly under PPP arrangements.[12] Private sector participation in these projects would require supporting laws and regulations that protect property rights during the concession period. While EBRD (2006) identifies a list of core principles for a modern concession law, these may have to be adapted for Islamic finance since some *Shariah* issues can arise with concession arrangements. For example, there are issues related to ownership of assets during the concession period and security sharing in syndicated financing. Islamic finance emphasizes ownership of assets to derive returns; however, in many countries, public assets cannot be transferred to private parties (World Bank and others, 2017).

While the Basel III standards were introduced to reduce systemic risks that have detrimental effects on economies, they can also create disincentives to invest in longer-term projects as these can invite higher capital charges. There must be ways in which regulations and policies can be balanced to ensure both financial stability and infrastructure investment (United Nations, 2013, p. 2).

There is also a need for new laws and regulations that support sustainable investment. Examples include regulatory guidelines on upfront tariff for alternative energy sources in Pakistan, which defines the rules and tariff rates paid for generating electricity from solar and wind power. The case study on Master Wind Energy Limited shows that one of the determining factors that led to undertaking the project was the certainty of tariffs and expected revenues that would be generated. Similarly, the introduction of the Sustainable and Responsible Investment *Sukuk* framework by Securities Commission of Malaysia in 2014 facilitated the launching of the Khazanah Sustainable and Responsible Investment *Sukuk* in 2015 and a green *sukuk* in 2017.

IV.4 Public-private partnerships (PPPs)

While Governments are responsible for ensuring adequate, sustainable infrastructure in an economy, there is an increased recognition of the role of the private sector in infrastructure development and use of PPP to achieve some of the goals. The United Nations (2013, p. 2) asserts that the public sector can take various steps to incentivize the participation of the private sector in infrastructure investment. The policies include creating an enabling legal, regulatory and policy framework to reduce risks and barriers to investment at the macro level and aligning private sector incentives with public sector goals and sharing risks between the public and private sector by using new financing models at the project level. Furthermore, a sound PPP framework would include elements related to (i) project selection and implementation, (ii) contracts that ensure appropriate pricing and transfer of risks, (iii) fiscal accounting and reporting standards, and (iv) legal, regulatory and monitoring framework (Jomo and others, 2016).

The World Bank and others (2017) identifies specific recommendations to increase the participation of Islamic finance in PPP projects. Other than raising awareness, they suggest developing new products and expanding the existing ones, and standardizing the documentation and approaches. There is also a need to address the Shariah issues that arise in PPP structures. As concessions involve transfer of assets for a limited period of time, issues related to transfer of ownership and/or lease of the asset and the responsibilities of the parties involved need to be addressed from a *Shariah* perspective. While the Islamic financial sector has been dealing with some of these issues on a case-by-case basis, a sound framework would be necessary for their wide use.

12 See EBRD (2006) for a list of core principles for a modern concession law.

IV.5 Capital markets

Capital markets play an important role in mobilizing funds from both institutional and retail investors. While *sukuk* have been used to raise funds for some projects, Islamic capital markets are still underdeveloped in many countries and their share is still small. The International Organization of Securities Commissions (IOSCO) identifies the key factors necessary for the development of Islamic capital markets as an appropriate regulatory framework, *Shariah* compliance and convergence, a range of products, lower transaction costs, development of market professionals, investor education, and knowledge-sharing (IOSCO, 2004).

A prerequisite for an efficient *sukuk* market includes the existence of standardized securities that are well understood by the relevant stakeholders, including investors.[13] The range of products in a *sukuk* market varies across regions, incorporating both debt-like and equity-type securities. Part of the problem relates to the Shariah governance framework that can create differences in Shariah rulings (*fatwas*) by *Shariah* supervisory boards (SSBs). While there is uniformity of rulings in countries that have SSBs at the national level, in other countries, a diversity of rulings exist within one jurisdiction (Grais and Pelligreni, 2006). Such diversity of *fatwas* can introduce reputational and legal risks and hamper the development of the *sukuk* market. Thus, there may be a need to have a national Shariah authority that harmonizes the Shariah rulings and oversees their implementation, and to standardize some of the *sukuk* structures at the regulatory level to minimize uncertainty and legal risks.

Developing the *sukuk* market will not only help raise funds for infrastructure projects, but also help support the growth of a liquid secondary market that would increase the asset choices for institutional investors. While the infrastructure sector has the potential to take the *sukuk* market beyond a threshold level that makes it viable, there are other requisites that need to be in place for the market to function. Other than providers and users of funds, there is a need for liquidity providers, as they act as agents who facilitate transactions in secondary markets.[14] Liquidity providers, such as brokers and dealers, buy and sell securities and help trading in the markets. There is need for a threshold level of *sukuk* to provide for a flourishing secondary market. Governments can facilitate the process by both providing the necessary legal and regulatory frameworks and market infrastructure, and taking the initial lead to issue sovereign *sukuk* for different infrastructure projects.

IV.6 Financial institutions

While a significant part of conventional infrastructure financing comes from non-bank institutional investors, data on Islamic finance industry show these institutions to be very small in size and making little contribution to the infrastructure sector. While the assets of banks constitute 33.5 per cent of total global financial assets, with the remaining 66.5 per cent of the assets managed by non-bank institutional investors (figure 1.3), assets of Islamic banks comprise close to 73 per cent of the total Islamic finance assets (figure II.5.1). There is, therefore, a need for greater diversity not only between financial institutions and capital markets, but also within financial institutions. Specifically, there is a need to increase the share of *takaful* companies, Islamic pension funds and Islamic infrastructure funds that can lead to increasing investment in the infrastructure sector.

One reason for having a dominant banking sector is the relatively emerging nature of the industry. In countries where Islamic finance has been operating for longer periods, the development of capital market and non-bank financial institutions segments appear to be larger. Malaysia is a good example, where the Islamic finance industry is distributed in a more balanced way into segments of Islamic banking (38.6 per cent), non-bank financial institutions (11.3 per cent) and capital markets (50.1 per cent). However, a balanced growth in Islamic finance would require a supportive legal and regulatory environment in which Islamic non-bank financial institutions can be established and flourish.

The social sector is significant in many countries and can grow further if attention is given to the governance and operational issues. Promoting the institution of *waqf* also has the potential to contribute to the develop-

13 Merton and Bodie (1995) assert that as the products offered by financial intermediaries increase in scale by serving a larger customer base, they can be standardized and sold in financial markets. More recently, one of the recommendations by the Basel Committee of Banking Supervision (BCBS) after the global financial crisis is the standardization of documents used for securitization in financial markets. See BCBS (2011).

14 Chami, Fullenkamp, and Sharma (2009) assert the important role of liquidity providers in efficient functioning of financial markets. In the absence of these agents, markets tend to become "buy and hold" and inactive.

ment of social infrastructure. The growth of Islamic non-bank financial institutions is also contingent on a robust Islamic capital market that creates Shariah-compliant investment opportunities for the former. In this regard, infrastructure projects not only provide new investment opportunities, but also create synergies for Islamic non-bank financial institutions and capital markets to grow together.

IV.7 Products

Infrastructure can be considered as a separate investment class with different risks and returns features compared to equities and debt. The average rates of return expected by companies involved in infrastructure is between 5-10 per cent for new projects, 5-6 per cent for utilities and power, 7-8 per cent for energy and 9-10 per cent for engineering and construction companies (Bielenberg and others, 2016, p. 28). Although infrastructure is an attractive investment class giving relatively good returns, a lack of products prevents investors from participating in this sector.

As it involves real assets serving social purposes, infrastructure financing fits well with Islamic finance ethos and principles. However, for the Islamic finance industry to invest in infrastructure would require coming up with products that satisfy the risk-return preferences of investors. While the recent growth in ESG investments in the conventional finance sector is now also witnessed in Islamic finance, there is a need to come up with new innovative products that can finance sustainable infrastructure projects. Examples of the green syndicate financing by Islamic banks in Pakistan and impact *sukuk* in Malaysia show that there is a need for supporting legal and regulatory frameworks to create incentives for launching sustainable products.

Islamic banks can increase their share in infrastructure investment further if the nature of the investment accounts can reflect the feature of risk sharing. In this regard, the Islamic Financial Services Act 2013 has taken the lead by distinguishing between deposits and investment accounts. Whereas the stringent capital adequacy regulatory requirements apply to assets financed by the former, the latter is not bound by them as investors bear the risk. One of the ways in which the pool of investment accounts can be used is to invest in infrastructure projects that will not only provide stable and relatively higher returns but also fulfil the social obligations of Islamic banks.

A small and illiquid Islamic capital market hampers the use of *sukuk* to raise funds for infrastructure projects. Islamic debt-based instruments have inherent problems of tradability and liquidity. As debt-based securities form the dominant part of infrastructure finance that cannot be traded, there is a need to create products that can enhance tradability. One way to resolve the issue is to have composite securities in which the debt-based component is minority. Another way to increase the marketability of the debt-based Islamic securities is to have the embedded option of a debt-equity swap (Khan, 2002).

Given the complexity of infrastructure financing and the relatively nascent nature of Islamic finance, structuring appropriate products can be challenging. The problem becomes acute since there is a lack of professionals in the investment banking sector who understand both Islamic law and complex financial transactions (Sole, 2008). Other than national level initiatives that can enhance the capabilities of professionals, the multilateral institutions (MLIs) can also provide technical assistance in transferring expertise and experience beyond national borders.

IV.8 Multilateral institutions (MLIs)

Since the 2030 Agenda for Sustainable Development was initiated at the global level by MLIs, they have a keen interest in ensuring its success. MLIs, such as the United Nations, the Organization for Economic Cooperation and Development (OECD), the World Bank Group, the Islamic Development Bank, etc., can play a facilitative role in contributing to increasing investment in sustainable infrastructure. One obvious way in which multilateral development banks (MDBs) contribute to infrastructure development is through direct investment in projects. The bulk of the portfolio of the MDBs consists of investments in infrastructure and social sectors. Some MDBs also have established infrastructure funds that pool resources from different sources for investment in infrastructure projects. The Islamic Development Bank has been instrumental in establishing Islamic infrastructure funds, including the Islamic Asia Infrastructure Fund with the Asian Development Bank. There are other ways in which the MLIs can help increase the capacities of domestic markets to enhance financing in sustainable

infrastructure projects.

In line with the Addis Ababa Action Agenda (United Nations, 2015b) that calls for standard-setting bodies to make adjustments for long-term investments, other international bodies such as OECD and the World Bank Group also recommend a standardized approach to sustainability in order to streamline and improve the qualities of infrastructure projects (UNEP, 2016, p. 25). Currently, numerous sustainability standards exist which can create confusion with regard to what is expected in infrastructure projects.[15] Thus, a standardized global definition of sustainability and its implications for infrastructure projects is essential. The standard can be used by different stakeholders to assess the sustainability features that include the ESG factors of different infrastructure projects across the globe.

A key aspect of the standards would be to include the ESG-related issues on evaluating infrastructure projects. Several global-level initiatives provide frameworks and approaches for setting up institutions and organizations that can promote sustainable development in general and infrastructure investments in particular. These initiatives include Inquiry into the Design of a Sustainable Financial System (United Nations Environment Programme (UNEP)), the Principles for Sustainable Insurance (UNEP Finance Initiative), the Equator Principles, the Green Bond Principles, the Principles for Responsible Investment and the Sustainable Stock Exchange Initiative (United Nations and KPMG International, 2015). While the World Bank Group and the International Finance Corporation do have screening criteria that includes ESG factors, there is a need for the Islamic Development Bank to also develop and use similar screening standards that comply with Islamic values and principles.

Given the complexity of infrastructure projects, there are estimates that the costs of structuring the projects by using lawyers, engineers, advisers, etc., can be from 1-5 per cent of the project costs. Some of the development and transaction costs and legal risks can be lowered by having consistent processes and standardized financing structures and contracts. The problem is more acute in Islamic infrastructure finance due to its nascent and emerging nature. In this regard, the Islamic Development Bank and IIFM can leverage on its experiences and develop standardized Shariah compliant structures that can be used for different projects.

An area in which MLIs and MDBs can help promote infrastructure development is to assist in creating the human capital and build capacity for Islamic infrastructure financing. Since the infrastructure projects are dispersed in different countries, the MLIs and MDBs are well placed to bring the different stakeholders together to share their experiences and expertise. Drawing on their experiences in project financing, MDBs can help promote domestic private investment in infrastructure by identifying investible projects and providing advice on structuring and underwriting the projects in terms of technical assistance. For example, the International Finance Corporation's role in providing support for private sector involvement in infrastructure includes advising on regulatory reform; concession and structuring related to PPPs; project preparation; investment and monitoring (International Finance Corporation, 2012b). Given that Islamic finance is a relatively new industry and Islamic infrastructure financing is scant, all the resources should be used to enhance the knowledge and skills in Islamic infrastructure financing mechanisms. MLIs related to the Islamic finance industry—such as the Islamic Development Bank and other organizations, including the Islamic Financial Services Board and International Islamic Financial Market—can help the financial industry in similar initiatives.

Given the important role that Islamic finance can play as an alternative source of financing and also its potential to diversify the financial sector to enhance stability and resilience, stakeholders need to highlight the industry's contribution to achieving the SDGs at various international forums. Under the presidency of Turkey of the G20 group and the co-chairmanship of Indonesia of the infrastructure working group in 2015, discussions on Islamic finance in general and *sukuk* as an infrastructure financing tool were incorporated in the documents and deliberations of the group's meetings (Vizcaino, 2015). In this regard, countries with a large and growing Islamic finance industry (such as Indonesia, Iran (Islamic Republic of), Malaysia, Pakistan, Saudi Arabia, Sudan and Turkey, among others) can continue to promote and champion the incorporation of discussions on the role of Islamic finance's contribution to the SDGs in different international forums, including the annual ECOSOC Forum on Financing for Development follow-up.

15 UNEP (2016, p. 25) indicates the number of such standards to be about 500.

IV.9 Conceptual outlook and mindset

One key issue arising in moving from the Millennium Development Goals (MDGs) to the SDGs is the emphasis on sustainability—an emphasis that requires a fundamental change in orientation and mind-set. The 2030 Agenda for Sustainable Development necessitates incorporating the ESG-related issues in assessing the projects for investment. There are four areas in which there is need for reorientation, both in terms of conceptual outlook and practice.

First, the decision-making process in the context of infrastructure investment needs to move from a purely economic perspective to a sustainable perspective. Sustainable finance requires additional qualities in decision-making that include being participatory, ethical and resilient, and having consciousness of social and environmental impact (PRI, 2016, p. 12).

Second, the necessary system-wide shift from short- to long-term financing will require a corresponding shift in mind-set. For this to happen, however, there must be an enabling legal and regulatory framework that can mitigate risks, create incentives and support long-term investment.

Third, the misconception that Islamic finance is for Muslims only persists. Islamic finance should be considered as an alternative ethical source of finance that can be used by all, irrespective of their religious orientations. Not only have many non-Muslim countries—such as Hong Kong SAR, Luxembourg, South Africa and the United Kingdom of Great Britain and Northern Ireland—raised funds by issuing *sukuk*, the demand for these Islamic instruments has been very high, with a significant percentage of investors being non-Islamic entities.

Finally, the practice of Islamic finance has been focussed on legal compliance with Shariah, paying little attention to the broader goals (*maqasid*) of Shariah. To contribute meaningfully to the SDGs, a change in outlook is required to ensure that Islamic finance practice reflects the spirit and substance of Shariah, which calls for promoting welfare (*maslaha*) and preventing harm (*mafsada*). Moving forward, this would require more proactively incorporating the social and ethical dimensions and participatory modes in their operations and financing decisions.

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SOVEREIGN WEALTH FUNDS INVESTMENT IN SUSTAINABLE DEVELOPMENT SECTORS

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Executive summary

In order for the Sustainable Development Goals (SDGs) to be achieved, a large amount of long-term investment capital must be deployed into sectors that can help catalyse improvements in areas where need has been identified. The SDGs in many ways reflect the lack of long-term investment that has occurred in recent times. Theoretically, there is a significant amount of long-term capital available to address some of the most pressing challenges we are facing in society today. Globally, sovereign wealth funds (SWFs) are a major source of capital that have the potential to invest for the long term in sectors that desperately need it.

There are, however, a number of issues inhibiting the flow of capital into sustainable development sectors. These are issues specifically related to how the funds themselves are set up and the processes involved in making investments. There are also issues on the governmental and public policy side regarding ensuring that long-term SWF capital can flow into the long-term projects that need investment.

On the investor side, the term "sovereign fund" can mean a number of different things relating to how the fund is set up and what the objectives of the fund are. A sovereign fund's type will impact its risk appetite and, therefore, the types of investments made. Sovereign funds can usually be grouped into the following: stabilization funds, savings funds, reserve investment funds, development funds and pension reserve funds. While SWFs as a group have been classed as large, long-term investors, the specific function of each may not enable them to invest as freely in long-term investments as one might hope; nor may they be incorporating environmental, social and governance (ESG) factors into their investment process. Generally speaking, stabilization funds have a more conservative risk appetite and therefore are usually restricted to lower-risk, passive investments. Such an approach is driven by the liability structure of these funds, where drawdowns may be required at short notice on the request of the Government. Investments in illiquid, long-term assets will therefore not be desirable. Pension reserve funds, savings funds or reserve investment funds, however, based on their funding ratios, may have longer-term liabilities and more flexibility to invest in illiquid, higher-risk and longer-term assets. Sovereign development funds have been used as a tool for certain countries to support economic growth and development, which has led to a greater proportion of private market investment. Sovereign development funds are examples of funds with a more flexible mandate around investment, which can lead to both successful development and financial objectives being attained.

When matching SWFs to the SDGs with investment opportunities, one can see that across the asset-class spectrum (whether in the public or private sphere, debt or equity), a number of investments may contribute to achieving the SDGs. Within the public market space, where the more conservative sovereign funds may invest, there are assets that would have certain SDG exposure. Most investments in the public market space, however, would have secondary exposure to SDGs with very few "pure plays". Investors can act as activist shareholders in publically listed companies; however, this will usually be restricted to the more sophisticated investors with more robust governance structures in place. Furthermore, in regions where the SDGs are most relevant, the lack of depth in capital markets means that SWF investment opportunities are few. However, in the private market space—particularly in the infrastructure, housing, private equity and innovation sectors—there is arguably much more scope to have greater impact at scale for the SDGs. There is a large amount of evidence to show that private, alternative investments can lead to wider economic and social benefits to the region. As mentioned, however, the propensity of SWFs to invest into alternative asset classes will depend greatly on the

risk appetite of these investors. Despite the challenges, industry data would suggest that the allocation of institutional investors to alternative asset classes is increasing, as more investors search for returns in order to help solve their funding deficits. The method of accessing these private market investments will also dictate the effectiveness of sovereign funds are for investing in the SDGs. The closer that more direct investors are to the underlying assets, the greater their ability to access the specific investments of interest, without the distortion of "productization" through financial service providers. Regardless of asset class, translating the SDGs into sustainable and measurable metrics for sovereign funds is required.

Governments have a significant role to play in matching sovereign capital to the SDGs. Certain sectors, such as infrastructure and housing, require Governments to procure assets in a way that allows investments to be made by these investors. As an example, infrastructure inherently has a number of wider economic and social benefits that accrue to society when investments are made. The opening up of these assets to private investors, however, has been a politically sensitive issue—one that, along with the technical knowledge required to package these investments to investors, is creating a barrier to investment. Policy and structural reforms within Governments are required to help ensure that the much-needed investment is made in those sectors that provide essential services to society. There are a number innovations occurring in which Governments have recognized the value of partnering directly with long-term institutional investors such as sovereign funds. These include setting up sovereign development funds with a specific mandate for investment in the infrastructure sector, such as the National Investment and Infrastructure Fund (NIIF) in India and the practice of Governments "offloading" assets to sophisticated institutional investors, as in Australia and Canada. There are lessons from these initiatives that can be applied to many other regions.

In summary, there is significant scope for sovereign wealth funds to invest in areas that contribute to the SDGs. Arguably, there has already been a large amount of investment made in SDG sectors, although this has primarily been done on a secondary or passive basis. A key recommendation for financing for development is to look at the development of sustainable and measurable SDG metrics that SWFs can incorporate into their investment process. This can then be applied to all investors, regardless of size, sophistication or risk appetite. Governments have a role to play in order to package and provide opportunities for investors in scalable, high-impact and attractive sectors. Policy recommendations should center around Governments rewarding investors who have shown a meaningful commitment to the SDGs, by partnering with them on major investments that can achieve significant scale and impact, such as large greenfield infrastructure projects in emerging economies.

I. Introduction

Sovereign wealth funds (SWFs) are expanding quickly in all parts of the world and are becoming a major force in global capital markets. The number of funds has grown fivefold since 2000 to approximately 80 and more are being created constantly. Furthermore, the volume of assets under management of SWFs has grown $400 billion to $500 billion per year since the global financial crisis, reaching a current total of over $6.5 trillion (Preqin, 2017; Kalb, 2015). Theoretically, there is significant scope for SWFs to invest in sustainable development sectors and support the sustainable development goals (SDGs).

What makes SWFs an attractive match for the financing of sustainable development, is their intrinsically long-term and large-scale nature. Because of their unique set up, SWFs tend to have longer-term or well-defined liabilities, which enable them to invest in more illiquid assets. Furthermore, certain SWFs, such as sovereign development funds, have a specific mandate to invest in sectors that support the social and economic development of local economies. While there may be instruments and opportunities to support the SDGs across the asset-class spectrum, this paper argues that the greatest impact in the sustainable development sectors will come from investments made in the private market space (i.e., areas such as infrastructure, real estate, agriculture, timber, venture capital and private equity). Furthermore, investments made in these sectors have proven to not only provide wider economic and social benefits, in line with many of the goals of the 2030 Agenda for Sustainable Development, but these investments also provide attractive risk-adjusted commercial returns to investors. There are, however, a number of structural issues that have stymied the flow of SWF capital into long-term sustainable development investments. This paper looks to address some of these structural issues and identify key areas for overcoming some of these challenges, both from the SWF investor perspective as well as the government procurement side.

Notwithstanding the inherent problem of a lack of long-term investment being made by SWFs, there are also a number of other ways that this group of capital can help contribute to the SDGs. Quite often, the stumbling block to long-term investment is a lack of governance, shorter-term liabilities (in the case of stabilization funds), and budget constraints for acquiring talent, all leading to a lower risk appetite. This has led to a reluctance to take on excessive liquidity risk and a stronger desire to invest in more liquid assets such as publically listed bonds and equities. Regardless of assets, there are measures that need to be incorporated across the portfolio of an SWF in order to help support the SDGs. This starts with measuring the SDG exposure in the various assets where SWFs are invested. Such an exercise requires appraising the positive, neutral or negative influences on the SDGs of various assets. A secondary step would be to come up with SDG metrics to measure the performance of an SWF portfolio across different asset classes. The methodologies for doing the above are not very well developed, but with current technological advancements in data science and machine learning, there is much scope for this to happen. These possibilities are explored in this paper.

The paper is structured as follows. Section II provides an overview of the different types of SWFs and how the categorization affects their ability to invest in the SDGs. Section III looks at the predominant models that have been employed by SWFs for meeting their investment objectives and looks at further challenges to sustainable development investing. It also looks at the specific nature of private, alternative asset investing, which is proposed as the most impactful type of long-term investment in sustainable development sectors. Section IV discusses investment styles and trends, and further analysis on what is meant by investment for the SDGs is provided in Section V, along with recommendations for how SWFs can help support the SDGs through investment across their entire portfolio. In Section VI specific case studies that highlight examples of how SWFs can support the SDGs are provided before the conclusions, implications and recommendations from the paper are summarized in the final section.

II. Sovereign wealth funds: history and categorization

While the first sovereign wealth funds (SWFs) date back to the nineteenth century, the modern wave of funds has steadily increased over the last 50 to 60 years thanks to a commodity boom in places such as the Middle East, Norway and many others. In the early years, a number of misconstrued ideas formed around the role of sovereign wealth funds, with critics heralding them as barbarians at the gate, looking to buy others' strategic assets. However, following the recent global financial crisis, SWFs suddenly came into great demand due to their provision of long-term capital for all sorts of industries and sectors in most countries. There has also been far more knowledge and understanding created between host and recipient nations of SWF capital, in large part due to the creation of the Generally Agreed Practices and Principles—Santiago Principles for SWF investment behavior.

The term "sovereign wealth fund" is generally known to refer to a pool of state-owned financial assets that are being managed (invested) for specific economic purposes. These economic purposes usually fall into a number of specific categories that impact and affect the investment behavior of organizations.

Types of sovereign funds

Stabilization funds are created with the objective of assisting in balancing short-term fiscal positions for a government. They are designed to insulate the budget and economy against volatility—generally commodity price fluctuations—and act as an additional policy tool for meeting government payments and foreign exchange commitments in countries with less developed capital markets and/or pegged currencies. For example, when commodity prices are low, reserves flow out and are used to stabilize the budget, protecting against shortfalls. When prices are high, surplus reserves flow into the fund. There are examples of stabilization funds in Botswana, Chile, Mexico, the Russian Federation and elsewhere.

Savings or reserve funds are set up with the objective of investing excess reserves for the benefit of future generations. The source of reserves has usually come from current, once in a generation, commodity windfalls. There are certain reserve investment funds that are used to supplement foreign exchange reserves and run by a country's central bank. The objective here is to invest excess reserves in somewhat riskier assets to help bolster returns.

Pension reserve or "buffer" funds are saving surpluses that will be used for a specific purpose in the future. The

funds come from commodity windfalls or out of the current tax base of a country with the aim of providing for contingent, unspecified pension liabilities on a government balance sheet from sources other than individual pension contributions. There is a difference between a pension reserve fund and a government pension fund in that the liabilities from reserve funds flow directly to the government and the government uses the fund to offset shortfalls in the pension system. For a government pension fund, the liability stream flows directly to the individuals contributing to the fund. There are examples of pension reserve funds in Australia and New Zealand. There may not be an explicit liability for these funds, but there will be a specific purpose for their development. In New Zealand's case, it is to smooth the future tax burden of providing retirement income because of the country's ageing demographic profile.

Development funds are set up with the primary objective of funding socioeconomic projects or investing in specific sectors within a country. The mission of development funds is usually to bolster domestic industries while also potentially crowding in foreign institutional investor capital. Development funds have also been termed "strategic investment funds". A more detailed case study on development funds is provided in section VI.

As mentioned, most SWFs formed in the second half of the twentieth century were commodity based. Today, the number of commodity-based SWFs is approximately 60 per cent while the remaining amount is made up of non-commodity, or trade-based funds. The older funds are generally larger, with the average asset size of the 21 SWFs that were formed before 2000 being $260 billion. The newer SWFs, formed since 2000, have an average asset size of $40 billion. There are currently approximately 80 SWFs in the world today with half of these started since 2005. The current value of total sovereign wealth fund assets is $6.6 trillion (Preqin, 2017; Kalb, 2015).

III. Sovereign wealth funds and long-term investment

As mentioned, the different ways sovereign wealth funds (SWFs) are created and their unique characteristics influence the way their assets are invested. This is particularly relevant when it comes to the question of long-term investment in sustainable development sectors. It is argued that the most impactful investments that will support the SDGs are long-term investments made in the alternative private market asset classes such as infrastructure, housing, clean energy, agriculture, timber, venture capital and private equity. There are, however, a number of structural constraints unique to the organizations described above that may inhibit the flow of capital into these high-impact sectors.

The first key constraint that might affect the investment time horizon of an SWF is its *liability profile*. SWFs that need to make payouts in the near term may not be able to invest in illiquid investments that have long lock-up periods. They may not be able to take on short-term volatility, which prohibits them from holding assets over the long term in the face of volatility. Generally speaking, SWFs have lower short-term liabilities compared to other institutional investors such as pension funds and endowments. As noted above, however, stabilization funds may need to draw upon their reserves at short notice, which might affect the investment decision-making process. An investor who acknowledges that they might be forced into selling positions at short notice may be reluctant to take long-term positions, especially in illiquid assets that they cannot readily exit from in the event of redemptions. Savings, reserve and development funds would have comparatively lower short-term liability issues.

Another constraint occurs if an SWF is facing net outflows from their fund rather than net inflows. Investors will be more confident that they will not be placed in the position of needing to sell into weak markets if they are confident that they will continue to draw inflows. Using data from 152 large superannuation funds in Australia during 2004-2010, Cummings and Ellis (2014) provide evidence that the funds flows of institutional investors influence the weightings held in illiquid assets. In particular, although the authors note that the heterogeneous nature of funds makes correlations difficult, they did deduce that larger funds with larger positive funds flows have a larger weighting to illiquid assets.

The *risk appetite* of an SWF will determine whether a long-term investment strategy will be employed, but there are a number of restrictions placed on certain SWFs that affect their risk appetite. A long-term institutional investor should be willing to accept moderate levels of risk, short-term volatility, potential permanent capital loss, and not divest from long-term investments in the face of market pressure. However, very close government oversight (where it exists) may affect the risk profile of an SWF and the manner in which risky assets are

treated in its accounts. Some regulators require investors to hold high capital ratios if investments are made into illiquid investments, which influences them to invest in low-risk assets. Certain SWFs may be subject to the opinions of politicians when they feel alarmed whenever volatility in asset prices leads to a sharp fall in a fund's value, regardless of whether that volatility had been taken into account. This type of pressure will make the funds cautious about making the investments in the first place. If pressure is placed by stakeholders on SWFs to maintain funded status in the short term and report to the market on a short-term basis, this may result in these funds having a low-risk appetite. Again, such pressures and influences on risk-appetite will be more pronounced for stabilization funds compared with other types of SWFs.

A number of other factors below have been highlighted as general long-term investing constraints for investment organizations. The factors will be apparent to SWFs in varying degrees depending not only on the structure and type of fund defined above, but also in how the best practices and guidelines contained in the Santiago Principles have been implemented.

The investment *decision-making process* within an institutional investor organization may provide certain constraints for the implementation of a long-term investment strategy. Laverty (1996) argues that organizational factors are a key contributor to short-termism. For example, organizational inertia and unwillingness to adapt towards the future can stem from group-think, escalating commitment and social structures within firms.

Multidivisional structures can combine with short-term measurements to encourage business units to focus on short-term outcomes; Laverty (1996) also cites managerial opportunism in pursuit of short-term results, building of reputation and avoidance of risk. Investment managers are often incentivized to maximize their performance over the short term, in line with bonus and other compensation payouts, or their performance may be pegged to an index benchmark such as the S&P 500, discouraging investment decisions from being made over the long term and employing a different performance trajectory to the benchmark (Stoughton et al., 2011).

Another important consideration is the length of the decision chain from the principal to the ultimate deployer of capital. The lengthening of the chain helps to foster a short-term culture, as delegated agents attempt to satisfy the expectations of investors who in turn are monitoring the agents based on the flow of short-term results. Internationalization has further distanced investors from their assets (i.e., companies they hold). Kay (2012) suggests that this chain creates misalignments, such as bias for action, as agents aim to justify their positions. The longer the decision chain, the higher the likelihood of misalignment.

Long-term investing requires a certain amount of *resource capability* to address the unique types of risks that are played out over a longer time frame. Certain SWFs face budget pressures that prevent them from acquiring the necessary research tools and internal expertise to help execute a long-term investment strategy. The market for investing talent is highly competitive and there are considerable challenges in attracting the necessary expertise due to restricted compensation levels and relatively fewer staff in organizations such as the SWFs described above.

Quite often, a fund's asset size will not only dictate the governance and internal capability to evaluate investments but also an institution's access to opportunities. As a result, smaller SWFs tend to have more conservative asset allocations compared with the largest funds.

The average tenure of a chief investment officer is approximately four years, meaning that long-term investing can provide a significant career risk. The tenure for more junior staff may be shorter and there can be significant pressure to perform within this period to achieve career progression. As a result, assets with a short time frame may be more attractive for investors.

There may also be constraints to long-term investment by institutional investors due to implicit understandings about the market and where the highest returns can be achieved. Long-term investment will require the belief within institutions that the returns generated from making long-term investments will be large enough to justify the associated risks, such as liquidity risk. There is a strong need within SWF organizations for principals, trustees and managers to believe strongly in a long-term investment strategy and understand counterarguments before investments can be made.

Good governance appears to be the most crucial aspect to the development of robust investment strategies for

SWFs and a critical determining factor for funds to invest over the long-term. Related to this is the role of government when it seeks to promote an SWF agenda. Establishing clear independence is a prerequisite in order to avoid political interference, which may erode the fund's ability to effectively achieve its financial and economic objectives. This is particularly relevant for development funds or strategic investment funds where domestic investments may destabilize macroeconomic management and undermine the quality of public investments and the wealth objectives of the funds. A clear separation needs to be made (generally for all SWFs) between the government as a promoter of investments and as owner of the SWF. It is thus necessary to build capacity for an SWF to operate as an expert, professional investor that can independently appraise prospective investment opportunities.

IV. Sovereign wealth fund investment styles and trends

The investment objectives of sovereign wealth funds (SWFs) are translated through an asset allocation process that is usually conducted alongside an investment consultant. Strategic asset allocation refers to a target allocation of assets into various asset classes based on the risk and return characteristics of a fund. Across the asset-class spectrum there are investments that suit certain types of investors more than others based on their risk tolerance, time horizon and expected return. SWFs with a shorter time horizon will have a greater allocation to shorter-term, more liquid assets such as bonds and certain public equities. Longer-horizon investors will have greater allocations to alternative, illiquid asset classes.

Investment policies should address performance of the whole fund as opposed to the performance of individual asset classes. Strategic asset allocation can have its drawbacks in that different asset classes have clear allocations that lead to a "bucket filling" exercise, wherein asset-class experts must achieve an asset-class-specific level. This can lead to a good asset-class outcome but it doesn't guarantee a good overall fund outcome. Other funds have taken a "reference portfolio" approach, where a simple passive listed portfolio is used as a benchmark. The investment teams within the fund are then incentivized and remunerated on how much value is added relative to the reference portfolio. The actual portfolio therefore deviates from the reference portfolio only if those investments make the overall fund better off, not just one division.

In conjunction with the asset allocation decision, a number of distinct investment models have emerged between the SWF and wider institutional investor community.

First, there is the *Norway model*, which is based on the strategy of investing primarily in traditional public market assets, whether equities or fixed income. Returns are generated through benchmarking public market indexes and the model often uses tracking error constraints relative to these benchmarks. It usually encompasses a traditional 50/50 or 60/40 equity/fixed income mix and uses a large insourced team with a small allocation to external managers to achieve its objectives.

Second, there is the *Yale* or *endowment model*, which is based on adding risk to the portfolio by investing in private market asset classes, such as private equity, real estate, infrastructure, and hedge funds, through external managers. A "top-down" model is employed in-house for the selection of an asset class/strategy, with external managers then assuming most of the responsibility for the investments. The endowment model is much more costly (due to the high fees of asset management firms) and has been based on getting priority access to well-performing external managers.

The third model is the *Canadian model*, employed by the large, sophisticated pension fund investors in Canada, and is characterized by largely insourced (direct) investment that has a higher allocation than most to private market alternative asset classes. The driving force behind the Canadian model is the ability to hire expert internal staff to execute the investment programme on a more cost-effective basis than using external managers.

More recently, we have seen a fourth model of investment emerge that combines aspects of both the endowment and Canadian models. The *collaborative model* recognizes that private market investing in assets like infrastructure and development projects is consistent with a long-term investment strategy, that the direct method of investing is the most cost-effective form of investing, and that alternative, external investment managers are required, but the governance needs to be redefined for more alignment. In this way, the collaborative model involves the platforms/vehicles that SWFs are developing among themselves, as peers, to invest more

efficiently in long-term assets and get as close as they can to the direct method. These include co-investment platforms/vehicles, joint ventures and seeding managers. The collaborative model has involved SWFs forming co-investment partnerships among themselves or developing more aligned arrangements with their asset manager partners. Examples of the collaborative model among SWFs include the Abu Dhabi Investment Authority (ADIA), NZ Superannuation Fund and Alberta Investment Management Company forming an investment alliance to invest in innovation in Silicon Valley; the Government Investment Corporation (GIC) teaming up with manager Highstar Capital to buy GWF Energy; and ADIA investing with and through the National Investment and Infrastructure Fund (NIIF) to access infrastructure investments in India (a detailed NIIF case study is provided in section VI).

Depending on the individual characteristics, SWF investors will usually adopt a combination of the four models described above to invest in a spectrum of asset classes.

IV.1 *Long-term private market investment for sustainable development*

Long-term investors such as SWFs can make an important contribution to growth in various ways, but perhaps most importantly by financing long-term projects, such as infrastructure, clean technology, real estate and agriculture. Infrastructure in particular has been the subject of much attention for attracting long-term investment, as most nations around the world struggle to address their infrastructure investment deficits. The very nature of infrastructure investment provides significant benefits to societies by contributing to economic growth, which further emphasizes the value of having long-term investors in these assets.

In the broadest sense, infrastructure services are those physical facilities that provide the building blocks of a functioning society. Within this broad concept, social infrastructure (e.g., health and education) can be distinguished from economic infrastructure. Economic infrastructure relates to the channels, pipes, conduits and apparatus that deliver power and water, provide protection from floods, and take away waste. It also includes the roads, railways, airports and harbours that allow the safe movement of people and goods between communities. These services directly support the well-being of households as well as production activities of enterprises at various points of the value chain, and is thus directly relevant to the competitiveness of firms and to economic development (Morley, 2002).

Specifically, the power industry, comprising generation, transmission and distribution, forms an integral part of the backbone of a modern economy. Without adequate investment and a reliable supply of power, an economy is unable to function efficiently, with economic growth targets difficult to achieve due to outages and blackouts. An integrated transport infrastructure that includes roads, railways, airports and seaports makes it possible to link underdeveloped parts of a country and regions into the global economy. Investments in transport infrastructure allow goods and services to be transported more quickly and at lower costs, resulting in both lower prices for consumers and increased profitability for firms. Water infrastructure relates to the delivery, treatment, supply and distribution of water to its users as well as for the collection, removal, treatment and disposal of sewage and wastewater. Investment into water infrastructure is crucial for sustaining the central role that it plays in human societies while also protecting aquatic ecosystems, which is critical for environmental health (United Nations, 2008).

The impact of infrastructure investment for the wider economy has been established through various economic studies, a number of which show the relationship between infrastructure investment and economic growth. Most of the research in this area has been done using the production function formula, where the output elasticity with respect to public capital (regarded as a synonym for infrastructure) is calculated to determine if higher rates of government expenditure can increase long-term growth rates (Solow, 1956). Early work indicated that a positive relationship exists between private sector output and infrastructure investment (Romer, 1986; Lucas, 1988; Aschauer, 1989). The direction of causality and quality of data were highlighted as limitations of the early studies; nevertheless, further work has also shown a positive relationship between public capital and private output (Munnell, 1992; Gramlich, 1994; Lau and Sin, 1997; Berechman and others, 2006, Sun and Zhu, 2009). Using an annual time-series growth regression, Égert and others (2009) provides additional evidence showing that the contributions of infrastructure have a positive impact on economic growth.

Investments in other private market asset classes can also be seen to have wider economic impacts. Venture

capital investments that back entrepreneurs and new businesses, for example, have been proven to contribute to economic development (Lerner and Kortum, 2000). Venture capital financing can result in new employment for businesses as well as the stimulation of businesses related to a new venture or sectors that support one. Through unique offerings of new goods and services and production processes, entrepreneurs can improve efficiency, and the innovation leads to economic growth (Timmons and Bygrave, 1986; Samila and Sorenson. 2011; Lerner and Kortum, 2000).

Similarly, certain real estate development investments have provided economic benefit, particularly those in underdeveloped areas, which could be classed as targeted investments (Hagerman and others, 2007). In fact, certain SWFs that have had a specific development focus (i.e., investing in real estate, private businesses and infrastructure) have been able to post attractive investment returns.

By 2030, as global population surpasses 8 billion, there will be significant increases in food demand, creating pressure for higher production of agricultural crops. Agricultural investment seems suited to SWFs and necessary for improving output productivity to meet global demand. The growing middle class in the developing world will be looking to consume more and more protein. A shift towards greater global protein consumption will increase demand for grain dramatically (TIAA-CREF, 2012). Furthermore, continued development and industrialization will reduce the land resources for agriculture. All of these long-term economic factors will drive the value of agriculture assets, highlighting the importance of long-term investment in this area.

Clean technology companies that help mitigate climate change require significant amounts of financing and should be ideally suited to long-term institutional investors. In the past, in order to access green energy opportunities, investors would normally use asset managers to invest through a closed-ended private equity fund structure. These investments, however, require large amounts of capital and longer horizons, not suited to the typical fund structure. SWFs have inter-generational time horizons and deep pockets, which makes them valuable partners for capital intensive and long-gestation companies. In this way, by leveraging off their key attributes (scale and time horizon), SWFs stand to make attractive returns and have significant impact.

IV.2 *Private market/alternative investing*

Private market investing is an umbrella term encapsulating a variety of illiquid investments that cannot be sold at short notice and therefore require a long-term investment horizon and patient capital. These types of investments (as outlined above) include infrastructure, renewable energy, agriculture, natural resources, real estate, venture capital and private equity. The opaque nature of private market assets and various information asymmetries has meant that a relational form of delegated investing has been adopted by a large number of SWFs for accessing these assets, involving a large reliance on intermediaries for the investment process. This is in contrast to direct investing or co-investing, where capital is deployed directly into the asset or company.

Private companies or assets are not subjected to the information disclosure regulations that publically listed companies must adhere to, giving investment managers the opportunity to gain access to and act on information not readily available in the public domain. Investments into private markets also often requires managing the assets actively, playing a material role in growing the assets, and adding significant value over the investment period. Investment management firms have investment professionals with the necessary skill set for sourcing, analysing, executing and managing long-term assets who are dedicated to taking advantage of informational asymmetries in private markets. For these reasons, many SWFs without sufficient governance and resource capability have utilized the services of third-party investment managers and consultants for making investments into private markets.

Investors in private markets should thus expect higher returns compared with public markets because of the premium paid for illiquidity and other asset-specific risks. While the benefits from each asset class vary (as well as the data and benchmark used for comparisons), there is substantial academic literature to suggest that private market investing can offer greater returns over investing in the public markets (Harris and others, 2013; Axelson and others, 2013; Robinson and Sensoy, 2011; Ljundqvist and Richardson, 2005; Stucke, 2011; Fisher and Hartzell, 2013). This is particularly true for private equity and real estate. While venture capital fund returns outperformed public equities in the 1990s, they have underperformed in the most recent decade (Harris and others, 2013). Infrastructure is a relatively new private market asset class, making reliable returns data quite limited.

Early studies have shown that infrastructure has been mixed with a large amount of variation in the types of assets and subsequent returns achieved (Inderst, 2009).

Institutional investors' allocation to private markets has been increasing over time. Andonov (2013), based on the CEM database,[1] shows that institutional investors in developed economies have increased their allocation to alternative assets (which also includes hedge funds) from 8 percent in 1990 to more than 15 percent in 2011. He finds that larger institutional investors have increased their allocation in a higher proportion. Larger investors not only allocate a greater percentage of their assets to alternative investments, but also are more likely to invest simultaneously in multiple alternative asset classes. In addition to the size of investments, institutional investors that diversify their public equity investment internationally also invest a higher percentage of their total assets in multiple alternative asset classes at the same time. Institutional investors that use more active rather than passive management in public equity are investing a greater proportion in alternative asset classes, where passive investing is virtually impossible. The results suggest that institutional investors do not substitute active management in public equity with alternative investments; rather, they engage simultaneously in active investing in public and private markets. Most industry-based publications and surveys would indicate that institutional investors will be increasing their allocation to private market asset classes over the next several years and beyond (Preqin, 2014; Towers Watson, 2015). The assets managed by SWFs have been growing by about $400 billion-$500 billion a year. Simply to maintain their current weightings, these funds will have to allocate about $150 billion-$200 billion a year to alternative investments (Preqin, 2017).

As indicated, there are a number of principal/agent and governance issues associated with utilizing third party intermediaries for making private market investments. One of the problems with investing in alternatives is that it can be very expensive. A large number of SWFs utilize asset managers for alternative investment, which means paying the 2-and-20 fee model. This refers to an annual 2 per cent management fee and 20 per cent performance fee, which can amount to roughly 3-4 per cent in total annual fees. Portfolio construction costs for investing in alternatives can add an additional 1-2 per cent, so the total cost of running an alternative investment programme can accumulate to 5-6 per cent a year. With this in mind, SWFs expecting to earn an illiquidity premium of 5 per cent on their alternative strategies may end up spending the entire premium on fees. To provide further perspective on this magnitude, an SWF investing $10 million or $20 million—or even $50 million—with an external manager may still be a good idea for the SWF because it is unlikely that the SWF could replicate the resources of that manager with the fees it is paying. However, if a larger SWF with a very large volume of assets under management invests $500 million with an external manager under the 2-and-20 fee structure model, the total fees would be about $20 million per year. Over 10 years, the total would be $200 million in fees. For these reasons, SWFs have been looking at new methods of investing and exploring better ways to work together with external managers that are fair and equitable in order to create structures where everybody can do well and share in the benefits of good performance (Kalb, 2015).

IV.3 *Emerging-market investing*

In areas that might have the most impact for the Sustainable Development Goals (SDGs), such as underdeveloped regions in Africa, Asia and South America, the attraction to SWFs based in developed countries has not been particularly strong. The question of investing in emerging economies relates back to the question of governance, and an appetite for risk that involves considerations similar to those of investing in illiquid assets. For SWFs based outside of emerging markets (EMs), a key challenge for investing in EMs has been to get the right internal culture to invest in a meaningful way. Many funds might direct a small number of external managers to invest in EMs generally, but the overall exposure would not be very large. Investing in EMs has been more of an opportunistic activity with investments gaining exposure to different asset classes but lacking focus. Common problems for increasing exposure have been a lack of conviction from GPs, cultural issues and currency risks. It has also been difficult to get the right benchmarks for EM investments because of the lack of depth of capital markets. Overall, there seems to be sufficient inertia within organizations to keep them from meaningfully investing the necessary resources EMs. On a risk-adjusted basis, many western-based SWFs have not found the

1 The CEM Benchmarking Inc. collects data from institutional investors through yearly questionnaires. The data in this study utilizes detailed information on the strategic asset allocation and performance of institutional investors during the 1990-2011 period.

opportunity compelling enough.

Despite the above, there are a number of global dynamics that would suggest that EMs are an attractive destination for reliable long-term capital. While the US pubic equities market has been rallying at record levels since the global financial crisis, there is investor caution around how long this will continue. In addition, the price of assets in developed countries—particularly in a low interest-rate environment—has created difficulty in identifying sources of value in these regions. A number of investors may have been underpricing developed-country risk and overpricing EM risk. The larger, more sophisticated long-term institutional investors in developed markets have recognized some of these points and have been investing in EMs in significant ways; some of these investors have set up offices in the new regions in order to have a local presence in areas where they previously did not have much oversight. Developing relationships with key local players has been crucial; partnering with family offices, sovereign development funds and multinational corporations is one of the strategies employed.

The above discussion has concentrated on the perspectives and challenges of SWFs based in western developed countries. For sovereign funds located in developing countries, the potential for investing in their local and surrounding economies is great. This is usually done through sovereign development funds. Their nature, unique characteristics and role for the sustainable development agenda are highlighted in the case studies in section VI.

V. Sustainable development sectors

It is argued that the greatest impact sovereign wealth funds (SWFs) can have for the Sustainable Development Goals (SDGs) is through long-term investments in the alternative private market asset classes such as infrastructure, real estate, agriculture, timber, venture capital and private equity. Not all SWFs are able to invest in these assets, particularly in a more direct, efficient way. This section thus outlines how the SDGs can be accessed for investment across the asset-class spectrum and identifies areas where and how the SDGs can be supported by SWFs more effectively.

Determining how and to what extent SWFs can access and promote the SDGs requires an assessment of where those SDGs already align with existing asset classes and investment products. It also requires an understanding of the strategies that SWFs have in furthering specific SDGs, measuring their exposure, and establishing programmes that facilitate investment.

The SDGs cover a broad range of development objectives, and while some of the goals that apply to economic development are readily accessible by current investment products and services, others are mostly accessible through private markets and direct investing programmes on a case-by-case basis. Others will require support from Governments and multilateral institutions to make them accessible by SWFs without significantly increasing risks or reducing investment returns. Access to these SDGs is thus often limited by insufficient staff time and a lack of other resources that could package opportunities into investible projects SWFs could support.

While there is little formal reporting or targeting of the SDGs by SWFs, there has been some adoption of reporting or metrics by service providers to the impact investment industry. Just one year after their adoption, 42 per cent of the industry reported that they use the SDGs to measure and report on their impacts.[2] One of the most common frameworks used by asset owners for assessing impact generally is the IRIS framework, which can report and track impact and sustainability across sectors and asset classes. For the SDGs more specifically, a common metric is the Investment Leaders Group (ILG) framework developed at the University of Cambridge, which groups the 17 SDGs into 6 themes and metrics to simplify and standardize reporting. That system will be described in further detail later in this section.

Formal programmes to address the SDGs and other impact-investing allocations are rare in SWFs, with a few notable exceptions. Those SWFs with impact-investing targets are often funds created with objectives and metrics other than investment returns. These sovereign development funds often have a mandate to achieve investment returns and also develop the local economy or alleviate poverty in their sponsoring nation, and are thus more likely to create investment allocations that are both impact and return oriented.

2 Global Impact Investing Network (2017). The State of Impact Measurement and Management Practice. Available from https://thegiin.org/research/publication/imm-survey.

V.1 Impact strategies

There are a variety of strategies that SWFs can use to invest in the SDGs. These will depend on the type of fund, the risk appetite and the portfolio of assets selected.

Passive investment: publicly listed

For most SWFs, constraints in furthering the SDGs are driven by limited staff time and investment opportunities, not capital. The majority of capital currently invested in SDG-related assets and companies is thus achieved through passive investing. Passive investing can be done directly in publically listed assets or through fund managers with an SDG orientation or strategy.

Investing in public listings that further the SDGs is a low-impact but easily scalable way to incorporate SDGs into an SWF investment strategy. While certainly useful, the breadth of SDGs accessible via public markets is relatively narrow, and the impact that SWFs are able to have through this model of investing is fairly low because these listings already enjoy access to capital markets. Thus, SWF investments in publicly listed assets have a relatively low impact if individual investments are relatively small.

Despite the limitations, there are certain public market passive indexes or exchange traded funds (ETFs) that have been developed to concentrate exposure towards the SDGs, thus providing options for SWFs. The iShares MSCI Global Impact ETF is one example of a public market fund designed specifically to address the SDGs. The fund targets companies that both employ business practices that further the SDGs and also deliver products or services that directly address one or more of the SDGs. Other ETFs or indexes that have been developed may focus on certain SDGs, such as climate change, or sustainability, such as the Dow Jones Sustainability Index.

Another public market strategy that can leverage some impact would involve SWFs taking an outsized position in a public company and further acting as an activist shareholder in the company, but this is a strategy rarely used for impact investment in general, and there are few examples to date of this activist shareholder strategy being used by SWFs to specifically further the SDGs.

Passive investment: private funds

Private funds are another model through which SWFs can gain exposure to the SDGs, and this strategy has increased significantly in recent years. Private funds include the asset classes, such as private equity, real estate, infrastructure and venture capital, which all might have secondary or inherent SDG impacts. There are also specific impact-investing funds that have been set up with the main objective of creating impact. Impact investing funds vary significantly in their particular strategies, metrics and return targets. These funds effectively overcome the human capital constraints on SWFs in pursuing SDG-based investment targets, but they also have significant limitations.

Closed-ended private funds must generally maintain fairly high return targets to make the economics of the structure work, in part because of the high fees required by the investment vehicles. These fees are also often both a function of assets under management and investment returns, which further incentivizes fund managers to target high returns. The added layer of fees can limit the use of this model in pursuing some SDGs that may require concessional returns; it may also limit the ability of funds to work with Governments and multilaterals to develop investment opportunities, in part because Governments are often wary of structuring high-return investment opportunities with private funds. A 2017 survey of impact investment funds reported that more than 60 per cent of the funds were targeting a market-rate or higher investment return, with only 13 per cent of funds reporting that they were targeting rates of return closer to capital preservation.[3]

Closed-ended funds also naturally limit the ability of SWFs to actively manage their investments in SDGs. As discussed in section IV.2, the specific terms of private investment funds, above and beyond their fee structure, can significantly impact the capability of the fund in furthering the SDGs and the ability of the SWF to actively track or manage its performance. Because private market investing naturally does not have the same disclosure requirements as public market investing, SWFs and other institutional investors must rely significantly more on their asset managers and other service providers to track their exposure and performance. In 2017, 35 per cent of impact investment funds reported that there was no explicit performance metric or formal incentive

3 Ibid.

for investment staff to meet the fund's impact targets, though many of the funds reported that staff were intrinsically motivated to meet impact objectives.[4] While most impact investment funds have active measurement programmes and provide reporting to their investors, 43 per cent reported that obtaining quality data from investments remains a significant challenge to reporting, and 32 per cent further reported that aggregating data across the investment portfolio remains a challenge.[5]

Active/direct and enabling investment

Direct or active investment is the most resource-intensive but highest-impact strategy for accessing the SDGs by SWFs. The use of the strategy has thus been fairly limited, but three are innovative examples of SWFs that have developed direct investing teams or platforms to further SDG or other economic development mandates. Direct or active investments also often entail additional risk, primarily because the ability to diversify is significantly lower through direct investment, and active investment naturally requires either complete ownership or ownership of a sizeable share of a target company or asset. Active investment involves the purchase of a controlling interest in an asset or operating company in order to influence or direct the adoption of practices or new initiatives that would further a particular SDG.

The term "enabling investment" is used here to describe a form of active investment that could further some of the SDGs even when the target asset is not directly related to the SDG. While naturally limited, there is that the potential for SWFs to partner with enterprises or Governments in financing programmes or initiatives that enable the partner to further an SDG. Investments with partner companies that support transitions to more responsible manufacturing, clean energy or reduced environmental impacts would fall within this subcategory of active investment.

Within the SWF industry, sovereign development funds are significantly more likely to create the internal capability to manage direct investing programmes with a specific impact focus, and also significantly more likely to achieve those impacts through enabling investments. This is partially because sovereign development funds often already have a dual-mandate incorporated into their charter that requires the fund to both achieve investment returns and also perform against other metrics, such as developing the local economy or alleviating poverty. This experience with using multiple performance metrics and the relative prevalence of direct investment teams make sovereign development funds particularly well suited to impact-oriented direct investment programmes in general, and thus more likely to adopt programmes with specific objectives to address one or more of the SDGs.

V.2 Measuring exposure

To date, the SWF industry lacks a common metric for measuring exposure to the SDGs, and those SWFs that measure and report their exposure use a variety of metrics to do so. IRIS, the metrics most commonly used to measure and report on impacts generally, and the metric system recently created by the ILG that addresses the SDGs more specifically, are described in detail below. First, the concepts of portfolio tracking and impact measurement—which generally reviews the evolution of impact measurement and reporting—are discussed.

Portfolio tracking

Portfolio tracking of exposure to SDGs is by far the most common way that SWFs or fund managers have tracked or reported their allocations to goals in public markets. Under this system, individual SWFs and fund managers catalog each of their investments and their exposures to the individual SDGs, and then provide a roll-up accounting of each SDG and its weight in their portfolio. Individual investments are "tagged" as furthering the SDGs, with some investments accessing several SDGs, depending on the nature of the company or asset. A higher order version of tagging individual investments has also been used in categorizing specific industry verticals as impacting each SDG positively (or negatively) and then summarizing the portfolio's impacts based on its exposures to those particular industries.[6]

4 Ibid.

5 Ibid.

6 See https://www.nnip.com/SK_en/corporate/News-Commentary/view/NN-IP-sketches-roadmap-for-investing-in-UN-Sustainable-Development-Goals.htm.

While portfolio tracking using these metrics is clearly useful, and a strong first step by any SWF in assessing its performance in furthering the SDGs, it also has some limitations. Industry tagging is useful in estimating exposure for some of the SDGs, but it cannot be used for others, such as gender equality, because progress along those SDGs is really only measurable by assessing specific companies or assets. Even in tagging individual investments, this process involves some subjective nuance on the part of investment staff. Additionally, many operating enterprises impact multiple SDGs in different ways that are not easily represented by a simple tagging metric.

Goal-based impact measurement

Some SWFs are turning to more direct measurement of the impact of their investment portfolios on furthering the SDGs by rolling up actual operating results. This practice is fairly new, varies significantly among individual investment organizations, and often requires considerably more resources and operational data in developing an aggregate picture of the portfolio's exposure. While there is no universally accepted standard for measuring all of the SDGs in aggregate, several initiatives have been used to aggregate information relating to some specific SDGs. GRESB Infrastructure and Real Estate, for instance, provides an online assessment tool that investors in those industries can use to measure their climate impact and general sustainability based on a set of eight core aspects and 32 indicators on specific projects and assets.[7] The tool also enables investment organizations to compare practices with their peer group.

These more nuanced operational assessments can give investors a clearer picture of their exposure to specific SDGs, but are naturally more aligned with the same SDGs in which investment and measurement is easiest. While measurements of the impact on industry, economic growth, clean energy and even climate action are more readily available for specific investments, other SDGs such as gender equality or peace and justice lack a readily available measurement system that can be applied to companies or assets. Other SDGs, such as poverty reduction or health and well-being, can be readily tagged to a particular investment, but the operational impact of that investment on those SDGs is often difficult to measure clearly.

Specific examples of metric programmes

IRIS is the system most commonly used by impact investors and other social or environmental investment programmes to measure and report their performance. The IRIS system is essentially a catalog of generally accepted metrics that apply to different sectors or operations of an investment. Both qualitative and quantitative metrics are included, and there is no standard template for an IRIS report. Rather, investors must select which metrics from the catalog will be most useful for their measurement and reporting programme. IRIS is essentially a clearing house for impact performance metrics, and the system assists investors in identifying which metrics apply to specific sectors within their portfolio and those that can be applied across their portfolio in their entirety. IRIS was created to leverage industry-specific standards wherever possible and it developed additional metrics for sectors or objectives when one did not exist. Many users create a set of metrics for investees that can be applied across portfolio companies and additional sets of metrics that apply to individual sectors. The catalog can also be used by investors to compare their metrics with those of their peer organizations, or by SWFs and other institutional investors that would like to apply a standardized form of reporting across all of their asset managers and service providers.

The ILG is a collective of long-term institutional investors—like pension funds and SWFs—that collaborated with a research group at the University of Cambridge in 2016 to develop its own set of performance metrics specifically addressing the SDGs. The framework was designed to improve on older metrics by placing more emphasis on environmental and social impacts directly, as opposed to impacts on investment returns, and a focus on actual outcomes, as opposed to investment processes and practices. The ILG framework groups the SDGs into three societal and three environmental impact themes and establishes a metric for each. The three societal themes are *Basic needs*, *Wellbeing*, and *Decent work*. The three environmental themes are *Resource security*, *Healthy ecosystems*, and *Climate stability*. For each of the themes, the ILG framework provides a simple "base" metric that can act as a proxy for an investment impact along that theme, as well as "stretch" metrics that could provide clearer or more detailed information, but that require data not readily available today. For instance, the base metric for the *Decent work* theme, which is meant to encompass SDGs 8-10, is simply the number of

7 Available from https://api.gresb.com/infra/home.

employment opportunities created per million dollars invested. Also, the ILG has a scale by which investment opportunities can be compared with one another. While metrics have been proposed for all six themes, detailed measurement guides have been developed for only two of them, while the other four remain in development.

V.3 *Allocation metrics*

In furthering access to SDGs, SWFs and fund managers have experimented with a variety of different metrics or key performance indicators for their investment teams and asset managers. Each of these metrics faces the same challenges and in some cases subjectivity in measurement described in the preceding section. Here, two different forms of these metrics are characterized broadly as goal-based allocations for asset managers or investment teams and the more nuanced establishment of dual metrics for investment staff and service providers. While these metrics significantly overlap and in fact require the effective measurement of impacts described in the previous section, these metrics are used to more specifically incentivize and then evaluate staff or asset manager performance in furthering the SDGs or other impact investment goals.

Goal-based allocations

Goal-based allocations are a fairly simple and more widely used metric that requires a particular allocation to further one or more of the SDGs, any investor requirement, or a metric beyond investment returns. Under a goal-based allocation, an investment team is simply required to source investments that impact a particular development goal. Beyond that requirement, an investment team or manager is assessed using the same performance metrics that would be used otherwise—that is, they are to construct an investment portfolio that maximizes their risk-adjusted returns.

Goal-based allocations are a simple metric for targeting portfolios towards investments that support the SDGs, and they have the added benefit of providing clear incentives to investment staff and managers to continue maximizing investment returns within their designated "box" of investment opportunities. They are also fairly easy to establish and administer. Goal-based allocations do still have several shortcomings. First, in practice they can be fairly subjective on the margins, for the same reason that the practice of tagging investments to measure SDG exposure can be. Also, goal-based allocations do not provide a measurement or metric for investment staff and managers to compare between two potential investments, both of which further an SDG and also offer varying risk-adjusted returns. Two clean energy investments, for instance, would be compared based only on their potential risk-adjusted returns as opposed to a goal-related metric, such as their carbon reduction over time. While goal-based allocation metrics are unable to capture nuances such as these to maximize impact on the SDGs, they are often beneficial in establishing a simple performance metric without sacrificing returns.

Dual-metric establishment

The establishment of dual-metric programmes is a relatively new but growing in practice in the impact investing industry. Under these programmes, investment staff and managers are given specific performance indicators that relate to one or more specific SDGs and are evaluated using both that metric and investment returns.

These dual-metric programmes provide the benefit of directly incentivizing the furtherance of SDG investment for staff, but are more difficult to establish in practice. They are generally only applicable for SDGs in which clear operational data can be measured and aggregated in an investment portfolio. They are also significantly more complex than simple goal-based allocations, which may create a complicated and less clear system of performance evaluation for an investment organization. These metrics are also only as effective as the availability of both data and objective measurement for an investment's impacts on a particular SDG. Because these metrics drive results, care must be taken to design dual-metric evaluations so that they do not expose the allocation to excessive risk or reduce investment performance beyond that targeted by the SWF creating the programme.

Applications in practice

Within the impact investment community, there is a wide range of reported use of metrics to evaluate staff, asset managers and investees. In a 2017 survey, 35 per cent of impact investors responded that they have no explicit staff performance metric evaluated against the impacts achieved, while 19 per cent reported that staff compensation is tied to achieving impacts for some or all of their staff. Metrics were reportedly used more often

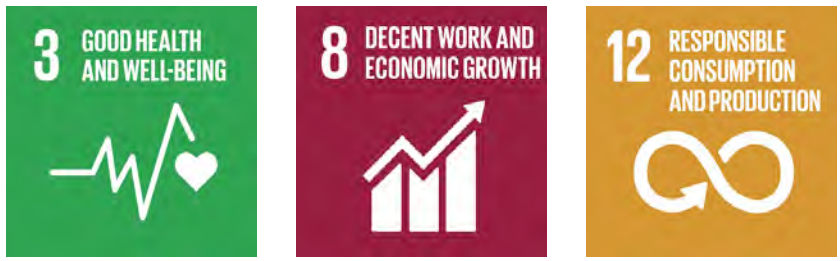
to evaluate investees, with 31 per cent of impact investors reporting that follow-on capital was tied to impact targets, and 15 per cent reporting that the achievement of impact targets was tied to better investment terms for investees. Eight per cent of the impact investors surveyed reported that they tied management team compensation for investees to the achievement of impact targets.[8]

PGGM, a large Dutch pension fund manager, provides an interesting example of a large institutional investor working to incorporate impact investing metrics into their portfolio of investments broadly, with a specific focus on the SDGs. As part of a working group of other banks and institutional investors, PGGM identified six SDGs for which it would measure investment and impact through four sustainability themes. The selected SDGs include Climate Action, Responsible Consumption and Production, Affordable and Clean Energy, Clean Water and Sanitation, Zero Hunger, and Good Health and Well-Being. PGGM then selected or developed quantifiable metrics that would evaluate investment opportunities and their performance against the selected SDGs. The scope of PGGM's metrics was limited to capturing the impacts of their current and planned investments, as opposed to limiting investment decisions or explicitly weighing the trade-offs between investment opportunities. However, the programme has already produced benefits by incentivizing better reporting from PGGM asset managers and investees; it also helped them better formulate how their various investment strategies map to specific impacts.[9]

V.4 *SDG accessibility by sovereign funds*

On a goal-by-goal basis, there is significant variation in the ability of SWFs to access investment opportunities that further individual SDGs. In this section, the specific SDGs are grouped into four sets, based on their accessibility to SWFs, in terms of their ability to gain exposure to the SDG; the availability of investment products that support those SDGs; and the availability of clear metrics by which an SWF can currently evaluate its exposure and performance. These groups include (i) a set of real economy SDGs that are highly investible; (ii) a set of climate SDGs in which few pure-play investments exist, but those that do can be measured across a portfolio; (iii) a set of social SDGs that are difficult for SWFs to access in a programmatic way; and (iv) a set of sustainable infrastructure SDGs that are accessible as investment opportunities, but that require innovative new fund models and approaches on the part of SWFs. This categorization identifies those SDGs that are currently readily accessible by large institutional investors; those that are more difficult to access or are a function of business practices (as opposed to pure-play investment opportunities); and those that can be accessed by SWFs via innovative investment programmes and partnerships with government.

Real economy SDGs: highly investible



These SDGs are readily investible by SWFs, and virtually all institutional investors justifiably have some exposure to them already. The SDG on economic growth is likely a component of all investment portfolios, and the SDGs of responsible consumption and production and health are accessible by almost any allocation to health care or manufacturing and consumer products.

8 State of Impact Measurement and Management Practice.

9 See https://www.dnb.nl/en/binaries/SDG Impact Measurement FINAL DRAFT_tcm47-363128.PDF?2017091813.

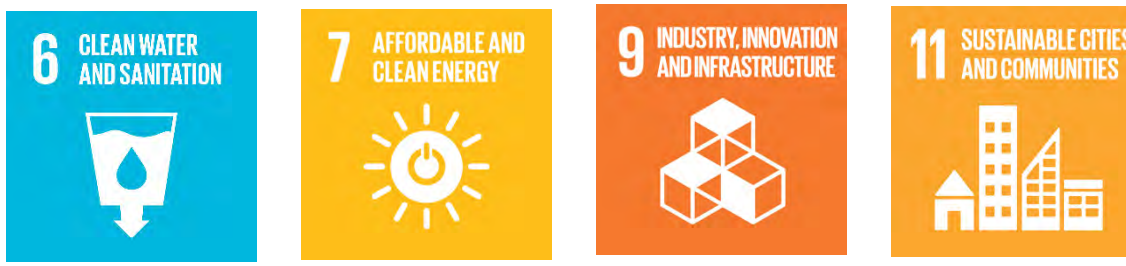
Climate SDGs: portfolio approach

The SDGs focusing on climate change and environmental conservation are difficult to access as pure-play investments, but a portfolio approach to measuring their exposure is viable. For example, investments in sustainable farming companies or clean energy and infrastructure impact both climate change and the environment. The impact of an investment portfolio on these climate SDGs is also better mentioned by specific qualities of individual investments, as opposed to the investments themselves. A real estate portfolio, for instance, does not inherently further a climate SDG, but a portfolio that requires all of its properties to have a low-energy certification or that reports on the energy practices of its assets could justifiably further the climate action SDG.

Social SDGs: difficult to access

Many of the social development SDGs do not translate readily into investment opportunities; they instead require concerted efforts or investment programmes in order to be accessed. Some social ventures aimed at providing education to low-income communities or reducing poverty may provide selected opportunities to have a social impact through investment, but these opportunities will likely only be accessible through direct private investing or targeted private funds. For the SDGs on poverty, hunger and education, some pure-play investments or impact investment funds are available; but the SDGs on gender and inequality are accessible primarily by investing in companies that promote those SDGs as part of their business practices (as opposed to being their core products or services). These SDGs may also be generally accessed by SWFs that have an economic development mandate in emerging economies, as these investments naturally target poverty and inequality reduction through second-order impacts.

Sustainable infrastructure SDGs: accessible via innovation



This final set of SDGs is considered the next frontier for SWF access. Readily available public investment opportunities are rare for these SDGs, but targeted funds and direct investment programmes can make them accessible to SWFs. Innovative examples exist of SWFs creating direct investment programmes that target sustainable development and cities that both further these sustainable infrastructure SDGs and generate investment returns. These SDGs also overlap significantly with government policy, which creates the potential for cooperative programmes between SWFs and Governments to package investment opportunities creatively that sup-

port SDGs and provide risk-adjusted returns.

Identifying SDG investment opportunities: an example in practice

A collaboration by Dutch pension fund managers APG and PGGM is the most notable example to date of large institutional investors making a concerted effort to identify investment opportunities that directly and measurably promote the SDGs. These two institutional investors collaborated to develop a taxonomy of sustainable development investments.

According to their taxonomy, a sustainable development investment must not only measurably support an SDG, but also be a significant or decisive investment with clear additionality. They also must not be in significant conflict with SDGs other than the goal the investment promotes. APG and PGGM's taxonomy was able to identify specific investment types that further all of the SDGs with the exception of SDGs 16 and 17 on peace, justice and strong institutions and global partnerships, respectively.

The process of developing the taxonomy enabled APG and PGGM to identify investments in SDGs that are generally considered difficult to access by investors. For example, for the SDG of Zero Hunger, the funds identified investments such as sustainable agriculture products, food storage and logistics, and impact funds supporting small-scale food producers, among other specific investments in the sector.

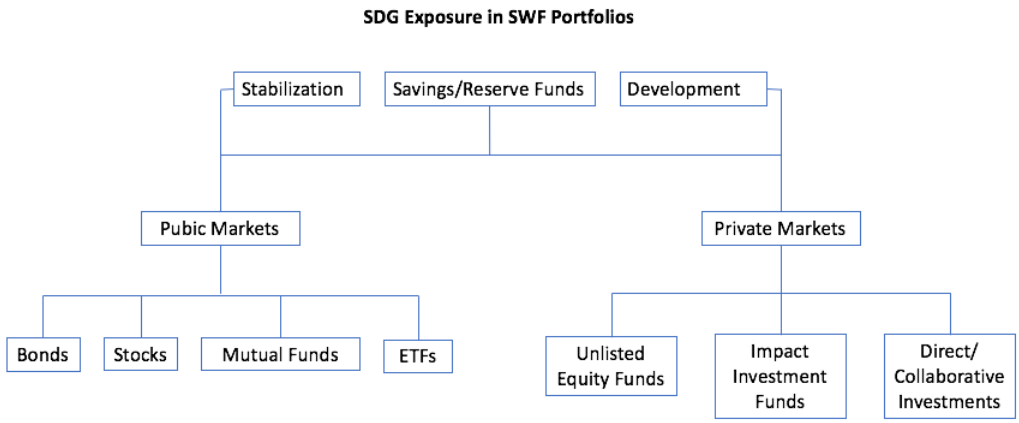
For SDGs and sub-goals with very few pure-play investment opportunities or sectors, the taxonomy states that the funds can promote the SDG through investments in acknowledged transformational leaders (ATLs) or larger companies and conglomerates that the funds determine do promote the SDG through their business practices. Under the SDGs for reduced inequalities or gender equality, for instance, the taxonomy identifies ATL investments in companies that have exceptional programmes for workplace fairness or that provide significant employment opportunities and skills development for low-income communities.

While the taxonomy is naturally limited for several of the SDGs and contains some grey area regarding which investors or asset managers can qualify as a sustainable development investment or ATL, it is one of the most significant efforts to date from large institutional investors to identify sectors or investment opportunities that measurably support the individual SDGs. It also takes a significant step beyond simply measuring the existing SDG exposure of their investment portfolios to actively identifying and seeking new opportunities to promote the SDGs.

V.5 *Summary of SDG exposure*

In summary, SWFs are able to get SDG exposure across the entire asset-class spectrum based on their risk appetite and governance capability, although the impact of that exposure varies significantly from public market asset classes to private ones. This can be seen in figure I below.

Figure 1: SWF exposure to SDGs



Within the public market asset classes, the exposure to SDGs is very passive in nature and the metrics for measuring SDG exposure is at an early stage of development. There are developments, however, such as offering green and social impact bonds. Sustainability indexes have also been developed that are using more and more sophisticated methods for identifying and scrutinizing companies' adherence to the SDGs. Currently, there is a wide spectrum of environment, social and governance (ESG) and SDG incorporation among the SWF community. This is related to governance, where the more sophisticated SWFs will have in their mission an explicit commitment to invest responsibly and integrate ESG and SDG considerations into the investment process. As mentioned throughout this paper, however, the greatest impact that SWFs can have is through direct investments in the private market space in asset classes such as infrastructure. In section VI, we highlight some of the innovations that are occurring in the private market space to help facilitate SWF investment in the SDGs.

VI. Case studies

The following case studies illustrate specific instances of the use of SWFs and sovereign development funds (SDFs) in furthering the 2030 Agenda for Sustainable Development and the SDGs.

VI.1 *Sovereign development funds: an overview of localized SWF investment*

Because of their set up, sovereign development funds (SDFs) or strategic investment funds have great potential for supporting the sustainable development goals (SDG) agenda. Governments typically create SDFs when domestic financial markets are underdeveloped or capital starved. SDFs do not, however, replace the functions of budgetary spending in the economy. In the design of an SDF, consideration needs to be given to local needs, and to the question of whether finance leads or follows development (Dixon and Monk, 2014; Patrick, 1966). For those that believe that finance and financial intermediaries lead development, there is a large role to be played by investors such as SDFs in identifying and financing entrepreneurs and technological changes that lead to growth and development (Schumpeter, 1934). Such investors catalyse opportunities and, as such, require a certain level of sophistication to play an active role in economic growth and change, identifying, researching and financing the most promising sectors, firms and corporates, and entrepreneurs. Others that believe that finance follows development take the perspective that investors would facilitate the flow of capital between savers and borrowers, between high-growth areas and low-growth areas, essentially responding to the demand for their services (Dixon and Monk, 2014). As opposed to the previous view, it is the entrepreneurs or enterprising firm that is the catalytic agent rather than the investors. Investors and intermediaries still matter, but the role is more of a passive one for the growth and development process. Notwithstanding the above, there is substantial academic literature that illustrates the important role that finance plays for economic development (King and Levine 1993, 1994; Mayer and Vines, 1993).

SDFs can be defined as government-sponsored commercial investment funds that combine financial performance objectives with development objectives. Most SDFs are created in countries that have broader economic development agendas, unlike a lot of Western developed countries where the role of government is limited.

The comparative advantage of SDFs over other types of financial institutions is that they can have proprietary knowledge of local opportunities, privileged access to opportunities, and trusted relationships with other investors, public or private. As a result, certain SDFs have been very successful in generating financial returns, despite their dual objectives. Examples of these include Singapore's Temasek, which has generated a 40-year total shareholder return of 18 per cent; Malaysia's Khazanah Nasional Berhard ("Kazanah"), which has a 10-year internal rate of return (IRR) of 13 per cent; and South Africa Public Investment Corporation (PIC), with a 10-year IRR of 16 per cent.

While recognizing that not all SDFs are created equally, there are a number of key lessons that can be learned from the currently successful SDFs. Research has shown that instead of being detrimental to financial performance, having a secondary or tertiary mandate can lead to a well-governed and well-managed investment organization that has room to be innovative and dynamic in pursuit of additional objectives. Furthermore, the fact that SDFs are "wealth creators" as opposed to "wealth accumulators" means that SDFs are more likely to help catalyse new enterprises or projects, to link their well-being to that of their ecosystem, and to think about sustainability. The less narrowly defined objectives actually appear to empower SDFs to take a path less travelled

that leads to the implementation of innovative and, hopefully, profitable strategies. Such flexibility, however, needs to be coupled with strong governance and management (Clark and Monk, 2015).

When it comes to governance, achieving complete independence from the government is unlikely for any type of sovereign fund. Arm's-length or double arm's-length arrangements[10] should be made whereby the Board of the funds is made up of a mixture of independents and officials. Oversight, however, is subject to company law, rather than to a government department. Boards usually should comprise nine members, reflecting best practice in the private sector around the world (Clark and Urwin, 2008). A management executive committee, chaired by a managing director, is usually employed to run the day-to-day activities of the fund, including the framing and implementation of investment strategy, management of the investment team and maintaining the operational services of the fund consistent with the fund's objectives. The objectives of the fund need to be clearly stated at the outset and consist of the mandate of the fund, the sectoral and regional focus, and the functional objectives in realizing the fund's mandate (Clark and Monk, 2015).

While there are best practice takeaways from SDFs, there are also certain risks to the local economy as a result of an SDF presence. In order to mitigate destabilizing macroeconomic management and undermining the quality of public investment and wealth objectives of the fund, Gelb and others (2014), provide the following guidelines for SDFs: (i) screen investments for commercial or near-commercial financial return; (ii) encourage investor partnerships to diversify risk and increase implementation capacity; (iii) design governance to insulate it from political pressure; and (iv) ensure full transparency on individual domestic investments and financial performance.

VI.2 *National Investment and Infrastructure Fund (India)*

The National Investment and Infrastructure Fund (NIIF) was created by the Government of India (GoI) to catalyse capital from international and domestic investors into infrastructure and allied sectors in India. The GoI has committed $3 billion to NIIF with the remaining capital flowing from other long-term investors such as SWFs, pension funds and other development institutions. The NIIF is set up as a company to act as investment manager to alternative investment funds and will be managed by a team of investment professionals. The governance of the NIIF entity will include a Board of Directors that will have government representatives, investor nominees and independent directors. The NIIF in many ways is an SDF or strategic investment fund as described above with the specific mandate to help deepen India's infrastructure sector.

The NIIF vehicle consists of two main strategies. The first strategy is that of a master fund, whereby outside investors will provide founding investor capital to gain ownership stakes in the vehicle. The master fund will then invest in specific platform companies set up in different infrastructure sectors such as roads, railways, airports and waterways. The master fund exemplifies the collaborative model of investment identified above, not only in the way long-term investor capital is pooled together (through a co-investment platform independent of asset managers), but also in how the capital is deployed into projects. The commercial nature of the initiative can be seen through the independence in governance arrangement, as well as the partnerships approach to investments. The NIIF master fund not only attracts investor capital into the vehicle itself, but also provides co-investment sidecars that can access the platform companies where the vehicle invests. The NIIF will co-invest into the platform companies alongside other commercial institutional investors. The NIIF has currently secured the investment of another SWF—the Abu Dhabi Investment Authority—into the master fund.

The second strategy of the NIIF is to set up a fund-of-funds vehicle to invest into private equity funds in the infrastructure growth sectors in India. This second strategy is more passive in nature but leverages the entity's position of having deep oversight over the most attractive opportunities in the sector, which stems from (a) having the sponsorship of the Indian Government; (b) the being a balanced solutions provider across line ministries, regulators and sector-focused agencies; (c) having and maintaining a strong network with private equity investors in India; and (d) possessing strong credit-worthiness within the Indian financial sector.

As indicated, infrastructure investment is in many ways central to the ability of the 2030 Agenda for Sustainable Development to directly and indirectly support the SDGs. India is one of the largest economies in the world, but

10 See IFWSF governance guidelines for an elaborate discussion on double arm's-length governance.

it also has one of the largest infrastructure investment deficits in the world. Its projected gross domestic product (GDP) growth for 2018-2019 is estimated at 7.8 per cent. This economic growth rate will largely depend on whether investments into crucial infrastructure sectors will be made. The NIIF, through adopting best practices in governance, capital pooling and deployment, is emblematic of the potential for SWFs to support the sustainable development agenda.

VI.3 *Aligned Intermediary for climate infrastructure investing*

Aligned Intermediary (AI), a global investment advisory firm, provides a platform for long-term investors such as SWFs to access climate infrastructure investments in a more effective way than past methods. Historically, in order to access green energy opportunities, investors would normally seek out a third-party asset manager to do an inventory of the investable assets and make investment decisions through a private equity fund structure. The scale and time horizon of these companies, however, did not fit within the fund structures of existing intermediaries, causing many of these investments to fail and deterring investors from the sector.

Despite this, there is a general consensus that green energy and technology companies will go on to be the most profitable companies for generations to come. A subset of these will play a catalytic role in driving large-scale reductions in global greenhouse emissions, directly addressing SDGs 13, 14 and 15, and indirectly addressing many others, such as 3 and 12. Many SWFs share this view and indeed believe that competitive, long-term investment returns can be generated by catalyzing solutions to the climate crisis.

In many ways, long-term investors such as SWFs are the best sources of capital for clean technology companies, as they have intergenerational time horizons and can make large-scale investments. Making direct investments into clean energy companies, however, can be very difficult because of the specific knowledge and sophisticated skill set required, which even some of the largest SWFs do not possess.

AI was thus formed to help channel long-term capital into climate infrastructure. The core function of AI is to source, screen, do due diligence, and structure and monitor clean and green technologies and companies for the purpose of connecting them with long-term investors. The climate infrastructure industry requires the development of new financial products, business models, measurements and standardization in order for the required investments to be ramped up over the next five to ten years, and this is what the AI is setting out to do.

AI currently has nine members that are long-term investors, two of which are SWFs that have committed $1.4 billion into transactions identified by the organization. AI essentially guides its long-term investor members around all levels of capital investment in climate infrastructure, early stage, growth and project finance. Deals sourced by AI are global, direct in nature and have a minimum investment size of $25 million. In addition to this, the organization recently started building out a strategy to de-risk climate infrastructure investments in emerging markets by blending institutional capital-seeking market returns with concessionary capital-seeking specific social, development and/or economic goals.

VI.4 *Government innovations for long-term investment: Queensland, Australia and Quebec, Canada*

As identified earlier, there is a significant role that Governments can play to facilitate the flow of long-term SWF capital into infrastructure. A certain number of Governments have recognized the importance of partnering with true long-term investors in this way and have thus come up with initiatives to help facilitate the flow of long-term institutional capital into their infrastructure projects.

The first example to highlight is the Quebec Provincial government and CDPQ Infrastructure partnership in Canada. In this case, the provincial government—which had been under pressure as the second most indebted Canadian province with a large infrastructure investment gap—announced that it would hand over the planning, financing and management of new infrastructure projects to the province's major pension fund, Caisse de Depot et Placement du Quebec. The arrangement can be seen as a more integrated design, build, finance, operate and maintain/public-private partnership model (DBFOM/PPP). After the government identifies its infrastructure investment needs, through the agreement, the pension fund will have the discretion to select the projects that will help generate a commercial return for its clients and to help propose solutions to the government. Various rounds of dialogue between CDPQ and the government will then proceed, after which the government will either

accept or reject the proposal. CDPQ will assume full responsibility for all aspects and stages of the project including planning, financing, execution and operations. The projects that are selected will be removed from the government's balance sheet, providing some budgetary relief.[11]

Such an arrangement allows the government to form a relationship with a trusted long-term partner to help solve its infrastructure investment needs. A key component is that the projects selected by CDPQ have to be able to generate revenues. By investing in the projects and overseeing their operation, execution, financing and planning, the citizens of Quebec not only benefit from improved infrastructure, they are benefit from the proceeds of the investment added to the pension fund, which will help to secure their retirement. It must be noted that CDPQ is a large, experienced direct investor in infrastructure with significant capability to carry out the function of investing and managing assets. This programme was designed to help fund greenfield projects, which historically have been too risky an investment for pension funds and SWFs. CDPQ will supplement their in-house expertise by working with well-aligned and complementary partners who can help undertake the stages of construction, logistics and operations. By being involved at the earliest stage of project origination, CDPQ will be able to carry out substantially deeper research and due diligence, and mould the design of the project to ensure mutually beneficial outcomes.

The first project—a new integrated light rail network linking downtown Montreal with the airport—is underway for the new partnership. The project will have construction costs of approximately $6.04 billion and requires government investment to complement the CDPQ investment. The project is expected to add more than $3.7 billion to Quebec's GDP over four years and enable $5 billion in private real estate developments along the route.

The second example to highlight here is the Queensland (Australia) government's sale of its motorway network to the local defined benefit pension fund manager, Queensland Investment Corporation (QIC).[12] In 2011, the Queensland government transferred Queensland Motorways (QML), a 70 km road network consisting of two major tolled motorways, to QIC under a long-term concession that valued the asset at AUD$ 3.088 billion. There were a number of factors that contributed to the sale. First, the Queensland government had professionalized its services in developing alternative procurement programmes for infrastructure assets, and the local defined benefit pension fund had professionalized its services to be able to conduct direct infrastructure investments. In the lead-up to the sale, system upgrades and the global recession had necessitated increased tolls for users but in 2010 the entity still reported aggregate deficiencies of equity of more than AUD 500 million from its major shareholder—the state government. The Queensland government's finances were also deteriorating with the state's credit rating being downgraded in 2009 and the state budget forecasting a deficit of AUD 1.9 billion. QML was identified as an asset to sell or lease in order to address the government's budget shortfalls.

At the same time, the state actuary was completing its three-year review of the state's defined benefit pension and found that the fund's liabilities exceeded its assets by more than AUD$ 1.4 billion. As a result and after weighing the relative disadvantages and advantages of putting QML through a standard competitive tender process, the Queensland government began an exclusive negotiation with QIC on the transfer of a concession agreement for QML. A key rationale behind the transfer was that value would ultimately be captured by the retirees of Queensland. The shared liabilities between QIC and the government reduced the concerns over the valuation of the asset for the public. The valuation and due diligence process also benefited from QIC's experience in evaluating infrastructure investments globally and in Queensland itself. Following consultations with external advisors and independent valuations being commissioned, both entities agreed on a market value of AUD$ 3.088 billion.

Following the sale transfer, QIC was able to make significant operational and efficiency improvements to the network, including adding new assets to the system by acquiring a failed tolled motorway and two other Brisbane City council-owned roads. In late 2013, the Board of QIC was presented with a unique challenge in that

11 For further information on the CDPQ/Quebec example, please see World Economic Forum (2016) Innovations in Long-Term Capital Management: the Practitioner's Perspective. Available from http://www3.weforum.org/docs/WEF_GAC_Future_of_Investing_Executive_Summary.pdf.

12 For more information on this case study, see In-Kind Infrastructure Investments by Public Pensions: The Queensland Motorways Case Study (M. Bennon, A.H. Monk, and Y.J. Cho, 2017). Stanford Global Projects Center. Available from https://ssrn.com/abstract=2981707.

the QML asset had grown sufficiently in size and value that it was overrepresented in the pension fund's portfolio of assets. The concentration of QML in the QIC portfolio was so great that the fund was forced to assess the divestment of all or part of QML. It was decided that the entire QML asset would be divested (in order to maximize the value of a sale) at a time when competition for operating brownfield infrastructure assets was extremely high. QIC sold QML to a consortium consisting of a local pension, a middle-eastern sovereign fund and a local road operator for AUD 7.057 billion, realizing a profit of AUD 3.8 billion for the pension fund over a four-year period. The sale was made between a pension fund and a consortium that also consisted of long-term investors. In normal circumstances, QIC would have held on to QML, being a long-term investor, however, the unique nature of concentration risk through the significant value creation led to the sale—a decision that was in the best interest of the beneficiaries of the pension fund.

Both of the cases above provide examples of how the arrangement between governments looking for long-term capital for their infrastructure projects and long-term investors such as SWFs can come to fruition. What is crucially required is a government that has the ability to procure assets for alternative financing, and SWFs with the expertise to execute infrastructure investments and manage assets appropriately. There are challenges with the model, including the conflict of interest of each entity in satisfying each of their beneficiaries appropriately—that is, SWFs should only be investing in assets that maximize commercial return in order to carry out their fiduciary obligation. Certain projects of the government, however, may not be the best commercially viable projects available. What is evident here though is the desire for governments to partner with true long-term investors, whose long time horizon points to a closer alignment with the public interest. While these cases are located in developed markets, there are attributes of both that could be applied in developing regions where such investment is likely to be of great impact.

VII. Implications and recommendations

While the assets of sovereign wealth funds (SWFs) have grown in size to over $6.5 trillion, their unique characteristics mean that this large sum is not fully available for investment in the sustainable development sectors. The role of SWFs for investing in and supporting the 2030 Agenda for Sustainable Development is substantial; however, a deeper understanding of the drivers and influences of investor organizations is required to mobilize the capital effectively.

Out of the universe of investable assets, this paper has made the assumption that investments in long-term private market asset classes—such as infrastructure, real estate, agriculture, venture capital and private equity—are the most impactful strategies to support the Sustainable Development Goals (SDGs). This is because SDG metrics in other asset classes, such as public markets, are not developed enough, but investors are able to have more control and invest over the long term, thus providing the ability to make a bigger difference. There are unique organizational and structural characteristics to SWFs that prohibit a number of these funds from investing in the most impactful asset classes. Furthermore, in regions where these investments would have the most impact, capital markets might not allow these opportunities to come to market, or governments do not have the capability to offer them. Investments into these sectors and regions seem to be restricted to the few savings, reserve investment and development categories of sovereign funds that have the required size, sophistication and governance to manage these investments.

In light of these constraints, this paper puts forward the following recommendations to facilitate the flow of SWF capital into SDG sectors:

i. More work is required to develop specific SDG measurement metrics that SWFs can use to appraise their investments across their entire portfolio. The ongoing measurement work by the Investment Leaders Group is a promising measurement initiative, and should the current lack of an industry standard persist, the suite of tools that IRIS provides gives SWFs and their asset managers a menu of measurement criteria to choose from.

ii. In addition to these programmes, measurement of the SDGs could be significantly improved by industry standardization and the further development of these measurements into actual performance metrics.

iii. The development of performance metrics is a natural next step for SWFs interested in furthering the SDGs.

While measuring impact produces benefits in itself, leveraging those impacts to adjust incentives for SWF staff, service providers and asset managers is eventually necessary to facilitate real change to the investment industry related to the SDGs.

iv. The individual SDGs vary in their ability to provide investable opportunities. Further detailed analysis on how the individual SDGs can translate into a reliable long-term investment programme that can specifically address the issues at hand is needed. In particular, the social SDGs 1, 2, 4, 5,10 and 16 are currently difficult to purposefully access.

v. Governments in emerging economies have a role to play to help attract SWF investment into their high-impact sectors. This could be done through the development of SDFs such as the National Investment and Infrastructure Fund in India, which provides foreign SWFs with a trusted local partner to co-invest in the priority sectors of the Government (these sectors can remain attractive for commercial investors).

vi. Governments also need to develop the skill sets to procure their assets and package them in a way that is attractive to SWF investors. Further examples, such as in Queensland, Australia, and Quebec, Canada, where governments have recognized the value of partnering with local and international long-term investors, should be explored and, where applicable, replicated in areas in needing investment.

vii. Ultimately, SWFs, where possible (mainly for savings, reserve investment and development funds), need to adopt a long-term approach to their investment decision-making process. They should be looking to take advantage of their competitive advantage of having scale and time horizons and make investments accordingly. By doing so, with the right governance and processes in place, they stand to make substantial financial returns for their beneficiaries and will also be contributing to sustainable development in a meaningful way.

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