

ECOSOC Annual Ministerial Review**Regional Consultation on Science, Technology and Innovation (STI) for
Promoting Renewable Energy Technologies for Sustainable
Development in Asia and the Pacific**

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Draft Background Note**SCIENCE, TECHNOLOGY AND INNOVATION FOR SUSTAINABLE DEVELOPMENT**

Science, Technology and Innovation (STI) are key enabling components of the sustainable development and growth of a country. Investing in STI that address human resource development needs as well as the needs of the economic and industrial sectors, is especially critical to enhance national productivity and global market competitiveness. Harnessing the full potential of STI however requires interactive and systemic approaches that link producers and end-users of scientific and technical knowledge so that scientific knowledge can be applied to real-world problems.

Current STI policies and programmes are largely viewed as market-driven and dominated by research and development (R&D) agendas that often do not address the challenges and basic needs of billions of impoverished people around the world. There is a need to review current STI systems to ensure that STI strategies and delivery mechanisms address the critical issue of sustainable and inclusive development. This may entail strengthening national institutional capacity to link STI to sustainable development objectives, by strengthening or reengineering existing participatory processes to ensure that they effectively identify national challenges to the achievement of those objectives and define research priorities that address those challenges. It might also entail integrating indigenous knowledge and grassroots technological innovation into formal R&D endeavors by “changing the incentive systems that structure the habits, practices, and norms of the research community”.¹

¹ ICSU, ISTS, and TWAS (2005). Harnessing science, technology and innovation for sustainable development, the International Council for Science, Paris, France

THE RIO+20 AGENDA AND THE MILLENNIUM DEVELOPMENT GOALS (MDGs)

The Rio+20 agenda identifies energy as a priority area for sustainable development and proposes to build on the “Sustainable Energy for All” initiative launched by the Secretary-General of the United Nations. The initiative aims at providing universal access to modern energy services for both consumption and production uses by 2030; improving energy efficiency at all levels with a view to doubling the rate of improvement by 2030; and doubling the share of renewable energy in the global energy mix by 2030 through promoting the development and use of renewable energy sources and technologies in all countries.² In order to achieve these goals, Rio+20 recognizes the importance of strengthening the scientific, technological and innovation capacities of countries, including by promoting effective mechanisms, enhanced means, appropriate enabling environments, and the removal of obstacles to the scaling up of the development and transfer of technology to developing countries.³ At the Rio+20 Conference, Member States agreed to strengthen international cooperation conducive to investment, development, transfer and diffusion of technologies.

Meeting sustainable development goals will require a number of actions, including harnessing and maximizing the potential of technological innovation in many areas of economic activity. In the emerging global sustainable development agenda, renewable energy will have a key role to play to ensure the achievement of this agenda. Evidence shows that energy access programmes and projects have improved the quality of life of communities in terms of energy cost savings, health, education, communication, access to information and women’s empowerment, thus contributing to the achievement of the MDGs.⁴ Renewable energy, in particular, has the potential to: increase availability and supply of quality energy; reduce greenhouse gas (GHG) emissions thereby mitigating the negative impact of climate change; promote low-carbon growth; substitute or complement conventional energy sources; promote greater access to energy; and create more employment opportunities. Renewable energy constitutes the core of most energy access programmes and projects that are being implemented worldwide. It is increasingly being recognized that renewable energy technologies (RETs) can help promote the achievement of the MDGs in various ways, from providing greater access to healthcare and ICTs to promoting gender parity.⁵ Wider access to and dissemination of RETs in developing countries and the increased use and adaptation of these technologies through all possible means will require these countries to strengthen their technology innovation systems.⁶ National STI policies could act as an enabling mechanism to promote renewable energy technology innovation systems in various ways as briefly described in the following sections.

² United Nations Rio+20 (2012). The future we want, <http://daccess-dds-ny.un.org/doc/UNDOC/GEN/N11/476/10/PDF/N1147610.pdf?OpenElement>

³ Ibid.

⁴ UNDP (2011). Towards an ‘energy plus’ approach for the poor: a review of good practices and lessons learned from Asia and the Pacific, Bangkok, Thailand. <http://web.undp.org/asia/pdf/EnergyPlus.pdf>

⁵ Practical Action (2010). Poor people’s energy outlook 2010, Rugby, UK

⁶ UNCTAD (2011). Technology and innovation report 2011 – Powering development with renewable energy technologies, New York (USA) and Geneva (Switzerland)

1. Shift balance in favor of renewable energy

National governments can benefit from substituting conventional energy with reliable and proven RETs as well as from promoting new RETs. This requires STI policies that focus primarily on developing RETs suitable for national energy circumstances, which include renewable energy targets as well as support mechanisms that act as driving force behind the deployment of renewable energy. Reportedly, at least 118 countries, more than half of which are developing countries, had renewable energy targets in place by early 2012, up from 109 as of early 2010.⁷ This indicates that policymakers are increasingly becoming aware of the benefits stemming from renewable energy - including energy security, reduced import dependency, reduction of greenhouse gas (GHG) emissions, prevention of biodiversity loss, improved health, job creation, rural development, and energy access – and thus more prone to facilitate the integration of renewable energy policies with policies in other economic sectors.⁸ This in turn requires suitable policy frameworks for RET development, production, adaptation and deployment in key sectors of the economy.

Priorities in this regard might include:

- Setting achievable renewable energy targets
- Improving policy frameworks for wider use of RETs
- Promoting the technology innovation ecosystem for the development, demonstration, diffusion and adoption of RETs
- Ensuring integration of RETs into other national policies including climate change mitigation
- Gradual increase in the share of RETs in the energy mix of countries
- Mobilizing greater domestic resources to foster development and use of RETs
- Promoting choices in RET-based innovation and industrial development
- Increasing investment for generating more energy through RETs
- Promoting market-focused RET innovation
- Creating awareness on RETs and promoting their acceptance by people

2. Alleviate energy poverty through improving and mainstreaming energy access

Energy access and affordability have been critical issues for majority of people living in rural and inaccessible areas. About 1.3 billion people—one in five globally—lack electricity to light their homes or conduct business and nearly 40% of the world's population rely on wood, coal, charcoal, or animal waste to cook their food breathing in toxic smoke that causes lung disease and kills nearly two million people a year, most of them women and children.⁹ Nearly 700 million people in the Asia Pacific region still have no access to electricity and about 85% of those live in

⁷ UNEP (2012). Renewables 2012 – Global status report, REN21 Secretariat, Paris, France

⁸ Ibid.

⁹ <http://www.sustainableenergyforall.org/objectives/universal-access>

rural areas while about 1.9 billion people in the region, nearly half of Asia's population (of 4.1 billion), have no access to modern cooking fuels and facilities and use wood, coal, charcoal, or kerosene, which can lead to health and respiratory problems; premature deaths from inhaling smoke; and accidental fires and injuries¹⁰ Greater access to sustainable energy for domestic use through affordable RETs can have a significant impact on the livelihood in the rural areas of developing countries and LDCs. Cleaner use of traditional fuels and renewable energy can significantly improve health, education and empowerment of women.¹¹ Renewable energy options - when linked to income generating activities – can also address poverty reduction, job creation and sustainable development. Though the advantages of RETs are being increasingly recognized worldwide, fossil fuel based energy still remains the dominant source of energy supply.

There are technological and economic challenges associated with the integration of renewable energy with grid-based conventional power supply. Renewable energy projects are often located in remote areas and, depending upon the class of project, the project company is generally unable to control the generation and dispatch of power to the grid. The lack of grid infrastructure is one of the biggest bottlenecks constraining development of renewable energy in much of the Asia Pacific region.¹² The lack of energy storage technologies is another techno-economic barrier for RETs. The current energy storage technologies are expensive and unable to store large volume of energy generated by RETs, while stand-alone large scale RETs based on off-grid operation are not yet financially viable. These factors constitute significant barriers to energy access and thus to sustainable economic development for many countries around the world. STI can be a powerful instrument to overcome these obstacles and thereby increase the accessibility and affordability of energy from renewable sources for the poor people in rural and remote areas. In order to do so, STI policies could focus on:

- Generating renewable energy that caters to local needs
- Developing, scaling-up, and deploying RETs in rural areas
- Promoting semi-grid or off-grid RET applications
- Integrating RETs with conventional, grid-based power supply
- Providing cost-effective RET solutions to increase its affordability by local communities
- Localization of imported RETs for local use and applications
- Providing technical support for servicing and maintenance of RET installations
- Promoting RET-based rural industry
- Promoting public-private partnerships to facilitate transfer and adoption of RETs, especially for semi-grid, off-grid applications

¹⁰ Asian Development Bank (2012). <http://www.adb.org/news/speeches/welcome-remarks-asia-pacific-dialogue-clean-energy-governance-policy-law-and-regulatio>

¹¹ UNCTAD (2010). Renewable energy technologies for rural development, UNCTAD current studies on science, technology and innovation, No. 1, New York (USA) and Geneva (Switzerland)

¹² Norton Rose (2010). Renewable energy in Asia-Pacific – A reference manual for anyone involved in the energy sector, Norton Rose LLP. <http://www.nortonrose.com/files/renewable-energy-in-asia-pacific-pdf-3mb-29339.pdf>

3. Enable technological leapfrogging

Most of the research and innovation to develop advanced renewable energy technologies are happening in the developed countries. The intellectual property of RETs is largely held by the developed world, which largely limits the accessibility of these technologies for the developing countries and LDCs in particular. It is thus very critical for developing countries to strengthen their technological capability. STI policies in these countries need to focus on strengthening national capacity for R&D, research commercialization, technology acquisition, localization of technology, etc. These efforts would reduce their technological dependence on developed countries in the medium and long run. In particular, STI policies in developing countries could embark on suitable strategies for accelerating RETs-related innovation and technological leapfrogging. STI policy priorities in this regard could include:

- Promoting technological learning and innovation
- Outlining R&D priorities in the field of RETs
- Developing human resources with advanced technical training
- Providing adequate financial support for supporting research in the development of advanced RETs
- Fostering innovation in R&D related to the development and transfer of RETs with potential rural applications through policy as well as market-based interventions.
- Building favorable policy environment for acquiring advanced RETs through technology transfer
- Developing a sound intellectual property rights (IPR) regime for the protection, commercialization and dissemination of RETs

4. Build capacity for development, transfer, adaptation and deployment of RETs

Building an adequate institutional capacity and framework is a prerequisite for developing new and innovative RETs and for making technical improvements to their current use, which will make them more affordable and more widely deployable in developing countries. Building capacity of relevant stakeholders in terms of research commercialization, technology transfer, technology deployment and adaptation is also very critical in this regard. The success of RET-related technology transfer also depends on the ability of key actors of innovation systems to access, absorb and use these technologies once they are acquired. In Asia-Pacific countries there is also a need to support the establishment and/or expansion of manufacturing and service businesses. , The absence of, or limited capacity of relevant stakeholders in the renewable energy value chain could undermine national efforts to promote a greater use of RETs to achieve sustainable development.

Key elements to build capacity for the development, transfer, adaptation and deployment of RETs could include:

- Mapping the various kinds of institutional competencies required to promote RETs and promote their interaction in the areas of R&D, innovation, and technology adaptation.

- Developing capability for renewable energy resource assessment
- Establishing specialized public research institutions and centres of excellence
- Developing renewable energy curricula, courses and training programmes in R&D institutes and universities
- Strengthening capacity of R&D institutions on innovation and R&D management to develop new and innovative RETs, protection of intellectual property rights, research commercialization, R&D collaboration with industry, etc.
- Building capacity of technology transfer intermediary agencies and technology promotion institutions
- Facilitating mobility of skills, expertise and personnel between public and private sector institutions
- Attracting partnership with private sector for important research programs

5. Promote green economy through low-carbon enterprise development

STI and enterprise development in the RETs sector are vital for fostering low-carbon economic development. They can be complementary and supplementary in terms of technological capacity building as well as commercialization, diffusion and adaptation of RETs. Small and medium-scale enterprises (SMEs) should thus be nurtured to participate in the international supply and value chain of renewable energy sector through active collaboration with global industry players. National STI policies could thus foster enterprise development in the renewable energy sector, which in turn would promote low-carbon economic development in line with the requirements of Rio+20 sustainable development agenda. Policy priority considerations in this regard could be:

- Reducing market barriers for renewable energy technologies
- Fostering RET-based micro, small and medium-scale enterprises
- Providing due consideration to the needs of target end-users when designing specific end-use applications of RETs.
- Promoting innovative RETs-based energy service models such as public-private-partnership (PPP), social enterprises, independent green power producers (IPP), etc.
- Creating links between knowledge generation and enterprise development in the renewable energy area
- Establishing business and technology incubators, technology clusters, and production networks in the renewable energy sector

GOOD PRACTICES ON EFFECTIVE STI POLICIES TO PROMOTE RENEWABLE ENERGY

There is ample evidence of good STI policies, practices and lessons learned in the promotion of renewable energy technologies in countries worldwide and particularly in the Asia-Pacific region. There are also examples of successful renewable energy service delivery models aimed at catering to the energy access needs of the “bottom-of-the-pyramid” strata of society. Networks, partnerships and collaborations among a broad range of stakeholders are a major

driving force for the development, promotion, and diffusion of RETs. Innovative practices are also being followed in many countries in several other areas of RETs promotion, such as: IPR, technological learning, resource mobilization, popularization of RET-based energy service delivery models, standardization, testing and certification of RET equipment and products, off-grid RET applications, etc.

1. Developing innovative STI policy instruments and incentives

National STI policies could create a conducive environment to facilitate a shift towards a wider application of RETs in the energy mix of countries. These policies can have a positive impact on the application and diffusion of RETs by fostering innovation activities, developing state-of-the-art RETs, encouraging innovators to make incremental technological improvements in RETs that lead to cost reductions, and promoting their adoption and utilization.¹³ Three policy options in particular could be effective in this regard and should be considered by national policymakers: regulatory policies, fiscal incentives, and public financing.¹⁴ Some of the innovative practices in these areas include:

Policy instruments

- Feed-in tariff
- Renewable Energy Targets/Quota obligations/Renewable portfolio standards
- Net metering
- Minimising subsidies for conventional energy sources, e.g. carbon-intensive fuels

Fiscal incentives

- Grant-support schemes for the development and early stage deployment of RETs
- Concessional loans
- Subsidies
- Tax incentives
- Energy production payment

Public financing

- Public research grants and funding schemes
- Public competitive bidding
- Public renewable energy fund, loans or grants
- Public procurement of renewable energy, equipment and goods
- Facilitating foreign direct investment in RETs

2. Mainstream energy access within national development strategies

¹³ UNCTAD (2011). Technology and innovation report 2011 – Powering development with renewable energy technologies, New York (USA) and Geneva (Switzerland)

¹⁴ UNESCAP (2012). Low Carbon Green Growth Roadmap for Asia and the Pacific : Fact Sheet - Renewable energy. http://www.unescap.org/esd/environment/lcgg/documents/roadmap/case_study_fact_sheets/Fact%20Sheets/FS-Renewable-energy.pdf

One of the major objectives of national innovation systems (NISs) in Asia-Pacific countries is to develop and deploy sustainable energy options, including renewable energy technologies to implement the national developmental agenda. Renewable energy technologies have the potential not only to enhance energy access for the vast majority of energy-deprived population, but also to contribute to other sectors of national economies, particularly those that are relevant to promote inclusive and sustainable development. In this regard, national governments could learn from the good practices of their counterparts in the region, such as:¹⁵

- Developing a long-term, well-articulated national policy on energy access and renewable energy, inclusive of sectoral and sub-national strategies within the overall government policy framework of development and poverty reduction
- Developing capacities of all key stakeholders, including project implementing agencies, technology suppliers, service providers, financial institutions, civil society organizations and consumers (including women)
- Engaging with stakeholders at all levels to ensure wider dissemination of information to ensure support for projects and to provide energy access to energy-deprived population
- Encourage production and servicing of sustainable energy options as a national mission.

3. Mobilizing resources for RETs innovation, development and commercialization

Government financial support for R&D and innovation both through the provision and mobilization of funds is critical to promote RETs. Public financing also plays an important role in exploring and promoting commercially viable renewable energy technologies. Investments in demonstration projects can build experience in installation, maintenance and repair, and increase the confidence necessary for early market development.¹⁶ Countries could learn from national good practices related to:

- Establishing RET-oriented financing schemes
- Generating resources through innovative fund-raising mechanisms for clean energy research and innovation
- Providing grants for research, development and demonstration, outreach and training
- Providing special funding for the absorption, diffusion and re-innovation of imported RETs

For example, the Government of India has recently created a National Clean Energy Fund (NCCF) through collecting a clean energy access of INR 50 per ton of coal, lignite and peat. The NCCF will be used to finance innovative green energy projects and research ventures aimed at reducing carbon footprint.¹⁷

¹⁵ UNDP (2011). Towards an 'energy plus' approach for the poor: a review of good practices and lessons learned from Asia and the Pacific, Bangkok, Thailand. <http://web.undp.org/asia/pdf/EnergyPlus.pdf>

¹⁶ UNDP (2008). Financing Options for Renewable Energy: Country Experiences, United Nations Development Programme, Bangkok, Thailand

¹⁷ <http://pib.nic.in/newsite/erelease.aspx?relid=71517>

4. Establish a flexible and favorable intellectual property regime

STI policies can promote a favorable intellectual property environment not only for the promotion of indigenously developed RETs but also for the transfer and acquisition of foreign technologies. In particular, a greater articulation of flexibilities at the national level under the global IPR regime could provide an impetus to the promotion of RETs in individual countries. Suggested IPR-related good practices for RETs promotion could include:¹⁸

- Flexibilities in patentability criteria to encourage incremental innovations
- Exceptions (e.g. for experimental use and from regulatory review) to granted patent rights to RETs for public good.
- Parallel imports of IPR-protected goods
- Bringing RETs under the jurisdiction of competition law and policy

5. Foster networks, partnerships, collaborations and inter-linkages for the development and promotion of RETs

Successful development and implementation of RETs requires the support of a variety of stakeholders, including public government agencies, public research institutions and centres of excellence, project implementing agencies, venture capital and finance institutions, the private sector, NGOs and civil society groups, development partners, end-users and consumers. Hence, there is a need to establish linkages among all these stakeholders in the form of networks, partnerships and collaborations through appropriate STI policy measures, such as:

- ICT enabled network of specialized institutions and stakeholders facilitating flow of knowledge and collaboration
- Regional technology innovation systems encompassing a whole range of actors and institutions – research parks, firms, public bodies, networks, etc¹⁹
- Open innovation platforms
- Public-private-partnerships (e.g. university-industry collaboration) for technology development and commercialization²⁰

Most RET projects aiming at inclusive and sustainable development also involve multiple stakeholders and hence it is critical to build and strengthen institutional collaborations and

¹⁸ UNCTAD (2011). Technology and innovation report 2011 – Powering development with renewable energy technologies, New York (USA) and Geneva (Switzerland)

¹⁹ Junmo Kim (2005). National R&D networks – critical policy issues and implications for SMEs, Asia Pacific Tech Moitor, Vol 22 No 4, Jul-Aug 2005, pp. 14-21

²⁰ Masayuki Kondo (2004). University-industry collaboration in Japan – Public initiative, public-private partnership and private initiative, Vol 21 No 4, Jul-Aug 2004, pp. 17-23

partnerships for delivering the desired services to end-users. Linkages between stakeholders would help to: (1) foster learning in various critical aspects of RET implementation through inter-organizational and inter-firm flows of knowledge and skills; and (2) integrate RETs across all sectors of the economy. At the implementation stage of RET projects, the type of inter-linkages and interactions as well as the level of engagement between different actors would determine the degree of success of the project. Some of the experiences and best practices from which countries could learn include:²¹

- Proactive information dissemination at all levels
- Continuous dialogue at the local level to create bottom-up demand for projects
- Regular project updates shared with stakeholders
- Capacity development to assist the local government to promote and disseminate RETs
- Documentation and dissemination through assessment reports, newsletters and case studies
- Ensuring broad-based and realistic stakeholder ownership of the project

6. Promote innovative renewable energy delivery models

In developing countries, the mode of renewable energy dissemination varies widely from completely unregulated, fully commercial models to various forms of private-public partnerships to donor-driven and state-subsidized models. Success, defined in terms of sustainability and wide coverage, particularly with regard to the poor, appears to be attributable in significant part to institutional arrangements that harness public resources, such as subsidies, and private sector competition in ways that build on the relative strengths of each without undermining the contributions of either.²² In view of the challenging demands of domestic and international consumers, innovative models are emerging as efficient mechanisms to bring together the resources and strengths of collaborative partners for mutual benefit. Many of these models have been successfully implemented around the world and Asia-Pacific countries in particular.

Developing countries could learn from current experiences and good practices with regard to various types of innovative models for the delivery of innovative sustainable energy services such as:

- Public-private-partnerships
- Social enterprises
- Independent green power producers
- Donor-driven models
- Full commercialization models

²¹ UNDP (2011). Towards an 'energy plus' approach for the poor: a review of good practices and lessons learned from Asia and the Pacific, Bangkok, Thailand. <http://web.undp.org/asia/pdf/EnergyPlus.pdf>

²² UNDP (2008). Financing Options for Renewable Energy: Country Experiences, United Nations Development Programme, Bangkok, Thailand

- Fully subsidized or grants-driven models

Some of these innovative renewable energy models implemented in Asia-Pacific countries are: private-sector-driven cook stoves programmes in China, Sri Lanka and Cambodia; Nepal Biogas Support Programme; solar home systems (SHSs) in Bangladesh, Nepal and Sri Lanka; renewable energy community grids in Nepal and the Philippines; and mini-grid experience with microhydropower in Pacific island countries.²³ Evidence shows that many of the above models could be expanded and further popularized for the commercialization of RETs for households to make them more accessible to the poor. This could be achieved through mapping, replicating and scaling-up of successful RET-based energy delivery models.

7. Supporting private sector for RETs dissemination

The role of private sector is important for the promotion and development of RETs-based industry. Once technologies are developed and transferred for commercialization, the domestic industry would require governments support in several areas of implementation. Best practices in this regard include:

- Mobilizing domestic resources and investment (e.g. venture capital, loans, equity, etc) for RETs-based enterprises
- Improving greater access to RETs through the provision of technology transfer support services
- Creating favorable environment for RET-based R&D enterprises to go public in overseas stock exchanges
- Developing commercially viable RETs and expanding the scope of choices of RETs in terms of specific characteristics of different RETs, varied project sizes, and end-use applications such as on-grid, off-grid or decentralized supply
- Ensuring standardization, testing and certification of RET equipment and products
- Providing training, quality control and technical support to pre-qualified private suppliers and distributors of renewable power systems
- Building supply chains of RETs

REGIONAL PERSPECTIVES AND REQUIREMENTS ON USING STI TO PROMOTE RENEWABLE ENERGY

The issue of facilitating greater transfer of climate-friendly technologies, which has been a key element in the global debate on climate change, is intricately linked to and dependent on existing national STI capabilities. Besides institutional limitations in R&D and innovation capabilities, there is a wide range of variations in RETs capacity among countries in the Asia-Pacific region. These limitations can pose a serious challenge to national efforts to promote RETs, which can lead to imbalances in RET-driven technological and industrial development in

²³ Ibid.

the region. Wider dissemination of renewable energy technologies could also be hampered if adequate STI measures are not taken both at the national and regional level. At the Asia-Pacific regional level, national STI policies need to focus on fostering regional linkages and partnerships among national RED stakeholders and on promoting south-south cooperation. Networking among national stakeholders at the regional level can help catalyze cross-border technological cooperation between countries.

Possible strategies to address some of these issues/challenges through regional level initiatives could include:

- Helping strengthen weak STI infrastructure and strategy required to transfer RETs to developing countries, particularly the LDCs, which otherwise may have difficulties in accessing technologies and related know-how for production and use.
- Addressing/reducing incoherent, and often conflicting, policy developments at the multilateral level, which tend to undermine the wider dissemination of RETs in developing countries.
- Exploring newer means of improving innovation capacity in RETs through south-south, north-south, and triangular cooperation
- Liberalizing trade and investment to promote south-south dissemination of RETs through simple flow of traded goods, flow of investments across borders, and joint investments in the setting-up of RETs-based power generation facilities.
- Promoting cross-border technology cooperation in the field of RETs through sharing of technologies, training and joint R&D between countries and also between their R&D institutes and innovative firms. These could be spearheaded by national governments, inter-governmental organizations, multilateral or regional development banks, or regional networking platforms.
- Developing regional RET databases, resource centres and networks for promoting RETs
- Integrating socio-economic development strategies in the region to promote wider dissemination and implementation of RETs in the region.
- Strengthening capacity of policymakers and other relevant stakeholders involved in the promotion of renewable energy, especially in LDCs, landlocked developing countries (LLDCs) and small island developing states (SIDSs).
- Developing and/or strengthening national policy frameworks that are conducive to RETs development, commercialization, adaptation and deployment.
- Supporting the implementation and dissemination of RETs within countries in the region through sharing of good practices and suitable replication of successful business models to provide sustainable energy technologies, products and services.
- Building regional capacity to use renewable energy resource assessment data and analysis.
- Developing regional renewable energy demonstration programmes to showcase business models of renewable energy project delivery.
- Developing appropriate financing and market mechanisms for supporting renewable energy projects in the region.

- Ensuring international support for RET development in the Asia-Pacific developing countries through various channels, including financial support and effective technology transfer mechanisms.
- Strengthening and/or establishing frameworks for cooperation on various aspects related to renewable energy technology transfer, including information sharing on: demand-supply gaps in specific renewable energy technologies at the national levels; existing national mechanisms for protecting intellectual property rights (IPR); and policies that promote cross-border cooperation for fostering innovation and entrepreneurship in the renewable energy sector.
- Establishing and strengthening regional mechanisms for accelerating the rate of exchange of information, sharing of best practices, transfer of technologies as well as establishing cross-border business partnerships in the renewable energy sector.
- Strengthening the capacity of value chain actors in the transfer and adoption of renewable energy technologies through training programmes focused on skill building related to various aspects of planning and managing technology transfer.
- Promoting and encouraging public-private partnerships in renewable energy through innovative policies and market mechanisms.

THE WAY FORWARD

The Rio+20 Outcome recognizes that developing countries are particularly vulnerable to and are increasingly affected by climate change, which is severely undermining their food security and efforts to eradicate poverty, as well as threatening their territorial integrity, viability and, in the case of the SIDSs, their very existence. It also encourages international initiatives and partnerships to address the interrelationship between water, energy, food and climate change in order to achieve synergies and minimize conflicts among policy objectives, with particular attention to impacts on vulnerable populations. Wide scale diffusion of renewable energy technologies could help countries in the Asia-Pacific region to address some of these challenges. Appropriate STI policy framework, institutional capacity building, and innovative market mechanisms can foster renewable energy technologies and create better market conditions for the development, acquisition, deployment, adoption and diffusion of RETs. Policy strategies that can promote RETs include: rationalizing fossil-fuel subsidies; incorporating environmental external costs into energy pricing; introducing regulations to tackle market failures and barriers; providing financial incentives and funding mechanisms for RETs; promoting research and development (R&D), etc.

The outcomes of the Regional Consultation on STI for Renewable Energy in Asia and the Pacific to be held in Bangkok, Thailand, on 13 March, 2013 will contribute to the work of the High-Level Panel on the Post-2015 Development Agenda to be held in Bali on 26 March, 2013 and to the Annual Ministerial Review of ECOSOC to be held in Geneva in July 2013.