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- p. 16: Burdett, R. & D. Sudjic (2008): The endless city. London: Phaidon Press Inc. Download available: [http://www.urban-age.net/publications/theEndlessCity/\\_spreads/02\\_30-31.html](http://www.urban-age.net/publications/theEndlessCity/_spreads/02_30-31.html)
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# ENDNOTES

- 1 UNEP 2009 — CSD 18/19: Key messages on the thematic cluster (Version 1 — 23 September 2009).
- 2 ACC (American Chemistry Council), 2004 — Guide to the Business of Chemistry, (August, 2004): p. 122, and ACC (American Chemistry Council), 2006 — American Chemistry Council: Business of Chemistry in China (March 2006)
- 3 Please note: BRIICS include Brazil, Russia, India, Indonesia, China and South Africa.
- 4 OECD, 2008b — OECD Environmental Outlook to 2030: Chapter 18 — Chemicals, p. 378 and (The Center for International Environmental Law (CIEL), 2009) — Discussion Draft: Addressing nanomaterials as an issue of global concern, p. 8
- 5 OECD, 2004 — A detailed definition of “sustainable chemistry” is included in <http://www.oecd.org/dataoecd/16/25/29361016.pdf>
- 6 WHO, 2009a — <http://www.who.int/ipcs/assessment/en/>
- 7 Toxicological evaluations of food additives and contaminants and of residues of veterinary drugs in food, produced by the Joint WHO/FAO Expert Committee on Food Additives JECFA, are used by the Codex Alimentarius Commission and national governments to set international food standards and safe levels for protection of the consumer. (<http://www.inchem.org/pages/about.html#sids>)
- 8 A global database with evaluated information on substances (chemicals, pharmaceuticals, poisonous plants, and poisonous and venomous animals) commonly involved in cases of poisoning. A PIM is a concise, practical document designed to facilitate the work of poisons information specialists, clinicians, and analysts. (<http://www.inchem.org/pages/about.html#sids>)
- 9,10 Please refer to p.40 and p.42 in the full report: [http://www.icca-chem.org/ICCADocs/ICCA\\_A4\\_LR.pdf?epslanguage=en](http://www.icca-chem.org/ICCADocs/ICCA_A4_LR.pdf?epslanguage=en). The calculations are based on analysis by McKinsey and Comp.
- 11 International Council of Chemicals Associations (2009). Innovations for Greenhouse Gas Reductions — A life cycle quantification of carbon abatement solutions enabled by the chemical industry. Download available (accessed September 2009): [http://www.icca-chem.org/ICCADocs/ICCA\\_A4\\_LR.pdf](http://www.icca-chem.org/ICCADocs/ICCA_A4_LR.pdf) and [http://www.americanchemistry.com/s\\_acc/sec\\_news\\_article.asp?CID=206&DID=9860](http://www.americanchemistry.com/s_acc/sec_news_article.asp?CID=206&DID=9860)
- Please note: The study used a life cycle carbon dioxide-equivalent (CO<sub>2</sub>e) emissions analysis to assess the global chemical industry's impact on greenhouse gas emissions through the life cycle of chemical products and the applications they enable. Analyses were performed for over 100 individual chemical product applications. Emission savings were compared with all direct and indirect emissions linked to the chemical industry. Analyses spanned the major relevant products and sectors of the chemical industry and covered a representative portion of the emissions linked to the chemical industry. Finally, 2030 modeling scenarios were used to extrapolate how emissions for production and use phases may develop.
- 12 Krausmann et al., 2009 — Growth in global materials use, GDP and population during the 20th century. *Ecological Economics*, Vol. 68, No. 10, p. 2696 — 2705.
- 13 Mining companies in emerging economies include:

Company	Country	Principal products (World ranking in 2007)
ENRC	United Kingdom/ Kazakhstan	Ferrocchrome (1), Ferromanganese, Iron ore, Aluminum
Metallinvest	Russia	Iron ore (4)
Alrosa	Russia	Diamonds (2)
PT Antam	Indonesia	Nickel (4)
Kazakhmys	United Kingdom/ Kazakhstan	Copper (11), Silver (5)

Gold Fields	South Africa	Gold (4)
Vedanta Resources	UK/India	Zinc (5), Copper, Cobalt (5), Iron ore, Aluminum
Impala Platinum	South Africa	Platinum (2), Palladium (3)
Antofagasta	United Kingdom/ Chile	Copper (10), Molybdenum (5)
KGHM Polska Miedz	Poland	Copper (9), Silver (3)
Anglogold Ashanti	South Africa	Gold (2), Uranium (10)
Grupo Mexico	Mexico	Copper (6), Molybdenum (3), Silver (9)
Codelco	Chile	Copper (1), Molybdenum (2)
Norilsk Nickel	Russia	Nickel (1), Copper (8), Platinum (4), Palladium (1), Cobalt (2)
Vale	Brazil	Iron ore (1), Nickel (2), Platinum (7), Copper (14), Aluminum

Source: Humphreys, 2009 based on information from Deutsche Bank and Brook Hunt

- 14 OECD, 2008a — “Environmental Outlook to 2030 — Chapter 11: Waste and Material Flows”, p. 239.
- 15 Source: (Metals Economics Group, 2009) and [http://www.metalseconomics.com/pdf/CES\\_2009.pdf](http://www.metalseconomics.com/pdf/CES_2009.pdf). Please note: The data from 1989-2006 CES did not include uranium; uranium exploration is included for 2007-2009 and the relative metals prices for 2009 are an average through September 2009
- 16 Contribution of mining to value added is the percent proportion of production in the mining sector of total value added for all sectors in the country or area at current prices. According to the System of National Accounts (SNA) 2008 gross value added is “the value of output less the value of intermediate consumption”. Value added is a measurement of output used for aggregating production without double counting intermediate consumption and processes. In national accounts, “mining” is defined according to the International Standard Industrial Classification (ISIC) 05-09, which includes mining of coal, lignite, and metal ores, extraction of crude petroleum and natural gas, and mining support service activities. Please note that for the purpose of this publication, countries without or without a dominance of crude petroleum and natural gas production were selected.
- For more information see: <http://unstats.un.org/unsd/cr/registry/isc-4.asp> and <http://unstats.un.org/unsd/nationalaccount/handbooks.asp>
- 17 Collier, Plog, Spence, & Venables, 2009) — “Managing Resource Revenues in Developing Economies”, p. 1-2
- 18 OECD, 2008c — “Environmental Outlook to 2030 — Chapter 19: Selected Industries”, p. 418.
- 19 In July 2008, Peru declared a state of emergency at a mine near Lima over fears that its tailings dam, weakened by seismic activity and subterranean water filtration, could release arsenic, lead, and cadmium into the main water supply for the capital (Bebbington & Williams, 2008).
- 20 Miranda et al., 2003 — Mining and critical ecosystems: Mapping the risks. World Resources Institute. Download available: [http://archive.wri.org/publication\\_detail.cfm?pubid=3874](http://archive.wri.org/publication_detail.cfm?pubid=3874)
- 21 See <http://archive.wri.org/image.cfm?id=1774>. Social vulnerability refers to the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recovery from the impact of a natural hazard (Wisner et al, 2004)
- 22 Miranda et al., 2003 — Mining and critical ecosystems: Mapping the risks. World Resources Institute (Chapter 4, p. 27). Download available: [http://archive.wri.org/publication\\_detail.cfm?pubid=3874](http://archive.wri.org/publication_detail.cfm?pubid=3874)
- 23 See <http://www.reliefweb.int/rw/rwb.nsf/db900SID/ACIO-7W8H54?OpenDocument>
- 24 See <http://archive.wri.org/image.cfm?id=1768>; metals and precious gemstones.
- 25 See <http://archive.wri.org/image.cfm?id=1771>

- 26 In June 2010 a world congress on “Water in Mining” is to be organized by companies in the mining sector. Issues to be discussed include: water management in arid areas, watershed management, water resource quantification and management, access to water and sustainable development, integrated mine water management throughout the mine life cycle, recycling of water in mining environments, effluent characterisation and management. For more information see [http://www.wim2010.com/evento2010/index.php?option=com\\_content&task=view&id=4&Itemid=2#3](http://www.wim2010.com/evento2010/index.php?option=com_content&task=view&id=4&Itemid=2#3)
- 27 Bebbington & Williams, 2008 — “Water and Mining Conflicts in Peru”, Mountain Research and Development 28(3/4):190-195. 2008
- 28 See <http://www.wri.org/chart/global-co2-emissions-growth-select-sectors-2000-2005>
- 29 World Resources Institute, 2009: <http://www.wri.org/chart/global-co2-emissions-growth-select-sectors-2000-2005>
- 30 For details refer to chapter 5 of the report “World Energy Outlook 2009”.
- 31 Notes: \* **Baseline scenario:** vehicle ownership and travel per vehicle for passenger light duty vehicles (PLDVs), trucks and other modes are consistent with IEA WEO 2008 and a world oil price of USD 100 rising to USD 120 by 2030. This scenario implies somewhat lower PLDV ownership in the developing world, at a given level of income, than has occurred historically in many OECD countries. This could be caused by a number of factors including greater urbanisation in developing countries and lower suburbanisation than in OECD countries, greater income disparities between the wealthy and the poor in non-OECD countries, and limits on the infrastructure needed to support large numbers of vehicles. This scenario also assumes a continuation of the decoupling of freight travel growth from GDP growth around the world which has clearly begun in OECD countries.
- BLUE Map scenario:** reflects the uptake of technologies and alternative fuels across transport modes that can help to cut CO<sub>2</sub> emissions at up to USD 200/tonne of CO<sub>2</sub> saved by 2050. New powertrain technologies such as hybrids, plug-in hybrids (PHEVs), electric vehicles (EVs) and fuel cell vehicles (FCVs) start to penetrate the PLDV and truck markets. Strong energy efficiency gains occur for all modes. Very low GHG alternative fuels such as H<sub>2</sub>, electricity and advanced biofuels achieve large market shares.
- BLUE Shifts scenario:** envisages that travel is shifted towards more efficient modes and a modest reduction in total travel growth as a result of better land use, the greater use of non-motorized modes and substitution by telecommunications technologies. Also there is a range of policies that could be adopted to shift passenger travel onto other more sustainable modes and most of these policies will need time to be implemented and to have a wide impact. The scenario envisages that this has happened by 2050, with passenger travel in PLDVs and aircraft approximately 25% below Baseline scenario levels as a result.
- BLUE Map/Shifts scenario:** is a combination of BLUE Map and BLUE Shift
- 32 Calculations are based on data from the presentation on “Transport, Energy and CO<sub>2</sub>: Moving Toward Sustainability” by Francois Cuenot of IEA (Slide 28). Presented at UN DESA Expert Group Meeting on Transport for Sustainable Development, 27 August 2009. S:\Denise\Trends Report\Transport\Graphics\IEA\_evolution\_modal share\_efficiency improvement.xls
- 33 Warr, 2010
- 34 Warr, 2010
- 35 See <http://www.worldbank.org/transport/transportresults/headline/rural-access/gender-equity-map.pdf>. *Gender equality is the goal of the equality of the genders or the sexes. The ratio refers to the ratio of girls to boys.*
- 36 See <http://www.worldbank.org/transport/transportresults/headline/rural-access/>
- 37 International Transport Forum, 2009
- 38 Chalk, 2009
- 39 Drake, 2010
- 40 Calculations based on World Development Indicator “Air transport, registered carrier departures worldwide” by using the latest figures available per country
- 41 Calculations based on World Development Indicator “Air transport, registered carrier departures worldwide” by using the latest figures available per country
- 42 [www.worldmapper.org](http://www.worldmapper.org), 2002d
- 43 World Bank, 2009. Calculations based on World Development Indicator “roads, total network (in km)” by using the latest figures available per country
- 44 [www.worldmapper.org](http://www.worldmapper.org), 2002b
- 45 World Bank, 2009. Calculations based on World Development Indicator “Passenger cars (per 1,000 people)” by using the latest figures available per country
- 46 [www.worldmapper.org](http://www.worldmapper.org), 2002c
- 47 World Bank, 2009. Calculations based on World Development Indicator “Rail lines (total route km)” by using the latest figures available per country
- 48 [www.worldmapper.org](http://www.worldmapper.org), 2002/2003b
- 49 World Bank, 2009. Calculations based on World Development Indicator “Rail lines (total route km)” by using the latest figures available per country
- 50 [www.worldmapper.org](http://www.worldmapper.org), 2003b
- 51 The World Bank, 2008. Calculations based on World Development Indicator “Air transport, freight (in million ton-km)”
- 52 [www.worldmapper.org](http://www.worldmapper.org), 2003a
- 53 [www.worldmapper.org](http://www.worldmapper.org), 2002a
- 54 [www.worldmapper.org](http://www.worldmapper.org), 2002/2003a
- 55 The World Bank, 2008. Calculations based on World Development Indicator “Container port traffic (in TEU: 20 foot equivalent units)”
- 56 UNCTAD, 2009
- 57 UNCTAD, 2009
- 58 Source: <http://unstats.un.org/unsd/environment/hazardous.htm> based on UNSD/UNEP Questionnaires on Environment Statistics (Waste section) and OECD/Eurostat Questionnaire on the State of the Environment (Waste section) as well as Eurostat environment statistics data website [http://epp.eurostat.ec.europa.eu/portal/page/portal/environment/data/main\\_tables](http://epp.eurostat.ec.europa.eu/portal/page/portal/environment/data/main_tables)
- 59 Cobbing, 2008
- 60 Rolf Widmer, Heidi Oswald-Krapfa, Deepali Sinha-Khetriwalb, Max Schnellmann, & Bön, 2005
- 61 Cartographer/designer credit: Claudia Heberlein. Based on statistics by EMPA Swiss Federal Laboratories for Materials Testing and Research (definition according to the European Union WEEE Directive. Additional information can be found: [http://maps.grida.no/go/graphic/what\\_is\\_e\\_waste](http://maps.grida.no/go/graphic/what_is_e_waste)

- 62 Toxics Link, 2009: 'Better safe than sorry': The Heavy Metals and E-Waste Debris Report to International Conference on Heavy Metals and E-waste, organized by Toxics Link on 26th and 27th October 2009 in India. For mor information, please go to: <http://www.toxicslink.org/pub-view.php?pubnum=250>
- 63 For additional information on the "e-Stewards Standard for Responsible Recycling and Reuse of Electronic Equipment@" please go to: [http://www.e-stewards.org/ewaste\\_crisis.html](http://www.e-stewards.org/ewaste_crisis.html)
- 64 Chair's Summary of the CSD Waste Management Seminar.
- 65 Cartographer/designer credit: *Philippe Rekecewicz, (UNEP/GRID-Arendal)*. Based on Basel Action Network, Silicon Valley Toxics Coalition, Toxics Link India, SCOPE (Pakistan), Greenpeace China, 2002. Additional information can be found: <http://maps.grida.no/go/graphic/who-gets-the-trash>
- 66 Hoornweg & Giannelli, 2007
- 67 Bogner et al., 2007, see chapter "10.2.1 Waste generation"
- 68 IPCC Working Group III: Mitigation, 2001, see chapter "3.7.4.6 Africa"
- 69 <http://unstats.un.org/unsd/environment/wastetreatment.htm>, Based on United Nations, Department of Economic and Social Affairs, Population Division, World Population Prospects: The 2008 Revision, New York, 2009 (advanced Excel tables), UNSD/UNEP Questionnaires on Environment Statistics, Waste section, OECD/Eurostat Questionnaire on the State of the Environment, Waste section. Eurostat environment statistics data website [http://epp.eurostat.ec.europa.eu/portal/page/portal/environment/data/main\\_tables](http://epp.eurostat.ec.europa.eu/portal/page/portal/environment/data/main_tables)
- 70 Data available for download: <http://titania.sourceoecd.org/vl=6246578/cl=12/nw=1/rpsv/factbook2009/08/02/02/08-02-02-g1.htm>
- 71 Data available for download: [http://www.oecd.org/document/49/0,3343,en\\_2649\\_34395\\_39011377\\_1\\_1\\_1,00.htm](http://www.oecd.org/document/49/0,3343,en_2649_34395_39011377_1_1_1,00.htm)). Please note: calculations based on data from latest year available.
- 72 Manders, 2009
- 73 See "DIRECTIVE 2009/28/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC," 23 April 2009)
- 74 The calculations are based on the IEA World Energy Statistics and Balances. Please note: The graph is based on data on energy supply and consumption in original units = terajoules (TJ). Industrial waste of non-renewable origin consists of solid and liquid products (e.g. tyres) combusted directly, usually in specialised plants, to produce heat and/power. Renewable industrial waste is not included here, but with solid biomass, biogas or liquid biomass.
- 75 Calculations based on data from OECD, 2009b and IEA World Energy Statistics and Balances, Please note that the graph is based on data on energy supply and consumption in original units = terajoules (TJ). Municipal waste consists of products that are combusted directly to produce heat and/power and comprises wastes produced by households, industry, hospitals and the tertiary sector that are collected by local authorities for incineration at specific installations. Municipal waste is split into renewable and non-renewable.
- 76 For additional information, please refer to Bitran & Valenzuela, 2009 and Sjoedin, 2006
- 77 <http://unstats.un.org/unsd/environment/wastewater.htm>, based on: UNSD/UNEP Questionnaires on Environment Statistics (Water section), OECD/Eurostat Questionnaire on the State of the Environment (Water section) and OECD Environmental Data Compendium (Inland Waters section)
- 78 Worldsteel Association, 2009, Global steel can recycling rate reaches highest recorded level, 18 March 2009. Please note: The calculation of the recycling rates is based on data provided by Worldsteel Association. The criterias used differ and the data may refer to different stages of packaging production and recycling: While food and beverage cans are the most common form of steel packaging, steel packaging also applies to industrial and household goods such as paint and air fresheners.
- 79 Calculations are based on data on Waste Recycling Rates for Glass from the Waste Section, Worksheet 4B, OECD, 2008d. Please note: The country grouping EU-15 consists of the following 15 countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom. Also note that Australia, Canada, Slovak Republic, Poland, Czech Republic and Hungary are not reflected, since data was outdated or not enough available (less than five years) and in the case of Mexico, data appears not plausible.
- 80 Calculations are based on data on Waste Recycling Rates for paper and cardboard from the Waste Section, Worksheet 4A, OECD, 2008d. Please note: The country grouping EU-15 consists of the following 15 countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom.
- 81 Calculations are based on data on Waste Recycling Rates for paper and cardboard from the Waste Section, Worksheets 4A and 4 B, OECD, 2008d. Please note: For "paper and cardboard" there is no current data available for Luxembourg; for "glass" no current data available for Canada, Czech Republic, Hungary, Luxembourg, Poland and Slovak Republic.







READER'S NOTES

Two columns of horizontal lines for taking notes.

