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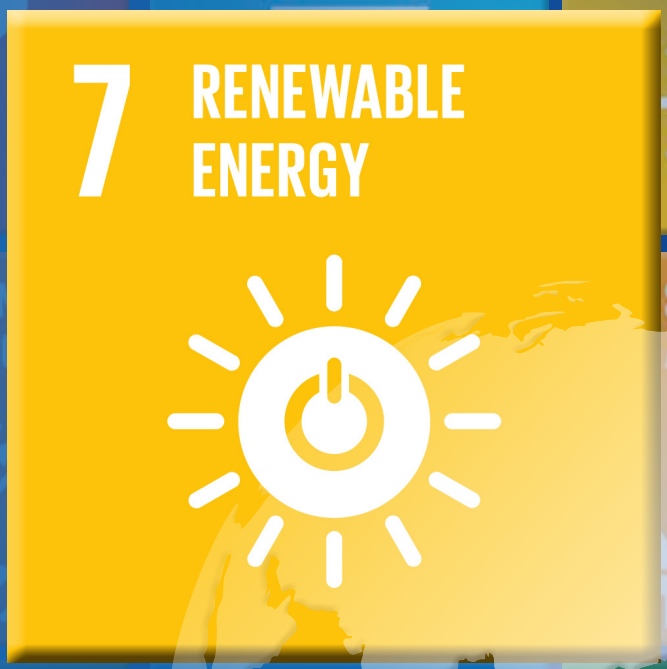
Economic and Social Commission for Asia and the Pacific

Statistical Yearbook for Asia and the Pacific 2015



Sustainable Development Goal 7
Ensure access to affordable, reliable, sustainable and modern energy for all

Access to affordable, reliable, sustainable and modern energy services is highlighted as a global development priority in the 2030 Agenda for Sustainable Development. The adoption of the Plan of Action on Regional Cooperation for Enhanced Energy Security and the Sustainable Use of Energy in Asia and the Pacific 2014-2018[1] by Ministers attending the Asian and Pacific Energy Forum in May 2013 had earlier confirmed this goal as a priority for the region, underscoring the importance of action by households and Governments and the potential value addition from regional cooperation.

7.1 Ensuring universal access to affordable, reliable and modern energy services

Most economic activity is impossible without access to adequate and reliable modern energy services. Ensuring access to energy, also referred to as "overcoming energy poverty", is therefore vital in the fight against poverty.

Poor people are the least likely to have access to energy services, such as electricity, and they are more likely to remain poor if they stay unconnected to such services. Therefore, statistics on lack of access to energy services are often interpreted as a proxy indicator for the existence of a vicious cycle of energy poverty. Further, because statistics are more readily available for access to electricity than for other types of energy services, electricity access is often used as an indicator for overall access to modern energy services.

People living in high income economies use 36 times more electricity than those living in low income economies

Residential electricity consumption per capita in Asia and the Pacific nearly doubled between 1995 and 2012, from 212 to 424 kWh. The relative increase in per capita residential electricity consumption was smaller in high income economies than in low income economies (Fig 1). Nonetheless, in 2012, on average, a person in a high income economy consumed in excess of 36 times more electricity than a person living in a low income economy. The average residential electricity consumption in low income economies in 2012 was 44.7 kWh per capita, which equates to an average use of 0.12 kWh per capita per day, less electricity than is required to boil a kettle of water.

Residential electricity consumption has increased most notably in the upper middle-income economies, from an average of 118 kWh per capita in 1995 to 495 kWh per capita in 2012, representing a more than fourfold increase. Much of this increase has been driven by China where consumption increased more than five times over the same period, to 459 kWh per capita in 2012.

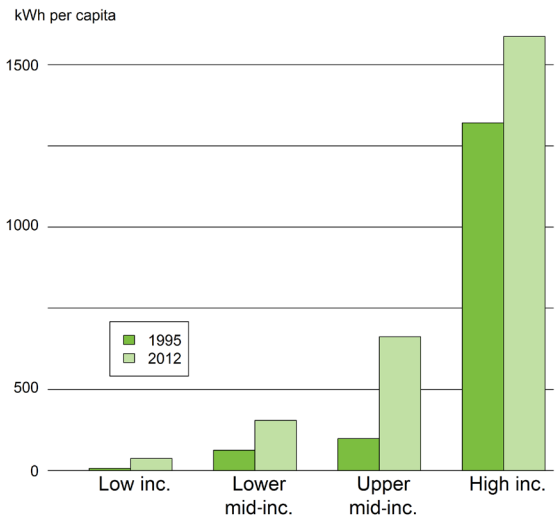


Figure 1 Residential electricity consumption per capita, Asia and the Pacific, 1995 and 2012

Access to electricity is still far from universal in Asia and the Pacific

A 2014 estimate by the International Energy Agency indicated that 621 million people in Asia and the Pacific were without access to electricity in 2012.[2]

Access to electricity is linked with economic prosperity. The three countries where access to electricity is lowest according to the 2014 estimate, namely the Democratic People's Republic of Korea (74 per cent), Myanmar (68 per cent) and Cambodia (66 per cent), are also among the poorest countries in the region (Fig 2). The lack of access to electricity is notable also in India, where about one quarter of the population does not have such access. In view of India's large population, this statistic equates to nearly 300 million people, or about half of those estimated to be living without electricity in the entire Asia-Pacific region.

There are large variations in access patterns, including between urban and rural areas. Many countries with low access rates also have large disparities in access between urban and rural areas. While 97 per cent of urban residents in Cambodia had access to electricity in 2012, this was the case for only 18 per cent of rural residents.

Further, many people with access to the electricity grid struggle with highly unreliable services; one third of developing countries experience at least 20 hours of power outages a month.[3]

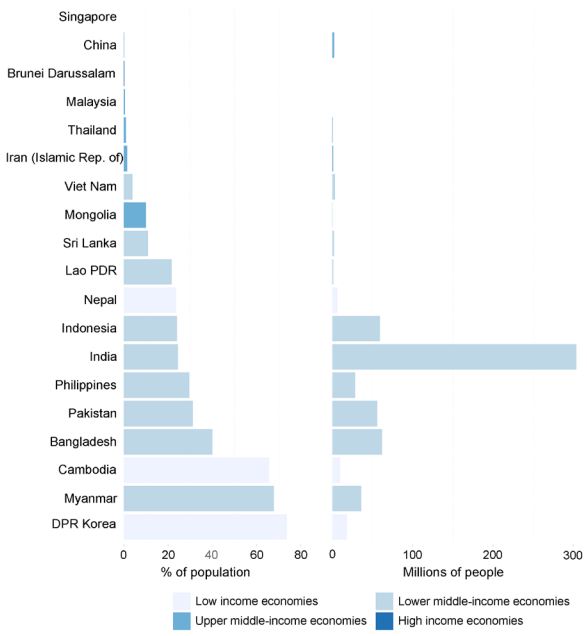


Figure 2 Population without access to electricity, selected Asian and Pacific countries, 2012

More than 2 billion people in Asia and the Pacific depend on solid fuels to meet their residential energy needs

Approximately 2.1 billion people in Asia and the Pacific depend on solid fuels to meet their residential energy needs, such as for cooking and heating. Solid fuels, such as wood and other types of biomass, is the primary source of energy for four out of five people (84 per cent) in low income countries, nearly two thirds (61 per cent) of people in lower middle-income countries and more than a third (39 per cent) of people living in upper middle-income countries. (Fig 3)

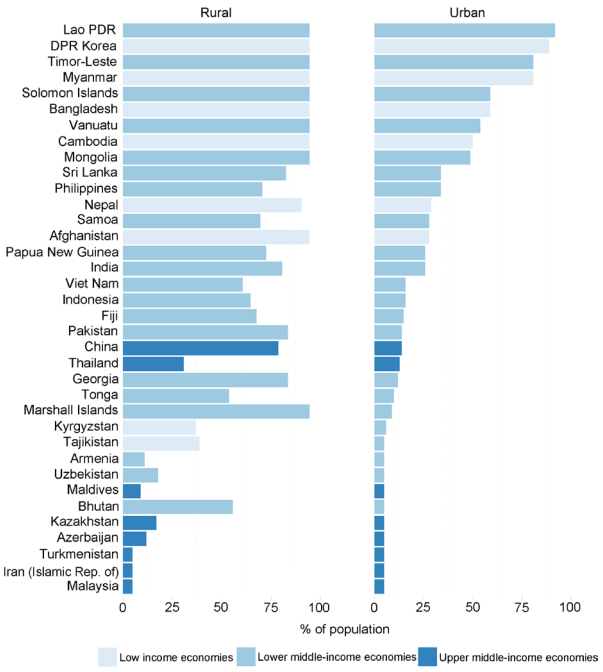
Within each country and overall in the region, higher percentages of rural populations (77 per cent) than urban populations (20 per cent) depend on biomass to meet their energy needs.

The use of biomass is often indicative of a lack of reliable access to electricity or other types of energy services for cooking. The greatest disparity between rural and urban use of biomass is in the upper middle-income economies (72 per cent rural, 13 per cent urban) due in part to the greater access to electricity in urban areas in such countries.

Solid biomass that is used in traditional ways forms a major share of the renewable energy supply in many countries. It is, however, questionable whether biomass when used in a traditional way can be considered renewable as it has been linked to deforestation and local air pollution causing environmental degradation and health problems, such as in Nepal.[4]

Even with access to electricity, some people still rely on traditional fuels for cooking and heating. This situation is caused largely by the unreliability and lack of affordability of electricity services. In some places, however, people find that cooking with traditional fuels and technology makes the food taste better.

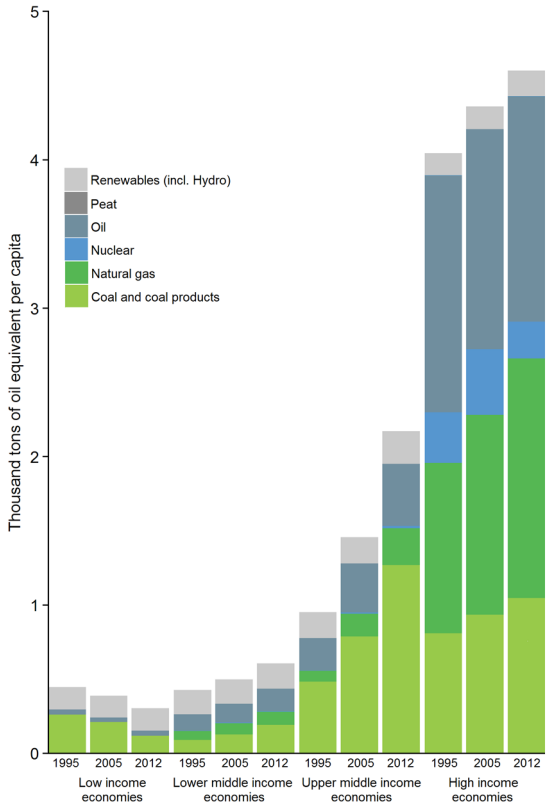
Figure 3
Percentage of urban and rural population using solid fuels, Asia and the Pacific, 2013



7.2 Increasing the share of renewable energy

Sustainable Development Goal target 7.2 is aimed at increasing the share of renewable energy in the global energy mix. In addition to reducing the environmental footprint as a result of energy production and use, development of renewable energy is likely to be an important contributor to improved access to energy services in many parts of the Asia-Pacific region.

Figure 4
Total energy mix per capita in economies of Asia and the Pacific, 1995, 2005 and 2013



Increases in the use of renewable energy in Asia and the Pacific are not keeping up with increases in fossil fuel use

Between 1995 and 2012, renewable energy supply in the Asia-Pacific region increased from 590 to 794 million tons of oil equivalent (Mtoe). During the same period, however, the share of renewables in the total energy supply (total primary energy supply, or TPES) decreased from 17 to 12 per cent. In other words, the increase in renewables was outpaced by other energy sources. This overall trend reflects developments in lower-middle-income economies and upper

middle-income economies, where the share of renewables in the total energy mix fell from 38 to 28 per cent and from 18 to 10 per cent respectively (Fig 4). In contrast, the share of renewables as a fraction of TPES remained at 3 per cent in high income countries and 46-45 per cent in low income economies.

The notable increase in renewable energy supply in low income economies in the region is mainly due to a number of hydropower plants that have become operational during the past few decades. Renewable energy sources now account for the majority of TPES in Nepal (84 per cent), Myanmar (75 per cent), Cambodia (72 per cent), Tajikistan (64 per cent) and Sri Lanka (53 per cent). However, there is no uniform definition of renewable energy (Box 1), and large hydropower plants can have undesirable environmental and social impacts.

Box 1

What is renewable energy?

Although there may be a general understanding of what constitutes renewable energy, precise definitions for statistical purposes vary slightly with differences of opinion existing for boundary types of renewable energy sources, such as peat, and types of use, such as large-scale hydropower.

The International Energy Agency defines renewable energy as "Energy derived from natural processes (e.g. sunlight and wind) that are replenished at a faster rate than they are consumed. Solar, wind, geothermal, hydro, and some forms of biomass are common sources of renewable energy".[a]

In a special report on renewable energy sources and climate change mitigation,[b] renewable energy is described as any form of energy from solar, geophysical or biological sources that is replenished by natural processes at a rate that equals or exceeds its rate of use. Renewable energy is obtained from the continuing or repetitive flows of energy occurring in the natural environment and includes such resources as biomass, solar energy, geothermal heat, hydropower, tide and waves and ocean thermal energy, and wind energy.

The International Renewable Energy Agency has a statutory definition that "renewable energy includes all forms of energy produced from renewable sources in a sustainable manner, including bioenergy, geothermal energy, hydropower, ocean energy, solar energy and wind energy".[c]

These definitions vary slightly in their emphasis on either the types of sources or the ways the sources are used and replenished, indicating absence of a universal definition of renewable energy.

In the International Recommendations for Energy Statistics (IRES),[d] endorsed by the United Nations Statistical Commission in 2011, a list of types of energy sources was adopted that is to be included when calculating renewable energy production. The present *Statistical Yearbook* and the ESCAP Online Statistical Database follow the IRES approach.

a International Energy Agency, "Renewable energy". Available from http://www.iea.org/aboutus/faqs/renewableenergy/.
b International Panel on Climate Change, "Introduction", *IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation*, prepared by Working Group III, O. Edenhofer and others, eds. (Cambridge, United Kingdom, and New York, Cambridge University Press, 2011).
c Conference on the Establishment of the International Renewable Energy Agency, "Statute of the International Renewable Energy Agency (IRENA)", Bonn, Germany, 26 January 2009. Available from http://www.irena.org/menu/index.aspx?mnu=cat&PriMenuID=13&CatID=126.
d See United Nations, *International Recommendations for Energy Statistics*, annex A. Unedited version available from a link at http://unstats.un.org/unsd/energy/ires/.

Overall, fossil fuels (coal, oil and natural gas) dominate as the sources of energy in Asia and the Pacific, and their share of TPES increased from 80 per cent in 1995 to 85 per cent in 2012. High income economies are particularly dependent on fossil fuels; they accounted for 91 per cent of those economies' energy supply in 2012 compared with 50 per cent in the low income economies.

The Asia-Pacific region accounted for 78 per cent of the world's solar and wind energy in 2013

Wind and solar energy are clean, local and effectively infinite sources of energy that have the potential to diversify a country's energy mix towards increased sustainability. In Asia and the Pacific there was a 15-fold increase in the consumption of solar and wind energy between 1990 and 2013, from 1,327 thousand tons of oil equivalent (ktoe) to 20,629 ktoe. (Fig 5)

Even with this impressive increase, however, the consumption of solar and wind energy in Asia and the Pacific represents only a very small fraction of the total energy consumed in the region (less than 0.5 per cent in 2012). Moreover, development has been geographically limited to East and North-East Asia, which in 2013 accounted for 19,072 ktoe or 92 per cent of the region's solar and wind energy consumption. The Asia-Pacific region and the East and North-East Asian subregion accounted for 78 and 72 per cent respectively of the 26,354 ktoe of solar and wind energy consumed globally in 2013.

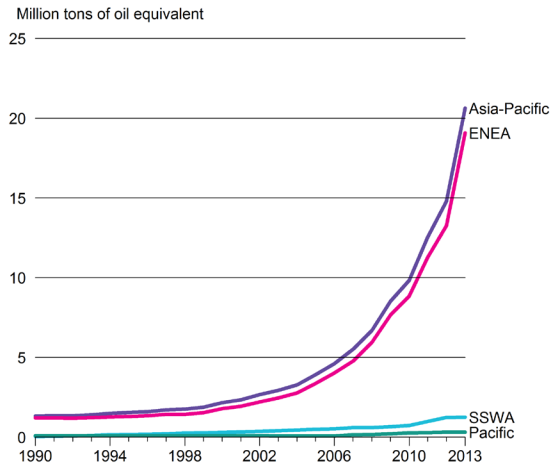


Figure 5
Solar and wind energy consumption in Asia and the Pacific, 1990-2013

7.3 Efficient use of energy

Energy intensity is an indicator of overall energy efficiency in an economy. It is calculated as the amount of energy used divided by the economic value of the goods and services produced. Lower energy intensity is promoted as part of low carbon development. Currently, despite substantial decreases since the 1990s, energy intensity in Asia and the Pacific is higher than the global average.

In the low income economies of Asia and the Pacific, only half of the energy was required in 2012 to generate the same economic output as in 1995

In 2012, an average of 380 units of energy was required to produce 1 unit of economic output in Asia and the Pacific (measured in kilograms of oil equivalent (koe) per 1,000 dollars GDP (2005 USD)), which compares to a global figure of 240 units of energy per unit of economic output. In other words, economies in Asia and the Pacific are more energy intensive than the global average.

However, the region has greatly improved its energy intensity during past decades; the current level of 380 koe should be viewed in comparison with the figure for 1995 when the energy intensity was 406 koe per 1,000 dollars GDP (2005 USD).

Low income economies have made the greatest energy intensity improvements since 1995 (Fig 6). Energy intensity in these countries in 2012 was 642 koe per 1,000 dollars GDP (2005 USD), decreasing from 1,264 koe in 1995, a reduction of nearly half (49 per cent). There have also been substantial improvements in the lower- and upper middle-income economies where energy intensity deceased by nearly a third (30 per cent). In comparison, improvements in energy intensity in the high income countries have been modest, decreasing 15 per cent from 234 koe per 1,000

dollars GDP (2005 USD) in 1995 to 197 koe in 2012. However, the high income economies are still far less energy intensive than other economies in the region and in 2012 used roughly a third of the energy required by the lower-income economies to produce 1 unit of economic output.

Energy intensity improves when increases in economic production outpace increases in energy consumption. Improved energy intensity, therefore, does not necessarily mean that less energy is consumed. For example, figure 6 shows that energy consumption by upper middle-income countries doubled from 1995 to 2012, from 1,044 Mtoe to 2,163 Mtoe. During the same period, GDP (2005 USD) more than tripled, resulting in an increase in the overall energy efficiency of those economies.

By contrast, energy consumption in high income economies, such as Australia, Japan and New Zealand, remained relatively constant, although per capita consumption far exceeded that in other subregions. Since GDP in these countries grew much less quickly than in upper middle-income countries, their relative energy intensity improvements were smaller.

Changes in energy intensity vary by sector

Comparative analyses of energy intensity are affected by differences in the structures of economies, which vary greatly across the region. Some productive activities, such as mining, are inherently energy intensive while other activities, such as service provision, are less so. Comparisons of energy intensity, therefore, are more informative when focused on a specific sector of the economy. For example, a number of developing economies in Asia and the Pacific continue to rely on traditional forms of agriculture with low levels of mechanization (Fig 7). In contrast, agriculture in higher-income economies is more energy intensive, having achieved increased levels of productivity through deployment of modern energy services. During recent decades, energy intensity in the agricultural sector in these economies has again decreased, aligning with the levels seen in lower- and upper middle-income economies.

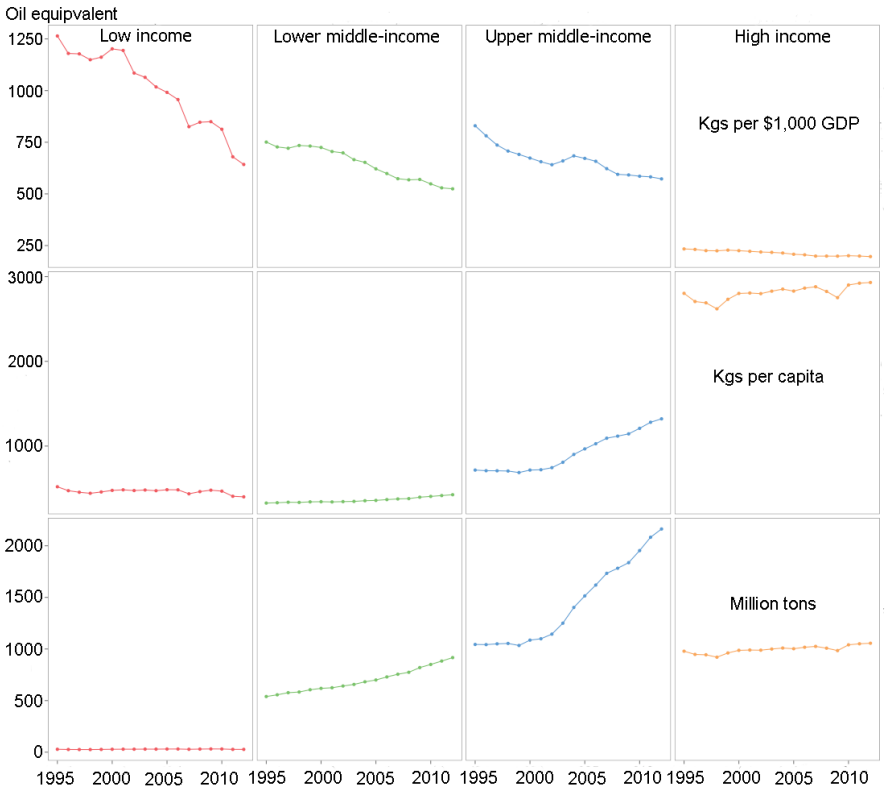


Figure 6
Total primary energy supply, per capita and energy intensity, Asia and the Pacific, 1995-2012

7.4 Energy security

Energy security is an important prerequisite for development. Although the definition of energy security varies across countries, generally it refers to long-term, sufficient and affordable energy supply. Limited years of reserves to the production ratio for fossil fuels in the region, various energy self-sufficiency levels, plus the differentiated influence of fluctuating international oil prices are all significant factors that call for regional collaboration on energy access, trade, connectivity, technology development and transfer, as well as fiscal strategies to enhance energy security for sustainable development in the Asia-Pacific region.

Figure 7
Energy intensity in the agricultural sector, Asia and the Pacific, 1995-2012

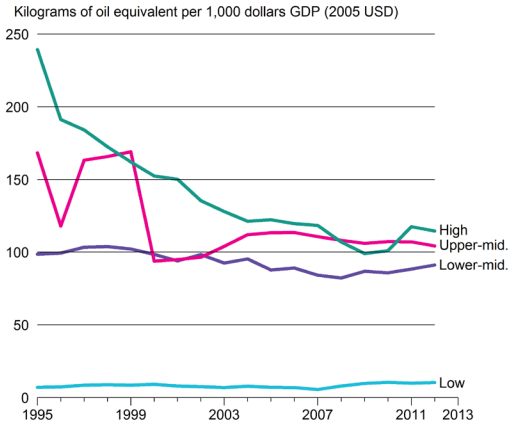
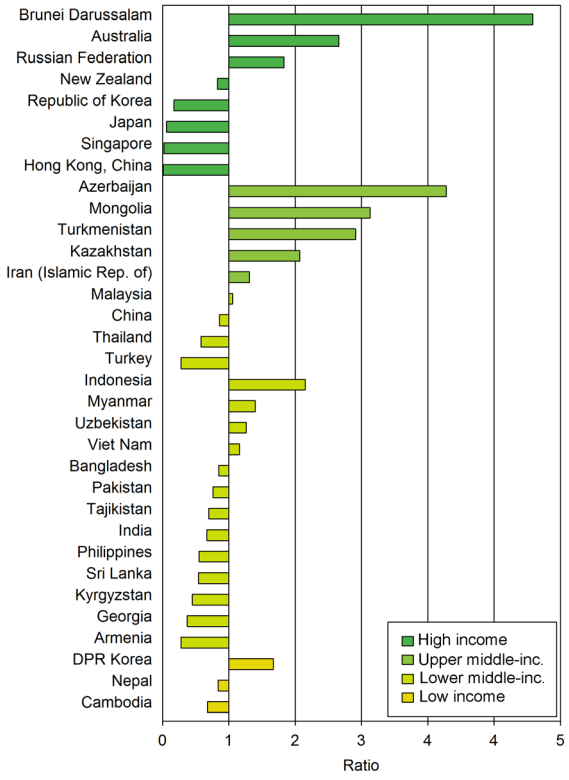


Figure 8
Energy self-sufficiency, Asia and the Pacific, 2013



More than half of the countries in Asia and the Pacific are not self-sufficient with energy

Energy self-sufficiency is one important component of national energy security,[5] and can be thought of as the extent to which countries are able to produce enough energy to meet their own total primary energy supply (TPES). Figure 8 summarizes this relationship for 33 economies in the region by presenting the total energy production in a country as a fraction of total TPES.

Countries with a self-sufficiency of 1 or more produce more energy than total TPES and have the potential to export energy. In contrast, countries where total TPES exceeds production are not self-sufficient and therefore rely on energy imports. A value of zero represents a country that has no domestic energy production and thus imports all its energy.

Owing to the extraordinary economic growth experienced in Asia and the Pacific in recent decades, energy demand has increased significantly and is expected to grow continuously in the foreseeable future. Fossil fuels have been and will continue to be the major energy sources in the region, accounting for more than 60 per cent of total final energy consumption.[5] Soaring energy demand plus unevenly distributed fossil fuel reserves in the region make many developing countries dependent on imported fossil fuels; therefore, they are exposed to energy price volatility in the international market.

Of the 33 countries and areas in Asia and the Pacific for which data are available, 14 were energy self-sufficient in 2013. The remaining 19 countries depended on imports from the international market to meet domestic demand. The four countries and areas furthest below the self-sufficiency threshold of 1.0 are the high income economies of the Republic of Korea (0.17), Japan (0.06), Singapore (0.02) and Hong Kong, China (0.01). These economies depend heavily on imported energy but may

be less economically vulnerable to volatility in international energy markets than lower-income countries. By contrast, countries such as Cambodia (0.68 per cent), Armenia (0.28 per cent) and Georgia (0.37 per cent) are less dependent on energy imports, but may have less economic room to manage market volatility.

7.5 Data and monitoring issues

Relatively broad data coverage for indicators of energy supply

The time series for total primary energy supply, or TPES, which form the basis for much of the trends presented in the present chapter, are available by energy source and for every year from at least 1990 onwards for nearly every country in Asia and the Pacific. The exception is for countries and territories in the Pacific subregion, where data are not available for most Pacific island developing States.

The renewable energy component of the TPES time series has a limitation: the figures do not indicate whether the renewable energy is being sustainably produced and used. For example, a substantial share of today's renewable energy consumption comes from the use of wood and charcoal by households in the developing world; however, such energy use is sometimes associated with unsustainable forestry practices and health-threatening, heavy, indoor air pollution.

Energy self-sufficiency measures are derived from total TPES and domestic energy production data, which as mentioned previously are available for most countries in the region – barring those in the Pacific subregion – and for every year since 1990.

Less data available for analysis of final energy consumption

Statistics on final energy consumption is in general available for the industrial sector, and data availability follows the same pattern of coverage as TPES. However, incompatibility between the definition of the industrial sector used for energy statistics and the classifications used for GDP statistics severely limits the calculation of a number of indicators, such as energy intensity for different sectors. A separate note of caution must be mentioned when referring to energy intensity figures: this indicator is an imperfect proxy for energy efficiency as it is affected by a number of factors unrelated to energy efficiency, such as climate, structure of the economy and nature of economic activities.

With regard to energy consumption by households, data on residential electricity consumption are sufficiently available to produce robust subregional aggregates for every year from at least 1990 onwards. Coverage is, however, again relatively low in the Pacific subregion, with data being available only for Australia and New Zealand.

Measuring access to modern and renewable energy

Data on access to electricity are less complete, and the analysis in the present Yearbook is based on 19 countries and for 2012 only. Available estimates of the size of the population lacking access to electricity vary between 621 million and 427 million depending on the method used. However, the 2012 data available on the percentage of the population using solid fuels can be disaggregated by rural and urban dwellers and are sufficiently complete to produce subregional estimates, except for the Pacific.

The concept of modern energy has not been defined for statistical purposes, and in the previously mentioned International Recommendations for Energy Statistics no distinction is made between modern and traditional energy. In the World Energy Outlook 2010, the International Energy Agency defined traditional biomass energy as "biomass consumption in the residential sector in developing countries that refers to the often

unsustainable use of wood, charcoal, agricultural residues and animal dung for cooking and heating". The United Nations Environmental Programme defines modern bioenergy as energy produced through the conversion of biomass to higher value and more efficient and convenient energy carriers, such as pellets, biogas, ethanol and biodiesel.[6] However, from currently available statistics in most Asian and Pacific countries, there is no way to determine whether the relevant flows of energy that are currently captured in their energy balances and categorized as renewable can be considered "traditional", "modern", or "sustainable". Similar issues pertain to the definition and classification of renewable energy (Box 1).

Sustainable Development Goal 7 implies that greater attention needs to be paid to detailed statistical information on energy use by communities that lack regular access to electricity. Providing such attention may require increased collection and use of data from household surveys, including through international programmes, such as the Demographic and Health Surveys (DHS) and the Multiple Indicator Cluster Surveys (MICS). Data from household surveys were used in this way for monitoring the targets on access to water and sanitation under Millennium Development Goal 7 through the Joint Monitoring Programme of UNICEF and WHO.[7] The most recent DHS (phase 6) and MICS (round 4) household questionnaires include questions on access to electricity and use of energy resources, such as natural gas and charcoal. A similar global monitoring initiative may be applicable for monitoring targets for sustainable access to renewable, affordable, reliable and modern energy resources.

Box 2

Impact of low oil prices

International crude oil prices have dropped significantly since the second half of 2014: the spot price for Brent crude dropped from $111.80 per barrel in June 2014 to $47.80 per barrel in January 2015; it rebounded slightly in early 2015, stabilizing at around $47 per barrel for August, September and October 2015 before dipping below $40 per barrel on 8 December 2015.[a]

Global demand for oil grew by about 1.0 million barrels per day (mb/d) in 2014, while the supply – boosted by unconventional sources in the United States of America – grew by 2.20 mb/d.[b] The world's two largest oil producers – the Russian Federation and Saudi Arabia – have been maintaining their crude oil output levels.[c] The return of the Islamic Republic of Iran to the international oil and gas market will add extra capacity to the global supply. Additionally, the combined impact of slowing growth in major economies and steadily declining energy intensity mean that the growth in energy demand will likely slow.

The United States Energy Information Administration projects that the Brent crude oil price will average about $59 per barrel in 2016,[d] while the World Bank forecasts prices below $60 until 2018, slowly increasing to $88.30 per barrel in 2025 for the average spot price of crude oil.e IMF also predicts that Brent crude oil prices will be below $50 per barrel in 2016 but, using a 95 per cent confidence interval, the forecast ranges from $28 to $98 per barrel.[f] The difference in predictions implies that there is huge uncertainty associated with crude oil price forecasts.

Prevailing low international oil prices have an impact on energy security and the sustainable use of energy in Asia and the Pacific. Low prices will induce economic activity, while reducing inflationary, external and fiscal pressures in oil-importing countries. On the other hand, low prices will adversely affect oil-exporting countries by weakening their fiscal and external positions and by reducing their economic activity.

Many developing countries in the region depend on imported fossil fuels. For those countries, the Asian Development Bank estimates an additional 0.5 per cent growth rate in 2015 GDP if oil prices remain low.[g] Low oil prices also lower inflation rates and present opportunities for oil importing countries to accelerate their programmes related to fossil fuel subsidies. In fact, energy

Box 2

Impact of low oil prices *continued*

subsidy reform has emerged as one of the most important policy challenges for developing Asian economies, as expenditures on fossil fuel subsidies pose a huge burden on government budgets.[h]

Many countries in the region have initiated reforms. The petrol subsidy in Indi was removed in June 2010, producing annual savings of $1 billion; diesel was deregulated in October 2014, producing annual savings of $10 billion. In Indonesia, fossil fuel subsidy reform reduced budgeted costs to below $8 billion in 2015 and is expected to reduce such costs further to less than $4 billion in 2016.[i]

Removal of fossil fuel subsidies is projected to have a significant impact on GDP and the energy sector, with savings becoming available for reallocation to the poor, who are the most vulnerable to the direct and indirect impacts of higher energy prices.[j,k] However, policymakers need to make sure that such reforms are credible and enduring, and that the redistribution of savings is beneficial for the national economy.[j] For example, government savings realized from the removal of fossil fuel subsidies could be redirected towards sustainable infrastructure, which would support improvements in energy access and efficiency, and contribute to further development of renewable energy.

With regard to renewable energy development, the general perception is that low oil prices may undermine the differences in cost between fossil fuels and renewable energy, thus making the latter less attractive. However, the evidence so far does not point uniformly in this direction. In fact, global investment in renewable energy rebounded in 2014 to $270 billion, a 17 per cent increase from that of 2013.[k] One of the reasons for this development is that the cost of renewable energy is declining while the long-term price of oil remains uncertain. Moreover, oil is not the primary fuel used for electricity generation in the Asia-Pacific region; most renewable energy utilization is for power generation. Furthermore, price is not the only driving force for renewable energy development. Concerns such as environmental sustainability, climate change and energy security, as well as technology innovation, also play important roles in the development of renewable energy.

a See United States Energy Information Administration, "Petroleum and other liquids: spot prices". Available from http://www.eia.gov/dnav/pet/pet_pri_spt_s1_m.htm; and Nicole Friedman, "Brent crude falls; oil prices end at nearly seven-year lows", Wall Street Journal, 8 December 2015. Available from http://www.wsj.com/articles/oil-prices-rise-but-more-pain-is-expected-1449577680.

b Organization of the Petroleum Exporting Countries, OPEC Annual Report 2014 (Vienna, 2014). Available from http://www.opec.org/opec_web/static_files_project/media/downloads/publications/Annual_Report_2014.pdf.

c Georgi Kantchev and Summer Said, "Russia and Saudi Arabia to continue pumping oil", Wall Street Journal, 2 October 2015. Available from http://www.wsj.com/articles/russian-oil-output-rises-to-post-soviet-high-in-september-1443777432.

d United States International Energy Administration, "Short-term energy outlook: prices", 8 December 2015. Available from http://www.eia.gov/forecasts/steo/report/prices.cfm.

e World Bank, "World Bank commodity price forecast", 20 October 2015. Available from http://pubdocs.worldbank.org/pubdocs/publicdoc/2015/10/966751445286237369/CMO-Oct-2015-Historical-Forecasts.pdf.

f International Monetary Fund, "Commodity price outlook and risks", 11 November 2015. Available from http://www.imf.org/external/np/res/commod/pdf/cpor/2015/cpor1115.pdf.

g Asian Development Bank, Asian Development Outlook Supplement: Stable Growth Outlook for Developing Asia, 14 July 2014. Available from http://www.adb.org/sites/default/files/publication/42754/ado-supplement-july-2014.pdf.

h Asian Development Bank, Fossil Fuel Subsidies in Thailand: Trends, Impacts, and Reforms (Mandaluyong City, Metro Manila, Philippines, 2015). Available from http://www.adb.org/sites/default/files/publication/175455/fossil-fuel-subsidies-thailand.pdf.

i Asian Development Bank, Fossil Fuel Subsidies in Indonesia: Trends, Impacts, and Reforms (Mandaluyong City, Metro Manila, Philippines, 2015). Available from http://www.adb.org/sites/default/files/publication/175444/fossil-fuel-subsidies-indonesia.pdf.

j Organisation for Economic Co-operation and Development, OECD Companion to the Inventory of Support Measures for Fossil Fuels 2015 (Paris, 2015). Available from http://sciences.blogs.liberation.fr/files/2215011e.pdf.

k Frankfurt School – UNEP Collaborating Centre for Climate and Sustainable Energy Finance, and Frankfurt School of Finance and Management, Global Trends in Renewable Energy Investment 2015. Available from http://fs-unep-centre.org/sites/default/files/attachments/key_findings.pdf.

Footnotes

1 United Nations Economic and Social Commission for Asia and the Pacific, *Ministerial Declaration and Plan of Action on Regional Cooperation for Enhanced Energy Security and the Sustainable Use of Energy in Asia and the Pacific* (Bangkok, 30 May 2013). Available from http://http://www.unescap.org/sites/default/files/APEF2013-Ministerial-Declaration-Plan-of-Action.pdf.

2 A more recent estimate that takes into account access to decentralized forms of electrification, for example off-grid solutions, such as solar panels and stand-alone systems in rural areas, and alternative means of grid connection, including illegal connections, points to a much lower but still significant number of people without access: 426 million. See Asian Development Bank, *Sustainable Energy for All: Tracking Progress in Asia and the Pacific – a summary report* (Mandaluyong City, Metro Manila, Philippines, September 2015). Available from http://www.adb.org/sites/default/files/publication/174335/se4all-tracking-progress.pdf.

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