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**Economic and Social Commission for Asia and the Pacific**  
Committee on Energy**Second session**

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Item 2 of the provisional agenda\*

**Status of and progress towards achieving Sustainable  
Development Goal 7 in Asia and the Pacific****Status of and progress towards achieving Sustainable  
Development Goal 7 in Asia and the Pacific****Note by the secretariat***Summary*

The present document contains information related to regional and national progress towards achieving the targets of Sustainable Development Goal 7, based on the data available as of July 2019. Examples of successful policies and measures that have supported advancements are presented, as are common challenges in aligning policies and creating the necessary conditions to achieve the Goal 7 targets.

The Committee may wish to provide guidance to the secretariat to further support members and associate members in achieving Sustainable Development Goal 7 and implementing its follow-up and review process.

**I. Introduction**

1. On 25 September 2015, the General Assembly adopted resolution 70/1, entitled “Transforming our world: the 2030 Agenda for Sustainable Development”, in which it established 17 Sustainable Development Goals, including Goal 7 on ensuring access to affordable, reliable, sustainable and modern energy for all. Goal 7 contains three targets to be achieved by 2030: target 7.1, to ensure universal access to affordable, reliable and modern energy services; target 7.2, to increase substantially the share of renewable energy in the global energy mix; and target 7.3, to double the global rate of improvement in energy efficiency.

2. The Sustainable Development Goals and targets came into effect on 1 January 2016. Governments have the primary responsibility for follow-up and review at the national, regional and global levels, in relation to the progress made in implementing the Goals and targets over the subsequent 15 years, and will provide for systematic follow-up and review at the various levels.<sup>1</sup>

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\* ESCAP/CE/2019/L.1.

<sup>1</sup> General Assembly resolution 70/1, para. 47.

3. The 2030 Agenda targets are defined as aspirational and global, and while the targets provide guidance to Governments, each sets its own targets and develops its own policies in accordance with national circumstances. Member States agreed that the global indicators would be complemented by indicators at the regional and national levels, as developed by Member States themselves.

4. The Second Asian and Pacific Energy Forum, which was held at the ministerial level in Bangkok from 3 to 5 April 2018, adopted the Ministerial Declaration on Regional Cooperation for Energy Transition towards Sustainable and Resilient Societies in Asia and the Pacific. In the Declaration, the Ministers recognized the Economic and Social Commission for Asia and the Pacific (ESCAP), including its Committee on Energy, as an important intergovernmental platform to facilitate regional energy cooperation. They also recognized the important role of the Commission in supporting the implementation of the 2030 Agenda including Goal 7, and its follow-up and review process by, inter alia, promoting policy dialogue and knowledge-sharing and helping to link the national and global levels of implementation.

5. In its resolution 74/9, the Commission endorsed the Ministerial Declaration and requested the Executive Secretary to support members and associate members in the implementation of the Declaration by following up on and reviewing regional progress towards Goal 7 targets in light of the regional road map for implementing the 2030 Agenda for Sustainable Development in Asia and the Pacific, as well as by conducting analytical studies on key energy trends and emerging issues in the Asia-Pacific region and compiling and disseminating relevant energy information and data, in particular through the Asia Pacific Energy Portal, to ensure informed intergovernmental deliberations, including at the sessions of the Commission and the Committee on Energy.

6. The present document contains information related to regional and national progress in achieving the targets of Sustainable Development Goal 7, based on the data available as of July 2019. Examples of successful policies and measures that have supported advancements are presented, as are common challenges in aligning policy and creating the necessary conditions to achieve the Goal 7 targets.

## **II. Significant progress in electrification**

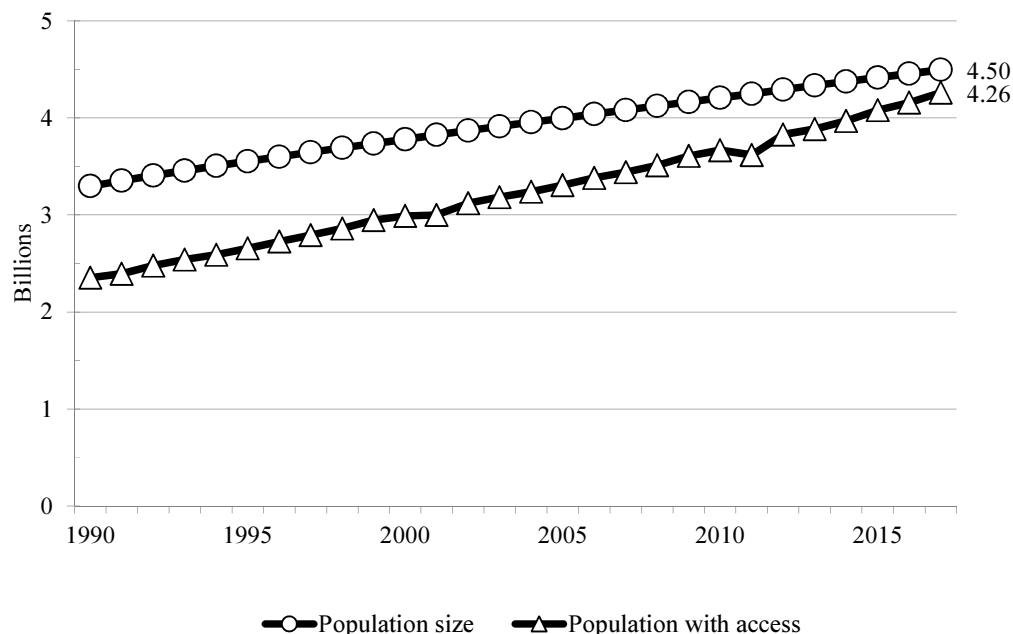
7. Target 7.1 is to ensure universal access to affordable, reliable and modern energy services by 2030. The assessment of this target utilizes two indicators, the first being indicator 7.1.1: the proportion of the population with access to electricity. This indicator is presented as a percentage of the total population and disaggregated for rural and urban populations.

8. Policymakers across Asia and the Pacific have acknowledged that electricity is fundamental to socioeconomic development. Their policies and programmes have demonstrated significant progress in bringing electricity to urban and rural populations. In 2017, the electrification rate for the total regional population reached 94.8 per cent, up from 87.2 per cent in 2010. Recent accelerated progress resulted in an average annual growth in electrification of 1.1 percentage points between 2010 and 2017, as compared to 0.8 percentage points between 2000 and 2010.

9. Between 2010 and 2017, an additional 305 million people were provided access to electricity, raising the region's total electrified population to 4.26 billion. This has closed the gap between those with and those without

access to its narrowest point in history. As of 2017, more than 231 million people lacked access to electricity in the Asia-Pacific region. Although large, the size of this unserved population represents a decrease of more than 75 per cent compared to 1990 levels, despite sustained population growth (figure I).

Figure I  
**Access to electricity in Asia and the Pacific, 1990–2017**



Source: ESCAP, Asia Pacific Energy Portal. Available at <http://asiapacificenergy.org> (accessed on 16 July 2019).

10. Based on the current rate of progress, the Asia-Pacific region is on track to achieve universal access to electricity by 2030. As of 2017, 31 out of the 62 members and associate members of ESCAP had achieved universal access to electricity, including 15 since 2010. As of 2017, an additional 11 members had reached access rates equal to or exceeding 95 per cent.

11. Between 2010 and 2017, nearly 300 million people in India gained access to electricity, and the country’s electrification rate reached 92.4 per cent, up from 76.3 per cent. In 2017, the “Saubhagya” scheme was introduced to provide last-mile connectivity in rural areas. According to government data, 102 million people, or 26 million households, still lacked access in 2017. In 2018, the Government announced that all villages had been provided with electricity and, at the time of writing, the number of unelectrified households had been reduced to 18,000.<sup>2</sup>

<sup>2</sup> For current figures, see Saubhagya Dashboard, available at <https://saubhagya.gov.in/> (accessed on 24 June 2019).

12. The Government of Bangladesh exceeded its 2017 electrification target of 85 per cent, set under its seventh five-year plan for the period 2016–2020, and is aiming to achieve 96 per cent electrification by 2020. In 2010, the country had an electrification rate of just 55.3 per cent; by 2017, through a combination of grid expansions, the world’s largest solar home system programme<sup>3</sup> and solar lanterns, it had achieved 88.0 per cent electrification.

13. Among the member States tackling universal access, the Government of Afghanistan has demonstrated remarkable progress, raising its access level from just 42.7 per cent in 2010 to 97.7 per cent in 2017. The Government has placed strong emphasis on the needs of its rural population and has deployed off-grid renewable energy, particularly micro-hydro and solar, to expand access to electricity.<sup>4</sup> The National Solidarity Programme, a community-driven development initiative, has played a major role, as have non-governmental organizations and international donors.

14. Between 2010 and 2017, the Government of Cambodia expanded access at an annual gain of 8.3 percentage points, the region’s highest average. This has raised the share of the population with access to electricity from 31.1 per cent in 2010 to 89.1 per cent in 2017. The Government has set a target to ensure that all villages have some form of electricity by 2020 and that 70 per cent of households have grid-quality power by 2030.<sup>5</sup> The country has rapidly expanded its national power grid and put in place four programmes to bring electricity to rural areas. In 2017, 26.1 per cent of households obtained electricity through off-grid technologies.<sup>6</sup>

15. Other notable cases include Timor-Leste and Papua New Guinea; in those countries access rates increased by 42.1 and 34.8 percentage points between 2010 and 2017. The Government of Timor-Leste, under its Strategic Development Plan 2011–2030, has upgraded and expanded the transmission and distribution system, added power generation capacity and connected existing diesel generators and local networks to the national grid. In addition, a solar light programme has been used to reach remote communities. The Government of Papua New Guinea first established its energy access priorities under its Development Strategic Plan 2010–2030, and expanded these priorities under its National Energy Policy 2016–2020. In 2010, the country did not have a national grid, but the Government has since implemented a national electrification roll-out plan<sup>7</sup> for both grid extension and off-grid stand-alone power supply systems.

16. Some member States still face significant challenges in achieving universal access to electricity. Bangladesh, the Democratic People’s Republic of Korea, Myanmar and Pakistan still had large unserved populations in 2017,

<sup>3</sup> Lighting Global, “World’s largest solar home system program adopts lighting global quality standards”, 24 June 2015.

<sup>4</sup> Afghanistan, Ministry of Energy and Water and Ministry of Rural Rehabilitation and Development, *Afghanistan Rural Renewable Energy Policy* (Kabul, 2013). Available at <https://policy.asiapacificenergy.org/?q=node/1003/portal>.

<sup>5</sup> Cambodia, Ministry of Industry, Mines and Energy, *National Policy, Strategy and Action Plan on Energy Efficiency in Cambodia* (Phnom Penh, 2013). Available at <https://policy.asiapacificenergy.org/?q=node/1910/portal>.

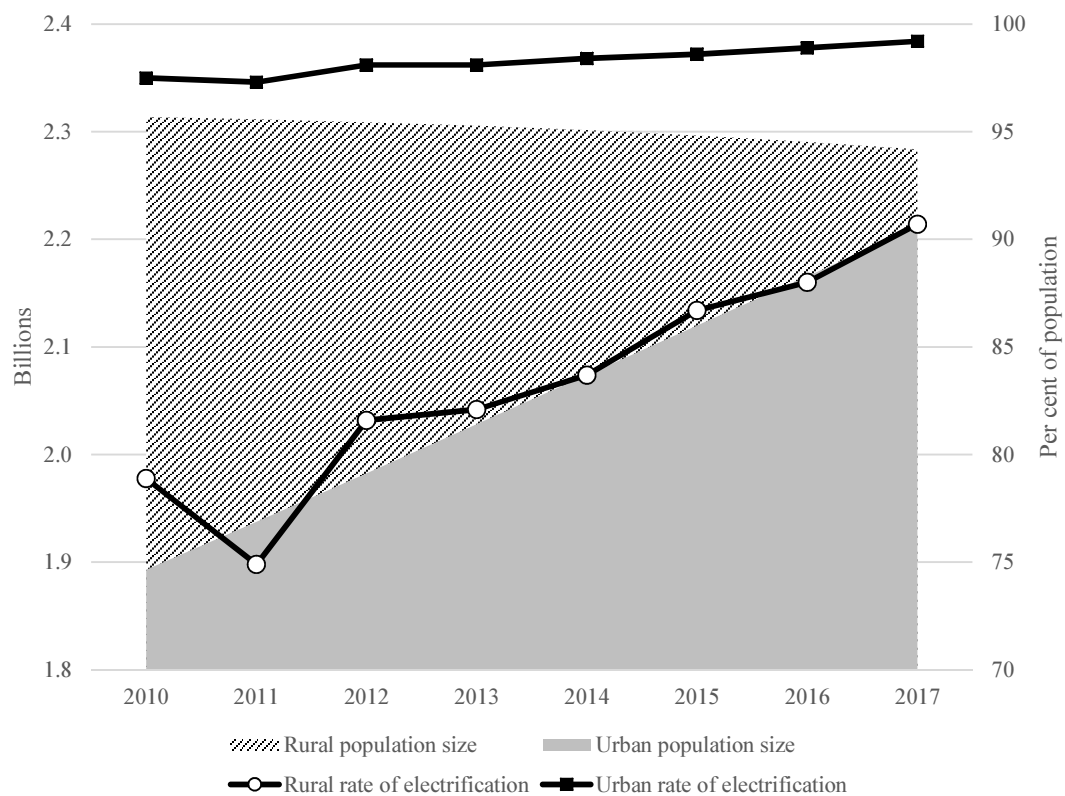
<sup>6</sup> World Bank, “Cambodia”, Regulatory Indicators for Sustainable Energy. Available at <https://rise.worldbank.org/country/cambodia> (accessed on 14 June 2019).

<sup>7</sup> See Papua New Guinea, Department of Public Enterprises and Department of Petroleum and Energy, *National Energy Policy 2016–2020* (Port Moresby, 2015). Available at <https://policy.asiapacificenergy.org/node/2676>.

though there was notable progress in Bangladesh and Myanmar between 2010 and 2017, with an annual access rate improvement of over three percentage points each. Progress has been slowest in Pakistan, where electrification for the total population increased slightly, from 70.4 per cent in 2010 to 70.8 per cent in 2017.

17. The disparity between rates of access to electricity in urban versus rural areas remains, although the gap is closing with the advances in off-grid and mini-grid technologies. The overall urban electrification rate in Asia and the Pacific reached 99.2 per cent in 2017, edging up from 97.5 per cent in 2010. At the same time, urban populations have grown rapidly. In rural areas, electrification efforts coupled with falling population sizes have increased access rates from 78.9 per cent in 2010 to 90.7 per cent in 2017 (figure II). A continued focus on access for rural populations is needed, with emphasis on providing off-grid areas with energy services that go beyond subsistence levels of energy consumption and strive towards greater quality and quantity to support modern lifestyles and productive activities.

Figure II  
**Rural and urban population size and electrification rates, 2010–2017**



Source: ESCAP, Asia Pacific Energy Portal.

18. Off-grid renewable energy technologies represent a viable electrification solution, though insufficient regulation of the off-grid energy sector creates challenges. Within a single country, various technological solutions, ownership frameworks and business models may create barriers to assuring quality modern energy services that are reliable. Regulation of the off-grid market is in its infancy, and efforts are needed to develop dedicated policies and regulations designed for various off-grid solutions.

19. Tracking electrification progress has a number of data-related challenges. No single internationally accepted and internationally adopted definition of modern energy access exists.<sup>8</sup> What constitutes access to electricity in one jurisdiction may not be accepted in another. In addition, the current indicator utilized for tracking electrification is binary; a household either has or does not have electricity. That measure does not account for other aspects of energy access, such as quantity, reliability or affordability, which are important in helping to understand electricity's usability and potential with regard to socioeconomic impact. Furthermore, the quantity and quality of data in many national contexts are insufficient, for off-grid areas in particular, due to such issues as methodological inconsistencies and irregular or infrequent data collection.

### III. Slow progress in clean cooking, with some highlights

20. The second indicator under target 7.1 is indicator 7.1.2: the proportion of the population with primary reliance on clean fuels and technology for cooking. The Asia-Pacific region has made modest progress in expanding access to clean fuels and technologies for cooking. In 2010, 2.11 billion people, or more than 50 per cent of the region's population, were reliant on highly polluting and harmful cooking solutions. By 2017, access had expanded even as the population grew, and that figure had dropped to 1.96 billion people, or 43.7 per cent of the population.

21. However, in 2017, just 16 countries had clean cooking access rates of 95 per cent or above, while 19 countries had access rates of less than 50 per cent, with more than half of their populations relying on dirty fuels and technologies for cooking. That year, there were more than 100 million people in each of the following countries who lacked access to clean cooking: India (737 million), China (592 million), Bangladesh (135 million) and Pakistan (110 million).

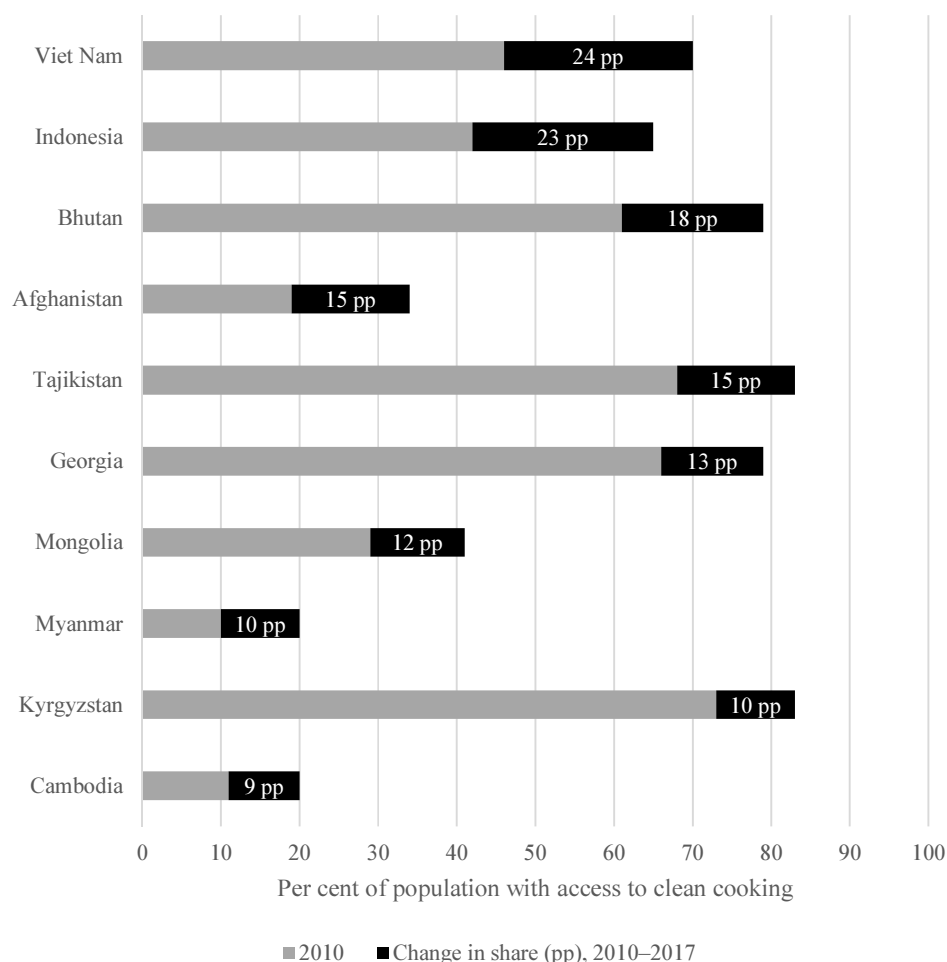
22. Despite significant challenges, nine member States increased their population share gains by 10 percentage points or more between 2010 and 2017. The largest gain was in Viet Nam, where the share of the population with access to clean cooking increased by 24 percentage points, from 46 per cent in 2010 to 70 per cent in 2017. Indonesia followed closely, where the rate increased by 23 percentage points. Countries with gains of 15 percentage points or higher include Bhutan, Afghanistan and Tajikistan (figure III).

23. Expanded access to clean cooking in Viet Nam has been supported by the 2015 approval of the country's 2030 development strategy and 2050 outlook, in which clean cooking targets focusing on converting users from conventional biomass stoves to high-performing models were established. The domestic liquefied petroleum gas market in Viet Nam has expanded in the residential sector, in part owing to price stabilization. Donors and non-governmental organizations have played a key role in expanding clean cooking through initiatives that move people away from beehive coal and other conventional stoves and towards clean options, such as liquefied petroleum gas and biogas.<sup>9</sup>

<sup>8</sup> Organization for Economic Cooperation and Development and International Energy Agency, *Energy Access Outlook 2017: From Poverty to Prosperity – World Energy Outlook Special Report* (Paris, 2017).

<sup>9</sup> C40 Cities, "Hanoi – households emissions reduction through cookstove conversions", 17 December 2018.

Figure III  
**Top 10 countries for gains, in percentage points, in access to clean cooking for the period 2010–2017**



Source: ESCAP, Asia Pacific Energy Portal.

Abbreviation: pp, percentage points.

24. Starting in 2007, the Government of Indonesia launched one of the world’s largest residential energy transition programmes, switching consumers from kerosene to liquefied petroleum gas. An initial give-away of liquefied petroleum gas cylinders and stoves was successful in establishing a market that now reaches more than 98 per cent of the population across a challenging archipelago geography.<sup>10</sup> The initiative also succeeded in eliminating a costly kerosene subsidy.

25. In Bhutan, the expanded use of electric induction stoves and liquefied petroleum gas has pushed up energy access rates, bolstered by very low-cost residential electricity from national hydro resources and subsidized liquefied petroleum gas imported from India. In 2017, the Government launched a scheme to direct a portion of its supply of liquefied petroleum gas cylinders to rural communities to encourage the switch from firewood. To help meet

<sup>10</sup> World Liquefied Petroleum Gas Association, *Accelerating the LPG Transition: Global Lessons from Innovative Business and Distribution Models* (2018).

growing demand and reduce shortages, higher-priced cylinders of unsubsidized liquefied petroleum gas were also introduced to the market, targeting more affluent urban dwellers. Shortages continued because of the lack of policy regarding the purchase of subsidized liquefied petroleum gas. The Government is currently considering harmonized pricing for cylinders of subsidized and unsubsidized liquefied petroleum gas.<sup>11</sup>

26. In Afghanistan, a number of companies established a nationwide network for the storage and distribution of liquefied petroleum gas to supply the population with much-needed cooking and heating fuel and enable reforestation efforts.<sup>12</sup> In Tajikistan, improved power and liquefied petroleum gas supplies have enabled households to move away from the use of biomass for cooking and heating.<sup>13</sup>

27. The adoption of modern technologies supports more efficient clean cooking markets. For example, in a number of locations across the region, liquefied petroleum gas can be ordered for home delivery by using a mobile application or a text message. In India, the Government has implemented the world's largest cash transfer scheme by combining banking, unique identifications and mobile phones to deliver direct subsidies for liquefied petroleum gas purchases, in an effort to bring clean cooking to the world's largest unserved population. In Indonesia, the Government is conducting trials on the use of biometric authentication to switch from an indirect liquefied petroleum gas subsidy to a direct subsidy for authenticated and qualified purchasers.<sup>14</sup>

28. Liquefied petroleum gas is emerging as the preferred clean cooking option for its proven utility, portability and health advantages. Electric cooking options also eliminate smoke, but may be expensive, have high power demand or be subject to fuel stacking (for example, an electric rice cooker is used in combination with fuelwood for main dishes). Improved cookstoves remain an important option in many contexts, though their performance and health benefits can be difficult to verify and certify. The low market penetration of liquefied petroleum gas in some countries suggests the existence of a large market opportunity for expanding the use of this fuel as a clean cooking solution.

29. Despite many examples of progress, the pace of improvement at the regional level is not rapid enough to realize universal access to clean cooking by 2030. To achieve that target, the average annual increase in the percentage of the region's households with access to clean cooking would need to increase more than threefold, from the 0.9 percentage points observed between 2010 and 2017 to approximately 3.4 percentage points.

30. The advantages of engaging women as consumers and actors within the supply chain of modern cooking solutions have not been fully appreciated. Beyond the well-recognized benefits of reducing women's exposure to

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<sup>11</sup> Passang Dorji, "Cost of Subsidised and Non-subsidised LPG cylinders to be same", Bhutan Broadcasting Service, 14 June 2019.

<sup>12</sup> For more information, see [www.barakatgrp.com/sungas.html](http://www.barakatgrp.com/sungas.html).

<sup>13</sup> Tajikistan, Statistical Agency under the President and Ministry of Health and Social Protection of Population, *Tajikistan Demographic and Health Survey 2017* (Dushanbe, 2018).

<sup>14</sup> GlobeNewswire, "Everest, ID2020 and the Government of Indonesia (TNP2K secretariat) announce innovative identity and blockchain pilot solution to enhance the national LPG subsidy program", 14 September 2018.



pollutants and of the time needed to collect fuel, clean cooking offers economic and business opportunities. As demonstrated by several Asia-Pacific government and civil society initiatives, women can play active roles as home energy decision makers, as well as clean energy marketers, trainers, installers and distributors. There is a need for more information-sharing on approaches to including women in the energy sector, in areas such as representation in policymaking, gender-equitable financing, and consumer-responsive technology and service development.

31. Inadequate or unreliable distribution networks limit the consumer base. Convenience is a factor in consumers' choice of cooking solutions, and factors such as the travel distance to obtain fuel, purchasing procedures and unreliable supplies can therefore limit the appeal of clean cooking solutions. Greater efforts are needed in understanding local market situations, consumer demand and accessibility issues in order to establish effective networks.

32. Affordability remains a barrier. Clean cooking solutions are often more expensive than conventional options. Even if the costs over time may be lower, lump-sum payment requirements for options such as liquefied petroleum gas can present a hurdle for consumers with variable cash flows.

33. Efforts to lower the cost of clean cooking solutions through subsidies have encountered challenges in a number of cases. Subsidized products do not always reach the intended beneficiaries, and in some examples, subsidies have provided greater advantages to the wealthy than to the poor. The development of smart policy solutions is needed to lower the economic threshold for new clean cooking consumers, while also limiting government spending on subsidies.

34. The private sector plays a strong role in energy access in Asia and the Pacific, particularly for off-grid electricity and the supply of clean cooking solutions. Public-private partnerships have enabled energy services to reach previously unserved populations, and the private sector continues to drive new innovations in technology and service delivery. Additional efforts are needed to develop enabling policy, financial and regulatory environments to lower market barriers, while ensuring high-quality, safe and affordable delivery of energy services.

35. Data for tracking progress in clean cooking are primarily sourced from household surveys that are not completed at regular or frequent intervals. Better data collection is needed to identify high impact measures and market opportunities while also supporting the tracking of progress towards universal access.

#### **IV. Renewable share remained steady regionally but declined in most member States**

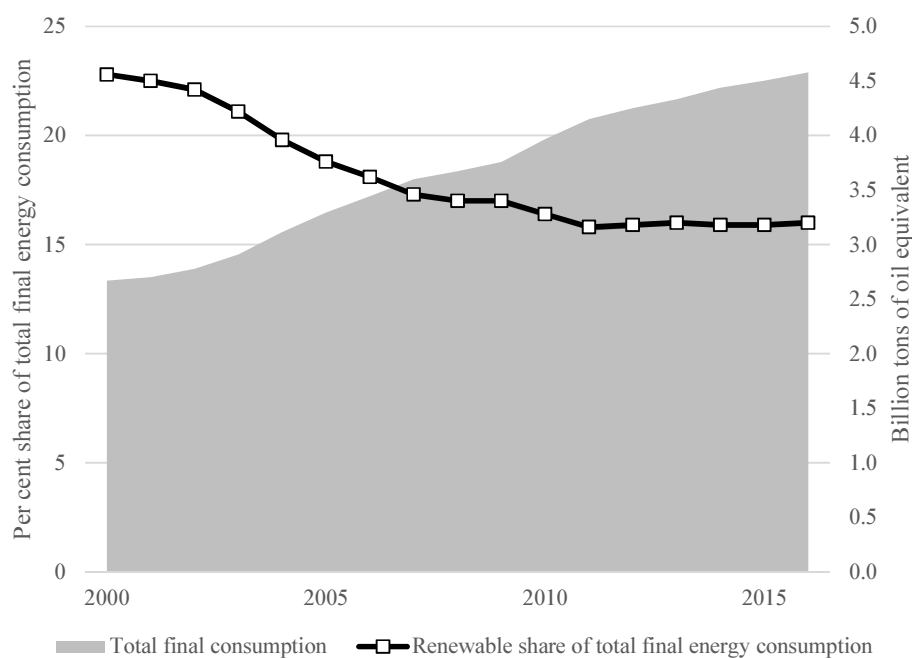
36. Target 7.2 is to increase substantially the share of renewable energy in the global energy mix. The indicator used to measure the target is the renewable share of total final energy consumption. While the target is set at the global level, regional and national actions contribute to, and ultimately determine, the global outcome. Therefore, it is necessary to review efforts and progress within the Asia-Pacific region and among the members and associated members of ESCAP. The contribution to global progress under this target necessarily varies by economy on the basis of factors such as size, development status, growth trajectories and resources. Still, it is possible to observe general

trends and analyse progress towards achieving regional, national and subnational targets and objectives.

37. It should be noted that data for this indicator are linked to traditional biomass. The move away from traditional energy resources, such as fuelwood, charcoal, crop residue and dung for cooking and heating, and towards modern options, such as liquefied petroleum gas, is creating a shift in resource consumption patterns. The decline of traditional biomass use, a positive outcome, can have a negative impact on the renewable share of total final energy consumption. The quality of data for biomass consumption is also poor, with discrepancies in data collection suggesting that biomass use may be lower than recently estimated.<sup>15</sup> In light of this indicator’s limitations, additional indicators are introduced here.

38. In the face of the world’s fastest rising energy demand and shifting consumption patterns, the renewable share of total final energy consumption in Asia and the Pacific slumped from 16.4 per cent in 2010 to 16.0 per cent in 2016. However, an extended view shows a steady decline in the renewable share from 2000 to 2011, after which renewable consumption generally began to keep pace with rising energy use (figure IV).

Figure IV  
**Renewable share of total final energy consumption and final energy consumption in Asia and the Pacific, 2000–2016**



Source: ESCAP, Asia Pacific Energy Portal.

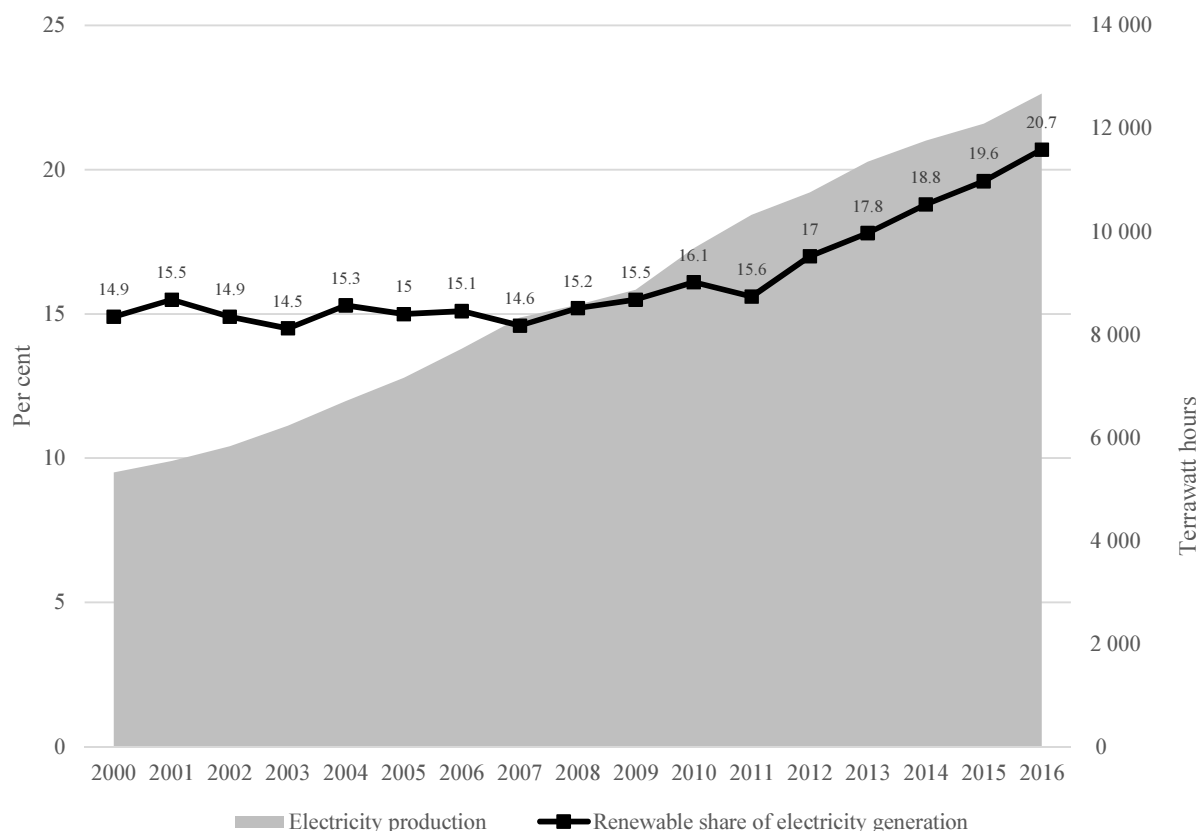
39. The largest gains for renewables are found in the region’s power sector. In 2016, the renewable share of total electricity output in Asia and the Pacific amounted to 20.7 per cent, up from 16.1 per cent in 2010 (figure V). The following year marked the beginning of a steady increase in the share of renewable energy in the power mix. The region is keeping pace with a rising global trend, though Europe, Latin America and the Caribbean, and North

<sup>15</sup> Sustainable Energy for All, “Renewables”, heat map, 25 June 2017. Available at [www.seforall.org/data-stories/renewables](http://www.seforall.org/data-stories/renewables).

America continue to have higher shares of renewable electricity, suggesting that there is potential for the Asia-Pacific region to make further gains.

40. Hydropower accounts for three quarters of the region’s renewable electricity output and is increasing rapidly. China is driving the regional trend, though India, Pakistan, Turkey and Viet Nam have also increased hydropower production.

Figure V  
**Electricity production and renewable share in Asia and the Pacific, 2000–2016**



Source: ESCAP, Asia Pacific Energy Portal.

41. Variable renewable energy, in the form of solar photovoltaics and wind, is becoming a mainstream in the power sector. In some contexts, technology costs have fallen below the costs of new fossil fuel supply and technological advances, including battery storage, have supported wider integration. In 2016, variable renewable energy amounted to 4.0 per cent of the region’s total electricity output, nearly quadrupling the 2010 share of 1.1 per cent. According to data from the International Energy Agency, Japan boasted the region’s highest share of combined solar and wind energy in its national power mix<sup>16</sup> at 8.3 per cent in 2017, followed by Australia and Turkey at 7.9 and 7.3 per cent, respectively.

42. The Asia-Pacific region is at the global centre of renewable energy development and deployment, with a number of countries demonstrating leadership in investment, net capacity additions and production. The largest

<sup>16</sup> International Energy Agency data are unavailable for a number of countries that may have high shares of solar and wind electricity.

additions occurred in China, which added 45 GW, while India, Japan and the Republic of Korea added 10.8 GW, 6.5 GW and 2.0 GW, respectively. China led wind power installations, with 21.1 GW of new capacity, while India added 2.2 GW. Global hydropower commissions were dominated by China, with 7.0 GW of new capacity in 2018, while Pakistan increased its total capacity by approximately one third, with nearly 2.5 GW of new additions. Turkey and Indonesia led new geothermal capacity, adding 219 MW and 140 MW of new capacity, respectively.

Table 1  
**Asia-Pacific countries' global rankings for annual investment/net capacity additions/production in 2018**

<i>Country</i>	<i>Global ranking number</i>	<i>Scope</i>
Australia	5	Renewable power and fuel investment (excluding hydropower over 50 MW)
	5	Solar photovoltaic capacity additions
China	1	Renewable power and fuel investment
	1	Hydropower capacity additions
	1	Solar photovoltaic capacity additions
	1	Concentrating solar thermal power capacity additions
	1	Wind power capacity additions
	1	Solar water heating capacity additions
	3	Ethanol production
India	2	Solar photovoltaic capacity additions (tied with United States of America)
	3	Solar water heating capacity additions
	4	Renewable power and fuel investment
	4	Wind power capacity additions
Indonesia	2	Geothermal power capacity additions
	3	Biodiesel production
Japan	3	Renewable power and fuel investment
	4	Solar photovoltaic capacity additions
New Zealand	5	Geothermal power capacity additions
Pakistan	3	Hydropower capacity additions
Palau	1	Investment in renewable power and fuels per unit gross domestic product
Thailand	5	Ethanol production
Turkey	1	Geothermal power capacity additions
	2	Solar water heating capacity additions

Source: Renewable Energy Policy Network for the 21st Century, *Renewables 2019 Global Status Report* (Paris, 2019).

43. In 2018, solar photovoltaic dominated renewable energy capacity additions across the region. At the national level, the largest renewable shares of total final energy consumption are found among nations where populations remain dependent on traditional biomass for cooking and heating or where hydropower resources are abundant.

44. Bhutan has the region's highest renewable share at 84.8 per cent and illustrates the importance of biofuels in the context of developing countries in the region. Electricity is the main energy source for food preparation in 95 per cent of households. However, traditional wood-fired *bukharis* and coal remain prevalent heating solutions and contribute to the nation's high use of solid biofuels, which account for nearly three quarters of its energy consumption.<sup>17</sup>

45. Shifting energy patterns in household cooking and heating do influence the share of renewables in the total final energy mix, but the principal factor leading to falling national renewable energy shares is growing energy demand, which is often met with fossil fuels. Between 2010 and 2016, 33 countries experienced average annual declines in their renewable energy share, 20 countries averaged gains and another 5 had no significant change.

46. Tuvalu posted the region's top average annual gains in the renewable share of total final energy consumption for the period 2010–2016. Under its Te Kakeega III: National Strategy for Sustainable Development 2016–2020, the 100 per cent electrified nation is looking to achieve 100 per cent renewable energy consumption by 2025. The Government has recently been focused on the deployment of solar photovoltaic and is looking to increase wind power, biofuels and energy efficiency to meet its target.

47. Under its Renewable Energy Policy, the Government of Afghanistan has increased hydropower and solar capacity to expand off-grid access and lower the nation's dependency on electricity imports. In 2017, the country adopted the Renewable Energy Roadmap for Afghanistan RER2032 to accelerate progress.

48. The Government of Malaysia surpassed its 2015 target of 5 per cent renewable energy in the energy mix, which was established under its 2009 National Renewable Energy Policy and Action Plan. Hydropower plays the key role in the nation's renewable energy sector development, though the Eleventh Malaysia Plan 2016–2020 and the Green Technology Master Plan 2017–2030 support increased diversification, particularly with the addition of large-scale solar systems.

49. In the Pacific Islands, the successful uptake of renewables is increasing the renewable share as well as energy access and energy security. The Government of Solomon Islands has capitalized on renewable energy to bring energy access to its population. The country's electrification rate was just 34.3 per cent in 2010, but small-scale renewables in the form of small hydro and solar systems increased electrification to 62.3 per cent in 2017 while also replacing costly diesel generation. The forthcoming Tina River hydropower project is expected to increase the power supply while also lowering tariffs.

50. In Japan, renewables support energy security and rural development objectives. With its fifth Strategic Energy Plan, the Government aims to reduce nuclear power and fossil fuel resource dependency while expanding renewable energy. The Government also views renewable energy expansion in rural areas

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<sup>17</sup> Bhutan, National Statistics Bureau, *Bhutan Living Standards Survey Report 2017* (Thimphu, 2017).

as a revitalization tool that can be implemented in harmony with agriculture, forestry and fishery development.<sup>18</sup>

51. In absolute terms, China leads the world and the region in renewable energy investment and deployment. The country produces more renewable energy than the rest of the region combined and more than Europe, North America or Latin American and the Caribbean. In 2017, the nation's installed renewable capacity approached 621 terawatts. Under its thirteenth five-year plan for renewable energy development, the Government continues to push for increased renewable energy capacity across technologies, a higher renewable energy share within the energy mix and further technological innovation. Through its policies and programmes, the Government has rapidly increased and diversified its renewable energy production while reducing the use of solid biofuels. Similar profiles of renewable energy development are beginning to appear in other Asia-Pacific countries as well.

52. Renewable energy targets have been established by nearly all Asia-Pacific countries, as well as at the regional and subnational levels. Some of the most ambitious targets are found among the region's Pacific island States, several of which are targeting 100 per cent renewable electricity generation. In South-East Asia, the States members of the Association of Southeast Asian Nations (ASEAN) have set the aspirational target of increasing the share of renewable energy in the energy mix to 23 per cent by 2025, under the *ASEAN Plan of Action for Energy Cooperation (APAEC) 2016–2025*. In addition, a growing number of municipalities have ambitious renewable energy initiatives under way. For example, cities in Australia, Indonesia, Japan and the Republic of Korea have set targets of obtaining 100 per cent of total energy or electricity from renewables, and Jeju province in the Republic of Korea has set an additional target of 100 per cent renewable transport by 2030.<sup>19</sup>

53. Feed-in tariffs and, increasingly, auctions, are important mechanisms for introducing renewables into the power supply.<sup>20</sup> In Japan, rapid growth in renewables has been achieved with aggressive solar feed-in tariffs which, under the latest plan, are being transitioned to auctions to reduce costs. In China, there is a detailed feed-in tariff regime as well as auctions to support renewable energy installations, including in industry, utilities and communities. Reductions to the country's solar feed-in tariff and caps in 2018 resulted in a contraction in renewable demand and investment, demonstrating the controlling influence of these policies on domestic and global markets. In a number of countries, feed-in tariffs are being phased out as renewable energy markets mature. Auctions have supported investments in India, where solar photovoltaic spending exceeded coal for the first time in 2018 and investment in renewable energy has topped fossil fuels three years in a row.<sup>21</sup>

<sup>18</sup> Japan, "Act on promoting generation of electricity from renewable energy sources harmonized with sound development of agriculture, forestry and fisheries", May 2014. Available at <https://policy.asiapacificenergy.org/?q=node/3179/portal>.

<sup>19</sup> Examples of national and subnational 100 per cent renewable energy targets are available at [www.100-percent.org](http://www.100-percent.org).

<sup>20</sup> Renewable tenders were held at the national, state and provincial levels in 2018 in Afghanistan, Armenia, Australia, Bangladesh, China, India, Japan, Kazakhstan, the Russian Federation, Singapore, Sri Lanka, Tonga and Turkey (Renewable Energy Policy Network for the 21st Century, *Renewables 2019 Global Status Report* (Paris, 2019)).

<sup>21</sup> Charlotte Edmond, "India is investing more money in solar power than coal for first time", World Economic Forum, 22 May 2019.

54. Although progress is significant within the region, levels of renewable energy readiness and development are mixed. According to policy analysis by the World Bank, numerous countries are emerging as sustainable energy leaders, yet significant gaps in policy and regulatory frameworks remain. According to the Regulatory Indicators for Sustainable Energy framework, prepared by the World Bank, only 6 of 35 Asia-Pacific countries analysed had a relatively mature renewable energy policy and regulatory environment, while another 10 were deemed to have only early-stage frameworks.<sup>22</sup> While legal frameworks are generally in place, areas such as planning, financial and regulatory incentives, network connection policy and carbon pricing require more attention. Limited technical capacity and low confidence levels in certain technologies are additional barriers.

55. In the power sector, increased spending on grid networks is needed to connect new generation projects. Grid capacity in several contexts is a main limiting factor, as generation technology has become increasingly affordable and accessible.

56. Renewable energy development has been highly concentrated in the power sector, which only represents approximately one fifth of the region's energy consumption. More attention is needed to increase the use of renewables in other sectors, in particular transport and heating. In the Asia-Pacific region, 70 per cent of renewable energy is consumed for the purpose of heating, the bulk of which is done with traditional biomass. In addition, while 19 per cent of the energy consumed in the region is used for transport, only 2 per cent of renewable energy is utilized in the sector.

57. Better data on renewables are needed. Biomass is the most-consumed renewable energy resource in the region, but the data for this resource are scarce and of poor quality. In addition, statistics do not distinguish between sustainable and unsustainable biomass production, creating challenges for measuring progress on Sustainable Development Goal 7. Furthermore, data for off-grid energy are limited and not sufficiently captured in energy statistics. Efforts are needed to develop improved standardized methodologies and more complete national data sets.

58. Cross-border connectivity has the potential to connect unevenly distributed renewable energy supplies with demand centres throughout the region and to create wider balancing areas capable of handling higher shares of variable renewable energy with enhanced stability. A number of regional initiatives include plans for multilateral market integration, though progress has been slow and multilateral trade has yet to be initiated in most areas of the region. Strengthened cooperation is needed to harmonize technical, legal and regulatory frameworks and to reach consensus on how to calculate the sharing of market integration benefits.

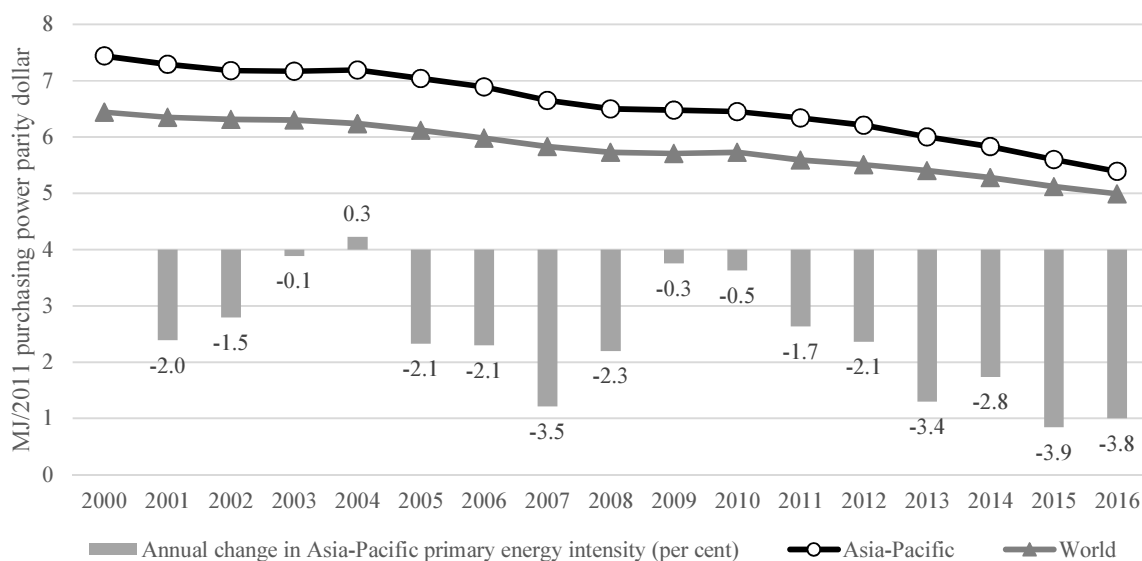
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<sup>22</sup> The Regulatory Indicators for Sustainable Energy scores are a set of indicators that supports the comparison of national policy and regulatory frameworks to advance Sustainable Development Goal 7. For more information, see <https://rise.worldbank.org/>.

## V. Mixed progress in energy efficiency, with a small number of member States driving the regional trend of energy intensity reduction

59. Target 7.3 is to double the global rate of improvement in energy efficiency by 2030. The associated indicator is energy intensity, measured in terms of primary energy and gross domestic product (GDP). In 2016, Asia and the Pacific accounted for nearly half of the world's primary energy supply and more than one third of the world's GDP. While the target is set at the global level, the region's rapid rise in energy demand and economic growth will heavily influence global energy efficiency outcomes.

Figure VI  
Primary energy intensity and annual change, 2000–2016



Source: ESCAP, Asia Pacific Energy Portal.

Abbreviation: MJ, megajoules.

60. The Asia-Pacific region has demonstrated a long-term decline in the energy intensity level of primary energy, measured as the ratio of energy supply in megajoules to GDP in constant 2011 dollars at purchasing power parity. The energy intensity level of primary energy dropped from 7.4 in 2000 to 5.4 in 2016 and is now approaching the global average of 5.0 (figure VI). The pace of energy intensity reduction has picked up in the recent period, with an annual reduction rate of 1.8 per cent for the period 2010–2016, compared to 1.4 per cent for the period 2000–2010.

61. In 2010, Asia and the Pacific had the highest regional energy intensity in the world. By 2016, the region had dropped to just below North America to become the third-most-intense region. While the region's GDP continues to grow, the primary energy supply has shown signs of levelling off in the recent period.

62. Energy consumption in Asia and the Pacific has increased rapidly since the early 2000s, in line with the economic development of the region. Energy use in the industrial sector has swelled, in particular in China, driving the sector's regional share of energy consumption above 40 per cent in 2011. The



subsequent fall in the sector's share can largely be attributed to energy efficiency measures implemented in China. Meanwhile, energy consumption in the region's residential sector remained relatively flat in the most recent period, whereas growth in transport is steadily capturing an increasing share of overall energy use.

63. In general, national energy intensity trends are encouraging. Energy intensity declined in 36 countries, yielding negative compound annual growth rates for the period 2010–2016. However, during that same period, 13 countries had rising levels of intensity.

64. In China, energy intensity dropped at an average annual rate of 4.6 per cent over the review period. The country has taken aggressive measures towards the achievement of its 2020 target of reducing energy consumption per unit among industrial enterprises by more than 18 per cent, compared to 2015 levels. Research and development in energy efficiency technology is a key field for government investment in science and technology, and the country has established itself as a regional and global leader in industrial energy efficiency.

65. In India, despite an 18 per cent rise in energy consumption, there have been impressive results, with a reduction of intensity at an average annual rate of 3 per cent for the period 2010–2016. Policies are focused on the upgrade and modernization of power plants, energy efficiency building codes, efficient lighting and appliances, and vehicle fuel standards. Advancements have been achieved in part through the Government's Perform Achieve and Trade programme. Recently, the Government announced a plan to build 100 smart cities and rejuvenate another 500 cities.<sup>23</sup>

66. Japan experienced an average annual drop in energy intensity over the time frame. The Government's fifth Strategic Energy Plan encourages the development of innovative technologies that can realize significant energy savings across industries. Objectives include achieving net zero energy for standard newly constructed houses by 2020, improving transport efficiency, developing next generation vehicles and adopting energy management systems and procedures. The Government has also advanced the Top-Runner benchmark programme, which sets targets for energy consumption per unit of GDP.

67. Solomon Islands ranks among the region's top performers in lowering energy intensity. Between 2010 and 2016, the nation reduced intensity at an annual rate of 5.4 per cent. Saddled with energy costs among the highest in the world, the Government has moved forward on targets and taken actions across sectors under its National Energy Policy, and Strategic Plan.

68. Many Asia-Pacific countries have established some form of energy efficiency target and are increasingly adopting action plans and measures to lower rates of energy consumption across the industrial, commercial, building and transport sectors. Targets are highly variable in their structure and ambition but are generally formulated with a view to lowering energy or electricity intensity or reducing overall energy consumption. Factors driving the adoption of these measures include the need to meet domestic demand for adequate and reliable energy supplies, together with support for economic growth and emission reductions.

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<sup>23</sup> Additional information is available at <http://smartcities.gov.in/content/>.

69. The upgrade and replacement of power generation, transmission and distribution infrastructure are improving the energy sector's performance, which is important in the face of growing demand for electricity. Efforts such as the conversion of single-cycle power plants to combined-cycle generation, which is under way in Bangladesh, and the upgrade of power grids to reduce losses, which is a priority for many countries, have the potential to increase the power supply and reduce the need for additional generation capacity. Greater support is needed to comprehensively assess existing energy systems with a view to identifying the best options for long-term improvements in energy efficiency.

70. While coal use has fallen in other parts of the world, the installed power generation capacity of coal in the Asia-Pacific region is rising. The introduction of high-efficiency, low-emission coal power plants provides potential for more efficient use of the fossil fuel. However, experience shows that new plants may not be used to full capacity owing to limitations of power purchase agreements and the prioritization of the existing, less-efficient supply. Stronger policies are needed in the region to prioritize the most efficient energy generation technology.

71. Electric and hydrogen transport vehicles have the potential to reduce energy consumption, local pollution and life cycle emissions. In 2018, 1.1 million electric vehicles were sold in China, together with 26 million two- and three-wheelers. In Japan, there is a focus on expanding the production and use of hydrogen fuel cell vehicle technology.

72. National and subnational emission trading schemes can play a significant role in encouraging energy efficiency. The Government of the Republic of Korea introduced the region's first mandatory national emission trading scheme in 2015. The Government of China is expected to launch nationwide emission trading in 2020, which will incorporate coal-fired power as the first industry.

73. Despite the evident progress in reducing energy intensity, many factors aside from efficiency measures have led to this outcome, and progress is needed to improve policy structures. In some cases, economy-wide targets do not exist or are set forth within broad policy documents without supportive actions backing them. According to the Regulatory Indicators for Sustainable Energy, only 7 of 35 Asia-Pacific countries analysed had relatively mature energy efficiency policies and regulatory environments, while another 14 had early-stage frameworks. Between energy access, renewable energy and energy efficiency, policy frameworks for energy efficiency are weakest in the Asia-Pacific region. As countries move towards defining targets in regulatory documents, with explicit measures and instruments to meet them, energy intensity reduction can be expected to accelerate across the region.

Table 2  
**Economy-wide energy intensity targets from the region's top energy consumers**

<i>Country/territory</i>	<i>Target</i>	<i>Policy document</i>
China	By 2020, national energy consumption per 10,000 Chinese yuan of GDP will be reduced by 15 per cent with respect to 2015 levels.	Thirteenth Five-year Energy Conservation and Emission Reduction Work Plan
India	Reduce emission intensity of GDP by 20–25 per cent, compared to 2005 levels, by 2020. <sup>a</sup>	Intended Nationally Determined Contribution: Working towards Climate Justice
Indonesia	Reduce final energy intensity 1 per cent per year up to 2025.	Government regulation No. 79/2014 on national energy policy
Islamic Republic of Iran	None identified.	
Japan	1 per cent improvement per year in energy consumption efficiency.	Act No. 49/1979 concerning the rational use of energy
Pakistan	None identified.	
Republic of Korea	13 per cent reduction in energy demand and 15 per cent reduction in electricity demand by 2035.	Energy Master Plan: Outlook and Policies to 2035
Russian Federation	Reduce energy intensity by 3.6–4.8 per cent by 2016–2020, and 5–5.2 per cent by 2030.	General Scheme for the Development of the Gas Industry until 2030
Thailand	Reduce energy intensity by 25 per cent in 2030, based on 2005 level; or equivalently reduce final energy consumption by 20 per cent in 2030.	20-year Energy Efficiency Development Plan (2011–2030)
Turkey	By 2020, energy intensity shall be decreased with reference to 2004 levels.	Climate Change Strategy 2010–2030

*Source:* ESCAP, Asia Pacific Energy Portal.

<sup>a</sup> Though related, emission intensity does not track energy intensity. For example, a country could have 100 per cent renewable energy and zero emission intensity but may still have high levels of energy use per unit of GDP.

74. The adoption of common energy efficiency standards and labelling systems supports the reduction of energy consumption while also building regional and global energy efficiency markets. For example, the Government of China is working with the European Union to harmonize energy labels for appliances, equipment and buildings.

75. To advance energy efficiency, more ambitious and specific targets and plans are required at the economy-wide and sectoral levels. Road maps are needed to phase out inefficient technologies and adopt emerging technologies, including smart grids, advanced building systems, efficient transport and the latest industrial and appliance technologies.

76. Financing for energy efficiency is a significant barrier for many member States. Increased knowledge-sharing and cooperation are needed to address a lack of funds and expertise for developing financing mechanisms.

77. Regional cooperation plays an important role in improving energy efficiency in Asia and the Pacific. For example, in 2016, ASEAN member States agreed to reduce their energy intensity by 20 per cent in 2020 and by 30 per cent in 2025, relative to 2005 levels. The subregion is set to exceed these targets. Backing this is the ASEAN Economic Community 2025 Consolidated Strategic Action Plan, a common framework for addressing matters such as regional and national policies and road maps for minimum energy performance standards, regional energy labels and standards, shared green building codes and data. These plans are supported by the ASEAN Energy Efficiency and Conservation Subsector Network.

78. The Asia-Pacific Economic Cooperation (APEC) economies are on track to achieve their aspirational target, reaffirmed in the Beijing Declaration of the 2014 APEC Energy Ministerial Meeting, to reduce their aggregate energy intensity by 45 per cent by 2035 compared to 2005 levels.<sup>24</sup> The APEC Energy Working Group hosts a number of programmes to that end, including the Peer Review on Energy Efficiency project, which provides recommendations for improving national energy efficiency action plans.

79. In 2016, the Group of 20 Energy Efficiency Leading Programme was established as the Group's first long-term plan for energy efficiency. The programme is aimed at significantly increasing energy efficiency in the Group by improving cooperation and encouraging members to develop active energy efficiency programmes, policies and measures.

## **VI. Investment in sustainable energy and infrastructure**

80. In 2018, investment in clean energy was down among the region's top investors. In China, investments dropped by 32 per cent in 2017, largely in response to restrictions on the feed-in tariff access afforded to new solar projects, while investment in Japan and India decreased by 16 and 21 per cent, respectively. China was still the top regional and global investor at \$100.1 billion, followed by Japan at \$27.2 billion and India at \$11.1 billion. India was the fastest-growing investor in the power sector, with investments in renewable sources outpacing fossil fuel investment for the third year in a row. Spending on new solar capacity in India exceeded coal for the first time in 2018.<sup>25</sup>

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<sup>24</sup> APEC, document 2014/EMM11/008.

<sup>25</sup> BloombergNEF, "Clean energy investment exceeded \$300 billion once again in 2018", 16 January 2019.

81. Clean energy investment was up across the rest of the region, including in the Republic of Korea, where investment increased by 74 per cent under its shift away from nuclear and towards renewable energy, and in Viet Nam, where investment jumped sevenfold in 2018, coinciding with the country's emergence as a major solar market. Falling costs for wind and solar power led to increased deployment of clean energy across the region.

82. Investment levels in power infrastructure are insufficient. The Asian Development Bank estimates that the region requires \$11.7 trillion in baseline investment in the power sector for the period 2016–2030, or an average of \$779 billion per year. Climate-adjusted estimates are higher, totalling \$14.7 trillion, or \$982 billion per year. The annual gap in investment is estimated to be between \$330 and \$459 billion.<sup>26</sup>

83. An estimated 2 per cent of the region's population accesses electricity from approximately 2,000 off-grid solar systems. Data for off-grid areas are insufficient, though it is estimated that most new investment is directed towards medium or higher levels of electricity access that support the use of appliances and at least eight hours of electricity.

84. Data for clean-cooking financing is particularly scarce, though total financing tracked in 2015 and 2016 reached \$3.6 million in Indonesia, \$0.4 million in Bangladesh and \$0.1 million in Nepal. While some countries exhibit progress, in general, investments in this area are minuscule in comparison to what is needed to achieve universal access to clean cooking.<sup>27</sup>

85. International public financing complements national public financing in the region. Investments in low-emission development through mechanisms such as the Green Climate Fund are catalysing renewable energy and energy efficiency in underdeveloped markets.

## VII. Issues for consideration by the Committee

86. In line with the provisions of Commission resolution 74/9 on the implementation of the outcomes of the Second Asian and Pacific Energy Forum, the secretariat will continue to deliver on its mandate to follow up on and review progress towards targets of Sustainable Development Goal 7 at the regional level, conduct analytical studies on key energy trends and emerging issues in the Asia-Pacific region, and compile and disseminate relevant energy information and data.

87. The Committee may wish to guide the secretariat on ways to further support ESCAP members and associate members in the implementation, follow-up and review process of the 2030 Agenda, including Sustainable Development Goal 7, by means of the following:

- (a) Promoting policy dialogue and knowledge-sharing and helping to link the national and global levels of implementation;
- (b) Building the capacity of the countries with special needs for producing, analysing and using various forms of data, including quantitative, qualitative and geo-located data, to effectively implement, follow up on and review Goal 7;

<sup>26</sup> Asian Development Bank, *Meeting Asia's Infrastructure Needs* (Manila, 2017).

<sup>27</sup> Sustainable Energy for All, *Energizing Finance: Understanding the Landscape 2018* (Washington, D.C., 2018).

(c) Supporting national efforts to mainstream the global targets related to energy into national policies, plans and strategies, and encouraging communication, the sharing of best practices and coordination on energy development policy and planning;

(d) Developing an annual compilation report on the status of and progress towards achieving Goal 7 in Asia and the Pacific by utilizing the outputs of the Expert Working Group on Universal Access to Modern Energy Services, Renewable Energy, Energy Efficiency and Cleaner Use of Fossil Fuels, taking advantage of and building upon existing knowledge, information and policy research, and ensuring close coordination with relevant international, regional and subregional organizations.

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