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Follow-up on the Ministerial Declaration on Regional Cooperation for Energy Transition towards Sustainable and Resilient Societies in Asia and the Pacific of the Second Asian and Pacific Energy Forum: review of progress towards Sustainable Development Goal 7 in Asia and the Pacific

Follow-up on and review of progress towards Sustainable Development Goal 7 in Asia and the Pacific

Note by the secretariat

Summary

In its resolution 74/9, the Economic and Social Commission for Asia and the Pacific requested the Executive Secretary to support members and associate members in the implementation of commitments contained in the Ministerial Declaration on Regional Cooperation for Energy Transition towards Sustainable and Resilient Societies in Asia and the Pacific, adopted by the Second Asian and Pacific Energy Forum, by following up on and reviewing regional progress towards the targets of Sustainable Development Goal 7, 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.

The present document contains information related to regional and national progress towards achieving the targets of Sustainable Development Goal 7. 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 document is based on the most recent data which covers the period up to 2018 for the majority of the indicators. It does not capture the extraordinary impact of the coronavirus disease crisis on energy demand and the challenges posed by the pandemic for consumers and energy providers across the region.

The electronic version of the present document contains embedded links to data within the Asia Pacific Energy Portal. For the best experience, representatives and readers are encouraged to follow links to charts where they can explore the energy data in detail.

* ESCAP/CE/2021/L.1.

I. Introduction

1. Sustainable Development Goal 7 of the 2030 Agenda for Sustainable Development offers a framework for decision-making in the energy sector that not only contributes to a global plan of action for people, planet and prosperity but also underpins efforts to limit the extent of global warming.

2. Sustainable Development Goal 7 (Affordable and clean energy) includes three targets to be achieved by 2030: 7.1, ensure universal access to affordable, reliable and modern energy services; 7.2, increase substantially the share of renewable energy in the global energy mix; and 7.3, double the global rate of improvement in energy efficiency.

3. The Sustainable Development Goal targets are defined as aspirational and global, and while the targets provide guidance, each Government sets its own targets and develops its own policies in accordance with national circumstances. Governments hold the primary responsibility for follow-up and review at national, regional and global levels, in relation to the progress made in implementing the Goals leading up to 2030.

4. The Asia-Pacific region had a population of 4.55 billion in 2018, approximately 60 per cent of the world total. The economies in the region produce approximately one third of the world's gross domestic product (GDP), consume half of the global energy supply and include the world's top energy producers and consumers. In 2018, Asia and the Pacific accounted for 56 per cent of global emissions from fuel combustion, nearly two thirds of which were from coal.

5. Despite facing many challenges, Asia-Pacific countries are demonstrating global leadership across the three pillars of sustainable energy – access, efficiency and renewables – offering strong commitments and innovation in those areas. New technologies and approaches have emerged, and as the Paris Agreement has turned the world's focus towards decarbonization, countries across the region have offered up new and increasingly ambitious targets to improve energy efficiency and to increase their renewable energy share.

6. The present document contains information related to regional and national progress in achieving the targets of Sustainable Development Goal 7, based on the latest available data as of November 2020. Regional examples of successful policies and measures that support advancements are presented, as are common challenges.

II. Energy access: the region is closing in on universal electrification, but clean cooking is hindered by inadequate policy attention

7. Sustainable Development Goal target 7.1 aims to ensure universal access to affordable, reliable and modern energy services by 2030. The target is comprised of two indicators: 7.1.1, proportion of population with access to electricity, and 7.1.2, proportion of population with primary reliance on clean fuels and technology.

8. As of 2018, continued electrification efforts across the Asia-Pacific region had brought electricity access to 95.6 per cent of the region's population, even as the population grew. Since the year 2000, 1.3 billion people have been provided access to electricity, approximately half of whom are in

India. Universal access has nearly been achieved in urban areas, though the electrification rate and quality of service remained lower in rural areas.

9. The Asia-Pacific region is largely on track to achieve universal access to electricity by 2030. As of 2018, 38 of 62 members and associate members of the Economic and Social Commission for Asia and the Pacific (ESCAP) had access rates of 99 per cent or higher, and only 6 had less than 80 per cent access.[1]

10. According to the latest data, 200 million people remain without electricity, more than three quarters of whom live in South and South-West Asia, though rapid grid extensions in India and deployment of off-grid solutions in Bangladesh have helped to reduce the subregion's unelectrified population significantly. Offsetting some gains is Pakistan, which is the only Asia-Pacific economy where the electrification deficit is increasing, with a growing, underserved rural population.

11. South-East Asia has approximately 29 million people living without electricity. The largest deficit is in Myanmar, where 18.2 million people have yet to be reached. The country has demonstrated recent gains with off-grid solutions, which provided more connections than extending the national grid. Meanwhile, Indonesia and the Philippines have demonstrated strong progress in reducing the size of large, unserved populations through on- and off-grid approaches. In 2010, Cambodia had one of the region's lowest electrification rates, but by 2018 had improved by 60 percentage points, to reach 91.6 per cent.

12. Over the same time frame, Afghanistan, Papua New Guinea, Solomon Islands and Timor-Leste all gained between 33 and 46 percentage points, while Bhutan and Kiribati achieved universal access.

13. The Democratic People's Republic of Korea has the region's lowest electrification rate with 13 million people, or more than half the population, lacking electricity.

14. Across the Asia-Pacific region, grid extensions have been the primary enabling factor for increased electrification, though renewable off-grid solutions play a significant role in small and remote communities, as well as in areas with poor grid reliability. Renewable off-grid installed capacity topped seven gigawatts (GW) for the region in 2019 and is comprised primarily of biomass, solar photovoltaics and micro-hydro and wind installations.

15. In Cambodia, the extension of the national grids and the introduction of renewable-based off-grid power systems in rural areas have been financed through the nation's Rural Electrification Fund, which has backed initiatives such as the Programme for Power to the Poor, the Programme for Solar Home Systems, and the Programme for Providing Assistance to Improve Existing and Develop New Electricity Infrastructure in Rural Areas.

16. In Afghanistan, off-grid renewable energy solutions have been the major contributor to the country's rising electrification rate. More than 5,000 community-owned micro-hydro mini-grids have been installed in rural areas previously lacking electricity, while a number of private sector companies have entered the Afghan market offering solar panel, battery and

[1] American Samoa (no data available), France, the Netherlands, the United Kingdom of Great Britain and Northern Ireland and the United States of America are non-regional members and were not included in the Asia Pacific Energy Portal.

pump installations, as well as small wind turbines. Nearly two thirds of the country's solar capacity is found in off-grid installations.

17. Although the gap is closing in the region, there is still a disparity between rates of access to electricity in urban versus rural areas. The Asia-Pacific region's urban electrification rate reached 99.7 per cent in 2018, while the rate for rural areas was 92.2 per cent.

18. To close the electrification gap, greater efforts are needed to provide affordable and sustainable energy solutions to rural, remote and island populations where energy systems are more costly to install and may be more vulnerable to extreme weather events and the challenges to maintaining reliable service are greater.

19. Regulation of the off-grid market is in its infancy and efforts are needed to develop dedicated policies and standards designed for various off-grid solutions. Policies need to emphasize providing energy services that extend above subsistence-levels of energy consumption towards higher tiers of quality, quantity and reliability and which support modern lifestyles and productive activities.

20. Progress in expanding access to clean fuels and technologies for cooking (hereinafter referred to as "clean cooking") is modest at the regional level and highly varied among Asia-Pacific economies. In 2010, 2.13 billion people, nearly half of the region's population, were reliant on highly polluting and harmful cooking solutions. By 2018, progress in the uptake of clean cooking had lowered the deficit to 1.78 billion people, or 39 per cent of the population.

21. Clean cooking rates are low, and the rates of progress slow in many economies. In 2018, 10 ESCAP member States had clean cooking access rates of less than 25 per cent, and an additional 12 members had access rates of 50 per cent or less. Several Pacific island countries are among those with the lowest rates of access; Pacific island countries often have small, dispersed populations, biomass is readily available and affordable, and reliable distribution of modern cooking fuels and technologies is challenging. However, high reliance on traditional biomass is also characteristic of the economies of the subregions of East and North-East Asia, South and South-West Asia, and South-East Asia.

22. Without strong policy interventions, if the current pace of progress continues, by 2030, urban areas will approach universal access, while rural areas will lag behind, with fewer than three out of five people relying on clean cooking fuels and technologies.

23. Although regional progress is slow, several countries are successfully increasing access to clean cooking through policies, programmes and investment.

24. The region's fastest rate of growing access to clean cooking is in Indonesia, where a kerosene-to-liquefied petroleum gas conversion initiative has enabled the country to increase its access rate from just 6 per cent in 2000 to 80 per cent in 2018. Prior to the programme, which offers households free liquefied petroleum gas cookstoves and fuel starter kits, many of the country's households relied on kerosene and biomass for cooking. The programme was implemented by an Indonesian state-owned oil and natural gas corporation and has reached much of the archipelago nation by building on existing energy distribution networks.

25. The use of liquefied petroleum gas in India increased from 22 per cent in 2015 to 58 per cent in 2018, according to a recent household energy survey. More than half of households surveyed reported that they gained access under the Government's Pradhan Mantri Ujjwala Yojana initiative, which was established in 2016 to provide 50 million liquefied petroleum gas connections to women of below-poverty-line families.

26. Viet Nam has demonstrated one of the fastest rates of improvement in clean cooking access, despite lower urbanization and income levels than neighbouring economies. The expansion of the liquefied petroleum gas market, driven by the private sector, as well as the promotion of locally produced advanced biomass and biogas cookstoves by the government and non-governmental organizations, are key contributing factors to this shift.

27. The quantity and quality of data for energy access are insufficient. Methodological inconsistencies and irregular or infrequent data collection present challenges to tracking progress with regard to Sustainable Development Goal 7, while more data are needed to better understand service delivery in terms of quality, reliability and affordability; energy user preferences; and clean cooking markets.

28. More efforts are needed to create, strengthen and expand clean cooking markets and distribution networks. While there are many stove models in the region, few apart from natural gas- and electricity-based models meet the emissions performance levels that are required to be considered clean. Adopting the International Organization for Standardization (ISO) standards for clean cooking stove performance, which align with the World Health Organization air quality standards, can help to align national regulatory frameworks with international best practices, enable the phasing out of inefficient and polluting technologies, and can help to facilitate regional and international markets and trade.

29. With few exceptions, investments in clean cooking are minimal. More investment is needed in the research and development of clean cookstoves that meet ISO standards as well as research into consumer preferences. Infrastructure financing is needed to support stove and clean fuel producers and distributors. Mechanisms such as microfinancing, pay-as-you-go and rental options are needed to provide end users with options to help them to bridge financial gaps, while public financing will be critical to making some options competitive with cheaper alternatives, at least in the short term. Engaging local lending institutions as partners in energy access programmes can expand the potential market for off-grid electrification and clean cooking technologies and fuels.

III. Modern renewable energy: rapid growth, though still a low share of energy consumption

30. The share of modern renewables (i.e., the renewable component, excluding traditional biomass) in total final energy consumption has been growing since the early 2000s, reaching more than 8 per cent in 2017. That was the first year that modern renewable energy overtook traditional biomass, accounting for 52 per cent of the total final renewable energy consumption. Yet, in Asia and the Pacific, the share of modern renewable energy in the energy mix remains low in comparison to other regions. Fossil fuels continue to comprise the bulk of the energy mix.

31. The largest gains for renewables are found in the region's power sector. In 2018, the renewable share of total electricity output in Asia and the Pacific amounted to 22.1 per cent, up from 16.1 per cent in 2010. Since then, there has been 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 America continue to have higher shares of electricity from renewable sources, suggesting that there is potential for the Asia-Pacific region to make further gains.

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

33. The Asia-Pacific region is at the global centre of renewable energy development and deployment, with several countries demonstrating leadership in investment, net capacity additions and production. In just three years, between 2015 and 2018, solar electricity production in the Asia-Pacific region tripled, while wind production nearly doubled. A growing number of megaprojects of global significance are rapidly building new capacity.

34. Australia achieved the region's highest share of combined solar and wind energy in its national power mix at 9.6 per cent in 2018, followed by Turkey and Japan at 9.4 per cent and 8.5 per cent, respectively. China has shown a dramatic increase in the share of solar and wind in total electricity output, growing from 1 per cent in 2010 to more than 7.5 per cent in 2018.

35. The largest solar photovoltaic capacity additions in 2018 occurred in China, which added 45 GW of new capacity, while India, Japan and the Republic of Korea added 9.2 GW, 11.3 GW and 1.3 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 7.9 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. In 2018, solar photovoltaics dominated renewable energy capacity additions across the region.

36. In absolute terms, China leads both the region and the world in renewable energy investment and deployment. It produces more renewable electricity than the rest of the region combined and more than Europe, North America, or Latin American and the Caribbean. The total installed renewable energy capacity of China approached 695 GW by the end of 2018.

37. The transition to renewable energy is accelerating as the cost of renewables falls to levels competitive with, or even below, the cost of fossil fuels. Though pricing varies according to context, the largest reductions are seen in terms of levelized costs for solar photovoltaics and onshore wind, which are cheaper than the marginal operating costs of an increasing number of coal power plants. The most competitive pricing is for installations in China and India, though several Asia-Pacific economies have experienced dramatic cost reductions in just a few years. Better technology, growing economies of scale, increased developer experience and improved supply chains are all contributing factors.

38. Small grid-connected installations, such as on rooftops, are contributing significantly to the growth of the renewable energy sector, particularly in urban areas and economies with constrained land resources. Supporting residential

and commercial investments in rooftop solar power can be a cost-effective way to add capacity without growing the energy system's footprint, while also alleviating financial pressure on limited public resources. Policy instruments such as net metering and feed-in tariffs as well as reduced equipment duties, connection fees, taxation and lending rates are being employed to accelerate growth in the sector. These installations also benefit from lower network losses due to proximity of supply and demand centres. Regional examples include Japan, which is encouraging distributed solar power with favourable feed-in-tariffs for installations of less than 10 kW in size, helping to shift new capacity away from larger installations that take up land area towards growing cumulative capacity on domestic, commercial and industrial rooftops. Singapore, with limited land area, is turning to public building rooftops, while Viet Nam, in order to accelerate installations by households and businesses, has introduced higher feed-in-tariffs for rooftop solar installations than for other solar installation types.

39. Innovations in renewable energy technologies and applications are further expanding the sector's potential. Increased power density is being realized with increased solar cell efficiency, larger wind turbines, and floating solar farms located on hydro reservoirs, which also take advantage of existing transmission infrastructure. Blockchain technology is being piloted in several locales to support peer-to-peer energy trading platforms, investments in renewable energy projects and the purchase of renewable energy credits. Virtual power plants that can aggregate the capacity of numerous distributed systems are being considered under several demonstration projects. The related vehicle-to-grid technology, which incorporates two-way power flows that allow electric vehicles to send power back to the grid, is being explored in order to advance virtual power plants.

40. Biofuels are edging into the transport sector in a small number of national contexts. Transportation accounts for one fifth of energy consumption in the region, and biofuels have the potential to decarbonize fuels used for road, marine and air transportation. Mandatory blends have been introduced in several South-East Asian economies, where biofuel feedstock is abundant.

41. Green hydrogen, which is produced using renewable power, holds promise as a fuel that can support decarbonization across sectors, including the more difficult heat and transport sectors. Costs are falling for technologies used to create hydrogen by splitting water molecules, and a handful of Asia-Pacific countries are piloting this emerging approach. For green hydrogen to become a viable option, massive investments are needed in the transportation and storage of the gas, while carbon pricing will be needed to enable cost competitiveness with fossil fuels.

42. The expansion of renewable energy in the power sector is highly reliant on a supporting grid infrastructure. Experience in the region shows that renewable capacity additions without the concurrent development of transmission lines or the strengthening of existing grid infrastructure can lead to curtailments of renewable power plants or the overload of local grid systems.

43. Increasing regional connectivity is an important tool that can be used to meet some of the challenges in the renewable energy sector, particularly in relation to variable renewable energies such as solar and wind. Larger grid systems offer greater grid stability by offering broader balancing areas and more diverse supplies. Power suppliers are also given access to additional markets, while the potential for renewable energy development in more remote but resource-rich areas to reach demand centres is increased with connectivity across jurisdictional and national boundaries.

44. 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 Pacific island States, several of which are targeting 100 per cent renewable electricity generation. In South-East Asia, the 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 at the subregional level to 23 per cent by 2025, under the ASEAN Plan of Action for Energy Cooperation 2016–2025.

IV. Energy efficiency: energy intensity is declining and can further improve with the increased uptake of energy efficient technologies across sectors

45. Sustainable Development Goal target 7.3 aims at doubling the global rate of improvement in energy efficiency by 2030. The indicator is energy intensity, measured in terms of primary energy and GDP.

46. The Asia-Pacific region accounts for half of the world's energy supply and more than one third of the GDP. Due to its rapid growth, both economically and in terms of energy demand, the region will heavily influence progress towards the global goal.

47. Energy intensity is a measure that tracks the energy supplied to the economy per unit value of economic output and is a proxy for energy efficiency in economies and end-use sectors. Requiring less energy to generate each unit of GDP reduces the energy intensity and indicates an improvement in energy efficiency.

48. The Asia-Pacific region has demonstrated a long-term decline in the level of energy intensity of primary energy supply. 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 dropped from 7.4 megajoules in 2000 to 5.2 megajoules in 2017 and is now approaching the global average of 4.9 megajoules. The pace of energy intensity reduction has picked up in the recent period, with an annual reduction rate of 2.6 per cent from 2010 to 2017, which is in line with the global annual reduction required until 2030. While improving, regional energy intensity in Asia and the Pacific remains higher than many other regional averages, indicating that relatively more energy is used to produce economic output in Asia and the Pacific.

49. Energy intensity is influenced by several factors, including economic structures, the nature of economic activities, the geography of a country, exchange rates, climate and the impacts of global energy prices. Low energy intensity is not necessarily indicative of a high level of energy efficiency. However, using this measure for comparisons across economies of similar contexts is useful, as it is for examination of long-term trends.

50. While the Asia-Pacific region as a whole is approaching the targeted rate of improvement, large economies are able to define regional and even global trends. The Asia-Pacific rate of improvement is largely driven by East and North-East Asia where the GDP gains of China have outpaced energy demand and accelerated the subregional average annual improvement to a rapid 3.6 per cent. However, energy efficiency remains important to economies of all sizes.

51. Energy efficiency policies and regulations governed by responsible entities are foundation blocks for the sustainable energy sector. Incentives and mandates across sectors influence the choices made by energy providers and consumers, while minimum energy efficiency performance standards limit the available choices. As the more efficient technology choices are often also more expensive, financing mechanisms play an important role in surmounting economic hurdles.

52. Most Asia-Pacific economies have adopted energy efficiency targets, either at the economy level or for specific sectors. However, the scope of these targets and the degree to which supporting measures have been put in place varies widely.

53. Regional cooperation plays an important role in improving energy efficiency in Asia and the Pacific. For example, in 2016, ASEAN members agreed to reduce their energy intensity by 20 per cent by 2020 and by 30 per cent by 2025, relative to 2005 levels. The subregion is set to exceed those targets. These reductions in energy intensity are supported by the specific sectoral actions stipulated in 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, and coordinated by the ASEAN Energy Efficiency and Conservation Subsector Network.

V. Special focus: challenging coal dominance in the power sector in Asia and the Pacific

54. The availability of modern and affordable energy has transformed the Asia-Pacific region, helping countries to develop their economies and lifting millions out of poverty. However, the reliance on polluting and carbon-intensive sources of energy such as coal has come at a great cost. The Asia-Pacific region accounts for almost 60 per cent of global total carbon dioxide emissions, nearly two thirds of which are from the energy sector, which is heavily reliant on fossil fuels. The Asia-Pacific region made up 80 per cent of the world's coal consumption in 2018, with demand mainly concentrated in China (50 per cent), followed by India (12 per cent), Japan (3 per cent) and the Republic of Korea (2.5 per cent). South-East Asian countries jointly account for 4 per cent of the world's coal consumption. Almost two thirds of the region's energy sector emissions come from coal-fired electricity generation.

55. The Secretary-General has recently reiterated that countries need to end their reliance on coal. He has called for taxes on carbon emissions, the removal of subsidies for fossil fuels and a stop to construction of new coal-fired power plants by 2020 if the world is to stand a chance of ending the climate crisis.

56. Despite the United Nations calling for an end to coal-fired power generation, hundreds of new coal-fired power plants in the Asia-Pacific region are still being built, and hundreds more are in the pipeline. The extent to which the region has ramped up the use of coal to meet its power needs is reflected by the average age of its coal-fired power stations, which is only 12 years. Given the typical economic lifetime of around 40 years, this infrastructure will lock high emissions into an energy system that urgently needs decarbonization.

57. Nevertheless, the region is slowly moving in the right direction, and the number of coal-fired power plants currently being planned is falling. New permits for coal-fired power plants have dropped to record lows, and more than

a thousand have been cancelled, a reflection of a tougher economic climate for coal plant developers and the growing consensus on the need to limit global warming and to protect human health.

VI. Issues for consideration by the Committee

58. In line with 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 the 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.

59. The Committee may wish to comment on the progress towards achieving Sustainable Development Goal 7 in Asia and the Pacific and to provide guidance to the secretariat to support further the implementation of Goal 7 and its follow-up and review process.