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**Economic and Social Commission for Asia and the Pacific****Seventy-third session**

Bangkok, 15-19 May 2017

Item 10 of the provisional agenda\*

**Theme topic for the seventy-third session of the****Commission: “Regional cooperation for sustainable energy”****Enhancing regional cooperation for sustainable energy in  
Asia and the Pacific****Note by the secretariat\*\****Summary*

In the present document, the main findings of the theme study *Regional Cooperation for Sustainable Energy in Asia and the Pacific* are summarized.

The document contains an assessment of the factors driving the energy transformation in Asia and the Pacific to meet growing energy demand, enhance energy access and shift to cleaner energy, together with the challenges to achieving this transformation and in particular the Sustainable Development Goals. It contains a review of policy options for accelerating the energy transformation and examines the regional disparities in energy demand and resource endowment that will drive the transformation in Asia and the Pacific.

The document concludes with recommendations to develop a regional cooperation framework on sustainable energy that promotes energy system transition pathways, regional connectivity and institutional arrangements.

**I. Introduction**

1. Countries in Asia and the Pacific face multiple energy-related challenges. The first challenge is to increase energy supplies to meet the growing demands of a region undergoing rapid urbanization, industrialization and economic growth. The second is to improve energy access for the approximately 421.4 million people that do not have access to electricity and the 2.1 billion people that rely on traditional biomass for cooking and

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\* E/ESCAP/73/L.1.

\*\* This note was submitted late owing to the extensive research and internal consultation that was necessary.

heating.<sup>1</sup> The third is to shift to utilization of low-carbon energy resources and to diversify the energy mix to enhance energy security, reduce environmental impacts, especially air pollution, and meet global commitments on climate change.

2. Meeting these multiple energy-related challenges will require a transformation in the way in which energy is generated, transmitted and consumed. Addressing energy challenges will also be an integral part of the implementation of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals, including Goal 7 (Ensure access to affordable, reliable, sustainable and modern energy for all). Major components of this transformation include improved energy efficiency, increased renewable energy in the energy mix, improved energy access and better connectivity across the region.

3. While the energy sector in many countries is being slowly transformed, increasing the pace and ambition of the change to meet the Sustainable Development Goals and national energy security ambitions will require major shifts, including more robust and predictable government legislation and policy, increased public and private investment in and financing of the energy transition, enhanced technical innovation and solutions, and new partnerships within and among countries and regions.

4. At its seventy-second session, the Commission decided on “Regional cooperation for sustainable energy” as the theme topic for the seventy-third session of the Commission. The present document contains an outline of the major findings and recommendations of the theme study *Regional Cooperation for Sustainable Energy in Asia and the Pacific*. The current trends that are driving the energy transformation are explored, some of the main challenges to addressing the growing energy needs of the region, while moving rapidly towards sustainable and modern energy, are identified, and policy measures are proposed that can help to trigger the necessary transformation. The challenges and opportunities of the transformation are analysed, and the role that regional cooperation can play in promoting the Asia-Pacific region’s sustainable energy future is identified.

## II. Energy system transformation

5. The concept of energy system transition is not new. The energy crisis of 1970s and 1980s revealed overreliance by many countries on imported oil and drove the discussion on the need to harness domestic energy supply and demand and to increase the application of renewable sources of energy.

6. Several key factors are driving countries in the region towards transforming their energy systems. These include energy security to meet the increasing energy demand, gaps in energy access, environmental impacts on health and well-being, and the ambition to decarbonize the energy sector. Each of these is examined in greater detail below. In addition, the table provides an overview of key energy indicators in the Asia-Pacific region that illustrate the urgency of energy transition.

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<sup>1</sup> International Bank for Reconstruction and Development/World Bank, *Sustainable Energy for All: Global Tracking Framework – Progress toward Sustainable Energy 2017* (Washington, D.C., 2017). Available from [http://gtf.esmap.org/data/files/download-documents/eegp17-01\\_gtf\\_full\\_report\\_final\\_for\\_web\\_posting\\_0402.pdf](http://gtf.esmap.org/data/files/download-documents/eegp17-01_gtf_full_report_final_for_web_posting_0402.pdf).

### Key indicators of the Asia-Pacific region

	1990	2000	2010	2014
GDP (at 2005 purchasing power parity)	8 931 774	10 267 632	15 758 130	18 598 638
GDP growth rate (percentage)	5.0	5.8	7.3	3.8
Population	3 278 430	3 764 208	4 182 135	4 430 890
Rate of urbanization (percentage)	33.6	38.2	45.0	48.8
Total primary energy supply (metric tons of oil equivalent)	3 346 473	3 865 700	6 084 127	6 777 730
Share of renewables in the total primary energy supply (percentage)	16.72	15.97	12.52	12.83
Share of fossil fuels in the total primary energy supply (percentage)	80.30	79.85	84.40	85.15
Carbon emissions (millions of tons)	7 750	9 148	15 469	17 588
Primary energy intensity (kilograms of oil per \$1000 GDP at 2011 purchasing power parity)	222	186	158	152 (2013)
People without access to electricity services (millions)	947	790	505	421
Share of population with access to electricity: urban/rural (percentage)	94.5/65.0	97.5/70.0	97.2/79.1	98.3/86.2
People without access to clean fuels and technologies	2 116 182	2 062 785	2 049 246	2 135 689
Share of population with access to clean fuels and technologies: urban/rural (percentage)	88.1/20.5	n/a	n/a	88.0/20.8 (2012)

*Abbreviation:* GDP, gross domestic product.

*Source:* Economic and Social Commission for Asia and the Pacific (ESCAP), Asia Pacific Energy Portal. Available from <http://asiapacificenergy.org/> (accessed 3 April 2017).

#### A. Energy security

7. Achieving national energy security remains a main driver for the energy transition, in order to protect economies from price fluctuations and market instability and reduce dependence on imported energy. More recently, the drive towards better demand-side management, encompassing load management and energy efficiency, has helped to address energy security concerns by reducing energy demand. The drive towards renewables has also supported energy security goals by reducing dependence on imported energy and by furthering non-grid renewable energy solutions that have helped to alleviate base load demand. Traditional understanding of affordability, accessibility and continuity of supply has therefore been expanded to also take account of the long-term shift to low-carbon and sustainable energy systems in order to meet energy demand for economic growth and facilitate broader development goals.

8. Energy security priorities and concerns play a key role in shaping national plans for energy system transformation. For developed economies in the region, such as Australia, Japan, New Zealand and the Republic of Korea, the energy security priorities include stockpiling, diversifying fuels and sources, and attaining a higher share of clean energy. For emerging economies with a rising global energy share, such as China and India, the energy security priorities are improving energy efficiency and demand management, diversifying fuels and sources of imports, reforming and creating markets, and investing in energy infrastructure and generation capacity. For major fossil-fuel exporters, such as Australia, Brunei Darussalam, Indonesia, the Islamic Republic of Iran, Kazakhstan and the Russian Federation, the energy security priorities are protecting trade infrastructure and routes, continuing the flow of investments and technology, ensuring security of revenue streams and gaining access to new reserves. For middle-income countries with high import dependence, the priorities are diversifying import sources and fuels, investing in external reserves and maintaining flexibility in energy systems. For low-income countries with net import dependence, the priorities are enhancing universal energy access, closing the gap between energy demand and supply from imports and securing capital and financing for investment in resource development and infrastructure. For small island countries, the focus should be on improving energy governance, increasing use of locally available renewable energy resources, improving data and information and ensuring the stable flow of external aid.

## **B. Increasing energy demand**

9. The region's strong economic growth potential points to an energy scenario in which energy demand growth will continue to outstrip that of every other region. Several future trends are likely to drive the increase in energy consumption in the region. First, economic growth averaged 5 per cent between 1990 and 2014. During the same period, total primary energy supply grew at an average of 2.98 per cent. Energy demand is forecast to increase by 60 per cent between 2010 and 2035,<sup>2</sup> or approximately 3.65 trillion tons of oil equivalent. Second, the next few decades will see a tremendous rise in the urban population in the region, and with it an increase in energy demand as urban populations consume more energy than rural populations on a per capita basis. Third, the Asia-Pacific region will account for 66 per cent of the global middle-class population and 59 per cent of global middle-class consumption by 2030, compared to 28 per cent and 23 per cent respectively in 2009.<sup>3</sup> The emergence of a large middle class will have a significant impact on energy demand as well as on goods and services that have embedded energy. Energy sources will be chosen to meet that growing demand and the efficiency of their use will greatly influence the course of economic development, environmental health and social progress in the region and beyond.

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<sup>2</sup> Asia-Pacific Economic Cooperation and Asian Development Bank (ADB), *Energy Outlook for Asia and the Pacific – October 2013* (Manila, ADB, 2015). Available from <https://www.adb.org/sites/default/files/publication/30429/energy-outlook.pdf>.

<sup>3</sup> Organization for Economic Cooperation and Development (OECD), "An emerging middle class", 2012. Available from [http://oecdoobserver.org/news/fullstory.php/aid/3681/An\\_emerging\\_middle\\_class](http://oecdoobserver.org/news/fullstory.php/aid/3681/An_emerging_middle_class).

### C. Gaps in energy access

10. While the region is growing rapidly, the benefits of such growth are not shared evenly. A total of 421.4 million people in the region still do not have access to modern energy services and 2.1 billion do not have access to clean fuels for cooking and heating. While current trends indicate improvements in access to electricity, the number of people without access to clean fuels has remained steady at more than 2 billion over the past two decades. Reliable energy access provides a foundation for social equity and environmental sustainability, and drives productivity and economic development. Future increases in energy supply will therefore need to meet the needs of people without access to energy services, as continued lack of access reinforces the cycle of poverty, hinders livelihood improvement and presents a significant impediment to sustainable development for the region.

### D. Environmental impacts on health and well-being

11. The increased consumption of energy, especially fossil fuels, has significant social and environmental consequences and costs at the local and regional levels. Air pollution is not just affecting people's health, but also harming the growth potential of entire cities and economies. According to the listing of 1,622 global cities in the 2014 World Health Organization (WHO) Global Urban Ambient Air Pollution Database,<sup>4</sup> the Asia-Pacific region accounted for 85 of the top 100 polluted cities, ranked according to annual average levels of particulate matter 10 micrometres or less in diameter and particulate matter 2.5 micrometres or less in diameter. Average levels among these cities ranged from 5 to 27 times higher than WHO air-quality guidelines.

12. Fuel savings, the externalities or costs associated with the health impacts of air pollution, and the avoided costs of catastrophic climate impacts balance almost all the costs of the transition. A full transition to a sustainable energy economy according to a scenario developed by Stanford University would result in substantial tangible benefits for employment, energy reliability, public health, energy cost stability and environmental stewardship by 2050.<sup>5</sup>

### E. Ambition to decarbonize the energy sector

13. The Asia-Pacific region now accounts for over half of global emissions. In 2015, countries reached the landmark Paris Agreement to combat climate change and accelerate and intensify the actions and investments needed for a sustainable low-carbon future, in order to keep global temperature rise in the twenty-first century well below 2 degrees Celsius above pre-industrial levels and pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. It will require global emissions of greenhouse gases to be deeply reduced by 2050, which will need a profound transformation in how energy is supplied and used around the world.

<sup>4</sup> WHO, WHO Global Urban Ambient Air Pollution Database, 2016 update. Available from [www.who.int/phe/health\\_topics/outdoorair/databases/cities/en/](http://www.who.int/phe/health_topics/outdoorair/databases/cities/en/) (accessed 3 April 2017).

<sup>5</sup> Mark Z. Jacobson and others, "100% clean and renewable wind, water, and sunlight (WWS) all-sector energy roadmaps for 139 countries of the world", 7 April 2017. Available from: <https://web.stanford.edu/group/efmh/jacobson/Articles/I/CountriesWWS.pdf>.

14. While per capita emissions remain well below the global average, 6 of the world's 10 largest sources of energy-related carbon emissions in 2016 were from the Asia-Pacific region: China, the Russian Federation, India, Japan, the Islamic Republic of Iran and the Republic of Korea. The region's carbon emissions more than doubled in only 20 years.<sup>6</sup> An energy transition in the region is therefore essential for the Paris Agreement to succeed, for the nationally determined contributions to be fully implemented and for ambitions to be raised to close the emissions gap that exists between current commitments and the international goal to limit warming to well below 2 degrees Celsius.

15. Between 1990 and 2014, the overall energy mix in the region barely changed. The share of fossil fuel increased from 80.4 to 85.2 per cent, while the share of renewable energy declined from 16.72 to 12.83 per cent,<sup>6</sup> against the backdrop of a large increase in supply. Both at the global and regional levels, the share of renewable energy has been more or less the same over the past two decades despite volatile and fluctuating oil prices. However, the decline in the cost of renewable energy together with political commitments have finally started to shift this trend, and the region observed an upward trend in the share of renewable energy in 2014. Globally, an estimated 161 gigawatts of renewable power capacity was added in 2016.<sup>7</sup> This growth occurred despite tumbling global prices of all fossil fuels, ongoing fossil fuel subsidies and other challenges facing renewables, including the integration of rising shares of renewable generation, policy and political instability, regulatory barriers and fiscal constraints.

16. Government officials and experts from several countries in the Asia-Pacific region have already recognized the need to align energy policies with the Sustainable Development Goals and the Paris Agreement. Nations will not have to start from scratch as the transition is already taking place in some countries. The following examples illustrate current progress.

17. The Government of Thailand is promoting "Thailand 4.0", a government agenda and 20-year national strategy to build the competitiveness of the economy in attaining sustainable development, whose aim is an integrated and efficient energy system characterized by creativity, innovation, sustainability and security.<sup>8</sup> The Ministry of Energy has set up "Energy 4.0" as a policy platform for integrating the efficient use of new and renewable energy, smart grids, energy storage technology, small power producers, hybrid firms and electric vehicles. While investments in the generation of fossil fuel power continue, the policy indicates the Government's intent to find new solutions to the country's energy challenges.

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<sup>6</sup> ESCAP, Asia Pacific Energy Portal. Available from <http://asiapacificenergy.org/> (accessed 3 April 2017).

<sup>7</sup> International Renewable Energy Agency, "Renewable capacity highlights", 30 March 2017. Available from [www.irena.org/DocumentDownloads/Publications/RE\\_stats\\_highlights\\_2017.pdf](http://www.irena.org/DocumentDownloads/Publications/RE_stats_highlights_2017.pdf).

<sup>8</sup> Thailand, Government Public Relations Department, "Thailand 4.0 policy to become a mechanism for national reform", 5 January 2017. Available from [http://thailand.prd.go.th/ewt\\_news.php?nid=4601&filename=index](http://thailand.prd.go.th/ewt_news.php?nid=4601&filename=index).

18. In China, the 13th Five-Year Plan for Economic and Social Development (2016-2020) includes strategies towards energy transition by focusing on energy demand structure and promoting green industry that is more conducive to the changing economic growth pattern. It is intended to deepen the transition to clean energy and low-carbon development in the next five years, which will be a pivotal period for China in its efforts to green its energy and economy. The plan's targets include reducing energy consumption by 15 per cent per unit of gross domestic product (GDP) compared to the 2015 level, and increasing the share of non-fossil fuel in the energy mix to 15 per cent from the 2015 share of 12 per cent.<sup>9</sup>

19. In the Pacific, not only do countries face the extreme adverse effects of climate change, including increased occurrences of violent weather and coastal erosion, but the continued reliance on imported fuels that penetrates most sectors of their economies, including energy generation and transport, leaves them heavily susceptible to oil price fluctuations, resulting in large burdens on foreign exchange reserves. Several countries and territories have adopted the goal of 100 per cent renewable electricity generation, including the Cook Islands, Niue, Papua New Guinea, Samoa, Tokelau, Tuvalu and Vanuatu.<sup>6</sup> Fiji has planned greater investments in renewable energy projects to undermine its reliance on fossil fuels, and launched its national energy policy in 2014 with the aim of increasing energy production from renewable sources to 80 per cent of its total production by 2020 and to 100 per cent by 2030.<sup>10</sup> Vanuatu has led the way with its national energy road map, which was launched in April 2014 with the aim of securing 100 per cent renewable energy within 15 years.<sup>11</sup> The Tonga Energy Road Map 2010-2020 contains a least-cost approach and an implementation plan with a view to reducing the vulnerability of Tonga to oil price shocks and achieving an increase in good-quality access to modern energy services in a financially and environmentally sustainable manner.<sup>12</sup>

### III. Main challenges and options in accelerating the implementation of Sustainable Development Goal 7

20. The 2030 Agenda encompasses a vision of a world in which human habitats are safe, resilient and sustainable and in which there is universal access to affordable, reliable and sustainable energy. The targets of Sustainable Development Goal 7 are to ensure universal access to affordable, reliable and modern energy services, increase substantially the share of renewable energy in the global energy mix and double the global rate of improvement in energy efficiency, all by 2030.

<sup>9</sup> China, National Development and Reform Commission, "13th Five-Year Plan for Economic and Social Development (2016-2020)", 7 December 2016. Available from <http://en.ndrc.gov.cn/newsrelease/201612/P020161207645765233498.pdf>.

<sup>10</sup> See United Nations Framework Convention on Climate Change, "Fiji's Intended Nationally Determined Contribution", registry of nationally determined contributions. Available from [www4.unfccc.int/ndcregistry/PublishedDocuments/Fiji%20First/FIJI\\_iNDC\\_Final\\_051115.pdf](http://www4.unfccc.int/ndcregistry/PublishedDocuments/Fiji%20First/FIJI_iNDC_Final_051115.pdf) (accessed 3 April 2017).

<sup>11</sup> See Vanuatu, Department of Energy, "Updated Vanuatu National Energy Road Map 2016-2030", June 2016. Available from [www.nab.vu/sites/default/files/documents/NERM2016-30.compressed.pdf](http://www.nab.vu/sites/default/files/documents/NERM2016-30.compressed.pdf).

<sup>12</sup> See Tonga, "Tonga Energy Road Map 2010-2020", June 2010. Available from <https://sustainabledevelopment.un.org/content/documents/1330tongaEnergy%20Strategy.pdf>.

21. Generally, the technologies for both energy production and energy consumption that are required to accelerate the transition and achieve the Sustainable Development Goals are already available in the commercial market. Most of the challenges that need to be overcome are not technological, but rather economic, financial and social, so Governments can play a leading role in addressing them. Accelerating energy transition will take the strongest possible push from Governments through policy and regulations. Within the present document, the analysis covers the above-mentioned three key aspects – technological, social and economic/financial – with governance as a cross-cutting issue.

#### **A. Energy access**

22. Given that more than 421 million people are without access to modern energy, and 2.1 billion people, equal to about 30 per cent of the global population, still rely on traditional fuels for cooking and heating, access to affordable, reliable, sustainable and modern energy remains one of the key development challenges in Asia and the Pacific.

23. Progress in energy access varies across subregions. Indeed, all the subregions have witnessed a significant increase in energy access. In the Pacific, although individual countries such as Fiji and Nauru are nearing universal access, overall progress remains stagnant with an average of approximately 80 per cent among the islands.<sup>6</sup> Moreover, as the region's urban electrification rate nears 99 per cent, the remaining last mile is in rural populations and often in remote and dispersed communities. These communities, where grid extension is often not economically feasible, will require new off-grid solutions.

24. For access to clean fuels, the situation is very different, with slow progress in comparison to electricity access. In fact, the number of people still relying on unsustainable traditional biomass for cooking and heating has increased. While positive examples can be seen in the region, such as in Bangladesh, India, Indonesia and Nepal, relatively few Governments have emphasized access to clean fuels as part of national policy compared to access to electricity.<sup>6</sup>

25. However, financing remains a key challenge in accelerating progress towards universal energy access. It is estimated that anywhere from \$1 billion to \$52 billion per year will be required globally, depending on the levels of energy access to which Governments aspire.<sup>13</sup> Private sector financing will play a key role in meeting this funding gap. However, attracting private capital to such investment is a challenge, because sustainable energy projects tend to have high upfront capital expenditures as a share of project cost and often have low rates of return. In addition, there are many perceived risks with respect to policy and governance that deter investors. Thus, increased investment in energy access will require the support of Governments to increase the commercial viability of energy access through a strong pipeline of viable business models that address risk sharing, or mitigation, and increase project revenue streams. Governments need to provide the enabling policy environment, while also shifting towards smart and innovative mechanisms to unlock financing such as interest rate subsidies, tax

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<sup>13</sup> ESCAP, "Draft outcome document", seminar on supporting Sustainable Development Goal 7, target 7.1, Bangkok, 21 to 23 June 2016. Available from [https://sustainabledevelopment.un.org/content/documents/11336Seminar%20on%20SDG7\\_Outcome%20Document\\_FINALv3%20CLEAN.pdf](https://sustainabledevelopment.un.org/content/documents/11336Seminar%20on%20SDG7_Outcome%20Document_FINALv3%20CLEAN.pdf).



exemptions on technology, or credit risk guarantees. Moreover, a strong focus on local engagement in support of energy market reforms and infrastructure investments and support for the productive use of energy are necessary to ensure energy system sustainability.

## B. Renewable energy

26. The International Energy Agency projects that if nations abide by Paris Agreement pledges, 37 per cent of global power generation in 2040 should come from renewables, compared with 23 per cent today.<sup>14</sup> Increasing the share of modern renewables in the energy mix will go a long way to reducing carbon dioxide emissions and supply the energy needed for economic growth. Countries across the region have already committed to increasing their share of renewable energy: 45 ESCAP member States have national policies for renewable energy targets, up from only 17 in 2010. However, the share of modern renewable energy sources is still relatively small in the region, owing to prevailing barriers that hinder deployment.

27. These barriers can be broadly classified as regulatory and policy uncertainty, institutional and administrative barriers, market barriers, financial barriers, infrastructure barriers, a lack of skilled personnel, public acceptance and environmental issues.<sup>15</sup> The barriers that exist in each country or region are different, since the techno-economic, market and institutional conditions are diverse. For example, in South-East Asia, infrastructure and grid-related issues and regulatory and administrative hurdles are major impediments to the deployment of renewable energy.<sup>16</sup> Non-economic barriers raise the return on investment required by financiers and the associated risk premiums. Policy measures such as simplified administrative requirements, government loan guarantees or loan-loss reserves can overcome some of these barriers.

28. While financing continues to be a major challenge for countries, some progress is being made. Investment in and installation of renewable energy reached its peak in 2015, when global investment committed to renewables, excluding large hydroelectric projects, rose 5 per cent to \$285.9 billion. Of that figure, \$160.6 billion was in Asia and the Pacific, including \$102.9 billion in China and \$10.2 billion in India. The year 2015 marked the first time that renewable energy accounted for more than 50 per cent of newly installed capacity, and that investment in renewable energy was more than double that of coal and gas generation.<sup>17</sup>

<sup>14</sup> International Energy Agency, *World Energy Outlook 2016* (Paris, 2016).

<sup>15</sup> Simon Müller and others, “Renewable energy: policy considerations for deploying renewables – information paper” (Paris, OECD and International Energy Agency, 2011). Available from [www.iea.org/publications/freepublications/publication/Renew\\_Policies.pdf](http://www.iea.org/publications/freepublications/publication/Renew_Policies.pdf).

<sup>16</sup> Samantha Ölz and Milou Beerepoot, “Deploying renewables in Southeast Asia: trends and potentials – working paper” (Paris, OECD and International Energy Agency, 2010). Available from [www.iea.org/publications/freepublications/publication/Renew\\_SEAsia.pdf](http://www.iea.org/publications/freepublications/publication/Renew_SEAsia.pdf).

<sup>17</sup> Frankfurt School of Finance and Management, United Nations Environment Programme Collaborating Centre for Climate and Sustainable Energy Finance, and Bloomberg New Energy Finance, *Global Trends in Renewable Energy Investment 2016* (Frankfurt, 2016).

29. With innovative approaches and financing mechanisms, renewable energy technologies such as onshore wind and solar power have already reached grid parity in many parts of the world, making them competitive with conventional generation sources. For example, globally, the levelized cost of energy for solar-photovoltaic power at utility scale in 2014 fell to as low as \$0.08 per kilowatt, a decrease of 50 per cent from 2010.<sup>18</sup> This has been possible despite the slow pace of pricing reform.

30. Another major common challenge for the Asia-Pacific region, particularly for developing member States, is to provide stable and long-term policies to facilitate energy system transition. Predictable policy is important for attracting investment, building up production capacity, promoting the development and maturity of new technologies and leveraging an expansion in the number of jobs created. Governments can help kick-start economies of scale to accelerate deployment by giving priority to clean energy technologies in procurement and/or by establishing energy efficiency and renewable portfolio standards for energy providers.

### C. Energy efficiency

31. Globally, Asia and the Pacific remained the most energy-intensive region in 2014, even with a steep decline from 222 kilograms of oil equivalent per \$1,000 of GDP in 1990 to 152 kilograms of oil equivalent per \$1,000 of GDP in 2013.<sup>6</sup> Comprehensive strategies for improving energy efficiency should thus be developed. Energy efficiency is the logical first step in the energy transition at every scale, from individuals and buildings to cities and entire economies.

32. The potential for energy savings in the Asia-Pacific region remains very high. Energy efficiency measures could save 35 per cent of energy consumption over the business-as-usual case by 2035.<sup>19</sup> Improving energy efficiency at a much-accelerated pace requires Asia-Pacific countries to overcome market barriers that prevent consumers and companies from purchasing the most efficient equipment and appliances. These barriers include market failures and imperfections; consumer attention to first costs rather than life-cycle costs; attitudes, behaviours and misinformation; and fiscal policies that discourage gains in energy productivity or reward inefficient energy consumption. These barriers often require government interventions to make labelling mandatory, set national and sector-wide energy efficiency targets and establish the legal frameworks necessary to implement and enforce mandates.

33. On energy efficiency policies, effective targets are those supported by detailed sectoral implementation plans and their strict enforcement. Basic policy levers used in the region can be broadly characterized as incentives, standards and penalties, and programmes to enhance capacity and management. Regulations are necessary to provide legal mandates for standards and labelling to build energy efficiency, and for energy efficiency programmes in industry. These programmes could be developed on an incremental basis, focusing on priority technologies at the initial stage and

<sup>18</sup> International Renewable Energy Agency, *Renewable Power Generation Costs in 2014* (Bonn, 2015). Available from [www.irena.org/DocumentDownloads/Publications/IRENA\\_RE\\_Power\\_Costs\\_2014\\_report.pdf](http://www.irena.org/DocumentDownloads/Publications/IRENA_RE_Power_Costs_2014_report.pdf).

<sup>19</sup> ESCAP, "Asia Pacific: Response to Climate Change", 10 December 2015. Available from [www.unescap.org/op-ed/asia-pacific-response-climate-change](http://www.unescap.org/op-ed/asia-pacific-response-climate-change).

broadening the scope in the expansion stage. Mandatory programmes for technology or performance standards and labelling are most effective, especially for key technologies, though voluntary programmes could be rolled out at the pilot stage. Enforcement mechanisms are essential components of such programmes. A legal framework and mandatory programmes with strong enforcement mechanisms are critical elements of the energy efficiency policies required to sustain energy transition. Mandatory programmes can require facilities to develop implementation plans to achieve the targets and regularly monitor and report progress, backed up with a real threat of increased government regulation or penalties if the targets are not achieved.

#### **IV. Achieving energy transformation in the Asia-Pacific region**

34. This section offers a menu of options on governance, legislative, regulatory and programmatic initiatives and partnerships that policymakers in the Asia-Pacific region can consider as they develop strategies for decoupling economic and population growth from levels of greenhouse gas emissions and ending energy poverty.

##### **A. Strengthen governance and capacity**

35. Governments have a key role in the transition, primarily because markets and private firms alone are unable to address the technological, financing and social challenges that impede the acceleration of energy transition.<sup>20</sup> In many developing countries in the region, Governments will continue to play a key role in addressing such challenges in the transition process.

36. Government can impact investment by improving project finance by facilitating additional revenue streams from investment; reducing risk; providing tax and other incentives to investors; and providing regulatory stability for the business and technology choices of investors. Governments have a host of financial tools at their disposal, including direct grants and investments whereby funding is transferred directly to recipients, often for research and development; loans and loan guarantees, catering for the risk that the private sector and investors face either in research and development or at the commercialization and expansion stages; and tax incentives that help improve the economics of either initial investment or operations in renewable technologies<sup>21</sup> or facilitate carbon finance as an additional revenue stream for projects.

37. The main challenge that countries in the region must overcome pertains to the relatively weak and fragmented institutional arrangements that position stakeholders in the centre of energy system transition, a critical element that requires a multidisciplinary approach vis-à-vis strengthening partnerships and promoting science, technology and innovation and transboundary power trade. An institutional environment that leads to cohesively and effectively coordinated actions on energy transition must therefore be created.

<sup>20</sup> Laura Anadon, Matthew Bunn and Venkatesh Narayanamurti, eds., *Transforming U.S. Energy Innovation* (Cambridge, Cambridge University Press, 2014).

<sup>21</sup> Harvard University, "Beyond the Debate: The Role of Government in Renewable Energy Finance", 15 December 2012. Available from <http://sitn.hms.harvard.edu/flash/2012/energy-finance/>.

## B. Improve use of economic instruments

38. Energy system transition requires a mix of incentives for clean energy, reforms of energy markets, the pricing of carbon emissions and reform of fossil fuel subsidies and must address social aspects arising from energy tariffs between urban and rural areas and from the reform of fossil fuel subsidies.

39. Phasing out fossil fuel subsidies should be at the top of the region's policy reform agenda. Such subsidies distort incentives in favour of fossil fuels at the expense of cleaner energy. They have large negative economic, social and environmental impacts. Beyond their contribution to fiscal imbalances and public debt, subsidies depress investment in the energy sector, which can hamper energy supply and exacerbate economic losses. Elements for successful reform include social support through subsidy targeting and cash transfers, institutional reforms to facilitate market-level pricing, and facilitation of improvements in energy efficiency and a transparent communications strategy.<sup>22</sup> A review of energy price reforms in Asia-Pacific countries shows mixed results so far. Globally, 10 of the top 25 nations that subsidize fossil fuel consumption in 2012 were in Asia. According to ADB, energy subsidy reform has emerged as one of the most important policy challenges for developing Asian economies.<sup>23</sup>

40. Carbon pricing is an important method to increase the effective carbon prices across key countries in the region, as these prices are currently too low to provide adequate incentives to pursue a low-carbon path. Economy-wide carbon pricing results in price signals that drive low-carbon pathways among businesses and consumers and stimulates clean technology and process innovation, while also supporting long-term behaviour change. Credible and long-term carbon prices have the potential to induce fundamental and long-term shifts in infrastructure, technology and behaviour. Many countries in the region have implemented emissions trading schemes at the subnational or national levels and in others these are under development. Carbon pricing can raise valuable public revenue through the auction of permits and the collection of carbon taxes. Estimates suggest that the introduction of the new national emissions trading system in China would potentially double the total value of emissions trading schemes and carbon taxes globally to about \$100 billion. Studies consistently show that among the various instruments available to reduce carbon dioxide emissions, carbon prices are the most likely to produce economic growth and increase the level of productivity.<sup>22</sup> Below are some brief examples of national efforts to reform energy prices and subsidies as well as taxation.

41. India introduced full price decontrol in October 2014, allowing public sector oil marketing companies to price diesel on a cost-recovery basis. The price of natural gas was revised and the amended market-linked pricing was adopted. Direct benefits transfer for liquefied petroleum gas was introduced and the fuel's per-unit subsidy was fixed.

<sup>22</sup> ESCAP, *The Economics of Climate Change in the Asia-Pacific Region* (ST/ESCAP/2761). Available from [www.unescap.org/sites/default/files/The%20Economics%20of%20Climate%20Change%20in%20the%20Asia-Pacific%20region.pdf](http://www.unescap.org/sites/default/files/The%20Economics%20of%20Climate%20Change%20in%20the%20Asia-Pacific%20region.pdf).

<sup>23</sup> ADB, *Fossil Fuel Subsidies in Asia: Trends, Impacts, and Reforms – Integrative Report* (Manila, 2016). Available from [www.adb.org/sites/default/files/publication/182255/fossil-fuel-subsidies-asia.pdf](http://www.adb.org/sites/default/files/publication/182255/fossil-fuel-subsidies-asia.pdf).

42. Indonesia strongly relies on fossil fuels, which account for approximately 55 per cent of final energy consumption. The country has long subsidized fossil fuels to protect the poor from rising fuel prices. However, this has hampered the investment environment for clean energy. The Government recently focused on a spending reform that reduced the budgeting cost of fuel subsidies from \$8 billion in 2015 to less than \$4 billion in 2016. Those resources would instead be released for long-term investments in economic growth and development. Priority areas include health, education, social protection and infrastructure.<sup>23</sup>

43. Electricity tariffs in Malaysia were increased by an average of 15 per cent in January 2014. A fuel cost pass-through was resumed to reflect international gas price movements. Natural gas prices were increased by up to 26 per cent for certain users. Gasoline and diesel subsidies were abolished in December 2014.<sup>24</sup>

44. In China, a reduced corporate income tax rate of 15 per cent was granted to qualified advanced and new technology enterprises. Applicable fields include solar, wind, biomaterial and geothermal energy. A refund of 50 per cent of value-added tax was paid on the sale of wind power and on the sale of self-produced photovoltaic power from 1 October 2013 to 31 December 2015.<sup>25</sup>

### C. Mobilize finance and investment

45. At the global level, investment requirements for renewable energy projects alone amount to \$500 billion per year up to 2020 and will increase up to \$1 trillion per year by 2030.<sup>26</sup> Opportunities to raise capital from the public sector are limited, meaning that project sponsors must rely on private and commercially sourced financing. The public sector would not be able to increase its level of funding from the current share of 15 per cent, so the private sector, including institutional investors, can play a crucial role in scaling up renewable energy investments. Around \$2.8 trillion per year could potentially be sourced from pension funds and insurance companies for clean energy investments.<sup>27</sup>

46. There is a need to develop financial policies that improve the availability and affordability of financial resources. The scope of financial policies is broad, ranging from providing public finance to incentivizing

<sup>24</sup> International Energy Agency, *World Energy Outlook 2014* (Paris, 2014). Available from [www.iea.org/publications/freepublications/publication/WEO\\_2014\\_ES\\_English\\_WEB.pdf](http://www.iea.org/publications/freepublications/publication/WEO_2014_ES_English_WEB.pdf).

<sup>25</sup> KPMG International Cooperative, *Taxes and Incentives for Renewable Energy* (n.p., 2015). Available from <https://assets.kpmg.com/content/dam/kpmg/pdf/2015/09/taxes-and-incentives-2015-web-v2.pdf>.

<sup>26</sup> OECD and International Energy Agency, *Energy Technology Perspectives 2012: Pathways to a Clean Energy System* (Paris, International Energy Agency, 2012). Available from [https://www.iea.org/publications/freepublications/publication/ETP2012\\_free.pdf](https://www.iea.org/publications/freepublications/publication/ETP2012_free.pdf).

<sup>27</sup> Christopher Kaminker and Fiona Stewart, “The role of institutional investors in financing clean energy”, Working Papers on Finance, Insurance and Private Pensions, No. 23 (Paris, OECD, 2012). Available from [www.oecd.org/environment/WP\\_23\\_TheRoleOfInstitutionalInvestorsInFinancingCleanEnergy.pdf](http://www.oecd.org/environment/WP_23_TheRoleOfInstitutionalInvestorsInFinancingCleanEnergy.pdf).

private sector financing. This includes banking regulations, public financing schemes, carbon financing, technical assistance and capacity-building in the financial sector, competitive and transparent financial markets (especially bond markets and stock markets), and innovative financial instruments.

47. The potential of private investment in promoting energy access should not be underestimated. The so-called “bottom of the pyramid” energy users currently spend \$37 billion on energy sources such as kerosene, batteries and candles, which are often inefficient and more costly than clean alternatives.<sup>28</sup> Many pioneering private sector firms have developed low-cost energy systems at the household or village scale, such as solar lanterns and biogas or micro-hydro systems, and are rolling out business models with innovations with respect to product, process and distribution. Across the Asia-Pacific region, rural microcredit is funding energy access. For example, in Bangladesh, the Grameen Shakti project has funded half a million solar home systems. Development of indigenous technology capacity in Nepal has lowered equipment costs for biogas and micro-hydro systems. India has leveraged public-private partnerships in its rural electrification efforts, bringing electricity to 32 million households over the past decade.<sup>29</sup> Local provision of energy can have a catalytic effect, leading to economic growth and increased demand for other products and services that can be met by these pioneering companies, leading to growing business opportunities.

48. However, attracting private capital for such investment is a challenge, because sustainable energy projects tend to have high upfront capital expenditures as a share of project cost, as well as perceived regulatory and political risks. Furthermore, the dispersed, diverse and small-scale nature of many investments – such as those related to small-scale renewables and energy efficiency – makes it difficult to package them to investors. The financial community needs to appreciate the distinctive nature of such investments and develop suitable vehicles to finance projects in a way that is aligned with their varying sizes, operational models and investment objectives, such as through green securitization.

#### **D. Promote science, technology and innovation**

49. The energy technology renaissance already under way in some countries is playing a vital role in the transition. New technologies are reducing the cost of clean energy and renewable power. Smart grids and electric vehicles are rapidly gaining market shares. Advances in long-distance power-transmission technologies enable the linking of areas rich in renewable energy resources – such as the Gobi Desert, Central Asia and the far eastern region of the Russian Federation – with distant population centres. The Asia-Pacific region has emerged as an engine for clean energy, both as a manufacturing centre for renewable energy technologies and as the leading region for deployment, with over \$160 billion invested in renewables in 2015.<sup>30</sup>

<sup>28</sup> International Finance Corporation, *From Gap to Opportunity: Business Models for Scaling Up Energy Access* (Washington, D.C., 2012). Available from [www.ifc.org/wps/wcm/connect/ca9c22004b5d0f098d82cfbbd578891b/EnergyAccessReport.pdf?MOD=AJPERES](http://www.ifc.org/wps/wcm/connect/ca9c22004b5d0f098d82cfbbd578891b/EnergyAccessReport.pdf?MOD=AJPERES).

<sup>29</sup> Akanksha Chaurey and others, “New partnerships and business models for facilitating energy access”, *Energy Policy*, vol. 47, No.1 (June 2012). Available from <http://dx.doi.org/10.1016/j.enpol.2012.03.031>.

<sup>30</sup> Renewable Energy Policy Network for the 21st Century, *Renewables 2016: Global Status Report* (Paris, 2016). Available from [www.ren21.net/wp-content/uploads/2016/06/GSR\\_2016\\_Full\\_Report.pdf](http://www.ren21.net/wp-content/uploads/2016/06/GSR_2016_Full_Report.pdf).

50. On the demand side, energy efficiency technologies have an important role to play in the energy transition. Better energy efficiency is a key driver in decoupling energy use and GDP growth in many economies. Given that 15 per cent of the world's electricity is consumed by lighting, efficient light-emitting diode technology, which consumes up to 85 per cent less energy, will make substantial savings.<sup>31</sup> Energy storage technologies for vehicles and power applications have also leaped ahead, offering flexibility in power usage and balancing variable electricity generation from renewables.

51. Traditionally, policy on science, technology and innovation in the region has been focused on stimulating economic competitiveness and growth. However, to meet the ambitions of the 2030 Agenda, it will be critical for such policy to also focus on social and environmental concerns.<sup>32</sup> Technological change for sustainable energy, particularly in developing countries, is not only about innovating at the frontier, but more importantly about adapting existing energy resources to achieve higher levels of productivity as applicable to their local contexts. The ability of local firms and enterprises to access technological know-how is fundamental to shaping their ability to provide sustainable energy products and services, and both are essential to improving living standards and promoting growth and competitiveness.

#### **E. Strengthen partnerships for different stakeholders**

52. As Governments will play key roles in the transition, more partners need to be involved in its planning and implementation. Stronger coordination and information exchange among government agencies will facilitate the strengthening of measures to address access, energy efficiency and renewable energy. Governments need to establish an enabling environment for the private sector to contribute to all three aspects of Sustainable Development Goal 7. Public-private partnerships could also be included to address energy access. Policies and strategies need to be developed through more evidence-based research with research institutions as well as national and international organizations that could bring in more innovative approaches and solutions.

#### **F. Manage trade-offs**

53. Managing the energy system transition is a complex undertaking, especially within the overall framework of the Sustainable Development Goals. Particular challenges exist with respect to achieving the Goal 7 targets, including the following:

(a) Competing water uses between hydropower and irrigation, which can be alleviated by better transboundary management of shared natural resources and agreed formulas for allocating water;

(b) The sharp shifts in the energy paradigm from fossil fuel energy systems to those more reliant on renewables will result in job losses and significant unemployment, generating further social (income) inequalities.

<sup>31</sup> International Partnership for Energy Efficiency Cooperation and AOB Group, *Energy Efficiency Magazine for COP 22* (8 November 2016). Available from [https://ipeec.org/upload/publication\\_related\\_language/pdf/551.pdf](https://ipeec.org/upload/publication_related_language/pdf/551.pdf).

<sup>32</sup> *Harnessing Science, Technology and Innovation for Inclusive and Sustainable Development in Asia and the Pacific* (United Nations publication, Sales No. E.16.II.F.12).

The establishment and maintenance of educational and retraining programmes for displaced workers, together with the diversification of local economies, will help secure social acceptability of the overall process;

(c) Large-scale systems such as hydroelectric dams and biomass projects may threaten the well-being of populations and potentially cause environmental damage if not managed appropriately.

## **V. Energy connectivity and trade: no one-size-fits-all solution for sustainable energy in the Asia-Pacific region**

54. A key element of the success of the energy transformation in the Asia-Pacific region will be how countries capitalize on opportunities for energy connectivity and trade. Though the region has adequate energy resources to meet its large and growing demand, most resources are highly concentrated in a few countries. The top five countries account for more than 85 per cent of total regional resources and are not the countries in which demand is expected to grow.<sup>33</sup> Nevertheless, trade and investments in regional energy networks remain low.

55. Energy connectivity, particularly the interconnection of grids and gas pipelines across borders, offers multiple benefits, including expanding access to energy, boosting trade and providing market access to low-carbon energy. The region includes large producers of natural gas with huge potential for meeting demand for clean energy through pipelines or liquefied natural gas. Energy trading and connections between natural gas networks will provide the much-needed flexibility and options to deal with energy security concerns. Deepening natural gas use will help meet growing demand by substituting coal with a less carbon-intensive energy source.

56. A regional cooperation framework for disseminating new technologies will also hasten the development of non-conventional gas resources, such as coal bed methane and shale gas. The trading of gas by means of cross-border pipelines can generate exports for supplier countries while diversifying the energy mix, improving local air quality and supporting decarbonization efforts in destination countries.

57. Solar and wind options are becoming cost-competitive in many locations in the region. It is feasible to integrate large-scale distributed networks and renewable energy options with traditional power systems, which will stimulate new private investment flows. Large electricity grids spread over vast geographic areas are well suited to accommodating large shares of intermittent wind and solar power. Pooling diverse renewable energy generation plants and load centres through interlinked power grids is another area of opportunity. Such pooling can lower prices, ensure availability and allow for greater use of renewables, benefiting both generators and consumers. Advances in renewable energy technology are creating opportunities for large-scale solar- and wind-power projects. There are also opportunities for importing hydropower from mountainous countries and from large-scale solar projects in desert regions. Bhutan, Kyrgyzstan, the Lao People's Democratic Republic, Myanmar, Nepal and Tajikistan all have large unexploited hydropower potential; the Thar Desert in South Asia and the Gobi Desert in China and Mongolia have considerable solar energy resources.

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<sup>33</sup> ESCAP, Asia Pacific Energy Portal. Available from <http://asiapacificenergy.org/> (accessed 25 March 2017).



58. Technology advances in power transmission can reduce the costs of long-distance electricity transmission, enhancing the prospects of cross-border power trading. Utilizing advanced technologies to minimize transmission losses, such trading can also address intermittency of renewable energy through a larger market for power covering various time zones. In addition to linking distant centres of supply and demand, power-grid enhancement and integration can raise the contribution of renewables.

59. Regional energy cooperation has been evolving in the region, mainly driven by regional and subregional organizations, which recognize the importance of the economic, environmental and social dimensions of the energy sector. Bilateral donors and international financial institutions also contribute by supporting specific energy-related studies and projects in the region.

60. Asia-Pacific subregional energy connectivity has fostered energy security through a number of deals, including two landmark projects that involve energy trade from Central Asia to South Asia: the Central Asia South Asia Electricity Transmission and Trade Project (CASA-1000) high-voltage grid connection, which will bring electricity from Kyrgyzstan and Tajikistan to Afghanistan and Pakistan, and the Turkmenistan-Afghanistan-Pakistan-India Pipeline, which will transport natural gas from Turkmenistan to energy consumers in Afghanistan, Pakistan and India. The Greater Mekong Subregion is an example of a successfully established subregional power-sharing market, in which countries in South-East Asia and two southern provinces of China trade electricity under harmonized policy and institutional mechanisms. The Belt and Road Initiative in China, which proposes the development of economic corridors to connect China with the rest of Asia and beyond, has inherent potential to bolster regional energy security. The Belt and Road Initiative aims, inter alia, to foster transboundary power connectivity and will help reduce the energy deficits currently affecting regional productivity and development.

61. Transboundary energy trade will require high-level political commitment, investment in infrastructure, removal of institutional barriers, and the normalization and harmonization of standards and regulations. Developing clean energy corridors along the route of the Belt and Road Initiative requires an assessment of the availability of and potential for renewable power generation and transmission.

62. Energy networks are capital-intensive, with large sunk costs. They present major challenges in financing and maintenance, especially when these are subject to differing legal and regulatory regimes. Accordingly, subregional energy trade deals involve large transaction costs and are subject to considerable political and institutional inertia.

63. Successful energy connectivity initiatives are encouraging but need to be replicated more widely, and their speed of implementation must be increased. To expedite implementation of projects, lead times must be shortened by putting in place a well-functioning intergovernmental mechanism. In the next few decades, action will be needed to build physical energy networks, institutional connectivity and, most importantly, trust between nations.

64. However, activities relating to energy within existing economic cooperation initiatives are either focused on efforts to establish common energy markets, or on specific areas for cooperation based on their mandates, together with the political and institutional complexities involved. Vast

amounts of human and financial resources are being used, but achieving full potential for energy cooperation in this diverse region still remains a distant goal. A firm commitment to energy transition and regional cooperation to achieve energy and sustainable development aspirations are therefore required in Asia and the Pacific.

## **VI. Regional cooperation for sustainable energy**

65. The success of the energy transition will require sustained commitment not only at the national level but also at the regional level. Energy system transition cannot be achieved by an individual country; a regional approach is needed through collective efforts based on global and regional knowledge and experience. Regional cooperation, by sharing policy experiences, building capacity and mobilizing finance, can play a significant role in assisting countries to implement their own energy sector reforms and capture the many co-benefits.

66. The importance of regional energy cooperation is evident in the transboundary nature of many prominent energy challenges, namely improving regional energy security, managing air pollution and establishing cross-border energy infrastructure. As outlined in the previous section, countries in South-East Asia, South Asia and Central Asia as well as China, the Russian Federation and Mongolia are already embracing cross-border energy connectivity. Long-term regional dialogue is required to further develop these complex and infrastructure-intensive initiatives. These and other initiatives are supported by a large array of regional and subregional institutions.

67. Strengthening regional energy cooperation in Asia and the Pacific will require the creation of new architecture for regional energy governance, including measures to address appropriate institutional arrangements in facilitating the energy transformation.

68. As a first important step in this direction, the intergovernmental Committee on Energy has been established. Through the Committee, countries have begun to identify key regional energy solutions, such as accelerating uptake of renewables and energy efficiency, establishing cross-border energy connectivity, promoting regional approaches to energy security and providing modern energy access throughout the region to ensure a sustainable energy future for all.

69. A further step could be the development of a regional cooperation framework on sustainable energy, as recommended in the theme study. The framework would enable Governments to identify the pathways that they should take towards energy system transition, including strengthening governance, improving economic instruments, strengthening partnerships, mobilizing finance and investment, capitalizing opportunities for energy connectivity and trade, promoting science, technology and innovation, and managing trade-offs.

70. The secretariat seeks guidance from the Commission in developing a regional cooperation framework, which may consist of the following components:

(a) Development of energy system transition pathways to ensure the attainment of Sustainable Development Goal 7 targets to ensure universal access to affordable, reliable and modern energy services by 2030, to increase substantially the share of renewable energy in the global energy mix by 2030 and to double the global rate of improvement in energy efficiency by 2030;

(b) Strengthening of policy analysis and feasibility studies to align energy system transition pathways to regional connectivity and mapping exercises to determine the viability of transboundary power trade and interconnection; and development of a regional plan for energy connectivity in Asia and the Pacific with a focus on power-grid connectivity to address the missing links of ongoing subregional initiatives;

(c) Development of an institutional arrangement in support of energy system transition pathways, such as an Asia-Pacific energy charter, that lays out a regional legislative framework to promote confidence among private and institutional investors in the long-term commitment of Governments;

(d) Promotion of public-private dialogues to encourage innovative financing and investment partnerships for supporting countries to deliver on their energy system transition pathways and large transboundary energy connectivity infrastructures; promotion of a conducive environment to attract private investment in sustainable energy; and identification of complementary approaches for small-scale energy solutions, including at the community level in remote regions;

(e) Strengthening of government capacity to translate energy system transition pathways into policies, strategies and programmes through regional cooperation on policy dialogues, sharing of good practices and training.

71. The process of achieving a region-wide energy cooperation framework has already started, as ESCAP has a natural advantage in bringing together the various groups of stakeholders and driving the sustainable energy agenda for this diversified region. ESCAP will focus on consensus-building and catalysing negotiations to help build the energy bridges that the region needs, while harnessing research and project development and model legal and regulatory agreements for energy connectivity. Collective action is critical to enable a move away from fragmented approaches towards more holistic, integrated and sustainable energy development.

72. The second Asian and Pacific Energy Forum, to be held in 2018, will provide an opportunity for Governments, policymakers and experts to work in partnership with the private sector to provide a vision for energy transition in the region. ESCAP can support such a transformative partnership for regional energy cooperation that creates incentives for accelerated change in the energy system, in order to ensure access to affordable, reliable and modern energy for all. It is proposed that various intentions and declarations toward energy transition in the region, in line with the areas outlined above, should be formalized as an Asia-Pacific energy cooperation framework, so as to convey the long-term commitment of member Governments and promote confidence among the private sector and institutional investors that supporting policies and instruments for energy transition will be put in place in a timely fashion.