Background document for the consideration of the 2016 Policy Dialogue on Energy for Sustainable Development in Asia and the Pacific 25-27 April 2016, Bangkok

Session 1: Emerging and Persistent Issues on Energy Security and the Sustainable Use of Energy

Session 2: Transboundary Power Trade and Inteconnection

Session 3: Access to Energy Services: Institutional Framework and Financing Mechanism

1. Introduction

The Regional Trends Report on Energy for Sustainable Development in Asia and the Pacific is an annual publication that feeds into the Policy Dialogue to serve as an input to hold discussions in identifying potential policy solutions through regional cooperation to the challenges identified and analyzed. The Regional Trends Report together with the Asia Pacific Energy Portal and the Policy Dialogue are the three components that the secretariat is providing in facilitating member States to implement the outcomes of the first Asian and the Pacific Forum.

The Regional Trends Report 2015 covered three main areas: (a) Asia-Pacific Energy scene; (b) Integration of Renewable Energy in Electricity system; and (c) Promotion of High-Efficiency, Low-Emissions Coal Technologies in Electricity Generation. The draft Regional Trends Report 2015 was made available for the discussion during the Policy Dialogue in 2014 and it was published during the Commission session in 2015.

The Regional Trends Report 2016 captured emerging energy issues that impact Asia and the Pacific, and focused on two key challenges: (a) Transboundary power trade for increasing power sector sustainability and regional connectivity; and (b) Developing effective policies for widening access to energy services. In addition, the Regional Trends Report 2016 also provided a preview of the Asian and Pacific Energy Forum's Plan of Action Mid-Term Review.

The Regional Trends Report 2017 will build upon the 2015 and 2016 reports to further discuss emerging issues in the Asia and Pacific region. The objectives of the report are to facilitate regional communications and knowledge sharing of energy issues; to identify barriers, challenges and opportunities for regional and subregional cooperation, and to work towards policy initiatives on energy security and the sustainable use of energy in the Asia and the Pacific region. Proposed topics for Regional Trends Report 2017 include: (a). Strengthening policy

framework to promote renewable energy; (b) Mainstreaming energy efficiency strategies and actions into national energy development plans. The secretariat welcomes comments on Regional Trends Report 2016 and guidance to the proposed topics for Regional Trends Report 2017.

2. Review of Regional Trends Report 2016

2.1 Emerging Regional Trends

Significant changes have taken place in the global economy and the international energy market in 2015. The global as well as regional economies face declined growth rate. The Asian Pacific region grew by 4.5% in 2015, the lowest rate since 2010, and only a modest rebound to 5 percent forecasted for 2016¹. The slowdown is a major factor influencing prospects and energy. In this background, Chapter 1 of the Regional Trends Report 2016 reviews major emerging and persistent issues that affect energy security and the sustainable use of energy in Asia and the Pacific. Session 1 of the Policy Dialogue will focus on this Chapter.

Fossil fuels have been and will continue to be the primary energy sources in the region, accounting for 80.0% of TPES in 2000 and 85.6% in 2013, with oil decreased from 30.0% to 23.6%, natural gas kept the same percentage and coal increased from 32% to 44%, nuclear reduced from 4.0% to 1.9%, hydro increased from 1.7% to 2.1% and renewable energy (exclude hydro) decreased from 14.2% to $10.4\%^2$. It is estimated that fossil fuels will dominate the region, with Asia the final destination for 80% of regionally traded coal, 75% of oil and 60% of natural gas in 2040³.

The prevailing low oil prices present both opportunities and challenges for countries in Asia and the Pacific. Brent spot price dropped from US\$111.8 per barrel in June 2014 to US\$47.8 per barrel in January 2015, rebounded slightly in early 2015, further lowered to US\$30.7 per barrel for January 2016, and then increased to \$32.18 per barrel in February⁴. The falling oil prices will support activity and reduce inflationary, external and fiscal pressures in oil-importing countries, but affect oil-exporting countries adversely by weakening fiscal and external positions and reducing economic activity⁵. Countries such as India, Indonesia, Malaysia and Thailand are taking the opportunity of lower oil prices to diminish fossil-fuel subsidies, cutting the incentive

¹ ESCAP, 2016. Economic and Social Survey of Asia and the Pacific 2015: Year-end update. <u>http://www.unescap.org/sites/default/files/2015%20Year-End%20Update_0.pdf</u>

² Asian Pacific Energy Portal.

³ IEA, 2016. World Energy Outlook 2015.

⁴ EIA, 2016. Spot Prices: petroleum & other liquids. Retrieved at: http://www.eia.gov/dnav/pet/pet_pri_spt_s1_m.htm

⁵ The World Bank, 2015. East Asia Pacific Update, April 2015: Adjusting to a Changing World. Press Release No: 2015/384/EAP.

for wasteful consumption⁶. However, the challenge is to sustain the policy in case the oil prices rebounded, and the redistribution of savings are beneficial for national economy⁷. On the other hand, low oil prices will affect oil-exporting countries adversely by weakening fiscal and external positions and reducing economic activity. For oil exporting countries, growth would be negatively impacted and government revenues reduced. The World Bank suggested that sustainable and equitable fiscal policy is the key for both oil importers and exporters⁸.

Demand for natural gas will increase, resulting from continuous economic growth, energy security concerns, diversification of energy mix, and transition to cleaner energy⁹. Japan and Republic of Korea use natural gas to make up for power lost from their nuclear energy sectors¹⁰. On the production side, the Russian Federation alone accounts for more than one quarter of global pipeline trade. Malaysia, Indonesia and Australia contribute to three quarters of global LNG trade and one third of global natural gas trade¹¹.

Pricing structure reform for natural gas is becoming a critical concern of countries in the region, as buyers in this region are paying higher prices than elsewhere. LNG prices in this region are linked to crude oil prices (with lag) through a set of complicated formulas. With declining demand and oil prices, LNG prices are predicted to fall, but still higher than other regions. While traditional LNG buyers --- Japan and Republic of Korea --- are sufficiently well-off to pay higher LNG prices for consistent supply and energy security benefits, other countries include China and India have tried to keep natural gas prices low to boost industry and economy and engaged in construction of gas pipelines, thus LNG has not been very competitive¹². Many countries have started reform to move towards a regional gas market indexed price from an oil-indexed system for imported gas¹³.

The challenge of increasing environmental concerns and continuing reliance on coal requires a transition to cleaner coal technologies that are of high efficiency and low emissions. Because of the GHGs emissions and other air pollutants resulted from coal combustion, OECD countries have reached an agreement to restrict their financial from overseas coal-fired power stations. But in this region, coal has been playing a critical role in bringing affordable and reliable electricity to millions of people in developing Asia, due to its availability and low costs.

http://www.reuters.com/article/2013/12/15/asia-gas-idUSL4N0JC1XH20131215

⁶ IMF, 2015. How Large are Global Energy Subsidies? WP/15/105.

⁷ OECD, 2015. OECD Companion to the Inventory of Support Measures for Fossil Fuels 2015.

⁸ World Bank, 2015. East Asia Pacific Update, April 2015: Adjusting to a Changing World. Press Release No: 2015/384/EAP.

⁹ IEA, 2015. Medium-Term Gas Market Report 2015. Market Analysis and Forecasts to 2020. ISBN 978-92-64-23523-6.

¹⁰ Reuters, 2013. As America Enjoys Cheap Gas, Asia's Top Buyers to Pay More. Retrieved on:

¹¹ U.S. EIA. <u>https://www.eia.gov/todayinenergy/detail.cfm?id=23132</u>. Retrieved on Jan. 10, 2016.

¹² The National Bureau of Asian Research, 2011. The Role of Natural Gas in the Asia-Pacific Energy Future. Retrieved on: http://www.nbr.org/research/activity.aspx?id=118

¹³ Enerdata, 2014. Natural Gas Trading Hub in Asia-Pacific. Retrieved on:

http://www.enerdata.net/enerdatauk/press-and-publication/energy-news-001/natural-gas-trading-hub-asia-pacific_28938.html.

The year of 2015 marked a new record for global investment in renewable energy, despite the falls of fossil fuel prices. Investment in renewables excluding large hydro rose 5% to \$285.9 billion globally¹⁴, of which \$160.6 was in Asia and the Pacific, including \$102.9 billion in China and \$10.2 billion in India. The \$265.8 billion in renewable power capacity was more than double of the investments into new coal and gas generation¹⁵. Overall new renewable power capacity excluding large hydro of 134 GW made up 53.6% of the additional installed capacity in 2015, the first time it has represented a majority¹⁶. Renewable energy systems have played an important role in energy access in remote and rural areas. Indigenous renewable energy development is critical for the Pacific island countries, as they rely heavily on imported fuels.

Energy development needs to take into consideration the social, environmental and economic aspects as they are the fundamental inputs to sustainable development. The newly adopted Sustainable Development Goals in which energy is one of the goals as well as cross-cutting issues and the Paris Agreement, which is expected to take into effect in 2020, under the UNFCCC will shape the future of energy development.

Energy connectivity has potential for optimizing the use of all energy resources, including renewable energy resources, gas and other sources for enhancing energy security and sustainable use of energy at the regional level. On-going regional and subregional energy connectivity initiatives will bring opportunities as well as challenges for regional energy development. Chapter 2 will have a detailed discussion on energy connectivity.

Energy access has remained as the major challenge and the energy poverty is acute in the region impeding development process and economic growth. Throughout the region, 455 million people lived without electricity access and 2.06 billion people relied on solid fuels for cooking and heating in 2012¹⁷. The poor are living without access to affordable, reliable and modern energy services, which are crucial for livelihood improvement and development, thus are deprived of such opportunities. Chapter 3 will have a detailed discussion on energy access.

To conclude Session 1 of the Policy Dialogue, the following topics will be forwarded to generate discussions among participants:

Topic 1: What are the common strategies, actions (short, medium and long term) and/or economic instruments to ensure implementation of long-term national energy strategies that will support sustainable development?

Topic 2: How to respond to the changing energy market to ensure energy security and sustainable use of energy in this region?

¹⁴ Frankfurt School – UNEP Center and BNEF, 2016. Global Trends in Renewable Energy Investment 2016.

¹⁵ Frankfurt School – UNEP Center and BNEF, 2016. Global Trends in Renewable Energy Investment 2016.

¹⁶ Frankfurt School – UNEP Center and BNEF, 2016. Global Trends in Renewable Energy Investment 2016.

¹⁷ Asia Pacific Energy Portal, 2016.

2.2 Transboundary power trade and Interconnection

<u>Context</u>

With energy demand in Asia and the Pacific forecast to nearly double from 2010 to 203518, access to reliable and adequate energy services will remain a focus for the decades to come. The region is expected to account for over 40 per cent of the US\$68 trillion of cumulative energy investments until 204019. Chapter 2 of the Regional Trends Report 2016 explores the potential of regional energy connectivity to meet broader energy goals within the framework of the Sustainable Development Agenda.

Transboundary power trade is an important aspect of energy connectivity and of sustainable development, as emissions from the combustion of fossil fuels for power generation are the leading source of global CO2 emissions. From a near-term perspective however, the benefits of transboundary power trade lay within the scope of increased energy security, including reliability, adequacy, and flexibility, as well as the economic gains associated with reduced need for generation reserve margins, and increased generation economies of scale achievable with access to larger markets.

A separate publication on energy connectivity as a means to promote sustainable development within Asia and the Pacific, entitled Towards a Sustainable Future: Energy Connectivity in Asia and the Pacific Region, has been prepared by secretariat and will be made available to Policy Dialogue participants here. The recommendations in this document are aligned with those in Chapter 2 of the Regional Trends Report.

Benefits

Through connectivity, countries within the region can exploit the complementarities in resource endowments and seasonal/daily differences in supply and demand patterns. This would allow for the enhancement of energy security, increased economic benefits and substantial environmental benefits. The enhancement of energy security can be seen in several ways: a) improved access to existing and new generation capacities; b) increased operational efficiency and quality of transmission and distribution networks; c) reduced vulnerability to localized disruptions. Main tangible economic benefits resulting from increased regional energy trade and integration include: a) lower cost of energy supply as a result of optimized use of existing/potential primary energy resources; b) increased investment in power generation and transmission capacities facilitated by economies of scale of generation; c) reduced costs of generation due to shorter reserve margins; d) reduced dependence on expensive oil-generated power for some oil-importing countries; e) economy-wide productivity gains from improved electricity access. Regional power integration may also have significant environmental benefits, including: a) higher utilization of existing hydro and thermal capacities in the short-term

¹⁸ ADB

¹⁹ IEA, WEO 2015

through replacement of traditional fuels and oil-based generation; b) establishment of larger integrated power pools allowing for greater incorporation of intermittent renewables and larger, more efficient thermal generation.

Energy trading provides flexibility among the trading countries to choose best possible option for transmission and generation. Asia-Pacific countries have great potential for enhancing energy connectivity for enhancing energy access, getting benefit from its diverse resources and creating market for future energy trading.

Barriers

Obstacles to promoting transboundary power trade include, among others: political; technical; regulatory; and financial barriers. No single barrier is insurmountable; however the combination often proves difficult to overcome, as evidenced by the lack of regionally integrated power markets within Asia and the Pacific. While technical, regulatory, and financial barriers can be overcome through effective policy, they require political will, which can be challenging due to numerous factors. Energy security concerns have led some countries to discourage the increase of transboundary trade, i.e. through the introduction of local content requirements. Fundamentally, a shift in thinking is needed from one based on the idea that energy security requires self-sufficiency of domestic energy supply toward one based on the principle that energy security requires diversity and redundancy of domestic energy supply through both domestic supply maximization and fluid trade with regional suppliers. Stable policy environments with long-term predictability and favorable investment conditions to minimize risk are needed to attract international investment with lower return on investment (ROI) requirements.

Unlike the global production networks that created a positive force for reinforcing the bottomup market integration process, efforts to connect energy sector in the region have not yet been very successful, excepting some cross-border investments in energy projects. Trade and investments in regional energy networks remain low despite the fact that there is a high and growing demand for energy and there are adequate beneficial opportunities waiting to be realised from regional energy trade. A number of factors are responsible for this disconnect as listed below.

Energy networks, unlike commodities have special attributes make it difficult to trade easily. Physical energy networks, such as gas pipelines or transmission grids are capital intensive and generally subject to economies of scale. Most of these networks require significant upfront investment but are also of little use until the works are complete and unless they are maintained in good condition. With large sunk costs, energy networks present major challenges in financing and maintenance, especially when these traverse multiple countries. These capital attributes lead to many market and government failures, and private investors may be reluctant to absorb this risk.

Unlike normal goods or commodities, most networks are geographically specific: once a location is set, it cannot be moved. For example, once a gas pipeline is laid, its spatial dimensions will also impact the value creation for one group of people versus the rest. It is difficult to put in place compensation mechanisms even when these are within single national boundary, when these are under different national legal and governance systems, it creates political risks and aversion.

Balancing the gains with overall costs between different groups of stakeholders requires a robust institutional mechanism. This in turn requires intervention and leadership by the participating governments and by technical experts if regional energy connectivity is to proceed. Various existing subregional programs supporting the energy integration process in the region show a lack of consensus in defining a comprehensive model of integration and satisfying interests of the whole region, including States and stakeholder groups. To a great extent, this shows a lack of human and institutional capabilities, political leadership and market mechanisms.

Human resource capacity is one of the key factors influencing what regional institutions can achieve. The European Commission— the heart of the European Union (EU) administration employs over 23,000 people in total; the two Directorates for Environment and Climate have staffs of 454 and 137, respectively; the European Environment Agency, which deals mainly with monitoring and information brokerage, employs around 200, and a number of environmental research centers are part of the EU administration, adding further expertise and capacity. Whilst a comparison of EU and Association of Southeast Asian Nations (ASEAN) secretariat capacity is perhaps unfair given that they have different mandates, it is notable in that ASEAN's secretariat employs just over 300 and the department dealing with environmental issues has less than 10 staff. As a further comparison, the secretariat of the Council for Environmental Cooperation (the organization set up as part of the NAFTA agreement to facilitate coordination of environmental protection in the three countries) employs less than 50 people.

Current initiatives

There are several energy connectivity initiatives in the region, but most of these have yet to move up the integration ladder. The GMS is perhaps the most advanced of all subregional programs in terms of harmonization of power policies and technical standards. In terms of subregional market creation, the region is behind Africa or Central America where power pools and market integration are at an advanced stage, though on a much smaller scale.

Regional cooperation in energy has been evolving mainly through five subregional clusters – South-East Asia, North and Central Asia, South and South-West Asia, North-East Asia, and the Pacific. The small island nations in the Pacific have a very different perspective of energy connectivity; while physical infrastructure is unviable, software for managing energy security risks and approaches to integrate renewables into diesel power systems can be better organized through close cooperation.

Energy and in particular, electricity is an inherently strategic commodity, as its trade faces additional obstacles compared to other commodities due to energy security concerns. Efforts to engage in deep integrated energy or electricity trading thus face not only technical, financial and regulatory issues, but also strong political concerns based on the energy security dilemma. Establishment of an integrated regional power market should therefore be pursued gradually and it requires broader commitment to trade and economic cooperation in order to create the necessary enabling environment. The establishment of bilateral or trilateral trade (through building transmission interconnectors and negotiating long-term PPAs) has proven to be a successful basis for existing integrated power pools. Case studies throughout chapter 2 will illustrate some of these issues.

Issues for consideration by Policy Dialogue 2016 participants

Regional energy connectivity will help implementation of the SDG7 that calls for improved access and move to cleaner source of energy to meet the region's future energy demand. The establishment of the new ESCAP Energy Committee offers an opportunity to institutionalize an intergovernmental platform, which can consider measures to foster an enabling environment to promote regional energy connectivity. Discussion could revolve around need to:

Deal with barriers to energy trade through removal of legal, regulatory and technical hurdles and seek for upfront political authorization. Despite many benefits of energy resource sharing, a number of countries have explicit and implicit restrictions on exports and imports of energy goods and services whose removal is critical upfront.

Promote sufficient levels of technical and regulatory standardization for deepening interconnectivity through development of an integrated power grid eventually.

Promoting competitive energy market structures through rationalization of the state's role along with measures to improve investment climate to attract new investments, improve efficiency, and adopt new technologies.

Develop a regional mechanism to facilitate transboundary power trade through the

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