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## Reflections of the 3<sup>rd</sup> East Asia Energy Forum

17 November 2020

The 3<sup>rd</sup> East Asia Energy Forum (EAEF3) was held virtually on 17 November 2020 organized by the Economic Research Institute for ASEAN and East Asia (ERIA), Energy Research Institute Network (ERIN) and the Ministry of Industry, Viet Name. The Forum with the theme of “Carbon Capture Utilization and Storage (CCUS) and Carbon Recycling in ASEAN” started with the opening speeches by H.E. Mr. Hoang Quoc Vuong, Deputy Minister of Industry and Trade, Viet Nam and H.E. Dato Lim Jock Hoi, Secretary General of ASEAN. Keynote speeches were given by H.E. Dato Seri Setia Dr. Awang Haji Md Hussein, Minister of Energy, Brunei Darussalam, H.E. Mr. Suy Sem, Minister of Mines and Energy, Cambodia, H.E. Dr. Khammany Inthirath, Minister of Energy and Mines, Lao PDR, H.E. Mr. Arifin Tasrif, Minister of Energy and Mineral Resources, Indonesia, H.E. Mr. Koichi Munekiyo, Parliamentary Vice Minister of Economy, Trade and Industry, Japan and Dr. Prasert Sinsukprasert, Director General of Department of Alternative Energy Development and Efficiency, Ministry of Energy, Thailand on behalf of H.E. Mr. Supattanapong Punmeechow, Deputy Prime Minister and Minister of Energy, Thailand. EAEF3 marked a great success with insightful presentations and active discussions. The following are the key elements summarized under the responsibility of the ERIA.

The most recent East Asia Summit (EAS) Energy Outlook suggests that the energy demand in the ASEAN region will expand by 2.75 times and from 2017 to 2050 under the Business-As-Usual (BAU) Scenario. Even under the Alternative Scenario (APS) factoring in aggressive energy efficiency and conservation and variable renewable energy (VRE) targets, the regional energy demand will grow by 2.20 times. In terms of energy mix, fossil fuels will account for the bulk of the total energy demand, 78% in 2017 and 87% in 2050 under the BAU Scenario. The fossil fuel share will still be high at 82% even under the APS. The share of fossil fuel out of total power generation, currently 79% will increase to 82% in the BAU while decreasing to 72% under the APS. As a result, energy related CO<sub>2</sub> emissions in the ASEAN region is expected to grow by 3.2 times in the BAU and by 2.3 times under the APS respectively.

These energy and emissions pathway are not at all compatible with the Paris Agreement target, which aims at stabilization of global temperature increase since the industrial



revolution between 1.5 and 2.0 degrees calling for global carbon neutrality as early as possible in the latter half of this century. In the Paris compatible Sustainable Development Scenario of the IEA's World Energy Outlook 2020 indicates that the South East Asia region will need to reduce the share of fossil fuel out of total energy demand and power generation in 2040 to 55% and 26% respectively as opposed to 78% and 76% under the Reference Scenario.

However, drastic reduction of fossil fuels in the ASEAN energy mix just for the sake of climate action is challenging. Since ASEAN countries need to tackle 17 SDGs of which priorities differ from country to country, robust economic growth undergirded by reliable and affordable energy supply is essential. It is encouraging that the generation costs of VREs are falling, but operational challenges remain due to their still relatively high cost as compared to coal power, intermittency and integration cost for absorbing penetration of VREs in the energy systems. International grid connections, which has been absorbing the fluctuation of VREs and enabling penetration of VREs in Europe, is still half way in the ASEAN region.

All the ASEAN countries will strive to go towards low carbon future. To achieve the ultimate objective of the Paris Agreement, increasing number of countries are announcing carbon neutrality goals in 2050. Most recently carbon neutrality goal in 2050 was announced by Japan and Korea while China announced 2060 carbon neutrality goal. ASEAN countries could envisage their own carbon neutrality goals with target years. However, there is a stark gap between aspiration to carbon neutrality and regional energy reality. It is more realistic to assume energy transition on step-by-step basis. All the policy and technology options need to be mobilized including energy efficiency in all the sectors, clean use of coal, fuel switching from coal to natural gas, nuclear and renewable in the power sector in the short to medium term and introduction of hydrogen, carbon capture, utilization and storage (CCUS) and zero emissions vehicle (ZEV) in the mid-to long term. .

Among various technologies, CCUS is particularly crucial in the region because the ASEAN region will still depend on coal due to its abundant availability in the region and affordable cost. For fuelling economic growth, new coal power plants will continue to be constructed. Even though some of the coal thermal capacity addition is substituted by gas fired power, CO<sub>2</sub> emissions cannot be avoided. The region's fossil fuel power plants have



young age with decades of economic life. Expanded use of intermittent renewables requires flexibility offered by thermal power plants emitting CO<sub>2</sub>. There is a growing interest in hydrogen as clean energy option in power, transport and industrial sectors. Since “green hydrogen” produced from renewable energy is still expensive, it is likely that hydrogen is produced from coal and natural gas by gasification processes and steam reforming processes in the region, which also emits CO<sub>2</sub>. All the above indicate that carbon neutrality in the ASEAN region can never be achieved without CCUS technologies. Deployment of CCUS technologies in the power sector will remove not only CO<sub>2</sub> but also SO<sub>x</sub>, NO<sub>x</sub> and other particulates and alleviate air pollution.

According to a previous study, the ASEAN region has plenty of geological storage resources in such country as Indonesia, Thailand, the Philippines and, Viet Nam. Expected increase of regional gas production could also offer low cost CCUS opportunities compared with those for power plants. Compact geographical area and existence of oil and gas infrastructure close to suitable geological sites suggests that the ASEAN region could build a regional CCUS hub and cluster model to provide CO<sub>2</sub> storage solutions among its member countries. In this respect, more detailed study of geological storage potential as well as large-scale CO<sub>2</sub> source in this region is expected for realizing the optimal sink-source matching

The biggest challenge for the CCUS technologies is their cost competitiveness. Their wide penetration cannot be expected in the region if it contradicts with affordable energy cost, which will continue to be high priority. In this regard, carbon recycling, an initiative that captures CO<sub>2</sub> and reuse them as fuels or raw materials could offer opportunities for improving economic viabilities of the CCUS process.

Successful deployment of CCUS and carbon recycling technologies calls for strong policy actions. Government actions include government RD&D programme, capital support, public procurement, tax credits, operational subsidies and regulatory standards/ obligations. Since the availability of CCS transport and storage infrastructure and demand for CO<sub>2</sub> from users is the prerequisite for investment in CO<sub>2</sub> capture facilities at power plants, government involvement in such infrastructure development is essential. Cross-border CO<sub>2</sub> transport and storage among this region could be possible in the future on the premise of collaboration among governments.



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Since CCUS and carbon recycling technologies are indispensable pieces for not only regional but global decarbonization and have strong relevance for fossil fuel producing and consuming countries, there is a strong case for international cooperation. A few bilateral cooperation initiatives have already started. Japan's initiatives for holding the 1<sup>st</sup> and 2<sup>nd</sup> International Conference on Carbon Recycling in 2019 and 2020 as well as the Japan-Asia CCUS Forum 2020 are highly commendable for promoting development and commercialization of CCUS and carbon recycling technologies through international collaboration among industry, academia and government. The Asia CCUS Network proposed by Japan and ERIA will provide excellent opportunities for exchange of knowledge and experience, conducting capacity building and eventually promoting joint efforts for development and deployment of CCUS. Support from developed to developing countries in terms of finance, technology and capacity building should also be considered.

The 3<sup>rd</sup> EAEF has demonstrated strong interests in CCUS and carbon recycling among public and private sectors. The ERIA will continuously support and facilitate regional cooperation in this field.