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Future Asian Electricity Markets

Ken Koyama, PhD
Chief Economist, Managing Director
The Institute of Energy Economics, Japan

I had an opportunity to participate in the 2012 Pacific Energy Summit hosted by the National Bureau of Asian Research, a U.S. think tank, in Vietnam's Hanoi on March 20-22. The meeting was the third of its kind following a Tokyo gathering in 2009 and a Jakarta gathering in 2011. At the Summit focusing on the main theme of future Asian electricity problems, participants such as energy policy planners, industry people and experts had vigorous exchanges of views through panel and other discussions. I here would like to outline the interesting and impressive points discussed at the conference.

First, electricity problems were the main theme. This is an important point. In the world including Asia, electricity is the most important and fundamental energy for supporting people's livelihood and economic activities. While electricity demand is expected to increase substantially in Asia, electricity problems involve a wide range of important economic, social, cultural and environmental problems due to the diversity of Asian countries in terms of economic development phases, income levels, resources, industrial structure and technological levels. Discussions on the future of electricity naturally cover energy sources for electricity generation including oil, gas, coal, nuclear, hydropower and renewable energy, as well as electricity industry arrangements, policies and markets. Thinking about Asian electricity problems is directly linked to thinking about the future of energy in Asia.

Second, responses to substantial growth in Asian electricity demand will be a very great challenge. The International Energy Agency's World Energy Outlook and other representative energy supply and demand forecasts share the view that Asia will be the center of growth in energy demand including electricity. Our institute's "Asia/World Energy Outlook 2011" forecasts that Asian electricity demand will increase 2.5-fold by 2035 in the reference scenario. Given that overall energy demand is projected to expand 1.9-fold by 2035, the forecast electricity demand growth turns out to be particularly high, indicating progress in electrification. Asian electricity demand growth is expected to account for some 60% of global growth. In response to the substantial demand growth, Asia's electricity sector will have to implement massive investment. Our institute estimates that Asia will account for $12 trillion or about 40% of $31 trillion in accumulated global energy sector investment to be required by 2035. Investment in the Asian electricity sector (covering overall generation and transmission/distribution) will capture $8.8 trillion or three-quarters of the entire Asian energy sector investment. However, the question of "When", "Who" and "How" with regard to realization of such massive investment are now uncertain. How to fulfill electricity demand and how to implement appropriate investment in a timely manner in large cities, developing regions and unelectrified areas are great challenges for relevant stakeholders.

Third, there is the problem of nuclear energy. Attracting much attention at the Summit was how the Fukushima nuclear plant accident in Japan, which possesses advanced nuclear technology, would affect the future course of nuclear energy in Asia. Most of the participants in the Summit

shared the view that Asian nuclear power generation capacity will expand as nuclear plant construction makes progress mainly in such emerging countries as China and India. In each country, however, citizens have growing concerns over the safety of nuclear energy. The degree of concern and the strength of anti-nuclear movements differ from country to country. Even in South Korea and Taiwan that have positioned nuclear energy as the mainstay power source, serious discussions have emerged on the future course of nuclear energy. In China and India that have plans for a massive expansion of nuclear power generation capacity, the enhancement of safety has become the biggest and most necessary premise. Some Asian countries could reconsider or reform nuclear plant construction plans. These points indicate that the Fukushima accident has greatly affected nuclear power generation in Asia.

Fourth, expectations on natural gas have grown dramatically in Asia. Many participants in the conference pointed out that demand for gas as a clean energy source with great supply potential has grown sharply with future demand projections revised upward not only in Japan after the March 2011 earthquake and tsunami but also in other Asian countries. On the other hand, the introduction of highly efficient technologies like CCGT (combined cycle gas turbine) plants and the procurement of gas/LNG at more competitive prices are indispensable for gas to play a major role in the power generation sector. In this respect, a great matter of concern discussed at the Summit was plans to launch lower-priced LNG supply to the Asian market from the United States where the gas pricing system is different from the Asian system.

Fifth, participants in the Summit paid renewed attention to the importance of coal thermal power generation that now has the largest share of electricity output in Asia. As cheap, abundant coal plays a central role in generating electricity in Asia, other electricity generation methods must compete with coal thermal power generation. On the other hand, how to reduce high dependence on coal is an important challenge in China and India. These countries have implemented various policies to diversify electricity sources. Given the importance of coal, however, expectations are very great on Clean Coal Technology (CCT) and Carbon Capture and Storage (CCS) in Asia. As there are various problems with the commercialization and dissemination of these advanced technologies at present, future technology development and cost reduction hold the key to their diffusion.

Sixth, Asian countries as well as the rest of the world have positioned the substantial expansion of wind power, solar and other renewable energy-based electricity sources as a major national policy objective. Renewable energy-based electricity generation is planned to expand for various purposes including global warming prevention, the improvement of energy self-sufficiency rates, the development of renewable energy-related industries and the electrification of rural regions with distributed electricity sources. Some participants in the Summit presented an optimistic view that renewable energy sources could diffuse substantially depending on sharp future cost reduction and government incentives. But some others pointed out that Asia, without grid networks such as those seen in the European Union, may face difficulties in addressing an expansion of intermittent electricity sources and high costs for the development, enhancement and stabilization of grid networks. They noted that Asia has many challenges in overcoming the high costs and instability of renewable energy-based power generation. Some participants focused on how Asia should take advantage of or learn lessons from renewable energy promotion measures in such European countries as Germany and Spain.

In this way, discussions on Asian electricity problems can expand to cover market designs, institutional problems and how to set electricity charges. While many participants in the Summit

emphasized the importance of energy and electricity conservation, some noted that electricity charges set at low levels for policy purposes may affect energy and electricity conservation incentives and investment in power generation facilities. In many Asian countries, however, electricity charge problems are politically and socially sensitive issues. No easy solution can be found. Through discussions at the Summit, I felt anew that electricity policies requires to address and solve very complicated equations with political, economic, social and cultural dimensions, as the policy must deal with such important and diversified challenges including electricity market designs, industrial arrangements, the important preparation of optimum long-term electricity supply and demand plans, setting appropriate government roles in such plans, and implementation of appropriate measures for promoting specific energy sources including renewables.

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