

## **Energy Talks with Students in Malaysia**

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

On July 5, I had an opportunity to deliver a lecture on global energy and environmental issues before 60 to 70 students in the energy economics course at the University of Tenaga Nasional in Malaysia and discuss these issues with the students. I have served as international adviser to the Energy Commission of the university since December 2015. In the energy talks with the Malaysian students, I first made a presentation on global energy and environmental issues and exchanged opinions with the students based on the presentation. In the following, I would like to introduce key points of the energy talks.

I made the following points: Energy is an indispensable good to support civic life, economic activities and national governance. Energy demand has been increasing in line with population growth, economic development, income growth and energy consumption appliance diffusion. The most fundamental energy issue is how to meet growing demand for indispensable energy in a stable, affordable and environmentally friendly manner. This represents the so-called 3E challenges – energy security, environment protection and economic efficiency. The simultaneous resolution of the three challenges is the ultimate energy policy goal. However, the three challenges frequently trade off with each other, leading to an energy trilemma.

Based on this, I explained current issues or challenges facing the world, including the possibility of crude oil prices' remarkable destabilization, the progress and implications of the U.S. shale revolution, the international energy market gravity center's shift to Asia, the deterioration of geopolitical risks as indicated in the Middle East, emerging environmental issues like climate change and air pollution and the importance of relevant countermeasures, the development and diffusion of advanced or innovative technologies expected to resolve these issues, their future courses, and conflicts between policies for resolving issues and market functions.

Various factors exist behind the destabilization of crude oil prices, including growing Middle East tensions over Iran and the future presence or absence and details of a possible military clash. Depending on future developments, crude oil prices could spike on a tightening international oil supply-demand balance, exerting serious impacts on the global economy including Asia. As the gravity center of the global energy market shifts to Asia, the region faces serious challenges regarding energy security, environment protection and market efficiency. The abovementioned Middle Eastern turmoil and possible crude oil price spikes would be urgent energy security issues for Asia. As Asia's heavy dependence on coal is a key factor behind the deterioration of environmental problems, the region is required to seriously pursue cleaner energy use. Many Asian countries are liberalizing or deregulating energy markets at various speeds and to various degrees. A focus of attention is how Asian countries would harmonize the achievement of energy security and environment protection with ongoing market reform.

In a scenario in which energy security will be enhanced with powerful policies and

advanced technologies diffused to conserve the environment, global energy supply and demand will make a major structural transition. Non-fossil energies such as renewable energy and nuclear will expand their energy mix shares while coal demand declines, with oil demand peaking. Even in 2050, however, the world would still be consuming massive fossil fuels, with fossil fuel market stabilization remaining as a key challenge.

Massive energy investment will be required for the structural transition of energy supply and demand through advanced technologies. The Institute of Energy Economics, Japan, estimates such global investment at 90 trillion yen in cumulative term up to 2050. Such huge investment would be a big challenge for energy stakeholders in the world. However, it may provide a big business chance as well. The world has experienced some energy transitions and is now amid a new transition. It is very hard to foresee winners or losers in the transition at this moment. In the absence of any “perfect energy source or option”, the most important point is to pursue the best energy mix to combine all available options in a balanced manner while overcoming their respective weaknesses.

Even in the uncertain world, society’s electrification is making progress. Market reform will exert great influence on the harmonized pursuit of stable supply and environmental friendliness of growingly important electricity. Competition promoted through liberalization or deregulation brings about numerous benefits such as rationalization, lower costs and higher efficiency. However, declines in electricity wholesale prices make it difficult to recover fixed costs or secure necessary investment. If market forces are left to determine everything, the achievement of a politically desirable energy mix may fail to be secured. Policy responses and initiatives will be required to resolve these problems. The best mix of market mechanisms and policies will become indispensable.

The abovementioned challenges or problems are global or common. However, the degrees of their seriousness and relevant countermeasures differ from country to country. Japan and Malaysia have their respective unique problems. Based on the uniqueness or exclusiveness, and relevant conditions, the two countries are required to take their respective measures to resolve their common problems regarding the 3E challenges. The above represents my message to students in the lecture.

Students asked how they should view hydro power generation that is frequently described as a green energy but occasionally criticized as environmentally hostile because of environmental destruction near dam or plant sites. As for nuclear power generation conceived as a CO<sub>2</sub>-free option to stably provide electricity, they questioned how they should view safety challenges and what new nuclear technologies there are. In response, I noted that these questions symbolize the absence of perfect energy sources and that technological and policy initiatives to overcome challenges should be enhanced along with their public acceptance through talks among stakeholders. As a new nuclear technology, I cited the small modular reactor (SMR) technology that are attracting attention.

Asked what energy policies Middle Eastern and other oil-producing countries should take if demand for fossil fuels slackens or slows down, I explained that these countries are trying to upgrade or diversify their economies in preparation for such future developments by planning to promote energy efficiency, renewable energy and nuclear in the energy sector and by implementing initiatives to combine their most important oil and gas sector with carbon capture and storage technology to produce CO<sub>2</sub>-free hydrogen. Students also questioned how the international energy market would be affected by global economic deceleration as a result of the U.S.-China trade war and if U.S. President Donald Trump’s energy and environment policies are contributing to making the international situation unstable and uncertain. Numerous hot and timely questions including the above ones made my energy talks with the Malaysian students very meaningful and significant.

Contact: [report@tky.ieej.or.jp](mailto:report@tky.ieej.or.jp)

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