

## **Japan Should Consider "Best Fossil Fuel (oil-gas-coal) Mix"**

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Participants in discussions on Japan's energy policy reform are looking for the "best energy mix" to achieve safety and the three Es -- energy security, environment protection and economic efficiency. While the points of discussion and priorities regarding the best energy mix may differ depending on the positions of energy policy experts, there are four key points of discussion -- (1) further acceleration and promotion of energy conservation and energy efficiency improvement, (2) large-scale introduction of renewable and distributed energy sources, (3) effective utilization of fossil fuels, and (4) utilization of nuclear energy with safety and reliability secured. Energy policy experts are expected to deepen their discussions on these points based on quantitative, objective and reasonable data and analyses in working out a new energy policy as the key to Japan's national strategy.

While deeper discussions are required on the four points, this paper focuses on the third one. The first reason for paying attention to the third point is that the fossil fuel problem has become very important not only for the short term but also for the medium to long term as fossil fuel demand has expanded on the spreading suspension of nuclear reactors (only eight of Japan's 54 reactors are now left operating). The second reason is that we will have to discuss or consider individual fossil fuels rather than all of them as a whole. Therefore, I would like to present here a view that Japan should achieve the "best mix of the three major fossil fuels" -- natural gas/LNG, oil and coal.

The first point I would like to make is that the most attention-attracting topic in this respect is undoubtedly the natural gas/LNG problem. Natural gas is the cleanest among the three fossil fuels and features stable supply. With these advantages, natural gas is well expected to grow more important as one of the future energy options. LNG thermal power generation is positioned as a key alternative electricity source not only for the short term but also for the medium to long term, while natural gas cogeneration plants are planned as distributed electricity sources. In this way, natural gas demand is expected to expand.

As Japan promotes the effective utilization of natural gas/LNG amid such expectations, the development of infrastructure to secure stable LNG procurement and expand LNG consumption will become a major challenge. I analyzed this point in "A Japanese Perspective on the International

Energy Landscape (61)" and would like to skip the details of this point. In any case, the public and private sectors must work together to consider and cooperate in enhancing the bargaining power of Japan as a buyer to secure sufficient natural gas procurement. As one fundamental measure to this end, how to manage and reduce LNG demand growth is important. In this respect, relatively inefficient existing LNG thermal power plants may have to be reformed into highly efficient advanced combined-cycle plants. It will thus be important to consider and implement measures to enhance the bargaining power on both the supply and demand sides.

The second point is that we must consider positioning oil, based on the characteristics of its supply and demand as demonstrated after the Great East Japan Earthquake. In this respect, we must remember how important petroleum products were as an energy source meeting urgent and immediate needs in the disaster-hit areas. We must also remember that the importance of oil thermal power generation as "the last resort" or "buffer" is attracting attention as nuclear power generation declines. The emergency after the disaster has indicated that petroleum products are more flexible than other energy sources in supply and more convenient for users.

Supporting the supply flexibility of petroleum products is the international oil market that is the most developed in terms of flexibility and liquidity among energy markets. Another key supporter is a domestic supply chain including infrastructure to enable flexible supply. Therefore, we may have to consider how best to take advantage of oil's characteristics and importance, based on post-disaster experiences to develop a flexible and resilient energy supply system for the achievement of safety and the three Es. In this respect, we may have to study how to establish a desirable domestic supply chain and how to address challenges regarding its implementation. The challenges may include stockpiling of petroleum products.

Lastly, there is the problem of coal. As is well known, coal is disadvantageous in terms of environmental load including carbon dioxide emissions. But coal features economic efficiency, abundant resources and supply stability and will grow more important when the post-disaster energy mix is considered.

Given that nuclear power generation as the base load electricity source is bound to decline, particularly, how to utilize coal as an alternative to nuclear energy effectively and efficiently will become very important for electricity supply/demand measures. The effective utilization of coal thermal power generation featuring economic efficiency will also be significant for holding down electricity cost run-ups. Japan's effective utilization of the coal option is expected to hold down any lopsided or excessive demand increase of other fuels such as gas and enhance its bargaining position, contributing to stable supply of other fossil fuels. Such measures as the promoted introduction of thermal efficiency-boosting and clean coal technologies are required to address the abovementioned environmental load. Nevertheless, it may become even more important than in the past to appropriately position coal in considering a future energy mix.

This brief paper is not designed to discuss or analyze challenges and problems for each fossil fuel in detail, but to indicate a view that it may become important to consider the “best fossil fuel mix”, based on the characteristics, advantages and challenges for each fossil fuel. As energy policy reform discussions intensify further after the turn of the year, this view may have to be considered seriously.

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