

Decarbonization and Info Revolution Make Stable Power Supply More Important

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A stable and affordable supply of energy as an indispensable commodity for everyday life and the economy is the most fundamental pillar of energy policy. Furthermore, due consideration must be given to the environment when energy is supplied. In this way, a stable energy supply, or energy security, remains extremely important as an overall concept. In particular, however, the importance of a stable electricity supply is now highlighted.

Of course, we must not forget that a traditional concept of the security of a stable oil supply continues to be a serious matter of concern amid the turmoil in the Middle East and that a stable supply of gas and LNG has also attracted global attention at once due to extraordinary price hikes and market instability during the Ukraine crisis. For the reasons explained below, however, the security of a stable electricity supply is attracting attention as the most important issue among today's energy security issues in Japan and around the world.

An important reason for the sudden increase in interest in the issue of the security of a stable electricity supply in Japan is the experience of facing electricity supply crunches in March and June 2022 mainly in the Kanto region. At that time, the country was plagued with price spikes in the international fuel market due to the Ukraine crisis, affecting electricity prices directly. However, an even greater issue than was concern about the physical electricity supply failing to meet demand.

The electricity supply crunch was triggered by a combination of accidents such as an electricity demand increase caused by temperature and other factors, sluggish renewable energy power generation caused by weather factors, and the unexpected shutdown of backup thermal generation capacity, leading to serious concern that the electricity supply may fail to meet demand.

However, the problem was not as simple as the combination of accidental factors. It must be noted that structural problems existed behind the accidental factors. The first structural problem was that electricity generators were reducing excess capacity to cut costs under competitive and rationalization pressures of electricity market liberalization, which made steady progress even after the Great East Japan Earthquake. As electricity generators reduced buffer capacity from the viewpoint of pursuing economic rationality, surplus capacity throughout the electricity system declined under a kind of fallacy of composition.

The second problem was that solar and other renewable energy sources rapidly increased their share of the power generation mix since the introduction of the feed-in tariff system in 2012. Renewable energy sources, though featuring great advantages as CO₂-free domestic energy sources, have natural intermittency of supply. It cannot be overlooked that the expansion of the renewable energy share may have a great impact when massive renewable power generation capacity is affected by natural weather conditions.

In this way, the issue of the security of a stable electricity supply has begun to attract a great deal of interest in Japan. Meanwhile, I feel that we have come to see important changes in thinking about Japan's energy policy. Of particular importance is the change in public opinion on nuclear energy. In the aftermath of the Fukushima Daiichi Nuclear Power Station accident caused by the Great East Japan Earthquake, various media opinion polls indicated that there was strong concern about nuclear power and that the majority of respondents were opposed to restarting nuclear power plants. As the electricity supply crunch has arisen in a manner to trigger an increase in public attention to the importance of nuclear energy, however, public opinion seems to have gradually shifted towards recognizing the importance of the use of nuclear energy.

Of course, it is true that even today there is a variety of opinions on nuclear energy, including deep-rooted opposition and strong concern about safety. From a holistic perspective, however, it is important to note that arguments in various areas have begun to reconsider the importance of nuclear power. This change is not limited to Japan. In many countries around the world, it has been seen in various ways, such as the construction of new nuclear power plants, the utilization of existing nuclear reactors, the restart of decommissioned nuclear power plants, and enhanced efforts to develop new reactors with innovative technologies.

Under these circumstances, two extremely important developments have emerged in considering the future electricity problem. The first is an increase in electricity demand or progress in electrification through decarbonization, under which the security of a stable electricity supply is important. In any country in the world, the most important and fundamental prescription for enhancing decarbonization initiatives is the promotion of electrification. The reason for this is simple in a sense. Since the electric power sector has renewable and nuclear energy as zero-emission electricity sources that have already been commercialized and are actually used widely, the most cost-effective emission reduction measure is to depend on electricity as energy as much as possible while procuring electricity from the above-mentioned zero-emission sources.

Globally famed long-term energy outlooks, such as the World Energy Outlook of the International Energy Agency and the IEEJ Outlook of the Institute of Energy Economics, Japan, have decarbonization promotion scenarios in which electricity demand will increase inevitably. Therefore, how to stably and affordably provide electricity, which will grow more important among energy sources due to increasing demand amid decarbonization, will become a structurally important issue.

The second important development is an electricity demand increase caused by the information revolution. Amid the rapid spread of generative artificial intelligence, the fast and significant increase in the number of data centers that support AI, and the expansion of semiconductor production capacity, initiatives to meet growing electricity demand are making progress in Japan, the United States, and other major countries. In Japan, a prevailing view had been that electricity demand in Japan would decline over the long term amid mature economic conditions and depopulation. In a symbolic development this year, however, the Organization for Cross-regional Coordination of Transmission Operators, Japan, forecast that electricity demand in Japan would expand towards 2030 and beyond. Although how much electricity demand would increase is a matter of question, the change from a decrease to an increase in forecast demand can be called a major paradigm shift.

Moreover, it is important to note that in the case of electricity (and energy in general), efforts to expand supply take much time, meaning a long lead time between a decision to expand power generation capacity and actual expansion. If electricity demand is expected to increase towards 2030, instead of decreasing as earlier forecast, electric power generators may have to immediately launch

initiatives to meet the demand increase. In this regard, too, an extremely great challenge has become real for a future stable electricity supply.

This challenge has become important in the current final talks on the next and Seventh Strategic Energy Plan. In order to support the Japanese economy and the livelihoods of the Japanese people to ensure future prosperity and stability, it is essential to secure a stable supply of energy, especially electricity. Moreover, a stable energy supply must coincide with enhanced decarbonization efforts. The pursuit of the best energy mix for this purpose should be the essence of the Seventh Strategic Energy Plan.

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