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Fast-spreading AI and Stable Electricity Supply

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At a time when generative artificial intelligence is spreading rapidly around the world, interest is growing in the impact of the AI spread on electricity issues. On April 10, the International Energy Agency published a report titled "Energy and AI," providing a comprehensive analysis of the relationship between energy issues and AI, based on the currently available best knowledge in the world. The very interesting analysis points out that the fast spread of AI will greatly affect electricity demand because energy, particularly electricity, is indispensable for using AI. It also notes that AI has the potential to exert a great impact on the energy market by contributing to efficient energy consumption. The report thus concludes that it is important to pay attention to AI's potential contribution to energy efficiency. Another important point emphasized in the report is that it is essential to provide electricity stably, affordably, reliably, and sustainably in response to growing demand through the use of AI.

The report analyzes that electricity consumption at datacenters, which are expected to substantially increase characteristically in line with the AI spread, will double from some 415 terawatt-hours, or 1.5% of global electricity consumption, in 2024 to 945 Twh by 2030. It also provides a scenario analysis about the pace of electricity demand growth for data centers, suggesting that the growth may accelerate even more substantially. It also notes that there is a lot of uncertainty about future datacenter electricity consumption, indicating that such consumption in 2035 may range widely from 700 TWh to 1,700 TWh. The United States, known as a frontrunner of the new information revolution, is predicted to account for the largest share of global datacenter electricity consumption, followed by China and the European Union. In the United States, datacenter electricity demand growth is projected to command half of total electricity demand growth, suggesting that datacenters for AI have important implications for future electricity demand.

As interest was growing in this issue, I had an opportunity to attend a meeting on April 18 to discuss AI and energy issues. At the meeting, participants from the Japanese and U.S. national governments, information technology and energy companies, and local governments discussed AI and datacenter expansion trends, subsequent electricity consumption growth, and how to secure the electricity supply for datacenters. It was important that they also discussed the possibility and significance of Japan-U.S. cooperation regarding AI and electricity demand issues.

Known well, key points of Japan's Seventh Strategic Energy Plan approved by the cabinet last February include how to respond to the increasing demand for electricity. In the past, the mainstream view had been that electricity demand would decline over the long term in Japan, where the economy is maturing with the population decline. However, the rapid spread of AI and data centers has brought about a "paradigm shift" in which future electricity demand has begun to be predicted to increase, instead of decrease. Since the construction and maintenance of infrastructure for electricity generation, transmission, and distribution requires a long lead time, the change in the direction of

electricity demand from a decrease to an increase has become a problem that needs to be addressed urgently.

At the abovementioned meeting, it was often pointed out that there was an urgent need to secure a sufficient electricity supply in light of the current situation regarding the expansion of data centers. From the perspective of relevant business operators, it is essential to proceed with the construction of data centers and other facilities appropriately for their business management and competition. In this sense, how to secure an electricity supply for such facilities has become a challenge that indicates even the loss of business opportunities.

The challenge is important not only for individual companies but also for the national economy. Whether to adequately respond to the economic need associated with the new information revolution is an issue that could affect future economic development. It is also a question of whether Japan can ride the wave of the new information revolution to attract investment, expand employment, and strengthen competitiveness. Naturally, the challenge is a problem that can make a big difference not only for the country as a whole but also for local communities.

That is why there is a high level of interest in securing the electricity supply. At the meeting, various specific initiatives were explained, indicating a challenge for investment in today's electricity market. In the liberalized electricity market, determining how to properly invest in electricity sources has become a difficult issue. Amid growing uncertainty about future sales channels and demand in a competitive market, relevant business operators will be required to make large-scale initial investments and recover the investment over a long period of time from construction to operation. This will inevitably be a major challenge for business operators.

Of course, it is most desirable to respond with spare supply capacity before making a new investment if there is such capacity. In the competitive electricity market, however, any spare capacity tends to be minimized, making it difficult to rely on spare capacity. Nevertheless, an important point for Japan is that there are many offline nuclear power plants, although it is difficult to describe them as representing any spare power generation capacity. This is because they may be able to stably provide highly competitive decarbonized electricity if they are restarted with their safety secured and national understanding gained. In this sense, the restart of the offline nuclear reactors for their effective use will be extremely important for a stable electricity supply in Japan.

On the other hand, it is necessary to consider investment in new power sources at the same time. In Japan, systems such as the capacity market for securing spare capacity in a competitive market and the long-term decarbonized power supply auction for investment in new power sources have been established to promote efforts to increase electricity supply capacity. Japan may be required to thoroughly examine whether the response under these systems is sufficient and to consider and prepare new measures if necessary.

How to respond appropriately to the growing demand for electricity under the new information revolution is an important key to supporting economic growth and building the foundation for development. That is why the response to this issue has been placed at the center of the Seventh Strategic Energy Plan. Not only power generation facilities but also a stable fuel supply is required for ensuring a stable supply of electricity. Efforts to ensure a stable supply of LNG are also unavoidable. All-out efforts are required for energy policy.

Of course, it is true that there are various uncertainties regarding the increase in electricity demand. It is necessary to pay close attention to progress in and the future of the new information revolution, which is the most important point of interest at present. As mentioned above, the spread of AI has increased attention on the possibility of not only increasing electricity demand but also enhancing energy efficiency. In addition, there is the possibility of improved AI efficiency. In January 2025, Chinese startup DeepSeek shocked the world by announcing a new high-performance, low-cost AI model. Close attention should be paid to how such new innovation will affect the world of AI and electricity. However, we must not forget that securing a stable supply of electricity is an urgent issue at a time when it is difficult to predict the future.

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