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How to View the Significance of "Visions" for energy

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On March 11, the 4th Science Tokyo GXI Public Symposium took place under the theme "GXI Vision 2050 and Expansion of GX Domain through Engineering × Medicine" at the Okayama Campus of Institute of Science Tokyo. The symposium began with an opening address by Prof. Yuki Kato, director, Laboratory for Zero-Carbon Energy, Institute of Science Tokyo, followed by an invited lecture titled "Strategic Energy Plan" by Atsushi Odaka, director of the Strategic Planning Office, General Affairs Division, Director-General's Secretariat, Agency for Natural Resources and Energy. In this lecture, Odaka, who has played a key role in the formulation of the Strategic Energy Plan, gave a detailed explanation of the outline and key points of the Seventh Strategic Energy Plan, which was approved by the cabinet on February 18, clarifying Japan's basic energy policy anew.

In the symposium's Part 1 titled "GXI VISION 2025," Prof. Kato explained the key points of GXI VISION 2050, which was announced in September 2024. In April 2022, Tokyo Institute of Technology launched the Tokyo Institute of Technology Green Transformation Initiative (Tokyo Tech GXI) to realize a carbon-neutral society. Being aware of ongoing discussions on the Seventh Strategic Energy Plan, the institute then compiled its relevant recommendations into GXI VISION 2050. Subsequently, Tokyo Institute of Technology and Tokyo Medical and Dental University merged into Institute of Science Tokyo. The Tokyo Tech GXI was then renamed "Science Tokyo GXI."

It is important to note that GXI VISION 2050 clarifies the significance of "achieving carbon neutrality through an affordable transition that anticipates social inertia." Achieving the unprecedented and important goal of carbon neutrality has become an extremely important challenge in today's society. In this respect, the vision demonstrates that it is essential to fully recognize that rapid changes in a short period of time are difficult to make because of energy-related infrastructure designed for long-term use and of the huge and complex existing supply chains. The vision also clarifies that the transition to carbon neutrality is important and should be implemented at affordable prices and costs. These points represent a sharp insight, reflecting current global talks on the energy transition.

Following Prof. Kato's explanation, I made a presentation titled "Energy Policy Outlook for 2050: Responding to the Turbulent Energy Situation at Home and Abroad," in which I pointed out the importance of long-term challenges towards 2050 as well as initiatives based on the reality of the international energy situation. At the same time, I noted that it is important to fully examine and respond appropriately to the impact of Trump 2.0, which is currently shaking the global energy situation. My presentation was followed by a panel discussion on "GX Vision for 2050," which was moderated by Prof. Kato, with the participation of four specially appointed professors for the GXI -- Keigo Akimoto (principal researcher at the Research Institute of Innovative Technology for the Earth), Takao Nakagaki (professor, Department of Modern Mechanical Engineering, Waseda University), Kenji Takeshita, and I. In the following, I would like to summarize my comments on the importance and significance of visions for energy that left an impression on me through these discussions. (Although there were a lecture and a panel discussion on "Expansion of GX Domain through

Engineering × Medicine" in Part 2 of the symposium, my essay focuses on the issue of energy visions.)

An energy vision represents a long-term future image of energy, comprehensively covering what future energy should look like and how world of energy should or may change, based on an awareness of problems and challenges in the real world. It also depicts what policies, strategies, and initiatives will be needed to realize the future image. In this respect, the Seventh Strategic Energy Plan and various long-term energy outlooks are energy visions. The most well-known energy vision is the International Energy Agency's World Energy Outlook. Our IEEJ Outlook is also an energy vision.

In the long-term future, changes that cannot be foreseen today may occur. In this sense, the future is uncertain. No kind of wisdom allows someone to accurately predict or anticipate the long-term future. In today's world and society, plagued with upheaval, it would not be an exaggeration to say that uncertainty is unprecedentedly high. In the world of energy, where the extremely challenging goal of carbon neutrality is required to be achieved, there is a great deal of uncertainty in the means, options, and approaches to achieving the goal. Technologies that are not currently widely used would have to be made available through innovation in order to realize carbon neutrality. This point naturally entails uncertainty.

As international politics, the global economy, and the security environment are currently chaotic, with the division of the world deepening, what would happen to the overall environment surrounding us is extremely uncertain. The destabilization of the international energy situation since Russia's invasion of Ukraine and growing tensions in the Middle East and East Asia have become important issues regarding energy geopolitics. Moreover, Trump 2.0 has had a significant impact on all of these issues. Under these circumstances, it can be said that we are facing unprecedented difficulties in predicting the future.

Paradoxically, however, the more uncertain the future is and the more difficult it is to predict the future, the more visions are required and expected to play an important role in considering response strategies. This is because it is absolutely necessary to draw future visions when making policy and strategic decisions and making efforts to realize the visions, or to take measures to deal with possible problems in the future. It is also significant to set ideal goals and high ideals with an eye on the long-term future and make maximum efforts to realize them. This is precisely because high ideals are likely to encourage human society to make its utmost efforts to realize significant changes and reforms. If human society is simply left to continue the current trends, it will be difficult for changes and reforms to be born or accelerated. In this way, visions can become the basis for social transformation and subsequent development.

Any vision needs to be supported by objective and scientific examination and consideration through the constant gathering and analysis of information on the reality of the world and society as a whole. In order to prevent a vision from ending up being a pie in the sky or generating excessive social costs, it is extremely important to conduct objective and scientific examination and consideration, as mentioned above. In today's increasingly uncertain world, growing hopes are placed on the role of energy visions. At the same time, how to develop the ability to interpret the reality and future of society and how to improve information analysis capabilities are questions being asked amid growing difficulty in formulating visions.

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