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Center on Japanese Economy and Business

Leading After a Nuclear Disaster

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Featuring
Naomi Hirose
Executive Vice Chairman of Fukushima Affairs at TEPCO; former President and CEO of TEPCO

On April 18, 2019, the Center on Japanese Economy and Business (CJEB) hosted Naomi Hirose, former CEO and President of the Tokyo Electric Power Company (TEPCO), for a discussion about leadership following the nuclear disaster in Fukushima in March 2011. He described lessons the firm has learned and changes to firm and regulatory practices that are poised to transform standards for nuclear safety internationally. Hugh Patrick, director of CJEB,

opened the event by introducing Mr. Hirose, who has dedicated his career and over 40 years of his life thus far to the work of TEPCO.

Mr. Hirose then began his talk by providing an overview of the natural disaster and events precipitating the accident at the Fukushima Daiichi Nuclear Power Station (NPS) in and its effects. TEPCO, the Japanese government, and local people have been redressing this

incident for 8 years as of 2019. In brief, there was an earthquake with a Richter scale magnitude of 9.0, the most intense earthquake recorded in Japanese history and whose magnitude was the fourth-greatest recorded in world history. Emergency protocols to shut down the nuclear power plant, also known as SCRAM, were activated. About one hour later, however, a tsunami triggered by the earthquake inundated the area surrounding the Fukushima Daiichi NPS, as well as the power plant itself, and destroyed backup methods of external power. The critical cooling process of nuclear materials could not be completed and consequently, the special metal surrounding the nuclear fuels began to melt. As the molten metal came into contact with water, the combination began to react and produce hydrogen, which ultimately created an enormous amount of pressure, causing the top of the nuclear reactors to explode. This explosion released radioactive materials into the surrounding atmosphere in Fukushima.

In comparing Fukushima from 2011 to 2017, radioactivity levels have decreased significantly and the condition of the Fukushima Daiichi NPS is now stable. Furthermore, designated evacuation zones have decreased as well. Although over 20,000 persons who used

to live in the evacuation zone remain displaced as a result of the incident, TEPCO is continuing its work to restore the homes and communities of local residents in many ways. Mr. Hirose further noted that, as of 2019, 96% of the plant site affected by the nuclear spillage in 2011 has been designated a green zone due to decontamination efforts that have made it possible for protective gear to no longer be necessary. Furthermore, TEPCO has started removing fuel bundles from the affected nuclear reactors in addition to making structural improvements to reduce risk. Additionally, TEPCO continues the work of removing debris from the nuclear reactors affected by the accident in 2011.

Mr. Hirose then provided a financial history of TEPCO and discussed the implications of the accident in Fukushima for management practices. The total estimated damage from Fukushima was estimated to be $200 billion USD. $145 billion USD of the responsibility was placed on TEPCO. Even depreciating this cost over 30 years, Mr. Hirose noted that to manage this enormous cost, TEPCO must make $5 billion USD annually to cover decommissioning expenses related to the Fukushima Daiichi NPS, decontamination costs of surrounding communities, and compensation costs in order to remain viable as a private company. Important lessons on governance that Mr. Hirose believes can be shared from the incident in Fukushima include the importance of instilling a safety culture at TEPCO, improving

communications from engineers in the field to corporate headquarters, and continuing to build solidarity and shared responsibility among employees in the firm in light of the crisis.

Mr. Hirose observed that in studies of the functioning of TEPCO after Fukushima, it was revealed that tradeoffs were often made between budgets, scheduling, and safety. Moreover, he notes that further commitment to finding optimal and safe solutions is something TEPCO has focused on improving. Additionally, he has encouraged engineers in the field to report crises even if they have not completely discerned the cause yet as sometimes delays can be crucial to determining the severity of crises. Since the incident, TEPCO has worked hard to engage employees and build a shared sense of responsibility for the crisis instead of instilling blame. Mr. Hirose shared proudly that TEPCO employees voluntarily devoted a total of over 460,000 personal days to visiting Fukushima, directly helping out with the work of restoring people's homes and clearing the area for resettlement, and learning about the disaster and its effects on the local community from local people.

Following Mr. Hirose's remarks, Professor Patrick continued the reflections on the experiences of the earthquake and noted that although it took some time to discern, it was ultimately ascertained that the most severe impact of the accident was localized to the area

surrounding the Fukushima Daiichi NPS. Professor Patrick asked the first question about the future of nuclear power for Japan and how Mr. Hirose envisions TEPCO's role in this picture. Mr. Hirose responded that, as Japan's energy self-sufficiency is only 8% and that it is currently very difficult to generate 100% of the energy required from solar and wind sources alone, nuclear power will remain an important power source for Japan in the future. Furthermore, given that stopping nuclear operation is contributing to increasing the carbon emissions ratio from Japan, Mr. Hirose stated that TEPCO is working hard to restart the two nuclear units in the Niigata prefecture, taking all of the lessons and precautions learned into consideration.

One audience member asked Mr. Hirose whether he believed the rating that the Fukushima Daiichi nuclear reactors could withstand an earthquake of 8.5 magnitude was overly generous given the accident, which occurred after an earthquake of 9.0 magnitude and the tsunami. Mr. Hirose noted that in spite of the earthquake and hydrogen explosions, all four nuclear reactors remain standing with structures largely intact. After the accident, he noted that the Japanese Nuclear Regulatory Authority has implemented very tough and stringent safety requirements for TEPCO and nuclear power firms and, thus, it takes many years to meet the new safety standards to restart the reactors. Lessons that Mr. Hirose emphasized repeatedly throughout the discussion included effective communication with the public and

media, and always leaving room to account for unexpected fail risks, even if they seem extremely unlikely.

Another question focused on what TEPCO plans to do about the remaining traces of tritium in the water that was formerly contaminated by the accident in Fukushima. Mr. Hirose responded that the initial water filtration process by the ALPS system couldn't remove all the contaminants and that the company has since improved the ALPS technology and plans to filter the water in the storage tanks again to remove all the contaminants except tritium. Tritium, given its chemical similarity to hydrogen, renders it very difficult to remove from water because the two substances are so similar. Mr. Hirose further noted that because tritium is so similar in structure to water, living species such as marine life and humans naturally excrete tritium from their systems, according to scientific experts.

Regarding potential mergers with renewable energy firms, Mr. Hirose stated that TEPCO plans to build a large, off-shore wind farm. Regarding Mr. Hirose's opinion of the government of Japan's preparedness for the next potential nuclear accident, Mr. Hirose noted that it is important to communicate potential risks, however small, to the local people instead of stating that plants are "100% safe." Regarding managing tensions between the firm, government, and the public in a crisis, Mr. Hirose noted that communication and coordination with the government and the media played a key role in TEPCO's management of the crisis.

On the subject of whether TEPCO would be open to sharing nuclear power plant best practices with Chinese firms, Mr. Hirose stated that TEPCO in fact shares best practices with the rest of the world including the Chinese government as TEPCO and Japan received great support from around the international community during the crisis. TEPCO would be happy to help anyone around the world implement practices to reduce the risk of such accidents occurring.

On the topic of whether TEPCO would continue using existing boiling-water technology in its nuclear reactors, Mr. Hirose noted that at present Japanese nuclear operators are trying

to restart the existing plants, but the new type of reactors might be introduced in the future. Furthermore, in response to a request for Mr. Hirose to compare Fukushima and Chernobyl, Mr. Hirose noted that the two are very different in terms of severity and circumstances. The Russian government covered the Chernobyl plant in concrete and has essentially encouraged people to abandon the area surrounding Chernobyl. In contrast, we are continuing our efforts to restore the area and allow people to return to their homes.

Professor Patrick then thanked Mr. Hirose for his time and his insights, and concluded the event.