3rd Stage　Keynote Address
Paris Agreement and Energy Security in Northeast Asia

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Firstly, I would like to introduce what the Paris Agreement is aiming for, then discuss the need to achieve its long-term goals by overhauling the energy structure within the next 30 to 40 years, which is a relatively short period of time in the energy field, and by realizing net zero emissions/decarbonization. Finally, I will outline the potential impacts that such a major shift will have on energy security in Northeast Asia, a region so dependent on fossil fuels.

The term energy security is generally defined as ensuring sufficient energy at a reasonable price, but today I would like to provide a broader description, one including the implication that a transformation of the energy structure itself will both have a significant socio-economic impact and suppress that socio-economic impact. In the face of great challenges, I will also touch on the kinds of initiatives and cooperation that are possible within the region.

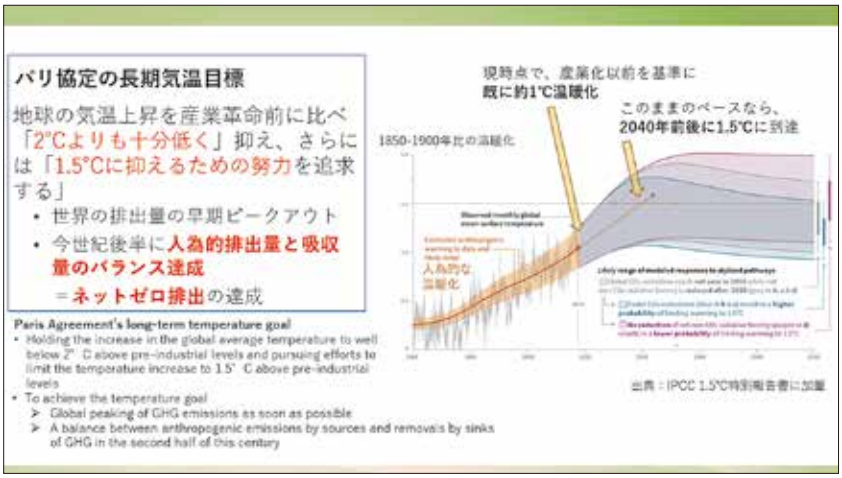
The Paris Agreement aims to pursue efforts to hold global temperature rises well below 2℃ and even 1.5℃ above pre-industrial levels. Currently, our earth's temperature sits about 1℃ higher than before the Industrial Revolution, and if it continues at this pace, it will have risen 1.5℃ by around 2040 (Figure 1). Science has confirmed this data, so if we are really going to limit this rise to 1.5℃, we must reach a global peak in greenhouse gas (GHG) emissions as soon as possible, after which we can achieve a balance between anthropogenic emissions and removals in the latter half of this century. Achieving net zero emissions by reducing emissions is also included in the Paris Agreement.

The important point here is that only net zero emissions will halt global warming. This was clearly spelled out in a sure conclusion by the Inter-Government Panel on Climate Change (IPCC). Since the temperature rise due to global warming is proportional to the cumulative emissions of carbon dioxide that human beings have emitted previously, additional emissions must be reduced to net zero to stop a further rise in temperatures. In short, emissions and absorption must be balanced.

However, as for when it will be net zero, the Paris Agreement pinpoints the second half of this century. Thus, the next important point is when we can achieve it. As mentioned above, the level of global warming is proportional to the total emissions we have emitted thus far, that is, cumulative emissions, so on the contrary, in order to stabilize temperature rise in a suppressed state, we must reach net zero in the earliest possible timeframe.

In that sense, the IPCC's 1.5℃ special report concludes that carbon dioxide emissions must be net zero by around 2050 if 1.5℃ is to be achieved. If the target is 2℃, then net zero will

Figure 1　Goals of the Paris Agreement



occur around 2075. In any case, we have a few decades at most for net zero or decarbonization to become a reality.

In response to this, in 2020, we saw a series of net zero declarations, including those from major players. I think it is fresh in our memories that after Chinese President Xi Jinping said in September that his nation would aim to be carbon neutral by 2060, Japan and ROK followed suit, declaring that they would aim for carbon neutrality in 2050. Also, about a week ago, U.S. President Biden formally announced in a White House press release that he would aim for net zero in 2050, in line with his previous pledge.

Countries that account for about 68% of global CO_2 emissions, such as China, the US, the European Union, and Japan, have declared targets for net zero. In other words, the world has steered itself toward decarbonization in the next 30 or 40 years. This has considerably affected those countries in Northeast Asia which have yet to advocate decarbonization themselves, inclusive of Russia and Mongolia, as the entire world shifts toward decarbonization. I would like to include such topics in further discussion after this.

When we say that we are aiming for net zero by 2050, scenario studies using global models forecast a rapid breakaway from fossil fuels, especially coal-fired power. The IPCC's 1.5℃ special report referred to earlier predictions saying that natural gas will generate about 8% of electricity, and coal-fired power generation will be almost 0%, but given this is too short a timeframe even for coal-fired power utilizing carbon capture and storage technology (CCS), its role will be a limited one.

A similar conclusion is drawn in the IEA's net zero by 2050 scenario released late last year, which states that renewable energy will continue to increase over time, and fossil fuels, especially coal-fired power, will play a more limited role.

On the assumption that this is the case, where do the countries of Northeast Asia stand? As we are all aware, their dependence on fossil fuels is very high (Figure 2). The graphs show the rate of primary energy consumption according to fuel sources. In Russia fossil fuels account for 88%, so too in Japan and ROK, while in China the rate stands at 85%, meaning that almost 90% of all primary energy in the region is supplied by fossil fuels.

The same is true of power generation, generally about 70% of electricity in the region is derived from utilization of fossil fuels (Figure 3).

Figure 2　Fossil Fuel-dependent Energy System: Primary Energy

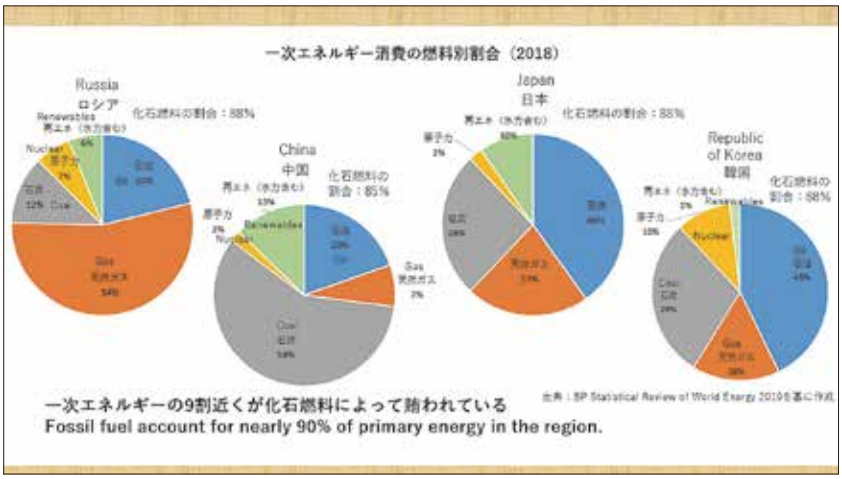


Figure 3　Fossil Fuel-dependent Energy System: Power Generation

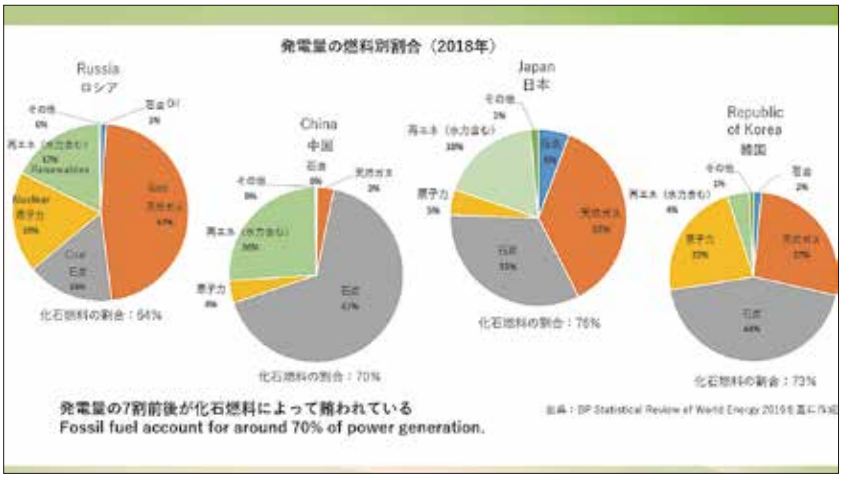
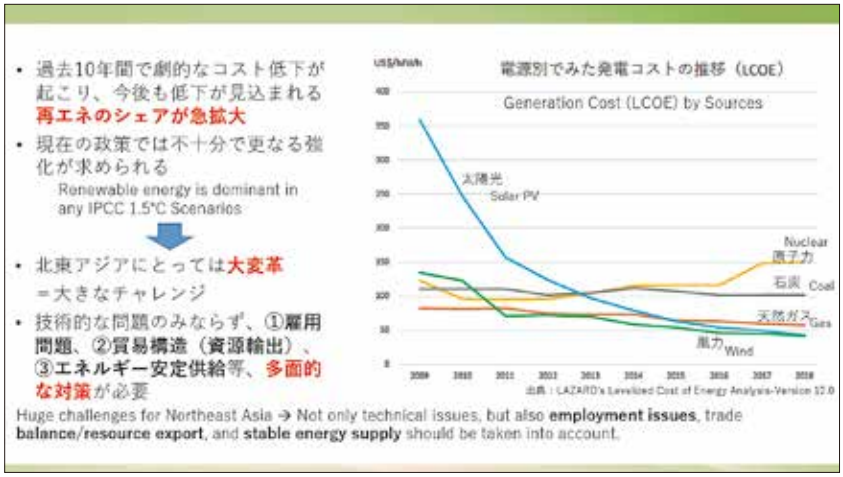


Figure 4　Moving Away from Fossil Fuel-dependent Energy System = Massive Transformation



In response to this, the energy structure must be transformed from a model of fossil fuel dependency in the future. Basically, various energy mixes are considered in the net zero scenario, but what is commonplace is that renewable energy is positioned as the main power source, a move supported by a sharp drop in costs over the past decade, as shown in Figure 4.

Naturally, this will significantly impact countries in Northeast Asia, so it will be necessary to consider not only technical issues, but also employment matters and trade balance issues, in addition to stable energy supply, from a more multifaceted perspective.

Next, I will examine some of the problems. With regard to employment, one mindset is to absorb the gradual decline in fossil fuel-related employment via the creation of employment in renewable energy. It is said that renewable energy is a fairly labor-intensive power source that can sufficiently soak up fossil fuel-related employment.

Figure 5 shows China's coal output by province, with coal production levels expressed in shading ranging from white to red. The circles, on the other hand, represent the potential for renewable energy in each province; green denotes solar PV potential, and blue indicates wind potential. Selecting an example, while coal production is high in Xinjiang and Inner Mongolia, both provinces offer massive potential for renewable energy. In these areas, it is safe to say that a shift in employment from coal mining to renewable energy would be physically possible. That said, examples of provinces that produce large amounts of coal but show little renewable energy potential can be found in central China, particularly in its west, and mid-west China. In addition, as renewable energy requires a wide range of employment skill levels depending on the stage, a variety of issues spring to mind, including whether the skills of fossil fuel-related workers match that stage, and whether the timing of employment and loss is properly matched. It is vital that we look beyond narrow energy policies, and instead, link them with a wide range of socio-economic policies such as labor, human resource development, and social security. I have shared the example of China here, but undoubtedly, this is a major issue not only for China but also for other Northeast Asian countries in general and the whole world.

Figure 5　(1) Employment Issues: Renewable energy could absorb a part of fissile fuel-related workers

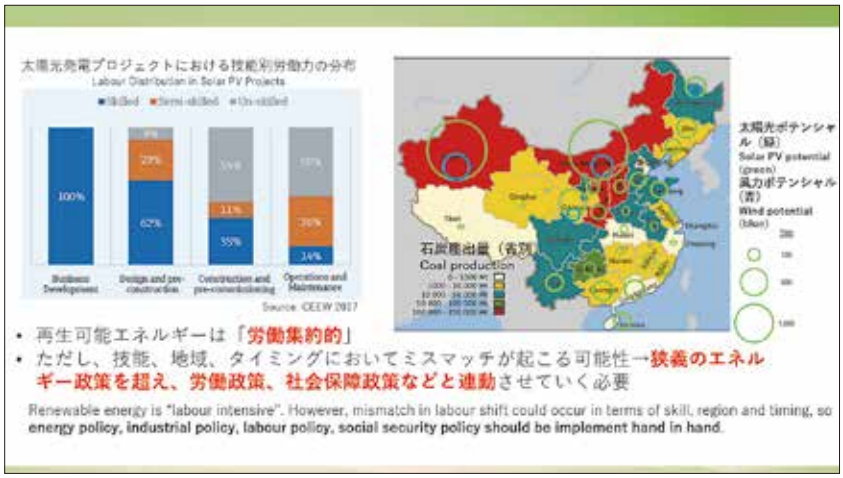


Figure 6　(2) Trade (Resource Exports)

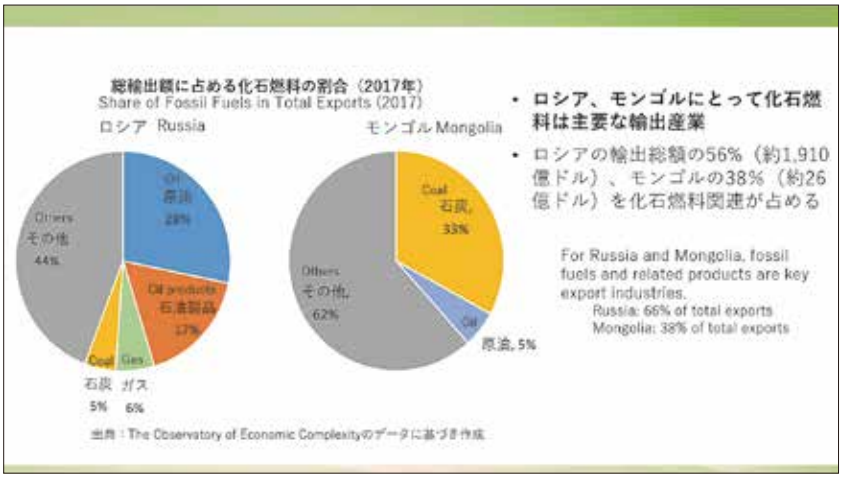


Figure 6 shows the share of fossil fuels in total exports for Russia and Mongolia. We see that fossil fuels are major export industries for both countries. 56% of total exports in Russia and 38% in Mongolia being fossil fuel-related, therefore, it is natural that both will be radically impacted as nearly 70% of the world's countries head towards decarbonization, as explained earlier in my talk.

Russia will probably focus on exporting natural gas, which emits less carbon dioxide, among fossil fuels, for the time being. In fact, Russia's pipeline from Siberia to Jilin Province, China, has been in use for two years and will be fully operational in 2024. Global warming will also make it easier to develop resources in the Arctic, which will advance the development of natural gas in the region and create gas development projects for Europe and Asia. Since it is necessary to reduce global emissions to zero early before mid-century, I think that despite its low emissions among the fossil fuels, it is necessary to pay attention to the need to gradually reduce the percentage of natural gas moving forward.

Consequently, I think that another step is to produce hydrogen by discharging natural gas. The production of carbon-free hydrogen via the application of CCS will be required in the future. This will be described later.

Next, let us examine the countries that import natural gas. Northeast Asia's three major importers of liquefied natural gas (LNG) are Japan, China, and ROK (Figure 7). Compared to other regions, such as Europe and the US, procurement costs are higher for various reasons. Therefore, under the premise that usage of natural gas will increase for the time being, one form of cooperation is to attain LNG at a more stable and lower price by demonstrating the so-called buying power of Japan, China, and ROK. However, in reality, the soaring price of LNG in early 2021 is explained in part because of the intense procurement competition between Japan, China, and ROK, and in reality, little cooperation has been seen. However, as an area of potential cooperation for the three countries in coming years, and one referred to in summit discussions, I think it is definitely an area worth pursuing.

Mongolia shows massive potential in renewable energy power, with enough potential to sufficiently cover the needs of China and Japan, so exports of renewable electricity are to be expected in the future (Figure 8).

In fact, various organizations and international organizations have come up with various concepts and ideas for an

Figure 7　Collaboration Among Natural Gas Importers

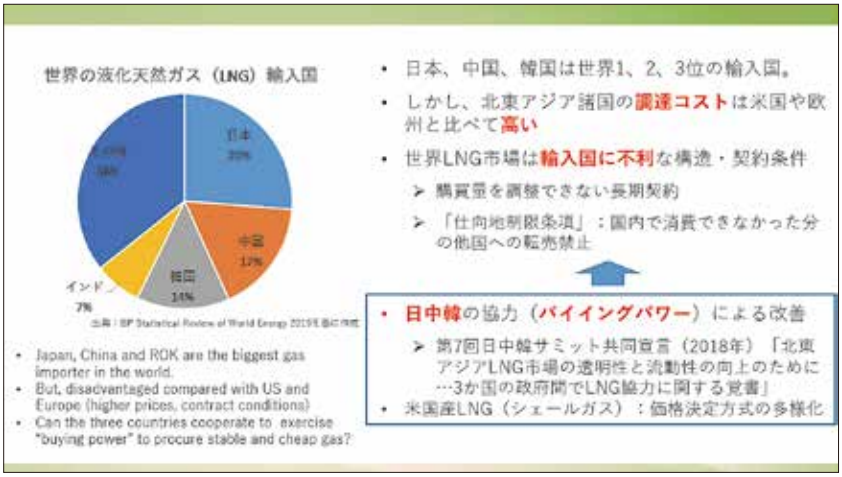


Figure 8　Mongolia: Export of Renewable Electricity

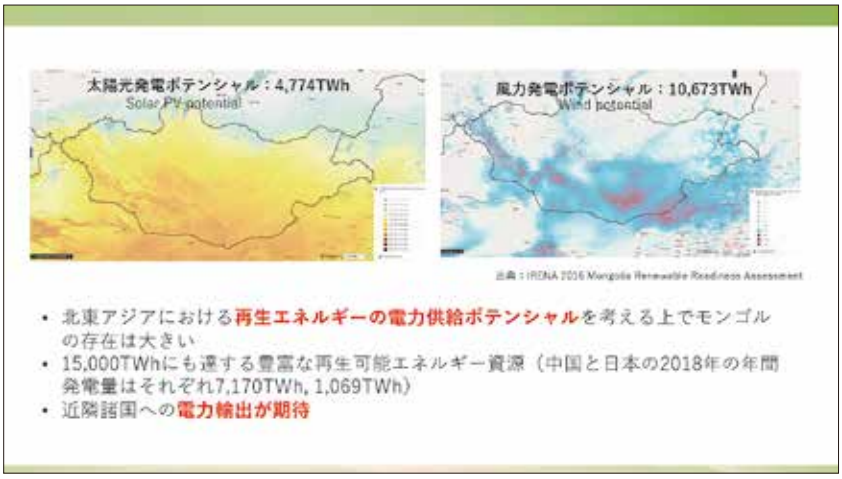
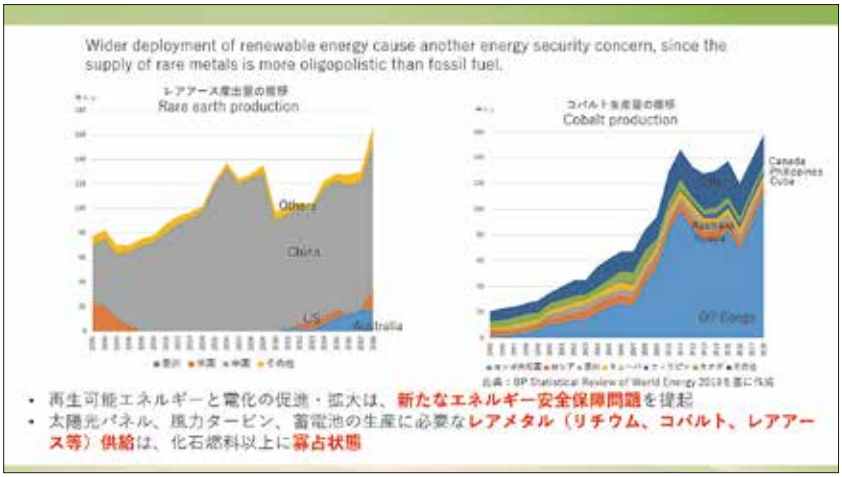


Figure 9　Expansion of RE can increase energy self-sufficiency



international power grid. It is said that constructing a wide-ranging connection will naturally achieve the merit of efficient and stable operation. Unfortunately, given the present security situation in the region and state of international politics, international cooperation and collaboration on a power supply system are at a complex stage, thus, improvement in the security situation is a prerequisite for the realization of this idea.

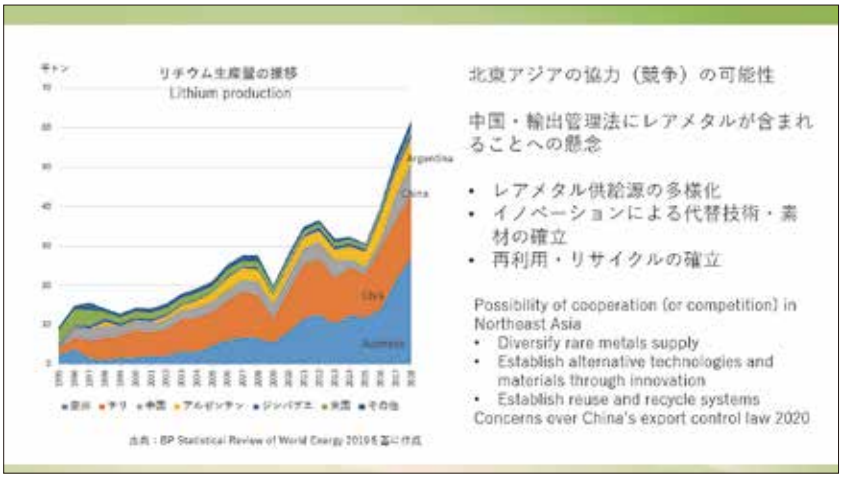
Hydrogen has attracted a lot of attention in the last year or so. Specifically, it plays a very large role in decarbonization in the transportation and industrial sectors. As for the power generation sector, it is said that hydrogen will play a major role in ensuring flexibility when renewable energy becomes the main power source, a fact raising eyebrows in Japan, China, and the ROK. Hydrogen is an energy carrier, and carbon-free hydrogen must be available to make use of it in decarbonization, so for example, it can be supplied by making hydrogen derived from fossil fuels with CCS. In fact, in Russia, there has been a movement to export hydrogen to Japan, China, ROK, and Europe with specific targets in mind.

The other is the prediction that producing hydrogen by water electrolysis from renewable energy will be cheaper in the long run than making it from fossil fuels. If so, countries that can produce cheap renewable energy domestically can make hydrogen by using their own renewable energy resources. Otherwise, a substitute is to import renewable hydrogen energy from countries such as Chile and Australia, and in fact, Chile and Australia are currently developing or considering such strategies.

In any case, creating an international supply chain will be a major key, and in the future Northeast Asian countries will need to collaborate to establish economies of scale and create a mechanism that can procure cheaper carbon-free hydrogen.

The last theme centers on the stable supply of energy. The expansion of renewable energy in the future is expected to contribute greatly to energy security in terms of reducing the reliance on crude oil, for which the region has long depended on foreign countries, and significantly raising the energy self-sufficiency rate. Conversely, experts point out that the promotion and expansion of renewable energy and electrification will give rise to new energy security issues. In short, there is more of an oligopoly for the supply of rare metals used to produce solar panels, wind turbines and storage batteries than for fossil fuels. As shown in Figure 9, China leads the world handsomely in rare

Figure 10　Expansion of RE can increase energy self-sufficiency



earth production, while cobalt production is concentrated in Congo. Alternatively, Northeast Asian countries can work together on the diversification of rare metal sources, alternative technologies through innovation, the establishment of materials, and recycling such as reuse, but on the contrary, the threat of fierce competition in these fields exists. Of particular concern is the fact that China's export control laws may include rare metals (Figure 10). Therefore, it is necessary to overcome these issues and pursue goals that forge cooperation in Northeast Asia, especially on the diversification of resources and innovation.

We have talked about security, and as the world continues to decarbonize, we need to pay attention to the fight for technological hegemony.

Until now, we have witnessed the major trade conflict between the US and China led by the former Trump administration. On the other hand, it is widely recognized that the issue of climate change is one where cooperation is possible. However, if we are to deal with climate change, social transformation is needed, including the mass introduction of renewable energy, the introduction of semiconductors and next-generation communication technologies, and promotion of the so-called digital transformation, for example, autonomous driving. The stable supply of rare metals is key to these developments, and it is necessary to take a collective view of this, which ensures that social transformation as a method to respond to climate change and issues related to renewable energy and other advanced technologies become inseparable. The ongoing battle between the US and China over technological hegemony in this area could in fact ignite the field of climate change, and I think it will be very important for the region as to what will transpire between the US and China in the future.

In summarizing my main points, the first I made was that there is basically only one way to curb global warming, that being net zero. Many countries, including Asian countries such as China, Japan, and ROK, are actively taking steps toward the realization of net zero emissions.

Next, a major shift in the energy structure is required to achieve this goal, but the high dependence on fossil fuels in Northeast Asia, as well as the insufficient development of energy networks, power grids and pipelines in the area are all stumbling blocks.

Moreover, I think this situation will, on the flip side, provide us with hints on cooperation moving forward. I believe that Northeast Asia should aim for cooperation toward a stable supply of electricity derived from natural gas and renewable energy, as well as putting more energy into hydrogen and rare metals. However, as I mentioned a few moments ago, the US-China confrontation casts a shadow over such a direction, so it will be necessary to tread carefully.

[Translated by ERINA]