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Renewable Energy Institute

*Statement*

**On the Energy Crisis Caused by the Invasion of Ukraine**  
**Renewable energy and energy conservation are the most effective measures**  
**for energy independence**

**The Current Energy Security Crisis Stems from the Vulnerability of Fossil Fuels**

(1) World Energy Crisis based on Russian invasion

The world is facing an energy security crisis caused by the invasion of Ukraine by Russia. The price of crude oil exceeded US\$130 per barrel on March 7 for the first time in 13 years and 8 months. This has led to discussions in Japan about the introduction of gasoline subsidies and “trigger clauses” for gasoline taxes – a measure to curb prices that is activated when certain conditions are met. The European Union (EU), in particular, is highly dependent on land-linked Russia for fossil fuel imports<sup>1</sup>, and supply concerns are growing. Although Russia has not stopped exporting fossil fuels at this time, its past history of temporarily suspending gas supplies to Ukraine in 2006 and 2009, which affected European countries, has heightened awareness of the crisis.

In response to the invasion of Ukraine, Western countries are countering Russia with economic sanctions. The U.S. government banned imports of Russian fossil fuels on March 9. On April 7, the EU, which is highly dependent on Russia, agreed to suspend imports of Russian coal, and discussions are underway regarding a ban on imports of crude oil and natural gas. These economic sanctions will hurt Russian economy as it relies on fossil fuels for half of its export revenues, but importing countries will have to find alternative sources of supply and face soaring international prices for fossil fuels.

(2) Energy security to date has been synonymous with fossil fuel security

This energy security crisis stems from the fact that Russia is one of the world's leading exporters of fossil fuels. To begin with, fossil fuels account for 80% of the world's energy supply, but they are unevenly distributed. As a result, fossil fuels are traded internationally in large quantities, and since oil exporting countries can often be found in politically unstable areas, international trade is easily influenced by geopolitical factors, forcing national governments to take action.

In short, energy security today is, in essence, the security of fossil fuels, and the current crisis is nothing more than a manifestation of the inherent vulnerabilities of fossil fuels, such as their uneven geographical distribution and finite nature. Many governments, including Japan, have struggled to cope with resource diplomacy, market intervention, and crisis response for the sake of protecting fossil fuel supplies. There are numerous examples of soaring prices and supply instability triggered by the war, such as the oil crisis in the 1970s and the Gulf War in 1990. In 2022, our economy and society

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<sup>1</sup> 46% for natural gas, 27% for crude oil, and 46% for coal (2021). European Commission, REPowerEU, March 8, 2022.

will still be dependent on fossil fuels. However, the Russian invasion of Ukraine has reminded us that such an energy crisis is inevitable as long as we remain dependent on fossil fuels.

### **Overcoming the Energy Crisis: Phase-out Fossil Fuels Through Energy Conservation and Renewable Energy**

In response to the recent energy crisis, the EU announced on March 8 its REPowerEU policy, which calls for diversification of natural gas imports, energy efficiency improvements, and increased adoption of renewable energy sources, thereby accelerating the transition away from Russia and fossil fuels by 2027. In particular, with regard to natural gas, the goal is to reduce imports from Russia by one-third by the end of 2022. Although fossil fuels will be procured from sources other than Russia, for example, by constructing an LNG terminal in Germany, we should be clear that the total consumption of fossil fuels should not increase. What is most required now is to reduce fossil fuel consumption as much as possible, and the most promising means of doing so are renewables on the supply side, and energy efficiency and conservation on the demand side.

#### (1) Renewable energy replaces fossil fuels

Renewable energy should be re-evaluated with the inclusion of its energy security value. Renewable energy sources are found throughout the world and are diverse, including hydropower, wind, solar, and geothermal, so that any country can be self-sufficient on a substantial scale. Because they are reproduced as a natural phenomenon, they are never depleted, have zero marginal cost, are not subject to imports and exports, and are not subject to price hikes or supply instability. Since it is based on local use in diverse regions (small-scale and decentralized), it is strong in terms of disaster resilience and contributes to regional economic cycles.

Although output volatility is sometimes mentioned as a barrier, it can be addressed through flexible grid operation, grid reinforcement, demand response, storage batteries including electric vehicles, use of flexible supply-demand adjustment such as pumped storage, and conversion to green hydrogen (PtG). It has become the cheapest power source compared to nuclear, coal-fired, and natural gas-fired power, and the IEA's Net Zero Scenario predicts that renewables will account for 88% of the global power mix in 2050. Only purely domestic renewables can replace foreign-dependent fossil fuels to ensure energy independence, and their introduction should be accelerated as a top priority.

#### (2) Improving energy efficiency is a top priority policy

In Europe and the U.S. state of California, which have been leading the world's efforts to combat climate change, energy efficiency has been positioned as the "number one fuel" and recognized as the highest priority in energy policy. Reducing total fuel consumption through energy efficiency is also an immediate measure to address the energy crisis. In 2011, when the Great East Japan Earthquake and the Fukushima Daiichi Nuclear Incident caused a power crisis in eastern Japan, it was the energy-saving efforts of companies and households that helped the country cope with the power demand in summer, when electricity demand peaked. Germany, which is particularly dependent on Russian energy sources, aims to reduce its dependence on Russian natural gas from 55% to approximately 30% by the end of this year and to end the dependence by the summer of 2024, through diversification of procurement places as well as energy efficiency, energy conservation, and

electrification in companies and households. It is also working on legal reforms to accelerate energy efficiency in new and existing buildings.

Japan is said to have achieved success in energy conservation after the oil crisis, but in recent years the country has not been able to take pride in its success. Energy efficiency in manufacturing has remained around in the same level for the past 30 years, and the insulation performance of homes is low compared to Europe and other countries. In response to soaring fuel prices, the government has introduced gasoline subsidies. While measures for businesses and households that are particularly severely affected are necessary, what really needs to be done is to increase investment in energy conservation that also utilizes DX, such as strengthening the insulation performance of buildings, smart houses, and demand response.

Both renewables and energy conservation have often been discussed as measures against the climate crisis, but at the same time, they are the most important means to achieving energy independence. In particular, Japan, which is not endowed with fossil fuels<sup>2</sup> but is blessed with abundant renewable energy resources, should accelerate renewable energy development and energy efficiency to overcome both the climate crisis and the energy crisis, and phase-out fossil fuels.

In August 2020, Renewable Energy Institute released its "Proposal for 2030 Energy Mix in Japan," in which it set the goal of future energy policy as the realization of a decarbonized society and the assurance of a stable supply that does not depend on fossil fuels. Based on this goal, it proposed that the power mix in 2030 should be 45% renewables, built on the premise that energy efficiency should be thoroughly promoted. This current energy crisis shows that this direction was correct and that it should be further accelerated.

### **Nuclear Power and Zero-emission Thermal Power Cannot be Relied Upon**

#### (1) Nuclear power has little future

In Japan, however, since the natural gas price spike in Europe in the second half of last year, there have been arguments that “energy crisis was a result of the excess steps towards decarbonization” and that “investment in fossil fuels should be increased”. Furthermore, in the wake of the invasion of Ukraine, there have been strong calls for accelerating the restart of nuclear power plants.

For some time, new nuclear power plants have not been built worldwide due to their high cost and high risk, and they have little future potential, including the problem of final disposal of high-level radioactive waste. In Ukraine, the nuclear power plants at Chernobyl and Zaporizhia became the target of a military attack for the first time, but the reactors were not designed for such a situation. Subsequently, France and the United Kingdom announced that they would build new nuclear power plants. Despite both countries having actively promoted nuclear power development in the past, new constructions have failed to materialize and the countries had to bail out their domestic nuclear industries. There is little reason to believe that this plan will be envisioned this time.

Japan has been promoting energy security measures that rely on nuclear power since the oil crisis, but besides the problem that they cannot be called domestically produced power because we import

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<sup>2</sup> In FY 2019, the country relied on imports for 99.7% of its crude oil, 99.7% of its coal, and 97.8% of its natural gas. Agency for Natural Resources and Energy, Energy White Paper, 2021 edition.

uranium fuel in the first place, even in the 1990s, when the percentage of nuclear power plants was at its highest, the country's energy self-sufficiency rate remained at 22%. It would be unreasonable to call this a "stable power source," since all reactors were shut down following the Fukushima Daiichi nuclear power plant accident in 2011, and energy self-sufficiency dropped to 6%. Some countries, such as Belgium, have decided to extend the period of operation of existing reactors. In Japan, the Nuclear Regulation Authority of Japan (NRAJ), which "prioritizes safety above all other circumstances" and based on "the world's most stringent regulatory standards," has approved the restart of those reactors that it has approved. Any loosening of this system of restarting reactors through independent review would undermine the very foundations of nuclear energy policy.

## (2) Zero-emission thermal power still depends on imports from foreign countries

The "Sixth Strategic Energy Plan" approved by the Cabinet in October 2021 expressed high expectations for zero-emission thermal power plants such as CCS thermal power, ammonia thermal power, and hydrogen thermal power, as well as nuclear power. However, in addition to the technical difficulties and high cost of CCS itself, thermal power with CCS goes against energy security in that it will depend on imported fossil fuels.

Most of the ammonia and hydrogen are expected to be imported. Projects are underway to import lignite-derived hydrogen from Australia as blue hydrogen, for example, but even if it were zero-emission, it would not contribute to energy independence. It should be recognized that self-sufficiency can only be increased by generating green fuels domestically from renewable electricity.

In short, whether CCS is attached or converted to ammonia or hydrogen, new energy derived from fossil fuels has many challenges. What is needed for energy security is not only zero emissions, but also phasing-out fossil fuels. As long as Japan continues to rely on foreign countries, it cannot escape the risk of facing an energy crisis. As a non-fossil-fuel-producing country, Japan should aim for energy independence without relying on fossils.

## **March Blackouts and Supply-Demand Crunch not Caused by Decarbonization**

Following the earthquake off the coast of Fukushima Prefecture on March 16, 2022, more than 2 million homes were without power in the Tokyo metropolitan area and other areas, and on March 22, the first warning of a power supply-demand crunch was issued. To use these events as a sign of weakness in solar power generation or as a basis for arguing that nuclear power plants need to be restarted is to completely misunderstand the true nature of the situation.

First, the immediate cause of the March problem was the sudden shutdown of several thermal power plants located along the Pacific coast and elsewhere. 6.5 GW of thermal power plant was taken out of service by the Fukushima earthquake on March 16, which upset the supply-demand balance and automatically activated the protection devices (UFR), causing the power outages. We should have learned from the rolling blackouts in March 2011 and the Hokkaido blackout in 2018 that thermal and nuclear power plants, which deliver large amounts of power per facility, are less resilient against disasters, leading to a greater likelihood of outages in such instances.

As for March 22, there was no sudden shortage of supply. In addition to the 3.35 GW of power plants

that were kept shut down due to the earthquake, 1.34 GW of power plants were shut down after March 17 due to other factors, and many other thermal power plants were out of operation for routine inspections. The decision was made that the projected maximum demand (as of 5:40 p.m. on March 21) of 48.4 GW, coupled with the increase in demand due to the decrease in temperature, could not be met.<sup>3</sup> Although it should have been possible to predict the situation to some extent in advance, the response was delayed as the supply-demand crunch warning was issued at 8:00 p.m. It is not that there was an absolute shortage of power plants, nor that there was no fuel itself. Therefore, even if thermal and nuclear power plants are forcibly constructed and restarted, the same could happen again.

That solar power output diminishes under bad weather conditions is a well-known phenomenon, the problem lies more in the fact that Japan has been extremely slow to introduce wind power generation, which can generate electricity even on cloudy days. What has become clear is not the weakness of renewables, but the weakness of the national energy policy.

The blackout on March 22 was avoided because of the reduction of power demand by more than 5 GW due to the efforts of companies, local governments, and households that responded to the call for power conservation, and also because of the power supply from the surrounding area, i.e., wide-area operation. The reinforcement of the Hokkaido-Honshu interconnection line and the East-West Frequency Converter, as a lesson learned from the Fukushima Daiichi Nuclear accident, has been successful. Although some have pointed out that this was inadequate, it can be evaluated as an achievement of the government's power system reforms. In order to promote the shift away from fossil fuels, with a focus on renewable energies, wide-area operation and grid reinforcement are indispensable, and should be further promoted to ensure stable supply.

### **Japan's Path Ahead: Accelerate Fossil Fuel Phase-Out**

The government has announced its forecast for electricity supply and demand in the winter of FY2022 as "the most severe since FY2012". The biggest problem that needs to be pointed out in reviewing the 10-plus years since the Great East Japan Earthquake is the government's insistence on restarting nuclear power plants and its failure to make sufficient efforts to develop the necessary alternative power sources, especially renewable energy.

Over the past decade, Japan's share of renewables has increased by about 10 percentage points from 10.4% to 19.8%, while in the same period Germany's share increased by more than 20 percentage points from 21.2% to 44.5% and the UK's share increased by more than 30 percentage points from 10.4% to 43.7%. Germany and the UK have rapidly expanded power sources that contribute to both energy independence and decarbonization.

The path Japan should take is clear. Japan should move away from fossil fuels, focusing on renewables and energy efficiency, which will mitigate both the climate and energy crises. The current energy crisis has strongly demonstrated the necessity and rationale for such actions, and we must not make the mistake of going back to fossil fuels.

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<sup>3</sup> The maximum summer demand in TEPCO's service area in FY2021 was 56.7 GW (August 26, 2021) and the maximum winter demand was 53.8 GW (January 6, 2022) and a supply-demand crunch did not occur. This indicates that supply capacity to meet these demands exists.



A complete energy transition will take 20 to 30 years, but this transition becomes more difficult to realize as long as we are 80% dependent on fossil fuels for energy, as we are today. In the process of transition, maintaining a stable supply and giving certain consideration to those who will be negatively affected are both key factors. However, it would be a mistake to delay the transition away from fossil fuels any longer over doubts about these premises.

Fortunately, Japan is not as dependent on fossil fuel imports from Russia as some countries in Europe<sup>4</sup>. The Japanese government also announced a future ban on coal imports from Russia on April 8, in coordination with Western economic sanctions. A transition away from fossil fuels should be accelerated both for our energy transformation and for our further support for Ukraine.

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<sup>4</sup> 8.3% for natural gas, 4.8% for crude oil, and 9.9% for coal (weighted average of common and coking coal). Agency for Natural Resources and Energy, White Paper on Energy, 2021; Figures for FY 2019.