

Perspectives from Previous Sessions

February 27, 2018

1. The Situation and Approach

1-1. Situation

(1) Megatrends = Decarbonization, Digitalization & Decentralization

- ✧ Decarbonization: Major decarbonization, and transformation of the energy structure is an irreversible global trend (all members)
- ✧ Decentralization & digitalization:
 - “The global tide of decarbonization, decentralization, and digitalization” (Mr. Didier Holleaux, Engie)
 - “The macrotrends are energy transformation and digitalization” (Mr. Guy Outen, Shell)

(2) Major Common Elements = Uncertainty and Incompleteness

- ✧ Uncertainty: It is difficult to forecast desirable demand and supply in the future
 - 【Fossil fuels】
 - “High possibility of instability in the Middle East” (Dr. Paul Stevens)
 - “Reduced US participation in the Middle East may promote instability there” (Prof. Shiraishi, committee member)
 - “The situation in the Middle East regarding fossil fuels will become quite unstable” (Mr. Nakanishi, committee member)
 - “Conflict between the major energy powers such as America, China, and Russia has come up to the surface” (Dr. Funabashi, committee member)
 - 【Technological innovation】
 - “Energy systems will make gradual progress in the short term, but the long-term future to 2050 is uncertain, and a consensus forecast is difficult because of technological innovations” (Mr. Adam Siminski)
- ✧ Incompleteness: No single perfect energy source exists that satisfies S+3E
 - “The various decarbonization technologies are not substitutes for each other, but are complementary. It is necessary to aim to achieve the Paris Agreement targets with an

ambitious overall portfolio.” (Prof. Jim Skea)

- “It is impossible to achieve 80% reduction just by extending existing technology. Technological innovation is essential.” (Mr. Iijima, committee member)
- “Fossil fuels will be depleted at some time, but renewable energy is still incomplete, and use of nuclear power is unavoidable. It is necessary to find the seeds of revolutionary technological innovation.” (Mr. Sakane, committee member)

1-2. Approach

(1) All-out Effort for Ambitious Goals

- “China is launching a major national strategy, and it requires national strength” (Mr. Nakanishi, committee member)
- “In the short-term market principles will be central, but in the long term it won’t go well just based on the market. A national perspective and the role of policies will be extremely important.” (Prof. Gonokami, committee member)

(2) Diversity, Proactiveness, Growth, and Flexibility

✧ Diversity

【Diversification of technology】

- “There are a number of issues with narrowly defining EV as electric vehicles. Offering a wide range of electrified vehicle technologies including FCV, HV, and PHV in response to demands from customers and the public.” (Mr. Uchiyamada, Toyota)
- “Japan’s low self-sufficiency rate and high dependence on thermal power are a serious situation from the perspective of security. It is important to disperse energy sources and increase diversity.” (Mr. Adam Siminski)

【Diversification of players】

- “Energy transformation should not just be up to policy makers and companies, but the cooperation of various players such as NGOs and consumers is necessary.” (Mr. Guy Outen, Shell)
- “It is important to have a participation of various players in the energy discussion. It is also important to create regional energy system that is independent from geopolitics.” (Prof. Eda Hiro, committee member)

✧ Proactiveness

- “Based on the global trend of decarbonization, digitalization and decentralization, we are making investments in emerging technologies.” (Mr. Didier Holleaux, Engie)
- “Energy transformation from hydrocarbons to electricity will accelerate” (Dr. Paul Stevens)
- “Competition between various advanced technologies will lead selection of the suitable technologies.” (Prof. Jim Skea)
- “We will make investments in different fields to adapt to a wide range of scenarios.” (Mr. Guy Outen, Shell)

✧ Growth

- “The business environment in Japan is tough, but the global demand for energy is large” (Mr. Nakanishi, committee member)

✧ Flexibility

- “Rather than focusing on a single technology, it is important to promote "competition between technologies.” (Prof. Jim Skea)
- “The future is uncertain. Assuming several scenarios is more appropriate than trying to predict the future.” (Mr. Guy Outen, Shell)

2. Arguments

(1) Each Energy Source

① Fossil Fuels

- “High possibility that instability will increase in the Middle East” (Dr. Paul Stevens)
- “Possibility that reduced upstream investment will raise future oil prices” (Mr. Adam Siminski)
- “Reduced US participation in the Middle East may promote instability there” (Prof. Shiraishi, committee member)
- “The Middle East situation will become quite instable regarding fossil fuels” (Mr. Nakanishi, committee member)
- “Conflict between the major energy powers such as America, China, and Russia has come up to the surface” (Dr. Funabashi, committee member)

② Renewable Energy

- “FIT and unbundling accelerated the installation of renewable energy” (Dr. Felix Matthes)
- “The core of renewable energy will shift from hydropower to wind and solar power” (Mr. Adam Siminski)
- “When renewable energy is installed in large volume, clean and cheap flexibility in energy system will be required. In the future battery storage will also be one of options.” (Dr. Felix Matthes)
- “Problems arise in grid system with the introduction of renewable energy, but as there are serious delays in reinforcing transmission grid, it will take a long time to adapt.” (Dr. Felix Matthes)
- “The marginal cost of installing renewable energy has fallen greatly. Under the market pricing system, it is difficult to recover fixed costs in any investment” (Dr. Felix Matthes)

③ Nuclear Power

- “One of the ways to reduce CO₂. In order to achieve the ambitious Paris Agreement targets, nuclear should be recognized as one complementary part of an overall technology portfolio.” (Dr. Jim Skea)
- “The mix of renewable and nuclear power are important in 3E” (Ms. Marianne Laigneau, EDF)
- “The social acceptability of nuclear power is critical.” (Mr. Michael Shellenberger)

- “Electric power generation is not simply a cost-based commodity. Reliability, toughness, and the environment must be factored appropriately into price formation.” (Exelon Corporation)
- “Standardization of power generation facilities and SMR are options for improving the economics.” (Exelon Corporation)
- “Conservative design changes in the plants are required. Step-by-step changes are linked to improved safety and nuclear power cost reductions.” (Mr. Michael Shellenberger)

④ Thermal Power

- “The ratio of thermal power is growing globally. Considering CO₂, CCS response is necessary.” (Mr. Adam Siminski)
- “Natural gas is important as a backup of renewable energy, even as a replacement for coal and oil.” (Mr. Didier Holleaux, Engie)

(2) Others

✧ Hydrogen

- “Hydrogen is an important potential energy carrier.” (Mr. Guy Outen, Shell)
- “Hydrogen market is very promising. In the future, we expect the hydrogen market to spread, as a zero-emission gas.” (Mr. Didier Holleaux, Engie)
- “In addition to gas thermal power, battery storage, pumped storage, hydrogen would be an effective method to keep flexibility in grid system.” (Mr. Richard Bolt, Victoria, Australia)
- “Hydrogen emits zero CO₂ when it is burned. It can be made from diverse primary energy sources, and can also be function as an energy carrier. Japanese companies have advantages in technology.” (Mr. Uchiyamada, Toyota)

✧ Energy systems

- “We will pursue systematic use of smart grids and EV.” (Ms. Marianne Laigneau, EDF)
- “Optimizing the customer experience and business processes through digitalization is important.” (Mr. Didier Holleaux, Engie)

✧ Corporate strategies

- “Select and focus businesses by using capital from sales of non-core businesses to invest in strategic businesses.” (Orsted Company)
- “Improving corporate value by rising the operating efficiency of nuclear power plants of acquired companies is capital for growth.” (Exelon Corporation)
- “We will make investments in different fields to adapt to a wide range of scenarios.” (Mr. Guy Outen, Shell)