Special Bulletin

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Energy Transition and Future of Fossil Fuels (4)

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The 464th, 465th and 467th issues of "A Japanese Perspective on the International Energy Landscape" discussed energy transition and the future of fossil fuels from various viewpoints. This time, I would like to discuss the matter from the viewpoint of costs.

The first important point I would like to make is that if the current energy supply and demand structure's transition to a new one is accompanied by responses to externality, the transition will inevitably generate cost hikes and burdens. Externality responses are related to various areas including energy security and environmental problems such as climate change. A point common to these areas is that some policy intervention is indispensable as market forces alone cannot guarantee appropriate responses to these externalities.

Undoubtedly, one of the most important factors behind the ongoing energy transition is the thorough enhancement of climate change countermeasures. Particularly, the modality and possibility of energy transition to realize very ambitious climate change goals including "net zero" greenhouse gas emissions are attracting attention from energy policy and industry stakeholders. It is clear that more ambitious energy transition means greater changes from the current system and more costs.

The current global energy supply and demand structure has resulted from the effects of natural market choices and policies in the past. The structure features that fossil fuels including oil, coal and natural gas account for 85% of world primary energy supply, holding a dominantly important position. Why do fossil fuels have such high share? Because fossil fuels are dominantly competitive as energy. Oil, coal and natural gas have been selected in the market as very cost competitive, abundant and highly convenient sources of energy in each country and respective economic sector. If energy transition is to be implemented to achieve "net zero" GHG emissions, the world has no choice but to greatly expand non-fossil energy sources' share or promote fossil fuel decarbonization including CCS (carbon capture and storage) and CCUS (carbon capture, utilization and storage). Such energy transition may generate considerable costs that the world should shoulder.

Solutions to the cost problem would include technological development and the emergence and diffusion of innovative technologies that could dramatically cut energy transition costs. It is pointed out that technological development has substantially and rapidly reduced solar photovoltaics and wind power generation costs. As indicated by the IEEJ Outlook 2020 (published in October 2019), however, overall costs for electricity supply, including those for integrating intermittent renewable energy power generation into the grid, will increase as intermittent renewables' share of power generation expands. The potential of CO_2-free hydrogen utilization as an innovation is also attracting attention. In the case of blue hydrogen that would be produced from fossil fuels with CCS technology used, costs would be higher than for ordinary fossil fuel utilization because of additional measures and infrastructure. As a matter of course, it is possible and important for technological

development and existing infrastructure utilization to hold down cost hikes. However, some additional costs will be inevitable.

If cost hikes are assumed, energy transition may be seen from the viewpoint of relevant countries' and their consumers' ability and willingness to pay higher costs while holding down cost hikes as much as possible.

Reviewing the history of responses to externality and their costs, we can remember Japan's responses to oil crises in the 1970s as an interesting example. Japan then depended heavily on oil from the Middle East for primary energy supply and had no choice but to tackle unprecedented hardships and challenges in the face of the oil crises. Japan promoted energy conservation, alternative energy sources and oil stockpiling through national efforts. This was because Japan then met the conditions of ability and willingness to pay additional costs. Japan had the ability as the world's second largest economy. Regarding willingness, the government and private sectors shared a strong sense of crisis.

As indicated by the above Japanese case, the world will have to meet the two conditions of ability and willingness to pay if it is to implement strong energy transition to achieve ambitious climate change goals. In this respect, however, it must be noted that realities regarding the conditions widely differ by region or country. While European and some other countries accelerate their pursuit of aspirational goals, developing countries have no choice but to give priority to basic needs including economic and social development, poverty countermeasures and energy access. Realities regarding the two conditions are thus very different. From the viewpoint of how to meet the abovementioned basic needs, the effective and clean use of fossil fuels may be a key point.

Another key point regarding the ability and willingness to pay is that how much the realization of "net zero" GHG emissions would cost through the current energy transition has not necessarily been clarified. Although technological development is expected to cut costs, how much to pay for responding to the externality has not been specified for each country and consumers. How much to contribute exerts great influence on the ability and willingness to pay. As a matter of course, this is an important, serious problem for developing countries with lower income levels. Depending on situations, however, this may become an unignorable problem even in developed countries. As how much to contribute grows clearer, various political, social and economic challenges regarding the two conditions may emerge even in developed countries. This is because discontent and divide structurally exist, with wide income gaps becoming social and economic problems, even in developed countries with relatively higher income levels. Who should pay how much? This is a difficult question.

Energy transition costs exert great influence on each country's growth, industrial competitiveness, national livelihood and trade problems. We will have to check who will be affected by costs for global benefits and what reactions would come to such costs.

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