

Japan Drafts 7th Strategic Energy Plan

Ken Koyama, PhD
Chief Economist, Senior Managing Director
The Institute of Energy Economics, Japan

On December 17, the draft of the Seventh Strategic Energy Plan was announced at the 67th meeting of the Strategic Policy Committee of the Ministry of Economy, Trade and Industry Advisory Committee on Natural Resources and Energy. The Strategic Energy Plan, Japan's most important energy policy document, has been updated repeatedly since the formulation of the first one in 2003. The current Sixth Strategic Energy Plan was approved by the cabinet in October 2021. When the current plan was formulated, decarbonization was the most important challenge under the global trend of carbon neutrality that accelerated worldwide in 2020. Since then, however, the situation in Japan and the world has changed dramatically.

Russia's invasion of Ukraine in 2022 quickly destabilized the international energy market. Later, the situation in the Middle East became significantly unstable, contributing to a sudden increase in the importance of energy security. In Japan, two electricity supply crunches came in 2022, raising awareness of the importance of a stable electricity supply. Furthermore, decarbonization efforts and the progress of the new information revolution have led forecast electricity demand to post a long-term increase instead of an earlier predicted decrease, causing a paradigm shift in the outlook for electricity demand. While major countries have advocated high ideals for decarbonization and enhanced decarbonization initiatives including industrial policies for innovation, rising energy costs have directly impacted people's lives and economies, with relevant discontent and criticism affecting election results. As economic security has become more important amid the deepening division around the world, furthermore, the concentration of clean energy manufacturing capacity and critical minerals for renewable energy power generators, electric vehicles, storage batteries, and other products in China and a few other countries has emerged as a challenge or a matter of concern in energy policy.

As the world has thus changed dramatically over the three years since the formulation of the current Strategic Energy Plan, a new one is required to be formulated in response to the above changes. In fact, the draft Seventh Strategic Energy Plan is a 90-page policy document, with pages 11 to 14 recognizing changes in the situation since the formulation of the current plan. Based on the recognition, the draft calls for maintaining the four basic principles for the formulation of the Strategic Energy Plan, known as "S+3E's" (safety, energy security, economic efficiency, and environmental friendliness). In this regard, it is interesting that the draft reaffirms the government's pursuit of economic efficiency improvement and environmental friendliness while prioritizing energy security under the main premise of safety (page 15). The subsequent chapter on the policy direction towards 2040 puts forward four key points: (1) the government will give priority to ensuring decarbonized power sources in response to an electricity demand increase in the new situation and implement the Strategic Energy Plan and the GX2040 Vision integrally, (2) the government will pursue a balanced electricity generation mix that does not overly depend on specific energy sources while maximizing renewable energy as the mainstay electricity source, (3) the government will promote the energy transition and maximize the use of renewable energy and nuclear power, and (4) the government will limit an increase in costs for decarbonization to the maximum extent possible based on the S+3E's principles

(excerpted from the outline of the Strategic Energy Plan (Draft) for the Strategic Policy Committee). Based on the policy direction, the draft comprehensively discusses policies that Japan should take under major items such as energy efficiency improvement and transition to non-fossil energy on the demand side (from page 20), expansion of decarbonized electricity sources and grid development (from page 16), systems to secure and supply next-generation energy (from page 53), systems to secure and supply fossil resources (from page 58), CO₂ capture, utilization, and storage (from page 65), and securing critical minerals (from page 68).

In the following, instead of detailing these policies, I would like to present the key points of the FY2040 energy supply and demand outlook given as a reference for the future vision of energy that Japan aims to achieve through the implementation of these policies. This is because the outlook has been the most attention-attracting matter of interest regarding the Seventh Strategic Energy Plan in a sense. The outlook presented in conjunction with the draft Seventh Strategic Energy Plan features forecast ranges based on multiple scenarios, taking various uncertainties into account. Another important point is that the outlook, while projecting Japan's FY2040 final energy consumption at between about 260 million and 280 million kiloliters, focuses on a power generation mix.

The first important point of the outlook is that electricity generation is projected at between about 1.1 trillion and 1.2 trillion kilowatt-hours for FY2040, up 10-20% from 984.4 billion kWh for FY2023 in a preliminary report. While the current plan projects electricity generation (or electricity demand) to decrease from the current level to 934 billion kWh in FY2030, the outlook predicts electricity generation to increase in the future. The predicted increase in electricity generation is of great significance, as explained below. The projected electricity generation mix indicates that renewable energy including solar photovoltaics may increase its share of the mix to around 40-50% in FY2040, becoming the largest electricity source. Nuclear is projected to account for around 20% of the mix, becoming a major electricity source. Fossil fuels, the largest electricity source at present, are predicted to reduce their share to around 30-40% from about 70% at present. Japan's greenhouse gas emissions under the electricity generation mix in FY2040 are forecast to decline by 73% from FY2013. Its energy self-sufficiency rate is projected to rise to around 30-40% from 15% at present

After the announcement of the draft, the media highlighted the basic policy of making maximum use of nuclear power, which represented a major shift from the current policy of reducing dependence on nuclear power as much as possible. In this regard, I received a lot of interest in how to view the nuclear power share of about 20% in FY2040. However, I understand that what is more important than the share of 20% is nuclear power generation. The target for FY2030 under the current plan is to achieve a nuclear power share of 20-22%, which translates into 180 billion to 200 billion kWh in nuclear power generation. According to the outlook for the draft plan, however, nuclear power generation in FY2040 is projected at about 220 billion to 240 billion kWh, or 20% of total power generation, expanding substantially from the FY2030 target. The projected nuclear power generation level apparently indicates that Japan would have to make efficient use of the existing nuclear power plants and build new ones. This is in line with the policy goal of making maximum use of nuclear power. The expansion of total electricity generation is thus significant. This is a key point of the outlook for the draft.

In this sense, it must be noted that the renewable energy share of 40-50% should be linked to the expansion of the total power generation. The power generation expansion has a greater impact than the share, indicating that efforts to increase renewable energy power generation are more important. Another feature of the outlook for the draft is the absence of a breakdown of the fossil-fired power generation share, which is about 30-40%. How to interpret the absence is an interesting issue.

Given the 73% cut in GHG emissions, I suspect that fossil-fired power generation, even though accounting for 30-40% of total power generation, may have to be mostly decarbonized. As far as there is the hard-to-abate sector where decarbonization is difficult, the electricity sector may have to be close to zero emissions to achieve the 73% cut in overall GHG emissions. In this regard, the outlook apparently suggests that the use of hydrogen and ammonia as well as CCS (carbon capture and storage) technology will become extremely important for fossil-fired power generation.

Finally, I am strongly interested in the point that the outline of the draft includes a statement calling for assuming the liquefied natural gas volume required for a case in which nationally determined contributions would be difficult for Japan to achieve due to insufficient technological innovation. This is because I have pointed out that “Strategic Plan B” would be important in a case in which realities would deviate from the ideal state that Japan pursues. I would like to pay attention to how policies will be formulated and implemented to materialize the new Strategic Energy Plan including the LNG-related statement.

Contact: report@tky.iej.or.jp

The back issues are available at the following URL.

http://eneken.iej.or.jp/en/special_bulletin.html