



## Will there be progress in the switch to a low-carbon society?

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This is the fourth in a series of reports on Japan's energy policy.

A searing heat wave in Europe, along with a severe drought in India and heavy rainstorms in Kyushu. These highlight the worry over how severe the problems of climate change have become. It is not scientific to conclude that these abnormal weather phenomena are caused by greenhouse gases emitted by humans, but there's little doubt that climate change is an urgent problem that needs to be tackled.

Japan's greenhouse gas emissions reached about 1.294 billion metric tons in fiscal 2017. Following the Fukushima nuclear disaster in 2011, emissions grew rapidly in the subsequent two years as nuclear plants, which had accounted for about 30 percent of power generation, shut down one after another and their losses were offset by an increased reliance on thermal power plants. After hitting a peak of about 1.490 billion metric tons in 2013, the nation's greenhouse gas emissions have been steadily declining. But the power generation sector, which accounts for about 40 percent of Japan's total emissions, has not succeeded in reducing emissions.

Emissions from the power generation sector were about 55 million metric tons more in fiscal 2016 than in fiscal 2010. Nuclear plants, which have the advantage of emitting no carbon dioxide during power generation, have taken multiple years for safety reviews to be conducted based on new safety standards, and only nine reactors have restarted so far. Despite a steady increase in renewable energy, renewables including hydro power still account for only about 15 percent of the power mix. That should come as no surprise as reliance on thermal power generation still accounts for about 80 percent.

The key to reducing Japan's greenhouse gas emissions is the decarbonization of power

sources. That would require lowering the ratio of thermal power generation as renewable energy is sustainably disseminated and as nuclear plants that have passed new safety standards are steadily restarted.

There is also a call for the decarbonization of thermal power. There are three kinds of fuel feedstock in thermal power: oil, coal and natural gas. Coal emits the most carbon dioxide, roughly double that of natural gas. From the standpoint of carbon dioxide reduction, it is imperative to abolish coal and switch to natural gas, but natural gas is more expensive than coal and more dependent on the Middle East, as opposed to coal, which is more evenly distributed throughout the world and requires less attention in terms of energy security.

But it is mainly natural gas-fired power plants that have played a major role as a replacement for nuclear plants that shut down following the Fukushima disaster. Coal has increased its share of the power mix by only 4.1 percentage points to 29.1 percent in 2017 from 2010, but natural gas has raised its ratio by 9 points to 38.3 percent during that time period. Globally, the ratio of coal-fired power accounted for 38.4 percent of the power mix on average in 2016, compared with 42.5 percent in Germany and 31.5 percent in the United States.

The government aims to reduce the average emissions of all power sources to 0.37 kg per 1 kilowatt-hour of power generation by 2030, but achieving that will not be easy.

There are several reasons for that. Japan has fully liberalized the power market, but that brings about cuts on new investment toward large-scale power generation facilities. Under the Rational Use of Energy Law, the government sets efficiency standards that have to be cleared when building new facilities, but active new investments with an eye toward pursuing high efficiency are hardly to be expected. That is because power demand growth could stagnate and the diffusion of renewable power would lower the utilization rates of backup thermal power plants, making it more difficult for power utilities to project business prospects. In addition, we're beginning to see a trend that financial institutions and investment firms are thinking twice about extending investments or loans to not only coal but also natural gas-fired power projects.

It is hoped that Japan's highly efficient thermal power technology will contribute to global decarbonization. For a long time, Japan's coal-fired power generation has been considered the world's best in efficiency with relatively low carbon dioxide emissions.

In recent years, the technology of Chinese firms has been improving rapidly, but considering the advantages of Japanese technology as a whole — such as stable operation for an extended period of time and environmental standards that regulate nitrogen oxides and sulfur oxides in addition to carbon dioxide, Japan’s coal-fired power technology can still make a great contribution to the conservation of the global environment. Furthermore, the government has been taking part in developing Integrated Gasification Combined Cycle (IGCC) coal technology through a national project for many years.

Coal-fired power plants are currently considered “the enemy of climate change countermeasures” and it has become practically impossible to procure funds for building new coal plants in developed countries, but demand for coal will continue to be high in developing countries. According to the projection of the International Energy Agency, coal will continue to account for the biggest share in the global power mix for the foreseeable future. Even though coal’s share is set to decline to 26 percent in 2040 from 38 percent in 2017, it would still eclipse natural gas as the biggest share in the power mix. If coal consumption is required for the foreseeable future from the standpoint of cost and energy security, we need to use it as efficiently as possible.

The Organisation for Economic Co-operation and Development’s rules discourage the financing of inefficient coal-fired plants, but an increasing share of the finance sector has practically ended the support of coal plants regardless of efficiency. But denying current technology without securing an alternative that is not prohibitive in terms of cost would lead to the abuse of loopholes. About 60 percent of green bonds issued in abundance in China are said to be used to finance export projects of coal-fired power plants, and unless common global rules are created, effective decarbonization won’t be possible.

Though decarbonization of thermal power generation is a big factor in reducing carbon dioxide emissions, what is required now is not idealism but the creation of globally fair rules and a steady effort toward technology development.