Japan has embarked on a new experiment in its energy system, encompassing changes to the mix of fuels used domestically and the corporate organization of energy production. Sunk costs mean changing energy systems takes decades, yet the incremental changes being implemented today promise to have a radical effect on the ways Japanese industry and citizens use energy.

Before the Disaster

Oil continues to make up the largest share of Japan’s primary energy supply because of the lack of substitutes for gasoline and diesel available at competitive prices. In electricity, on the other hand, for six decades energy planning has operated under the assumption that nuclear power, in conjunction with efforts to reduce the energy intensity of economic activity, provides the safest, most secure, and most cost-effective way of powering the economy. The benefits of nuclear power are contrasted with coal (too dirty), oil (too expensive, insecure, and dirty), natural gas (too expensive), and renewables (too expensive and insecure).

Government activism in the energy sector was accelerated by the rise of climate change as an important part of national policy. As I show elsewhere, it is no surprise that the institutional and financial resources supporting Japan’s industrial policy were redeployed towards the energy sector, even as the government began to withdraw from actively shaping other economic markets.¹

The bulk of government revenues were deployed in support of nuclear power. Vast sums were spent to support the development of a domestic nuclear industry, and to promote the acceptance of nuclear power among local communities. This system of nuclear promotion, referred to as the “nuclear village” by detractors, was underpinned by a series of regional electricity monopolies which continue to dominate markets in their service areas despite limited deregulation a decade ago.

The most coherent statement of policy prior to the March 11 disaster is the June 2010 Strategic Energy Plan (SEP) produced within the Ministry of Economy, Trade, and Industry. It established a series of targets focused on expanding the role of nuclear power in electricity generation by building 14 new nuclear units by 2030, increasing the use of renewable energy, and subsidizing the deployment of low carbon technologies through the commercial, residential, and transport sectors.

It was estimated that this would lead to a substantial reduction in aggregate energy demand, as well as a shift away from the consumption of coal, oil, and natural gas to a lesser degree, in favor of nuclear power and renewable energy. Nuclear power represented the largest increase in projected energy supply by far, rising from 10 percent to 24 percent of total primary energy supply and 50 percent of electricity generated. This was

estimated to require a total investment of 5.6 trillion yen.

**Three Challenges to the Status Quo**

It is safe to say that the 2010 SEP is a snapshot of a future world that will now never come about. Instead, the focus on how to promote nuclear power as the optimal supply-side to Japan’s environmental, energy security, and efficiency challenges has been replaced with a series of questions. What should be the mix of electricity supply that will make up for the shortfall in the expected increase in nuclear power? How much of this shortfall can be made up through more aggressive demand management? And who will have a voice in deciding the answers to these questions?

It remains to be seen how these questions will be answered. Nevertheless, clarity is emerging in three key areas. First, despite differences in rhetoric, there is a surprising degree of continuity in the approaches taken by the Liberal Democratic Party (LDP) and the former government (the Democratic Party of Japan, or DPJ) towards the energy mix. DPJ officials adopted strong language against the nuclear industry and initially proposed aggressive targets for banishing nuclear power from Japan’s electricity generation. Final legislation showed they were willing to accept a longer-term role for nuclear power; however, ordinances allowed the operating life of nuclear units to be extended by up to 20 years if approved by the safety regulator.

The DPJ also extended generous returns for investments in renewable sources of energy beyond the solar sector that was the traditional focus of public investment through a Feed-In-Tariff (FIT) scheme. This has led to a boom in investment in renewable generation. It has also been retained by the LDP, although the government is considering reducing benefits for the solar portion of the FIT.

Second, the LDP has decided to move ahead with a deeper restructuring of Japan’s system of regional electricity monopolies. Discussion over further deregulating and liberalizing Japan’s electricity sector began under the DPJ, and there was some conjecture that the LDP would not follow through with this given the historically close relationship between it and industry. But last month the Cabinet approved a plan to fully liberalize the electricity retail market, free electricity rates, and, most importantly, force structural separation of the transmission and distribution segments of electricity supply from generation.

This goes substantially further than the changes implemented between 2000 and 2005 that led to some falls in electricity prices but did not reduce the monopoly status of the regional electricity monopolies. The hope is that it will also enable greater uptake of renewable energies onto the grid and that competition will also help limit electricity price increases caused by the rise in fuel costs, although the evidence from international experience is mixed. However, it also has implications for how Japan would go about expanding nuclear power once again, should sentiment towards it change in the future.

Third, the establishment of a Nuclear Regulation Agency (NRA), which is charged with ensuring the safety of the nuclear industry, is fundamentally changing energy policymaking. Japan has historically not placed great emphasis on independent regulatory agencies. This began to change with the creation of the Financial Supervisory Agency (FSA) in 1998, following an outcry with the Ministry of Finance’s performance in regulating the banks. The NRA is a second experiment with using an independent authority to regulate industry. It is housed within the Ministry of Environment which did not have a role promoting Japan’s nuclear energy program or in regulating nuclear power plant safety. The new agency has already inserted itself into the process of determining the restarting of Japan’s nuclear units by choosing to draft new safety standards covering a range of new areas. How long operators will need to meet these new standards remains an open question with substantial commercial implications.

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Japan’s Radical Incrementalism

Taken together these changes represent a radical incrementalism that over time promises to alter Japan’s energy mix substantially. Large investments have already been made in natural gas turbines as well as solar, wind, and other energy sources that will become part of the energy landscape. The long-term fate of nuclear power in the energy mix is likely to be influenced by the decision to restructure the industry. And in addition to the increase interest of local communities, the range of decisionmakers involved in planning for Japan’s energy mix has broadened, shifting away from the quiet politics that characterized energy policymaking prior to the disaster towards a noisier version.

The precise mix of fuels and demand-side changes that will account for the reduction of nuclear power remains unclear. It is also unclear how the public policy goals of environmental stewardship, security, and cost management will be pursued in this new environment. Japan’s CO₂ emissions have risen as fast as its fuel import bill, for example, as fossil fuels have replaced nuclear power in the provision of baseload power, an effect worsened as the yen falls. But what is certain is that new investment patterns and regulatory complexity are already ensuring that nuclear power is set to play a reduced role in Japan’s energy supply picture moving forward.

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