

JAPAN

Post-Fukushima concerns still hinder Japan's nuclear plans



Japanese policymakers are keen to make nuclear power part of the country's decarbonisation strategy – but the public and the industry aren't so sure, writes Rob Gilhooly in Tokyo.

The Japanese nuclear sector may have the backing of its government, but a combination of technical challenges and public disapproval is impeding plans to restore the country's nuclear capacity to its pre-Fukushima peak.

During a news conference on 1 January, Hiroaki Nakanishi, Chairman of the Japan Business Federation, was pessimistic about the industry's future. With only nine of the country's reactors operating – out of the 54 online before a magnitude-9 earthquake and a tsunami crippled the plant at Fukushima in March 2011 – the commercial performance of plant operators and manufacturers has inevitably been restricted, he said.

'If clients can't make profits, it's difficult for vendors, too,' explained Nakanishi, who is also chairman of Hitachi, one of Japan's main nuclear technology suppliers.

Decarbonising Japan

What has kept hope alive has been the attitude of the Japanese government. A new energy policy released last July has retained a target of making nuclear power account for 20% to 22% of the country's energy mix by 2030. These figures are up from the 1.7% it currently holds and moving towards the 30% share it held before the earthquake.

Under the plan, this level of nuclear generation would also be

linked with an increased share of power generation from renewables, which will rise to 22%–24% by 2030. The country is aiming to generate 44% of its electricity from non-fossil sources by this time in the hopes of reducing its carbon dioxide (CO₂) emissions by 26%.

'Despite the difficulties, the entire industry is working toward ensuring that [the 2030] goal is realised,' said a spokesperson for the Japan Atomic Industrial Forum (JAIF), whose members include the electric power companies that operate nuclear plants.

While increasing the share of renewables is regarded as desirable, he argued, continuing operational 'flaws' in renewable technology (such as unreliability of supply) only underline nuclear's importance as a baseload energy source.

This is especially true in light of Japan's increased reliance on coal-burning plants since 2011, with their share of power generation increasing from 25% in 2010 to 32% in 2016. Beyond that, the Japanese government has a target of reducing greenhouse gas emissions by 80% by 2050, added the JAIF spokesperson, with next-generation nuclear reactors key to achieving that target.

Nakanishi, however, is concerned about the sustainability of this policy given widespread public opposition to nuclear power in Japan. Despite the post-Fukushima safety checks and costly construction of improved sea defences, one 2018 survey, undertaken by the Japan Association for Public Opinion Research, found that more than 80% of respondents were concerned about the risk of a severe accident at a nuclear plant.

In addition, 75% called for the phasing out nuclear energy or the immediate scrapping of all nuclear plants. This means the future of

nuclear in Japan should be opened up to popular debate, argued Nakanishi: 'To force nuclear power on a public that's opposed to it is undemocratic,' he said.

Restarting reactors

Eight years on from an accident that measured level 7 on the seven-point International Nuclear and Radiological Event Scale, the government of Prime Minister Shinzo Abe and the country's power industry continue to push for more restarts of mothballed reactors. Many of those are undergoing rigorous safety checks enforced by Japan's Nuclear Regulation Authority (NRA) to make them more disaster-proof – retrofits that utilities have estimated could cost almost \$2bn per reactor.

Those and other prohibitive costs – not to mention losses from reactor inactivity and Japan's continuing lack of back-end provisions, including a reprocessing facility and waste disposal sites – have prompted utilities to close 18 reactors over the past eight years.

Among them are the six at the Fukushima No 1 plant, which experienced multiple meltdowns in 2011 and is currently facing a minimum 40-year decommissioning. The cost of this process has been estimated at \$72bn by Japan's Ministry of Economy, Trade and Industry. However, the Japan Centre for Economic Research believes the cost of decommissioning the reactors alone will be closer to \$100bn, while total clean-up costs could reach \$633bn.

Plant operator Tokyo Electric Power Co (TEPCO) announced last June that it is also contemplating the decommissioning of four reactors at its second Fukushima plant. While two plants are under construction – J-Power's controversial Ohma plant in Aomori

Some 4,000 people take part in a demonstration against nuclear power in Tokyo

Photo: Robert Gilhooly

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**Robert Geller,
University of Tokyo**

prefecture and Chugoku Electric Power Co's Shimane-3 in Shimane prefecture – there are no planned new-builds in the pipeline.

As a result, there are serious doubts about the government's nuclear expansion plan. In December 2018, Akio Takahashi, the JAIF President, estimated that Japan would need 30 reactors online just to hit the 2030 target. No additional restarts are expected this year, and it remains unclear how many more reactors will restart in the coming decade. The start-up dates for the two plants currently under construction have yet to be decided.

'[Nakanishi's view] seems sensible based on current reality,' said Robert Geller, a University of Tokyo Emeritus Professor of Seismology and commentator on nuclear issues. 'I think nuclear will gradually become less and less important to the energy mix because it's obviously not paying for itself, not to mention the lack of new orders for nuclear plants. That, combined with the advances in cost reduction of solar energy, more efficient energy use, and so on, means you have lower demand.'

Moreover, the nuclear industry itself seems pessimistic. In a recent survey conducted by JAIF, just 1% of the 365 nuclear energy and technology companies surveyed expressed a positive business sentiment during the 2018 fiscal year. Only 10% of respondents said they thought the government's 2030 goal was realisable. Half of those who considered the government's expansion goal unrealistic cited a lack of plans to build new, or replace old, nuclear reactors.

Oddly, environmental group Greenpeace believes that Japan's nuclear sector does have a future, even if it opposes the technology. Shaun Burnie, a nuclear expert with Greenpeace, says he expects nuclear to continue in Japan, but in a significantly reduced capacity. 'I think there's an increasing possibility of a major revision of the basic energy plan in 2021, and nuclear's portion of the mix will be downgraded, but not eliminated, perhaps to 10–12%,' he predicted.

In the longer term, much will depend on the ability of TEPCO to

get the Kashiwazaki-Kariwa plant – the world's largest by net capacity – back online. In its absence, Burnie said, TEPCO could be pushed toward renewables. 'Without the Kashiwazaki plant, TEPCO could be out of nuclear,' he explained. 'If the industry lost one of its major players, that would be a real game-changer.'

Overseas expansion

Indeed, Japan's reactor manufacturers are increasingly looking overseas for clients – though with mixed results. In January, Hitachi put a freeze on its \$27bn nuclear project in Wylfa, Anglesey, Wales, due to escalating costs, leaving the door open for Russian and Chinese state-owned developers. It has also halted work on developing nuclear power generation at the Oldbury-on-Severn site in Gloucestershire, south-west England.

In December 2018, reports surfaced that the Japanese government and Mitsubishi Heavy Industries (MHI) were considering pulling out of a planned 4,500 MW public-private nuclear plant in Sinop, northern Turkey amid surging costs and profitability concerns. This follows major investor Itochu – a Japanese trading house that is also a major player in Japan's uranium importing business – quitting the project last April.

MHI President Shunichi Miyanaga subsequently announced the Turkish government was 'in the midst of evaluating the project,' and the company would make its decision on future involvement after that review was completed.

These difficulties come after the Vietnamese government blocked a 2016 plan by a consortium of 13 Japanese companies – including TEPCO and Hitachi – to build a similarly-sized plant in Ninh Thuan Province. Rising costs and safety concerns were once again cited in this decision.

One year later, Hitachi announced it was closing its offices in Lithuania half a decade after a referendum in the Baltic state failed to drum up enough support for the Visaginas nuclear plant. Hitachi had been selected as strategic investor for the project, with Hitachi-GE Nuclear Energy contracted to undertake engineering, procurement and construction work. Although this project has yet to be officially terminated, it is looking increasingly likely to be scrapped, with Hitachi's estimated \$4bn cost being a major obstacle.

Yet, abroad, as at home, Japan's government seems far from discouraged by these setbacks. In a

recent interview, Japan's Economy, Trade and Industry Minister, Hiroshige Seko, said that, thanks to lessons learned from Fukushima, Japan was well placed to 'contribute globally through technical know-how related to safety at nuclear power plants'.

Exporting expertise

The government, for instance, has negotiated a Japan-India civil nuclear cooperation agreement, paving the way for Japan to export nuclear plant technology. But there have been mixed results: Toshiba looked set to be a major beneficiary when Westinghouse – then owned by Toshiba – held talks in 2017 to supply technology for a six-reactor plant in Andhra Pradesh. But Westinghouse's subsequent bankruptcy led Toshiba to sell the US nuclear outfit in early 2018.

Toshiba also signed memoranda of understanding last July with Ukrainian energy outfits Energoatom and Turboatom to cooperate in the modernisation of the turbine island equipment of Ukrainian nuclear plants. But again there are question marks over such work, given that Toshiba wound up its UK-based NuGeneration subsidiary in November, when it also scrapped its plans to build a new plant in Cumbria, northern England.

Foreign competitors are unlikely to boost Japan's nuclear sector to any significant degree as they continue to struggle to gain a footing in the country, despite the existence of agreements such as the 2006 Japan-EU agreement on nuclear energy cooperation, an agreement that also recognised the 'principal of free movement' of nuclear material.

However, given Japan's lack of reprocessing and storage facilities, some overseas companies have secured contracts, such as the UK's International Nuclear Services – a wholly owned subsidiary of the UK government's Nuclear Decommissioning Authority, providing fuel transportation, storage and recycling, usually in cooperation with a Japanese partner.

Whether Japan's nuclear output ever can ever come to match its renewed ambition remains to be seen. Optimism by the country's policymakers ultimately marks a strong contrast with the pessimism of the nuclear industry itself. There's little doubt that Japan is still living in the shadow of the Fukushima disaster – but it still isn't certain of how to move forward with nuclear energy. ●

Staff lay cables at the Minamisoma Agri-Solar Park in Fukushima in 2013. Over 2,000 panels provide power to two domes, inside which farmers affected by the 2011 tsunami and nuclear accident grow produce.

Photo: Robert Gilhooly

