

AFTER FUKUSHIMA: THE NUCLEAR QUESTION

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On the 16th December 2012, the victory of the Liberal Democratic Party (LDP, Conservatives) in Japan re-launched speculation on the future of nuclear energy in the country. On the 14th September, the previous government (Japan's Democratic Party, centre-left) had unveiled a plan to end the Japan's reliance on nuclear power within the next thirty years,¹ in the wake of the Fukushima disaster. There is, however, uncertainty regarding this decision as the LDP has campaigned on the impossibility of a nuclear phase-out in the medium term.

To date, only two out of fifty reactors in Japan have been restarted since the Fukushima accident. The new government has pleaded for a security review of all installations over the next three years. This review is set to lead to a revival of a significant portion of the nuclear reactors in Japan, though it is still too early to determine what the exact position of the LDP will be in the longer term. It seems highly unlikely that the decision to pursue a nuclear phase-out will remain. However, the new government needs to take into account the new expectations of a population which has been strongly affected by the catastrophe.

What can be drawn from Fukushima in the nuclear energy debate?

As a consequence of the earthquake and tsunami that took place in March 2011, the Fukushima accident has been a contributor to the re-launch of the debate surrounding nuclear energy. Beyond the emotional impact linked to the disaster, there are numerous factors to be highlighted.

At first sight, the scale of the disaster may seem relatively small. The authorities say that not one single death has so far been linked to the nuclear disaster itself.² **To determine the full extent of the long-term health consequences will require significant continued efforts.**³ In light of this challenge, the government launched an ambitious project to gather information from the Japanese population with a goal of identifying the 'medium to long-term' consequences of this accident, particularly as regards the development of cancer. The inquiries will involve tens of thousands of people over a period of 30 years.

To the above must be added the evacuation of around 80,000 people covering an area of 900 km² around the nuclear power station⁴ due to radioactive contamination.

- 30% of this area is progressively being repopulated following decontamination efforts and infrastructure rehabilitation.
- 50% of this zone will require many years of rehabilitation work to be carried out.
- The remaining 20% will be left inhabitable for the foreseeable future.

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It is difficult to estimate the compensation the victims of the disaster will receive, though it is said to be billions, even tens of billions of euros.

Adding to this compensation are numerous costs, such as those linked to:

- the several decades of work needed to dismantle the power station
- the capital loss of a non-operational power station
- updating the safety measures across the whole site, etc.

Tepco, the power station's operator, has subsequently been taken into state ownership to avoid bankruptcy.

(1) The previous government had announced that it would take into account recommendations from the 'Innovative Strategy for Energy and the Environment' report (http://www.npu.go.jp/en/policy/policy06/pdf/20121004/121004_en2.pdf) which mentions in particular a nuclear phase-out before 2030, but has not made this date official. The Minister of Economy and Industry, Yukio Edana clearly stated that this objective will not be achieved. • (2) The six

deaths since the accident were due to the earthquake/tsunami or personal health issues. • (3) The debate is still ongoing regarding the death toll of the Chernobyl disaster in 1986. The WHO outlines the health consequences as 56 deaths and 4,000 thyroid cancer cases, in which more than 99% of those affected are still alive. Other studies led by NGOs suggest several hundred thousand deaths. • (4) The surface area equivalent to the entire city of London.

Beyond this assessment, we now know that the authorities had envisaged scenarios in which the consequences were much worse. If major radioactive emissions had reached Tokyo and its 35 million inhabitants, the consequences would have been devastating.

Such a scenario was only narrowly averted:

- It could have become a reality if water in the fuel ponds had completely evaporated (leaving fuel rods exposed to the open air), which would have happened had the members of staff been evacuated as initially planned by the power station's operator, leaving the ponds without cooling systems.
- If, for one reason or another, the employees had not been able to put water back into the ponds to ensure this cooling, it would have been a different story.

Serious consequences for the energy mix

The government's choices relating to nuclear energy will have serious consequences for the future of the country in terms of its energy use.

The evolution of Japan's energy mix since the disaster gives an insight into the challenges ahead.

Before the accident, Japan's electricity supply was mainly provided by:

- Gas (27%)
- Nuclear (27%)
- Coal (27%)
- Oil (9%)
- Hydroelectricity (7%)
- Other renewable energies (3%).

Japan has had to face a major challenge in providing the country with electricity as only two of the original fifty reactors have been restarted since the accident.

The previous government initially urged businesses and consumers to reduce their electricity consumption. However, this proved unsuccessful in that the decrease in consumption equated to a mere 5%, compared to an initial target of 15%.

As a result, in the absence of nuclear electricity, **Japan had to turn to fossil fuels in order to meet demand.** In the first quarter of 2012, fossil energy's contribution to the total electricity mix rose to 73%, which led to an increase of 21% of gas imports, almost 10% of coal imports and 5% of oil imports.

If this massive dependency on fossil energies is to be progressively reduced with the restarting of nuclear power stations, this first experience illustrates just how difficult it is to eliminate nuclear energy without resorting to an increased dependency on fossil fuels.

The previous government had, along with a nuclear phase-out, proposed a new strategy that focused on energy efficiency and the development of renewable energies.

The strategy notably included the strong development of solar energy. Hydraulic and wind energy have limited potential in Japan. Hydroelectricity (~7% of the current mix) already uses the core exploitable sites and Japan's dense population is holding back significant development opportunities for on-shore

wind power. The depth of Japanese coastal waters also makes off-shore wind projects very difficult.

The success of the LDP in the elections has brought these objectives into question. If the new government is likely to be willing to develop energy efficiency and renewable energy, the level of ambition will be considerably less if nuclear is to remain an important part of the energy mix.

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A worldwide energy debate rekindled

What happened in Fukushima has been a harsh reminder, not only to Japan, but to the rest of the world, that zero risk simply does not exist and disasters much worse than Chernobyl can happen.

The debate is far from over. **Most of the energies that we use pose significant risks to humans.**

- **Coal** is responsible for thousands of deaths each year in the mining industry and leads to respiratory problems for people in the surrounding areas.
- **Construction of major hydroelectric dams** involves large-scale population displacements and has major impacts on biodiversity, etc.

As Fukushima has shown, nuclear energy creates specific security risks. It does remain, however, amongst the cheapest for producing electricity and has the advantage of zero greenhouse gas emissions.

Fukushima led to a change of course in terms of the energy mix for countries such as Germany, Switzerland and Japan. Nevertheless, numerous states such as the United States, France, Russia and China would like to keep using this technology, stating that **the Fukushima disaster will result in the strengthening of safety measures in power stations, and even justifies further investment into new reactor generations, without, however, calling into question the entire industry. The debate therefore remains open.**

‘**Most energies we use involve significant health risks to humans. There is no such thing as 'zero risk'.**

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