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Hubris Punished: Japan as Nuclear State 驕れる者は久しからず――核国家としての日本

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Introduction

The following paper, which draws on and updates a 2007 Japan Focus article, was written for Le Monde Diplomatique, where it was posted online in French early in April 2011.[1]

This article offers a general overview of the nuclear era that began in Japan less than a decade after the destruction of Hiroshima and Nagasaki and may well have been brought to its close by the events at Fukushima six and a half decades later. The Hirohito imperial broadcast of 15 August 1945 announcing the Japanese surrender and calling on the Japanese people to unite to "endure the unendurable" is now matched by the Akihito imperial television address of 16 March, calling on people to unite in the face of catastrophe and help each other through the crisis. Two days after the Akihito address, the government announced that the "Great East Japan Earthquake" disaster was to be elevated from level 4 to level 5, on a par with Three Mile Island, and three weeks later, on 12 April, it raised it again, to level 7, the maximum on the international scale for nuclear incidents, alongside Chernobyl.[2]

Does the first imperial address on television match the first on radio in signifying radical change? Those at the centre of the Japanese state, on both occasions facing deep crises, seem to have deployed the emperor to similar ends: to soothe public fear and desperation, deflect anger from the pursuit of those responsible into a national sentiment of unity, and confirm the emperor's own place as healer, restorer, and axis for change.

1945

2011

The Akihito address used form and content that subconsciously linked the two occasions in listeners' minds. Through it, the Japanese state implicitly called on the people to appreciate that, beyond the disaster unfolding in northeastern Japan the country itself faces a shift in direction comparable to that of 1945. Then, Hirohito's role was to shift Japan from militarism and war to the acceptance of defeat and drastic change; now, Akihito's address may be construed as a concession that the nuclear path chosen by post-war Japan, like the militarist path of his father's generation, has ended in catastrophe.

Successive generations of Japan's bureaucratic, political, corporate, and media elite have insisted that Japan pursue the nuclear power path at all costs. In retrospect, they drove the country forward, as the elite of the Kwantung Army drove it in the pre-war era, towards disaster, ignoring, coopting, or crushing all opposition.[3] Only now, facing the costs—human, environmental and economic—the long-postponed debate opens.

The problem is not just the cluster of reactors in and around Fukushima, but the nuclear system, and the mentality that underpins it; Fukushima is far from being exceptional. Seismologists have long said that the fault lines on which the Hamaoka cluster of reactors at Omaezaki in Shizuoka prefecture rest are unstable and at least as prone to disaster. The Hamaoka design contemplated a maximum earthquake of 8.5, which means it could no more be expected to cope with one of 5.6 times greater force (480 M tons of TNT) than was Fukushima. Seismologist Ishibashi Katsuhiko notes that the impact of such an event would be huge: "the US military will also be affected – a disaster at Hamaoka will mean bases in Yokosuka, Yokota, Zama and Atsugi will all be of no use."[4] A Fukushima-type collapse would force the evacuation of 30 million people, signalling the collapse of Japan as we now know it.

Even though no existing reactor has been designed to withstand a level 9 earthquake or its likely accompanying tsunami and therefore all *should* be closed, it would be unrealistic to demand that. However, to stabilize not just Fukushima, but Japan itself, the disastrous and irresponsible decisions taken by governments over the past half-century to pursue nuclear energy as a sacrosanct national project, have to be reversed. The immediate priority must attach to close the Fukushima and Hamaoka (and other extreme high-risk sites including Kashiwazaki-Kariwa in Niigata prefecture, the world's largest nuclear generation complex);[5] to secure, stabilize, and remediate the Fukushima sites, resettling and compensation the refugee population and rebuilding shattered infrastructure; to cancel all planned and under construction reactor works (including Hamaoka Number 6 and Kaminoseki in Yamaguchi prefecture); to suspend all existing and experimental projects for uranium enrichment, plutonium accumulation, use, and fast-breeding; to stop the planned export of nuclear plants to countries such as Vietnam (personally promoted by Prime Minister Kan as late as October 2010); and to adjust public and private investment priorities to a completely different vision of energy production and consumption.

What is called for, in short, is the reversal of a half century of core national policies and the switch to a renewable energy system beyond carbon and uranium.[6] Such a strategic decision, turning the present disaster into the opportunity to confront the key challenge of contemporary civilization, amounts to a revolutionary agenda, one only possible under the pressure of a mobilized and determined national citizenry. At this crucial juncture, how Japan goes, the world is likely follow. The challenge is fundamentally political: can Japan's civil society accomplish the sovereignty guaranteed it under the constitution and wrest control over the levers of state from the irresponsible bureaucratic and political forces that have driven it into the present crisis?

On such a trajectory, instead of a subordinate and secondary role in the current (now stalled) global "nuclear renaissance," and the continuing feeble presence on the world political and diplomatic stage as a US "client state," Japan could become a world leader. It is the sort of challenge to which Japan's best and brightest might rise, and around which its people might unite.

March 2011 is set to mark a caesura in Japanese history comparable to August 1945: the end of a particular model of state, economy and society, both marked by nuclear catastrophes that shook the world (even if the present one seems likely to be slightly muted and the meltdown kept to partial, the regional consequences may be broader, the number of people disastrously affected greater). Where the mushroom clouds over Hiroshima and Nagasaki signalled the end-point of the path chosen by the young officers of the Kwantung Army in the 1930s, the chaos and apocalyptic apprehension of post-quake and tsunami Fukushima in 2011 is the end-point of the path chosen by senior state bureaucrats and their corporate and political collaborators in the 1950s and steadily, incrementally, reinforced ever since then. Their legacy is today's nuclear state Japan. 1945 was a purely human-caused disaster. 2011 differs in that it was occasioned by natural disaster, but human factors hugely exacerbated it.

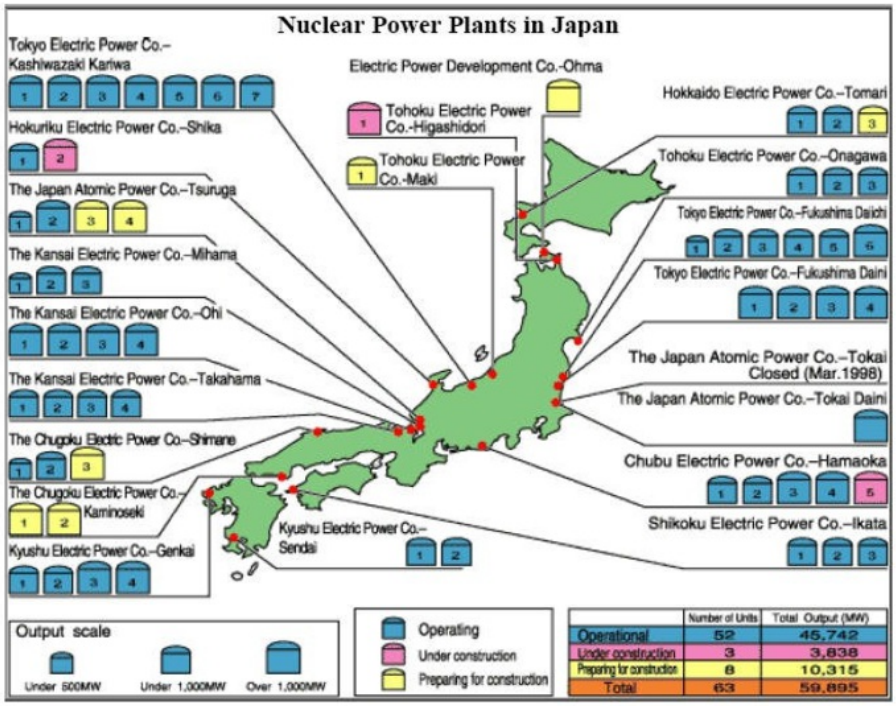
Japan's "Hiroshima syndrome" of fear and loathing for all things nuclear meant that cooperation with US nuclear war-fighting strategy had to be kept secret, in *mitsuyaku* or "secret treaties," especially in the 1960s and 1970s that have only become public in the past two years. The nuclear energy commitment, also pressed by the US, had likewise to be concealed, never submitted to electoral scrutiny, and continually subject of manipulation (extensive advertising campaigns), cover-up (especially of successive incidents), and deception (as to risk and safety levels). The extent of that too is now laid bare.

The way forward out of the current disaster remains unclear. The debate over Japan's energy and technology future will be long and hard, but what is now clear is that Japanese democracy has to rethink the frame within which this elite was able to overrun all opposition and push the country to its present brink. The crisis is not just one of radiation, failed energy supply, possible meltdown, the death of tens of thousands, health and environmental hazard, but of governability, of democracy. Civic democracy has to find a way to seize control over the great irresponsible centres of fused state-capital monopoly and open a new path towards sustainability and responsibility. A new mode of energy generation and of socio-economic organization has to be sought. Ultimately it has to be a new vision for a sustainable society.

Emperor and Empress speak with town mayor of Kazo, Saitama on April 8 while visiting a makeshift shelter. On April 15, TEPCO announced that it would provide "provisional compensation" of approximately $12,000 to tens of thousands of households ordered evacuated, perhaps permanently, from the 13-mile exclusion zone.

It is of course a paradox that nuclear victim Japan should have become what it is now: one of the world's most nuclear committed, if not nuclear obsessed countries. Protected and privileged within the American embrace, it has over this half-century became a nuclear-cycle country and a plutonium super-power, the sole "non-nuclear" state committed to possessing both enrichment and reprocessing facilities, and to the fast-breeder reactor project. Its leaders chose to see the most dangerous substance known to humanity, plutonium, as the magical solution to the country's energy security. While international attention focused on the North Korean nuclear threat, Japan escaped serious international scrutiny as it pursued its nuclear destiny. One bizarre consequence is the emergence of Japan as a greater nuclear threat to the region than North Korea.

Just over a decade from Hiroshima and Nagasaki, at the time of Eisenhower's "atoms for peace," Japan's Atomic Energy Commission drew up its first plans. The 1967 Long-Term Nuclear Program already incorporated the fuel cycle and fast breeder program in them. By 2006, the Ministry of Economics, Trade, and Industry (METI)'s "New National Energy Policy" set the objective of turning Japan into a "nuclear state" (*genshiryoku rikkoku*). Nuclear power generation grew steadily as a proportion of the national grid, from 3 percent of total power in 1973 at the time of the first oil crisis to 26 percent by 2008 and around 29 percent today. The country's basic energy policy calls for the ratio of nuclear, hydro and other renewables (nuclear the overwhelming one) to be nearly 50 per cent by 2030. Under the Basic Energy Plan of 2010, 9 new reactors were to be built by 2020 (none having been built since the 1970s in the wake of Three Mile Island and Chernobyl), and 14 by 2030, while operating levels of existing reactors were to be raised from 60 percent as of 2008 to 85 percent by 2020 and then 90 percent by 2030.[7]



The dream of eternal, almost limitless energy has inspired the imagination of generations of Japanese national bureaucrats. In the words of a panel at the Aquatom nuclear theme-park-science museum in Tsuruga, close to the Monju plutonium fast-breeder reactor,

> "Japan is a poor country in natural resources … therefore Monju, a plutonium burning reactor, is necessary because plutonium can be used for thousands of years."

Trillions of yen were channelled into nuclear research and development programs and additional vast sums appropriated to construct and run major nuclear complexes. If the Federation of Electric Power Companies estimate is even roughly correct, that the Rokkasho complex in northern Honshu will cost 19 trillion yen over the projected forty-year term of its use, that would make it Japan's, if not the world's, most expensive civil facility in history.

Japan is alone among non-nuclear weapon states in its pursuit of the full nuclear cycle, building plants to reprocess its reactor wastes, burning plutonium as part of its fuel mix (as at the Fukushima Dai-ichi's No 3 Plant since late 2010), storing large volumes of "low-level" wastes, and desperately struggling to chart a way forward to fast-breeder technology, something so prodigiously difficult and expensive that the rest of the world has set it aside as a pipe-dream. At all stages: fuel preparation, reactor construction and operation, waste extraction, reprocessing, storage, its nuclear system was problematic long before the tsunami crashed into its Fukushima plant on March 3, 2011.

There are 54 reactors currently in operation, or were till March. At Fukushima the reactor cores may have survived intact, but the management practice of leaving highly toxic and long-lived wastes in ponds beside the actual reactor, has proven a terrible mistake. According to atomic specialist Robert Alvarez, such pools contain radioactivity between five and ten times greater than that of one reactor core, with one pond holding "more cesium-137 than was deposited by all nuclear weapons tests in the Northern Hemisphere combined" and "a major release of cesium-137 from a pool fire could render an area uninhabitable greater than that created by the Chernobyl accident."[8] Whether because of sloshing under the impact of the quake or leakage from structural collapse, the rods at several of the Fukushima plants were partially exposed for unknown periods, fires did burn, with unknown consequences, and the resumption of cooling using sea-water by fire-hose or helicopter bombing and ultimately by the reconnection of pumps has proven immensely difficult.[9]

Once the immediate crisis passes, these plants will have to be decontaminated and dismantled, an expensive, difficult, and time-consuming task that will take decades, while the electricity they once provided must be somehow substituted. Whether they can or will simply be cased in concrete like Chernobyl remains to be seen, but they will surely become a monument to the disastrous mistakes of the post-war Japanese nuclear plan.

Of the major complexes other than Fukushima, the most notorious are those at Kashiwazaki in Niigata and Hamaoka in Shizuoka. Kashiwazaki, with 7 reactors generating 8,000 MW, is the world's largest nuclear generation plant. The 6.8 magnitude quake it experienced on 16 July 2007 was more than twice as strong as the design had allowed for and the site proved to be on a previously undetected fault line. Catastrophic breakdown did not occur, but multiple malfunctioning did, including burst pipes, fire, and radioactive leaks into sea and air. The Hamaoka complex, 190 kms southwest of Tokyo, has five reactors, which, like those at Kashiwazaki, sit on fault lines where the Eurasian, Pacific, Philippine and North American plates grind against each other and where experts predict a strong chance of a powerful quake some time in the near future. Company officials say the plant is designed to withstand a magnitude 8.5 earthquake, since that was believed to have been the most powerful ever known in the area. After Fukushima's 9.0, however, the preconditions on which Hamaoka was based have collapsed. A Fukushima-level event here could force the evacuation of up to 30 million people.

Perhaps most controversial of the planned new reactor plants is that for two reactors to be built at Kaminoseki, population: 3,700, an exquisitely beautiful, national park site at the southern end of the Inland Sea about 80 kms from Hiroshima, one to commence operation in 2018 and the other in 2022. After nearly 30 years of attempts to start these works, blocked by fierce local resistance, especially on the part of the fishing community of Iwaishima, the island that faces the reactor site across about four kilometres of sea, preliminary forest clearing and sea refilling works began late in 2010. With fierce confrontation continuing at sea between fishing boats, canoes and kayaks on the part of the protesters and the power company's ships, however, it is hard to imagine that after March 2011 the government will find the will to move in and crush the protesters. Indeed, the Governor of the prefecture has demanded work be halted (and in the wake of 11 March they have indeed been halted, at least temporarily).

Nuclear reactors generate large quantities of irradiated waste, which has to be either stored or reprocessed. Since 1992, high-level wastes have been reprocessed at plants at Sellafield in England and la Hague in Normandy in France, each shipment equivalent to about seventeen atomic bombs-worth of plutonium. The former Director-General of the International Atomic Energy Agency (IAEA) Mohammad Elbaradei saw reprocessing as so dangerous that it should only be done under the strictest of international supervision and appealed to Japan for a five-year freeze on all enrichment and reprocessing works. Japan dismissed his appeal, arguing that such a moratorium was applicable only to "new" projects, while Japan's had been under way for decades.

Rokkasho, north of Fukushima in Aomori prefecture, is the world's most intensive concentration of civilian nuclear energy facilities, including fuel processing, waste reprocessing, enrichment and waste storage. Its reprocessing unit is designed to convert eight hundred tons of spent fuel per annum, yielding each year about eight more tons (1,000 warheads-worth) of pure, weapons-usable plutonium. After many delays, reprocessing was conducted on a trial basis in 2006 but the facility has yet to commence full commercial operation. A second reprocessing plant at Tokaimura has been shut since 1999 when an accident at its experimental fast breeder showered hundreds with radiation and killed two workers. Consequently reactor wastes accumulate, much of them stored, like those at Fukushima, around the reactors from which they have been extracted.

Rokkasho Nuclear Fuel Reprocessing Plant, 2008. Photo: Kyodo

Even if Rokkasho's reprocessing plant were to commence operation some time soon, it would make little more than a small dint in Japan's accumulated and accumulating wastes, estimated at approximately 12,600 tonnes as of 2006. So Japan's wastes, including separated plutonium (Japan possesses roughly one fifth of the world's civil plutonium stocks), accumulate steadily, and will continue to do so even if or when the reprocessing proceeds according to plan.

Under current (to March 2011) plans, fluids containing low levels of radiation were to be piped several kilometres out into the Pacific Ocean for discharge, the standards for effluent control having been relaxed so that Rokkasho could discharge the equivalent of the nuclear wastes of 1,300 power stations, sending tritium into the sea at 7.2 times the levels of the recently closed Sellafield plant in Northern England or 2,800 times the level permitted for conventional reactors. Wastes from the infamous Sellafield plant are blamed for the devastation over decades of fish stocks across much of the Irish Sea and leukaemia levels in children 42 times the national average as far away as Carnarvon in Wales.

Other low-level wastes are held in 200-liter drums, both at nation-wide reactor sites and at the Rokkasho repository. Rokkasho's projected eventual capacity is for three million drums in forty vast repositories, each containing 10,000 drums, destined eventually to be covered in soil, with something like a mountain built over them. After that, they must be closely guarded for at least 300 years. These repositories spread like giant poisonous mushrooms across the once beautiful backwater of rural Aomori prefecture.

Nuclear Wastes

High level wastes, vitrified and put in canisters, are returned to Rokkasho where they are to be stored initially for 30 to 50 years while their surface temperature slowly declines from around 500 degrees centigrade to 200 degrees centigrade, at which point it is planned to bury them too, in deeper (300 meter) underground caverns where their radiation will further dissipate over millennia.

The burning of mixed plutonium-uranium oxide fuel, as at Fukushima's No 3 plant, constitutes another way to divert plutonium from "waste" into active use as part of the "eternal" energy cycle. Fast-breeder reactors are another part of the solution to plutonium accumulation. They "breed" (i.e. produce more than they start with) very pure, "super-grade" plutonium. But the risk and the cost associated with this unproven technology is so great that Japan is among the few nations that now pursues it, at prodigious expense and with very limited success. The Monju prototype fast-breeder reactor (at Tsuruga, in Fukui Prefecture on the Japan Sea coast) had to be shut down in 1995 after a sodium leak and fire followed by evidence of negligence and cover-up. After ten years, the Supreme Court ruled in 2005 that it could proceed, and a contract was awarded to Mitsubishi, but technical difficulties mean that it has yet to do so. Under current plans, the fast breeder would be commercialized by 2050, 70 years behind its original schedule, with Monju being replaced by an additional plant, at a cost of "about 1 trillion yen" around 2030.

For the country whose scientific and engineering skills are the envy of the world to have been guilty of the disastrous miscalculations and malpractices that have marked the past half-century - including data falsification and fabrication, the duping of safety inspectors, the belittling of risk and the failure to report criticality incidents and emergency shut-downs – and then to have been reduced to desperate attempts with fire hoses and buckets to prevent a catastrophic melt-down in 2011, raises large questions not just for Japan but for humanity. Could the rest of the world, for which the US government holds out the prospect of nuclear renaissance, do better?

The "nuclear state Japan" plans have plainly been shaken by the events of March 2011. It is too much to expect that they will be dropped, but the struggle between Japan's nuclear bureaucracy, pursuing the chimera of limitless clean energy, global leadership, a solution to global warming, the maintenance of nuclear weapon defences (America's "extended deterrent"), on the one hand, and Japan's civil society, pursuing its agenda of social, ecological and economic sustainability, democratic decision making, abolition of nuclear weapons, phasing out of nuclear power projects, and reliance on renewable energy, zero emission, material recycling, and non-nuclear technologies enters a new phase after March 2011.

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recently, of Client State: Japan in the American Embrace *(New York, 2007, Tokyo, Seoul and Beijing 2008) and* Target North Korea: Pushing North Korea to the Brink of Nuclear Catastrophe *(New York, 2004, Tokyo and Seoul 2006).*

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Notes

[1] "La maison Japon se fissure - Le Japon nucléaire ou l'hubris puni," *Le Monde Diplomatique*, Online, April 2011, link.

[2] Meaning it was responsible for a major release of at least tens of thousands of terabecquels of radioactivity that was likely to cause "acute health effects" over a wide area.

[3] Ishibashi Katsuhiko is one Japanese critic who has consistently made this criticism. See, most recently, his essay, "Masa ni 'genpatsu shinsai' da," *Sekai*, May 2011, pp. 126-133.

[4] Jun Hongo, "World right to slam nuke program mismanagement: expert," *Japan Times*, 14 April 2011.

[5] Shut down for nearly two years following damage in the Chuetsu earthquake of July 2007.

[6] For a Japanese newspaper editorial in similar vein: "Shinsaigo 'tei-ene' shakai Nihon moderu wa kano da," *Mainichi shimbun*, 16 April 2011.

[7] The DPJ government announced on 29 March 2011 that the existing "Energy Basic Plan" would now have to be fundamentally reviewed, and that green sources of energy, including solar, would be part of the review. ("14 ki no genpatsu zosetsu, minaoshi, taiyoko nado jushi e," *Yomiuri shimbun*, 29 March 2011. The debate, of course, is just beginning.

[8] Robert Alvarez, "Meltdowns grow more likely at the Fukushima reactors," Institute for Policy Studies, 13 March 2011.

[9] For a catalogue of TEPCO's and the Japanese government's technical and other errors in handling the Fukushima disaster and earlier nuclear accidents, see Vaclav Smil, "Japan's Crisis: Context and Outlook," *The American*, April 16, 2011.

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