

October 23, 2012 2:26 pm

# Doubts cast over Japan nuclear phase-out

By Jonathan Soble in Tokyo



It has only been a month since Japan declared that it would close down its nuclear industry by the end of the 2030s, but already a contentious plan to complete several partially built reactors is sowing doubts about the government's commitment to the radical policy shift.

The facilities – stretching from the northern tip to the southwestern part of the country – were approved years before the triple meltdown in Fukushima in March last year, but construction had been frozen following the disaster. The decision over their fate is seen as a test of just how serious Japan is about abolishing an industry that had been the source of 30 per cent of its electricity.

## Japan nuclear map



In the weeks since the nuclear phase-out was announced, Yukio Edano, industry minister, has said three approved but unfinished reactors are exempt from a central provision of the phase-out policy, under which no new plants will be built. Electric Power Development, the utility that owns one of the facilities, responded by saying it plans to resume work this year, with an eye to beginning electricity production some time after 2014.

Iida Tetsunari, a leading anti-nuclear activist, called the decision “insincere politics” that was “clearly against the principle” of ending nuclear power. The Mainichi newspaper, a national daily, said: “Many people must surely feel as though they’ve been tricked by a fox.”

Some sceptics had already dismissed the phase-out announcement as empty pre-election rhetoric. The target date was vague, and within days the cabinet of Yoshihiko Noda, prime minister, backtracked over implementation. Under pressure from pro-nuclear business groups, it resolved to act “flexibly” and with “constant verification and revision” – hedges that might keep the nuclear industry in business indefinitely.

It remains unclear exactly how many new reactors might be completed in practice. One of the three approved units, at Higashidori nuclear station, located on the remote northern tip of Japan's main island, is owned by [Tokyo Electric Power](#), the disgraced and financially

crippled operator of the Fukushima plant.

Construction is only about 10 per cent completed, and Tepco's problems make prospects for a resumption dim, according to government officials and analysts.

Electric Power Development's facility, in the village of Oma not far from Higashidori, is about 40 per cent finished, while the most advanced, Chugoku Electric's Shimane plant in southwestern Japan, is more than 90 per cent built and was supposed to have started operating this year.

Chugoku has not revealed its plans for the facility, but has been consulting local politicians over restarting work.

In theory, it is possible to reconcile finishing the plants with the gradual phase-out envisioned by the new energy policy. Japan has 50 reactors already in service, and they are to be used while the country develops alternative energy sources such as solar and wind power. Supporters of the partially built plants argue that they will contain the latest, safest technology, and scrapping them now would mean writing off the tens of billions of yen already sunk into construction.

However, Kenichi Oshima, a nuclear policy expert at Ritsumeikan University, says uncertainties about the future cost of operating nuclear plants in Japan weaken the economic case for more atomic power. "There will be more costs for safety upgrades, and no one knows what kind of insurance system is going to be put in place. These things will make a big difference to generating costs."

Since it takes about 40 years for a reactor to recoup its initial building costs, switching off the new plants in the 2030s, around two decades before the end of their normal operating lifespans, would mean accepting major investment losses – something a future government might be unwilling or unable to impose on utilities. "Basically, building these reactors would mean reversing the nuclear phase-out," Mr Oshima says.

Allowing Oma and Shimane to go ahead could also open the door to more plants being built. Nine other reactors were in various stages of planning before Fukushima, and while the government has said they will not be constructed, some pro-nuclear local leaders have continued to push.

The governor of Fukui prefecture, a western area with a big nuclear industry, has recently stepped up lobbying for two planned reactors in his jurisdiction that had been close to receiving final approval before the accident. Higashidori's village council has appealed for construction on its reactor to resume over fears for the local economy.

The phase-out plan could recede even further if Mr Noda's Democratic party of Japan is ousted in an election early next year, which polls suggest is likely. The opposition Liberal Democrats nurtured the nuclear industry for decades when they were in power, and are

more sceptical towards renewable energy.

The main roadblock to building could come from other local governments. Towns and villages that host nuclear plants receive generous state subsidies and tend to support the industry, even after Fukushima, but their unsubsidised neighbours are often less keen.

In northern Japan, the mayor of Hakodate city, located across a narrow strait from Oma on the island of Hokkaido, has threatened to sue to prevent construction from resuming. On a visit to Tokyo to complain to the government this week, he told reporters: “The decision to permit construction is based on a pre-Fukushima safety myth.”

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March 8, 2012 11:17 pm

# Energy needs: Thinking small is new big idea

By Jonathan Soble

After Japan's 9.0-magnitude earthquake badly damaged his house in Sendai last year, Eiji Okuyama went weeks without gas, electricity or water.

So did many of his neighbours: up and down north-eastern Tohoku, even homes that withstood the quake and the tsunami that followed lost basic utilities – some for a day or two, others for longer – as fallen electrical towers and broken gas pipes became choke points that paralysed the region's large, integrated distribution networks.

Mr Okuyama is an engineer who lectures on urban planning at Nihon University. For years he has advocated the ecological benefits of so-called "smart communities", high-tech towns and districts that combine computer-monitored distribution of energy with often small-scale, local generation. The aim is to cut waste and, ultimately, the burden on the environment.

But his experience last year, he says, woke him up to another potential benefit of smart communities: their resilience in disasters. In a system of local "micro-grids", damage in one area is easier to contain, and widespread failures less likely.

"We need to build communities that are both protected from natural disasters and environmentally friendly," Mr Okuyama says.

Views on normally arcane subjects such as energy distribution and town planning are getting an unusual amount of attention in Tohoku.

The tsunami wrecked a 300km stretch of the region's Pacific coast, and the rebuilding effort is only barely under way.

Given the thoroughness of the destruction – with some seaside towns totally destroyed – authorities and surviving residents have been forced to start again. Planners are bringing their most cutting-edge ideas to the process.

Energy is of particular concern. The meltdowns at Fukushima Daiichi nuclear power station have contaminated part of the region but also threatened a big local industry.

Atomic plants in rural Tohoku export power to Tokyo to the south, bringing badly needed jobs, subsidies and taxes. But the accident has put the industry in jeopardy – and with it, the chances of luring back many of the thousands of residents who have fled.

Ken-ichi Funabashi, a professor at Iwate University, wants to see Tohoku become a centre of green-energy innovation and employment.

Eventually, he believes, independent solar, wind and bio-energy producers could fill the gap left by a diminished atomic sector.

“When we think about building smart communities, we have to think about employment because without employment there won’t be any communities here in 10 or 15 years,” he says.

At a recent conference in Fukushima city, about 60km inland from the ruined nuclear station, Mr Funabashi and other local academics and planners heard how that might be accomplished.

Leo Christensen, a municipal official from the island of Lolland in Denmark, explained how his Tohoku-like rural constituency had reversed unemployment and population decline by turning to wind power and other new-energy projects.

“Basically, we invited universities to use us as a laboratory for their latest ideas,” he explains. Lolland now generates about four times more electricity than it consumes locally, and sells the excess to urbanites in Copenhagen.

Tohoku has experimented with similar projects on a smaller scale. In Rokkasho, a village at the northern tip of Tohoku that also hosts a nuclear reprocessing plant, a wind farm has contracted to sell its excess power to a large office building in Tokyo.

“There is an opportunity for local areas to make their own power companies,” says Kimio Yamanaka, president of the Institute of Energy Strategy, a think-tank. He also notes that a small experimental smart community in Rokkasho that draws its power from the wind farm suffered no power outages after the quake.

Japan is a leader in efficient power consumption, but non-hydro renewables account for just 1 or 2 per cent of production. That percentage is certain to increase, and some companies are preparing to meet the demand.

Canadian Solar, an Ontario-based group that manufactures photovoltaic panels in China, is negotiating with several local governments in Tohoku to build a factory in the area.

Masayoshi Son, the billionaire-founder of [Softbank](#), a telecoms group, is looking to build a network of commercial-scale solar generating stations around Japan, and last year donated Y10bn (\$120m) to a foundation that will help promote the cause.

A number of obstacles to a Tohoku clean-energy boom remains, however.

Creating a new industry will require financial investment on a scale that will surpass even Mr Son's resources.

The government is devoting trillions of yen to rebuilding, but there will be a lot of competition for its money – from housing to tsunami-proofing the coast. And states have a poor record of picking the most viable technologies and projects.

Entrepreneurs and other private-sector investors, meanwhile, will need to be convinced that renewable energy in Tohoku is good business.

Initially, at least, that will depend on the amount of public aid available. Japan last year passed a law expanding access to feed-in tariffs – fixed rates at which mainstream power companies must buy electricity from “green” producers. But the level of the tariff, the key factor in determining the viability of producers' business models, has yet to be decided.

Much will depend on the future of the nuclear industry, since the competitiveness of renewable energy hinges on the cost of the sources it seeks to replace.

Nuclear power plants are expensive to build but cheap to run, and with all but two of Japan's 54 commercial reactors offline for safety checks, the cost of electricity generation has skyrocketed.

According to Tomas Kaberger, a Swede who heads the Japan Renewable Energy Foundation, the fund set up by Mr Son, it is now at levels at which solar power and other renewables could compete even without subsidies.

The government wants to restart most of the idled reactors to avert energy shortages, but it is still debating the industry's longer-term future, and an eventual phase-out of atomic power is possible.

It must also tackle a so-far vaguely promised liberalisation of the monopolistic electricity sector to lower barriers to entry and give households control over where they buy their power, Mr Kaberger and others believe.

“On the plus side, there is a lot of room for improvement,” Mr Kaberger says.

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March 9, 2012 9:29 pm

# Fukushima: a strange kind of homecoming

By Mure Dickie

One year on from Japan's Fukushima nuclear disaster, the Unuma family return to the exclusion zone and what was once their farm



The Unumas visit a family grave at the Shofuku-ji temple in Futaba town, Fukushima prefecture, Japan

**I**t is on the road to Yoshitada Unuma's family grave that my Geiger counter really starts crackling. At some point in the past year, an invisible dusting of radioactive particles has spread across this country road and the pine trees on either side, leaving them heavily contaminated. As we drive up the quiet valley towards the graveyard, the needle of the detector on my lap climbs to more than 40 microsieverts per hour – about 800 times the level near my home in Tokyo. Somewhere in the van we are travelling in, a radiation alarm starts beeping, but Yoshitada and his wife Tomoe pay it no heed. We are deep in the exclusion zone around the Fukushima Daiichi nuclear plant: here, even higher radiation levels are routine. Tomoe glances at her own radiation detector and sighs. “These days, it's risky even to pay your respects to the dead,” she says.

I first met Yoshitada and Tomoe Unuma, aged 45 and 36, in a futuristic sports arena near Tokyo, 10 days after the tsunami-crippled Fukushima Daiichi power station plunged into crisis on March 11 2011. The quiet-spoken couple and their 10-year-old daughter Hana had been forced to flee their farm just 2km from the plant in the coastal district of Futaba,

leaving behind almost all their possessions, their pack of beloved cats and dogs and 40 cattle. After a chaotic flight south, they and more than 1,000 fellow Futaba residents had found refuge in cardboard cubicles set up in the arena's corridors.

Those were extraordinary times in Japan. The nation was still reeling from the biggest earthquake in its recorded history and a resulting tsunami that devastated the north-east coast, killing nearly 16,000 people and leaving more than 3,000 missing. Workers, soldiers and firemen were toiling in desperate conditions to cool Fukushima Daiichi's radiation-spewing reactors. The day after I met the Unumas, then-prime minister Naoto Kan secretly commissioned a worst-case scenario for the crisis that would raise the dreaded possibility of evacuations as far away as the megalopolis of Greater Tokyo, with its population of 35 million.

One year on, those fears have receded. Conditions at the plant have been stabilised, radiation leaks stemmed and new jury-rigged cooling systems installed. Yet for many in Japan, the crisis is far from over. More than 100,000 people are still exiled from their homes; millions more suffer the anxiety of living amid elevated levels of radiation. The failure of Fukushima Daiichi has thrown into question resource-poor Japan's energy strategy and shaken public faith in the government.



The Unumas revisit Futaba Beach, north of the Fukushima plant, and one of their favourite places

Like all the best horror story settings, the forbidden zone around Fukushima Daiichi is a blend of the bizarre and the banal. To enter, you have to show a travel pass at police checkpoints and then stop at an outdoor processing centre where you are issued with a white suit of disposable overalls, mask, gloves and shoe covers, a thin shield against radioactive dust or mud. The irregular flow of trucks and buses bound for the plant gives a veneer of normality to a road lined with a standard Japanese suburban sprawl of automobile



dealerships, noodle shops and farm produce packing centres. It is only when you look closely that you notice all the lights are off in the convenience stores and grass is poking up through cracks in the tarmac of the chain restaurants' forecourts. Off the main road, the shallow valleys are eerily quiet. Occasionally you spot a slowly patrolling police car or a fellow visitor, also clad in a white radiation suit. Otherwise all is still, except for a circling kite in the cold blue sky.

It is Tomoe Unuma's third trip home since the March 11 disaster and Yoshitada's fourth. This time they are travelling with a camera crew and presenter from Japanese TV broadcaster TBS, who, like me, have seized on the couple's visit as an opportunity to bypass official restrictions on access.

As we turn the last corner before the Unumas' farm, Tomoe cries out at the sight of a small group of cows that start and run at our approach. It is the first time she has seen any survivors from the family herd. These were in the fields when the Unumas fled and were later set free by animal welfare volunteers. Now they roam wild. The cows and calves stuck inside on March 11 were not so lucky. We find their corpses lining the floor of the barn in tangles of skin and exposed bone. In one pen, however, there is a panicking live cow that has returned out of habit and become trapped. Tomoe finds a tool kit to dismantle the pen's fence, then gently shoos the cow outside. "Take your time, take your time," she tells it. "Go and join the others."



A dead cow inside the Unumas' barn

For the Unumas this is the strangest kind of homecoming. Futaba's coastal villages were scoured by the tsunami, but most houses inland survived the earthquake. Now, neglect is exposing them to a more insidious kind of destruction and everything is tainted by the fear of radiation. I find in the Unumas' home a chaotic mess, created first by the earthquake, which turned over furniture and tossed toys off shelves, and then later deepened by their rushed efforts to find prized belongings and by the defecation of abandoned pets. At least the family appears to have been spared by the burglars who looted many homes and businesses in the evacuation zone in the first months after the disaster. But the house where Tomoe's parents lived, a long, low structure that combines living quarters and a barn for rearing calves, is already starting to sag. Its paper interior walls are torn and rot is spreading across its ceilings.

Now that the Unumas are home, with permission to stay for only five hours, there is not actually much worth doing. The TV crew help to bury one dead cat, found nestled in the couple's futon. A bag of dog food is opened and

left in case other family pets might return. Tomoe tears the plastic covers from some bales of straw for the cows. She wonders whether to take back some hair curlers and a couple of children's Hollywood DVDs, trying to weigh their worth against the risk of contamination. It is hard to abandon even mundane possessions when they are sitting intact in front of you. "Every time I buy a spoon or a pair of chopsticks, I can't help thinking: 'I've already got one at home'," she says.

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A feeling of being stuck in a weird limbo is common among nuclear evacuees. In Tokyo, I catch up with Ryota Takakura, who was working at Fukushima Daiichi when the earthquake hit and fled south with his extended family as conditions worsened at the plant. We meet at a council flat in a Tokyo suburb, where his sister now stays with her husband and two children.



Ryota Takakura (left) with brother-in-law Ryutarō Oshida and family in their Tokyo flat



Inside the Uhumas' home, a photo of Tomoe aged 20 hangs on the wall; the clock is still ticking and has only lost three minutes since the disaster

Red-eyed after a night out with friends, Takakura, 29, says he has no long-term plans. Getting a job seems pointless since it would probably make him ineligible for loss of income compensation from Tokyo Electric Power Company (Tepco), the utility that operated Fukushima Daiichi. Yet it is hard for him to know how much he will eventually receive from Tepco. The government has unveiled some broad standards – such as a fixed payment of Y120,000 (£940) a month for time spent living in sports halls or tents – but other vital details are still to be decided.

Many evacuees also find the compensation process confusing and bureaucratic. Even after a government-ordered simplification, the pack that Tepco sends claimants is a daunting sheaf including one form that runs to 30 pages and has a guide to filling it in that is twice as thick.

"When I saw that, I thought they were making fun of us," says Takakura's brother-in-law, Ryutarō Oshida. After fleeing Fukushima, Oshida has opened a restaurant in Tokyo to replace the one he ran near the plant and is part of a band that has released a song in support of local tsunami reconstruction. But such successes do not make him any more forgiving of Tepco. "The way they act, it seems like they don't really think they have done anything wrong," he says.



[View the slideshow](#)

Anger against Tepco and its complacent government overseers runs deep in Fukushima and among a wider public that had been promised Japan's nuclear plants were fully proofed against the seismic misfortunes that plague this unstable archipelago. When March 11 demonstrated the emptiness of those promises, nervous local authorities began blocking the restart of reactors shut down because of the earthquake or idled for routine maintenance. By this month, only two of Japan's 54 commercial reactors – which until the disaster accounted for nearly a third of the nation's electricity supply –

were still online.

Yet while Japan's love affair with nuclear power is surely over, it is striking how muted the backlash has been. Within a few months of the failure of Fukushima Daiichi, Germany and Italy turned decisively against atomic power, but Japan has so far merely announced a review of its energy policy. Many in the political and media establishments are convinced the resource-poor nation cannot abandon nuclear power completely. Meanwhile, only a handful of anti-nuclear demonstrations have managed to muster more than a few thousand participants.

To find out why, I visit Hidekatsu Yoshii, a member of parliament for the Japanese Communist party. If anyone should be reaping a political reward from the Fukushima Daiichi crisis, it is Yoshii and his comrades, who have been opposing nuclear power since the 1960s. Yoshii warned parliament six years ago that a combination of an earthquake and tsunami could disable a Japanese atomic power plant's cooling systems, with dire consequences.



Hidekatsu Yoshii, Diet lower house member for the Japanese Communist party

But the Communists have hardly surged since last March. Opinion polls put the party's support among voters at 2 per cent or less. Yoshii, a loquacious political veteran with a smooth, deep voice, admits that anti-nuclear campaigners face a hard fight to defeat an industry in which much of the Japanese business establishment – from construction companies to megabanks – has a stake. And he complains that Japan's mainstream media ignores homegrown anti-nuclear demonstrations.

Still, Yoshii senses a sea-change in public opinion fuelled by the growing sense that renewable energies can be a realistic alternative to nuclear. A book he wrote making that case had little impact when it was published in late 2010, but sales surged after Fukushima Daiichi failed. A small town that he cited as a model of renewable energy use was suddenly



overwhelmed by would-be emulators. “It’s caused a lot of trouble for them,” Yoshii grins. “They’ve had to start only accepting visitors two days a week.”

The one-year anniversary of the disaster will offer an opportunity for anti-nuclear activists to put renewed pressure on national politicians. Campaigners, including Nobel prize-winning novelist Kenzaburo Oe, are planning to hold a major rally in one of Fukushima Prefecture’s biggest cities on March 11. Yet even organisers admit it is hard to rouse a public that has had little experience of mass protest since the febrile 1960s. Author and activist Keiko Ochiai says that after travelling around Japan to take part in anti-nuclear events, she is “not necessarily optimistic” that the movement can gain momentum. “I worry that the crest of the wave may have passed.”

The most important task for the Unumas during their brief time in the exclusion zone is to visit their family graves. First we pay our respects at a row of headstones nestled by a stand of pines on the edge of the farm. These are Tomoe’s ancestors, who have tilled land here for at least five generations. Yoshitada married into the household, adopting his wife’s surname – a common practice for families that find themselves short of male heirs.

Next we all pile into the van for the short drive to the municipal graveyard, where Yoshitada’s parents’ ashes are buried. Although we are actually heading away from the plant, the radiation level rises sharply. Fallout does not fall evenly; it is driven by vagaries of wind and rain and then further redistributed by rivers and drains. Some farms almost in the shadow of Fukushima Daiichi have levels lower than others tens of kilometres away.



Yoshitada Unuma tends the grave of a friend’s baby while visiting his parents’ graves

At the graveyard, Yoshitada, who has dyed hair and a taste for motorbikes and the latest consumer electronics, crouches to light a few sticks of incense. As their sharp scent slips

through my facemask, he pours a libation of bottled green tea over the headstone and clasps his hands in prayer. The needle on my radiation meter has fallen back to 25 microsieverts per hour and its ticking sounds less urgent, but the TV announcer is still anxious. “It’s dangerous here,” he tells the Unumas. “Don’t stay too long.”

Just how dangerous is a matter of fierce debate between opposing camps; they argue on one side that radiation risk is ludicrously over-emphasised out of scientific ignorance and nuclear paranoia and on the other that it is being dangerously understated in the interests of the atomic establishment.

At 25 microsieverts an hour, it would take me less than two days to receive a dose above 1 millisievert, an internationally adopted annual limit for artificial radiation exposure to the general public. Yet that dose would still be only one-hundredth of the level at which there is generally accepted statistical evidence of increased incidence of cancer. Any thorough risk assessment would also need to take into account the different kinds of radiation given off by different radionuclides, whether the exposure is internal or external, and how much of a dose I have already received from half a dozen trips to Fukushima since the accident. But it seems to me that I would have to be incredibly unlucky to suffer harm from just a few hours in this kind of environment.



Tomoe Unuma checks and records radiation levels around her former home town

The Unumas, too, are relaxed enough to tend another grave, this one belonging to friends who had moved away from Futaba district before the accident. Because their friends are no longer residents, they do not have permission to enter the exclusion zone to tend it themselves.

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Some of the most commonly used Japanese words defy satisfactory translation into English. One such word is the verb *ganbaru*. Its imperative forms *ganbare* and *ganbatte* – which can be variously rendered as “Do your best!” or “Hang in there!” – are the standard way to fire up exam-takers, sports contestants or anyone faced with a challenge. So well-wishers naturally used such words to offer encouragement to the victims of the tsunami and the nuclear crisis.

But it is hard for those who have lost so much to be told by the more fortunate that they should be doing their best. There were complaints that instructing victims to “*ganbatte*” only added to the psychological pressure on them, leading to a mini-linguistic backlash. These days, more thoughtful Japanese find other words to comfort disaster victims – or at least shift to the more inclusive form *ganbaro*, which can be translated as “Let’s persevere”



and has become a slogan to be stuck on the side of trains, painted on primary school walls and parroted in the prime minister's new year speech.

When I meet Shunichi Yamashita in his office at the Fukushima Medical University, he is wearing a "Ganbaro Fukushima!" badge clipped to his tie. The badge, standard government issue in the prefecture, also offers a neat, if loose, English translation: "Fight! Fukushima!" An avuncular medical scientist from the port of Nagasaki, Yamashita certainly has a fight on his hands. His outspoken belief that low-level radiation exposure poses little risk to humans has made him a figure of hate for many.

After 20 years of work on radiation and health, Yamashita – whose mother was a survivor of the atomic bomb dropped on Nagasaki in 1945 – is confident that the evacuations, economic disruption and general stress are far more likely to harm residents' health than fallout from Fukushima Daiichi. This is a view shared by many scientists but it enrages those who believe that radiation leaked from the plant is a pressing danger, especially to children. Internet commentators in Japan and overseas have compared Yamashita with the murderous Auschwitz doctor Josef Mengele and called him a devil in human form.

"I'm not a devil," Yamashita tells me, when I ask him about the criticism. "I'm not such a bad person, I'm working for the Fukushima people."

Indeed, Yamashita is now helping to lead what could be one of the most important government-funded programmes in Fukushima: an ambitious survey intended to monitor the health of the prefecture's 2 million people for decades to come. Though billed as a way of reassuring residents, the survey should also provide information to help researchers paint a clearer picture of radiation risk.

Many people in Fukushima are sceptical about the survey. Some suspect that the appointment of Yamashita as its science director means the programme will be biased against finding radiation-related harm. Public faith in authorities has been badly battered by the government's failure to keep Fukushima Daiichi safe or to provide information about the crisis at the plant as it unfolded. There is deep bitterness about the decision to evacuate some residents to areas that turned out to have suffered heavier fallout than the homes they left behind. Rumours swirl of radiation-caused leukaemia cases going unrecorded and contamination levels being understated. "They are turning us into guinea pigs," complains Oshida, the DJ-restaurateur. "Nobody believes the government numbers."

Goshi Hosono is too smart a politician to try to deny that public trust in the government has been damaged. Instead, he says he shares responsibility for the problem. After March 11 he was appointed nuclear point man for then-prime minister Kan. Now he is the cabinet minister in charge of dealing with the consequences of the accident and preventing others.



Goshi Hosono, government minister for the environment and for nuclear accidents

Yes, Hosono concedes, the government was sometimes slower and less effective than it should have been in dealing with the crisis and information disclosure was inadequate. But the handsome former consultant takes pride in the fact that not a single life has been lost because of the nuclear accident – and wonders aloud if other nations would have been able to handle things better.

Now the government is pinning its hopes on a vast decontamination effort to ease citizen fears by steadily reducing radiation levels, allowing evacuees to go back to their homes. More accurate mapping of contamination levels is already helping communities to decide for themselves whether evacuation is necessary. Hosono is heartened by the recent decision taken by one evacuated township that it is safe to return.

The 40-year-old minister, one of the ruling Democratic party's most persuasive performers, aims to do more than merely cope with the accident's aftermath. He hopes to help make Fukushima a healthier place than it was before, promoting better diets and exercise that should leave it with a lower cancer rate than other prefectures. "If we can do that, then Japan will really have overcome the nuclear accident," he says.

For many in Fukushima, such a bright future seems a long way off. Towns and villages are deeply divided about what level of radiation is tolerable for children or pregnant women. Some fret about a permanent, prefecture-wide exodus of the young. Hosono promises that the government will support communities and individuals whether they decide to stay in irradiated areas or not. But some radiation experts are sceptical about the prospects for decontamination – which is slow and very costly – while financial compensation cannot alone make up for the disruption and stress residents suffer.

A year after the tsunami hit, the future remains unclear for those whose homes are closest to the plant. The government says that it will be at least five years before the most irradiated areas can be resettled. Hosono acknowledges that it could be decades more. The Unumas are doubtful that they will ever be able to go back. Even if they did return, who would buy their beef and rice? "We think the land is probably useless now," Yoshitada tells me. "We understand that with our heads, but emotionally it's still hard to accept."

So for now the couple continue their evacuee existence. Yoshitada is working in a factory an hour's drive from the zone, while Tomoe stays far away near Tokyo so that their daughter can go to school with other Futaba refugees. They meet once a month, and last year Yoshitada missed little Hana's birthday for the first time. Though his company has so far survived the closure of its production line within the exclusion zone, its prospects are unclear and the initial sympathy shown to victims of the nuclear crisis is fading. His temporary

apartment is well-equipped, but it gets lonely living on single-portion microwave dinners. “I never had a problem sleeping before,” he says. “Now, I lie awake a lot.”

Before we leave the zone, we take a detour through the centre of Futaba town and stop near a sign that hangs across its main shopping street. Since March 11 2011, it has become an ironic symbol of the shattering of nuclear hopes. On one side it says in Japanese: “Atomic power is the energy of a bright future”, on the other: “Correctly understand nuclear power for an affluent life”.

Tomoe Unuma looks up at the sign and gives a sniff of disgust. The street is still and empty. “Where’s the affluence now?” she asks.

Mure Dickie is the FT’s Tokyo bureau chief.

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The reactor: stable but fragile

These days, the rare outsider granted a visit to Fukushima Daiichi nuclear power station is greeted by ranks of hulking metal guardians. Blue and grey, cylindrical and pill-shaped, standing on end or lying on the mucky ground amid overturned trucks and debris, almost 1,000 containers for storing radiation-tainted water cover the devastated site, writes Jonathan Soble.

Three of the plant’s reactors melted down in the wake of north-east Japan’s tsunami a year ago, but today public attention has shifted to the long-term consequences of the disaster: the need to compensate victims, decontaminate nearby towns and re-write the country’s energy policy. Prime Minister Yoshihiko Noda declared an end to the emergency phase of the crisis in December, after engineers succeeded in bringing the reactors to a more or less safe state known as “cold shutdown”.

Yet the stability at Fukushima Daiichi is fragile. Radiation levels around the reactor cores are still too high for humans to get close, and assessing conditions inside remains largely a matter of guesswork. In late January, an apparent rise in temperature at one unit alarmed technicians enough that in February they began injecting boron, to prevent an atomic chain reaction. After readings increased for several weeks, with no new calamities, they concluded the problem was instrument failure.

The biggest problem at Fukushima Daiichi is water. Since last June, a 4km network of hoses, pumps and purification tanks has drawn irradiated water out of the reactor buildings, removed heat and contaminants, and sent it back in again as coolant. But the system has been plagued by leaks, particularly during the cold winter months, when sub-freezing temperatures have cracked dozens of pipes and seals.

More seriously, not all the contaminated water at the site can be recycled. The 1,000 storage

tanks have been brought in to hold 165,000 cu m of runoff, and Tokyo Electric Power Company (Tepco), the plant's owner, is planning to add capacity for 40,000 cu m more. Decontaminating all the water used in the emergency effort is expected to take until 2020.

Stabilising the plant is just the first step in a generations-long clean-up project. The government estimates that decommissioning Fukushima Daiichi will take between 30 and 40 years and cost at least Y1.15tn. Removing about 4,600 uranium fuel rods – or what is left of them – from the reactors' cores and spent-fuel tanks is to begin in 2014 and, if all goes well, finish in 2021. Then the reactors themselves will be dismantled.

Jonathan Soble is the FT's Tokyo correspondent

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September 20, 2012 4:27 pm

# Japan floats radical ideas for energy

By Jonathan Soble



Before the meltdown at the Fukushima nuclear plant last year, Takeshi Ishihara's idea for the world's largest floating wind farm was little more than an academic's fancy – an expensive and risky experiment that no one wanted to fund.

Now, 18 months after the world's second-worst nuclear accident, the Tokyo University professor has ¥12.5bn (\$160m) in government start-up money and partnerships with some of Japan's biggest energy and construction companies, who will install a few test turbines not far from the Fukushima plant from 2013.

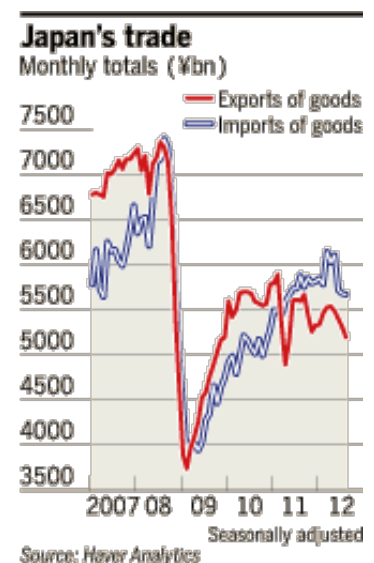
If the trials go well, Mr Ishihara wants to expand to 140 floating turbines generating 1GW of power by 2020 – close to the capacity of Fukushima's largest reactors. "We aim to create the infrastructure for a 21st-century society," he says.

Japan will need more projects like this if it hopes to scrap its remaining nuclear plants by the end of the 2030s, the goal of a new long-term energy strategy announced last week.

Business groups strongly oppose the plan, fearing higher energy bills and less stable supplies, and cabinet ministers responded on Wednesday by promising "flexible" implementation. The unsettled situation reflects a lack of consensus on a basic question: can Japan replace a carbon-free energy source that had accounted for almost 30 per cent of its electricity without doing catastrophic damage to its economy or the environment?

In the most basic sense, Japan is already getting by without nuclear power – it has turned off its reactors without blacking out the country. All 50 of its surviving reactors were stopped in the months after the March 2011 accident, amid wrangling between Tokyo and local governments over safety measures. Only two have been restarted.

But few believe the current situation is sustainable. Energy-saving has helped: nationwide





electricity consumption declined 5 per cent in the year to March, and peak-hour usage this summer – the most demanding time for power companies – was down more than 10 per cent on 2010.

That has still left a big hole in Japan's electricity supply, which has been filled by vastly increased use of fossil fuels. For a country with virtually no carbon reserves of its own, the strain has been severe. Utilities are paying billions of dollars more for natural gas and oil and emitting 30 per cent more greenhouse gases; Japan's trade balance has fallen into deficit, a shock for an economy used to buoyant net exports; and a 40-year national project to reduce Japan's dependence on foreign fuel is in tatters.

“This could be a turning point for Japan,” says Nobuo Tanaka, former executive director of the International Energy Agency, who argues for continued use of nuclear power. “The confidence of financial markets could be lost for government bonds and the yen.”

Avoiding disaster would require making recent energy savings permanent. Under the new strategy, Japan would reduce electricity consumption by 10 per cent by 2030 by investing Y84tn in low-consumption technologies and tightening already strict efficiency standards on everything from factories to appliances.

It is an ambitious target. Since the oil shocks of the 1970s, Japan has managed to keep increases in power consumption below its rate of economic growth, but achieving the absolute cuts envisaged by the plan would be a far greater challenge.

Even then, Japan would still emit more greenhouse gasses. Previously, the government had promised a 25 per cent cut in emissions compared with 1990 levels by 2020; now, it is aiming for a 5-9 per cent reduction by that date, and a 20 per cent decrease by 2030.

Developing the necessary clean-energy alternatives will not be easy. Solar and wind power, neglected amid the past focus on nuclear, together account for less than 1 per cent of total electricity generation. The strategy calls for output from these and other non-hydro renewables to increase eightfold by 2030, at an estimated investment cost of Y38tn.

Together, investment in efficiency and clean generation would amount to about a third of one year's GDP over 20 years. That is probably affordable for a rich country like Japan, but experts say logistics could be a bigger problem given the country's mountainous terrain and dense population.

Masakazu Toyoda, of the Institute for Energy Economics, calculates that raising solar power's share of electricity generation to 8 per cent by 2030 would require fitting photovoltaic panels on 80 per cent of all new buildings, starting immediately, plus retrofitting 3 per cent of homes and covering 550 sq km of farmland each year.

The lack of space for onshore wind farms explains Mr Ishihara's plan to float his out at sea – but offshore projects cost much more, even when turbines are mounted directly on the

seabed. The deep waters that surround most of Japan call for even more esoteric – and pricey – adaptations.

Supporters of a nuclear withdrawal point out that the deadline is nearly three decades away, giving utilities, consumers and government lots of time to adapt. Existing nuclear plants would be restarted in the meantime, then decommissioned after 40 years of operation, so Japan would still get 15 per cent of its electricity from nuclear power at the start of the 2030s.

Optimists also say much of the money invested in green technology would go to domestic technology companies, becoming an economic stimulus rather than a drain, and could lead to the development of whole new green industries.

Masaru Kaneko, a professor at Keio University, likens eliminating nuclear power to the US Clean Air Act of the 1970s, which spurred Japan's carmakers to develop the fuel-efficient vehicles that ultimately conquered the US market.

“Japanese carmakers hated the [law] at the time, but now they're grateful for it,” he says.  
Additional reporting by Ben McLannahan

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March 7, 2012 3:25 pm

# Japan weighs nuclear future

By Jonathan Soble

The coast road that winds along the Tsuruga peninsula, a rugged outcropping on the Sea of Japan that is home to a few hundred families and a cluster of nuclear power plants, is two lanes wide and seems well maintained. Yet its condition doesn't satisfy Jitaro Yamaguchi.

Mr Yamaguchi, mayor of the nearby town of Mihama, thinks the road is vulnerable to earthquakes and mudslides, which could leave the nuclear plants – two commercial facilities and an experimental fast-breeder reactor – cut off from help in an emergency. To forestall an atomic disaster like the one at Fukushima last year, he wants the government to pay for upgrades.



“I’ve been asking about this for years, but now I’m strongly demanding it,” Mr Yamaguchi says.

His renewed campaign is certain to get a hearing. Since three reactors melted down at Fukushima Daiichi after Japan’s tsunami 12 months ago, Mr Yamaguchi and other local leaders across Japan have effectively shut down the country’s nuclear industry, by withholding permission for plants in their jurisdictions to restart after regular safety inspections.

Today, only two of the 54 reactors that were in service before the Fukushima accident are producing power. The remaining pair are scheduled to go off-line by early May, leaving Japan without a working atomic plant for the first time in four decades, and depriving it of what had been the source of up to 30 per cent of its electricity.

The prospect has raised fears of supply shortages and, eventually, a nationwide rise in electricity tariffs. “Every day, Y10bn [US\$] of our national wealth is disappearing,” the conservative Sankei newspaper warned last month, citing a government estimate that the cost of importing extra natural gas, coal and other thermal fuels would reach Y3tn a year, about one-third of one per cent of GDP, if all the country’s reactors stayed shut.

Authorities in Tokyo are listening. Although the government of Yoshihiko Noda, prime minister, has talked of reducing Japan’s “dependency” on nuclear power in the long run, it is lobbying local leaders to allow their nuclear plants to resume operations for now, pending safety checks. “We hope to regain the public’s trust,” Mr Noda said in a recent interview with the Financial Times and other foreign journalists. “But in the end it will come down to a

political decision.”

Mihama and its neighbours are at the forefront of the politicking. Fukui prefecture, where the town is located, hosts 13 commercial reactors, more than any other prefecture in Japan, earning it the nickname *genpatsu ginza*, or “nuclear high street”. Reactors at one of its facilities, Oi nuclear station, were the first to undergo computer-simulated “stress tests” designed to assess their resistance to unusually large quakes and tsunamis.

A paradox of the nuclear impasse is that Fukui’s politicians are almost uniformly supportive of atomic power. Nor have they faced a groundswell of popular opposition. Last April, for instance, just a month after the Fukushima accident, Kazuharu Kawase, the staunchly pro-nuclear mayor of Tsuruga city, next door to Mihama, was reelected to a fifth term. “None of the other candidates was anti-nuclear either,” he says, adding that the few dissenting voices he hears come from “outside the prefecture”.

Yuki Sekimoto, an organiser for Greenpeace, which has set up a temporary lobbying operation in Fukui city, the prefectural capital, says the reception has been “friendlier than expected” but admits the area is “a very conservative place”.

Simple caution may explain local leaders’ reluctance to sign off on plant restarts until the lessons of Fukushima are fully absorbed. But so might the political advantages of wielding veto power.

Rural areas such as Fukui depend financially on Tokyo, and even nuclear safety can be a bargaining chip. When Issei Nishikawa, Fukui’s governor, endorsed the restart of Tsuruga’s fast-breeder reactor in 2010 – 15 years after a sodium leak forced it to shut down – local leaders say he openly linked his approval to the extension of a Shinkansen high-speed train line to the area. Construction is to begin in 2014. “That was definitely a trade,” says Mr Kawase.

Local leaders say they lack technical expertise to evaluate the safety of plants themselves, and are simply waiting for national authorities to make a definitive assessment on their behalf. Yet one lesson of Fukushima is that, in complex matters such as nuclear safety, absolutes are hard to come by.

Kansai Electric Power (Kepeco), operator of most of the atomic facilities in western Japan, including Fukui, has won a partial endorsement from regulators in Tokyo of its stress tests at Oi. Of the two national bodies that supervise the nuclear industry, one has signed off on the results and the other is scheduled to finish its deliberations next month.

However, one expert involved in the deliberations, a former nuclear plant designer at Toshiba, has called the tests “meaningless” academic exercises, while the normally pro-nuclear chairman of the Nuclear Safety Council, Haruki Madarame, said last month that a second, more comprehensive round of evaluations might be needed.

Keeping plants closed would carry costs for the often economically depressed areas that host them. In Mihama, mayor Yamaguchi says atomic facilities provide 1,000 permanent jobs, plus another 1,000 temporary ones during inspection and maintenance periods – a big part of the workforce in a rural town of 11,000 residents.

About 45 per cent of the Mihama municipal budget comes from nuclear-related taxes and subsidies.

At a coffee shop frequented by Kepco employees, Takako Tsuji, the owner, says Mihama “would become a ghost town if the plants stay closed, and a ghost town if there’s an accident”. She would like to see the reactors restarted “as long as we can be sure they’re safe”.

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