



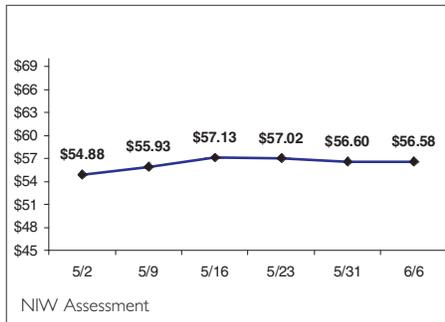
# NUCLEAR INTELLIGENCE WEEKLY

Incorporating Uranium Intelligence Weekly

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Vol. V, No. 23, June 6, 2011

## UPP: \$56.58/lb U3O8



## Market Points

The spot market remains quiet, and the price stable as the traditionally slow summer season (in the Northern Hemisphere) begins.

Unfilled uranium requirements for the world's largest fleet of nuclear reactors increased last year, according to the US Energy Information Administration.

Speakers at a conference Monday in Seville told market participants that China has built a uranium stockpile and stepped back from its previously aggressive spot market buying.

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## WEEKLY ROUNDUP

### US Unfilled Uranium Demand Rose in 2010

- Unfilled uranium requirements for US utilities increased by about 5% last year, bucking what had been a generally downward trend since 2000, according to the US Energy Information Administration (p3).
- Japan's Fukushima Daiichi nuclear power plant had full meltdowns at units 1-3 after the Mar. 11 earthquake and tsunami, CNN reported Jun. 6, citing information from the country's Nuclear Emergency Response Headquarters. This goes further than Tepco's own analysis, which suggested partial or full meltdowns (NIW May23'11). Meanwhile, the estimated release of radioactive material into the air has doubled to some 770,000 tera bequerels (vs 370,000 TBq previously) between Mar. 11 and Mar. 16, Bloomberg reported, citing remarks by Nisa's deputy director-general Hidehiko Nishiyama at a press conference Jun. 6. In related news, radiation of up to 4,000 millisieverts per hour was detected in the unit 1 reactor building, possibly the highest so far recorded. And Japan's NHK reported Jun. 5 that trace amounts of plutonium were detected in soil samples some 1.7 kilometers from the nuclear plant.
- Westinghouse and Hitachi-GE Nuclear Energy are apparently willing to become equity investors in newbuild projects, at least for Lithuania's prospective Visaginas nuclear project (p4).
- Competing for domestic projects in the past few years, CNNC and CGNPC are now vying for international markets, hoping to grab shares from more established players (p5).
- The Tennessee Valley Authority has announced plans to complete the 1,260 MW Bellefonte 1 reactor, which was started in the 1970s (p6).
- Running short of indigenous uranium supplies, Brazil's state-owned uranium mining company borrowed inventory from a Navy stockpile, leading to massive protests last month (p7).
- The IAEA began a weeklong board meeting in Vienna Jun. 6, with the US and its Western allies seeking to refer Syria to the UN Security Council for "noncompliance" for alleged illicit nuclear activity. The 35-member board has a number of other weighty items on its agenda, ranging from the accident in Japan to the upcoming two-year budget. However, attention is likely to be focused on the Middle East, with Syria taking over from Iran as the focal point. IAEA Director General Yukiya Amano recently stated his conviction that Syria was "very likely" developing an undeclared covert reactor on a desert site, known as Dair Alzour, flattened by Israeli bombs in September 2007. Iran will be criticized for stockpiling low-enriched uranium in defiance of multiple UN sanctions, and refusing to answer allegations of possible military dimensions to its nuclear program.
- In Perspective: Japanese Prime Minister Kan's recent declarations about nuclear power raise serious concerns about the alternatives, argues analyst Paul J. Scalise (p8). ☼

## Japan's Nuclear Energy Policy Revisited

Prime Minister Kan's recent declarations about nuclear power surprised many observers, and raise serious concerns about the alternatives. Paul J. Scalise, a nonresident fellow at the Institute of Contemporary Asian Studies at Temple University, Japan Campus, and contributing analyst to Oxford Analytica, the Economist Intelligence Unit, and Eurasia Group, describes what is known.

Just five weeks after the most destructive earthquake in Japan's history precipitated a tsunami-induced nuclear power accident at Tepco's Fukushima Daiichi, Prime Minister Naoto Kan's touched on the need to freeze Japan's plans to build new nuclear facilities until further notice. On May 16, the premier sent further shockwaves through the nuclear policy communities by requesting Chubu Electric Power Co. shut down its Hamaoka nuclear power plant out of earthquake safety concerns.

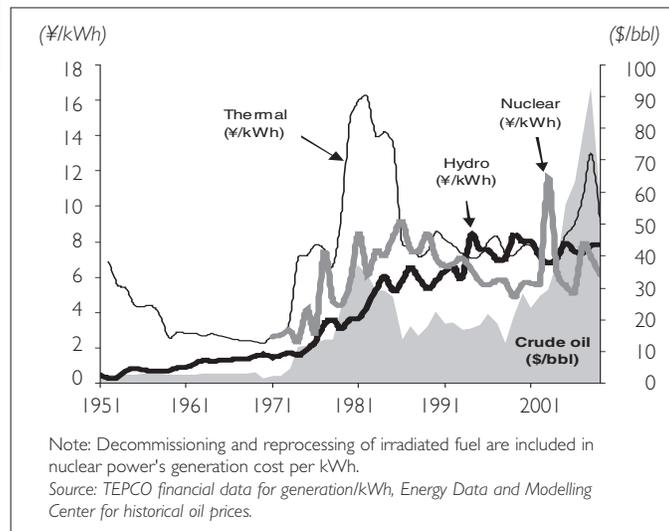
These rapid-fire developments in a country known for taking its time in the decision-making process have led many to question the premier's unilateral declarations on nuclear policy. Is this the beginning of the end for Japan's nuclear program, or simply a political maneuver by an increasingly unpopular premier designed to buy the Cabinet Office some time?

Japan's status as the only country to experience firsthand the impact of nuclear weapons, yet a country that embarked on a civilian nuclear energy program in the early postwar era, contributes to the muddle. From 1963 to 2009, 60 nuclear reactors were built in rapid succession, contributing approximately 30% of total generated power by the major electric utilities by 2010 (22% if all off-grid sources are included). If Japan truly suffers from a "nuclear allergy" (kaku are-rugi), some ask, why would it ever insist on building commercial nuclear power plants? Yet given the circumstances, it is difficult to see why and how the country would not have built them.

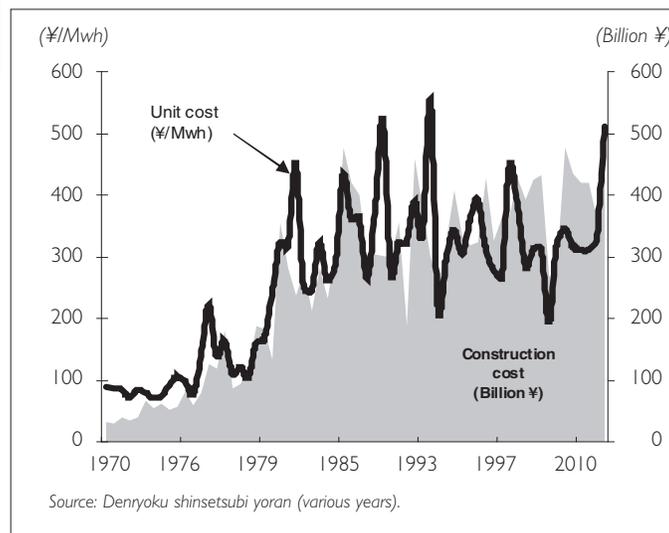
Japan is the third largest economy in the world. It occupies 0.28% of the world's land mass, 2.1% of the world's

population, and 15.3% of the world's GDP. A densely populated industrial society that heavily depends on stable energy supplies to survive, Japan's imports virtually all of its oil, coal and natural gas.

### Generation Cost by Type Vs. Oil Price



### Japan's Reactor Construction Costs



Before the 1973 Arab-Israeli War, this predicament was manageable. Oil-fired conventional thermal plants operated at a marginal cost that was both price competitive and logistically sound: conventional plants were quick to build, small in size, and required little staff to keep pace with growing demand. After the 1973 oil shock, it became evident that relying on imported fossil fuels to generate 83% of a country's installed capacity was both reckless and short-sighted. As oil prices skyrocketed 660% within the decade, Japan's average electricity tariffs also rose 228% from 7.3 yen/kWh to 23.9 yen/kWh by 1981. Electricity-intensive industries in Japan like aluminum faced bankruptcy, while others floundered.

In response to the energy crisis, Japan embarked on an ambitious commercial nuclear development program. Dwight D. Eisenhower's "atoms for peace" found a friend in Japanese industry, government and the electorate. They viewed it as an environmentally friendly generation source, offering a stable "baseload supply" that ran 24 hours a day, providing much-needed jobs, and — perhaps most importantly —

being cheaper than rival power alternatives (2.4 yen/kWh for nuclear vs. 7.1 yen/kWh for conventional) in 1974.

Today, the energy economics remain largely the same, but nuclear's political image has grown suspect. The Three Mile Island accident in 1979, Chernobyl in 1986 and a series of lesser scandals energized the not-in-my-backyard (Nimby)

## Japan's Nuclear Energy Policy Revisited (cont.)

sentiments among many local communities that delayed the siting, licensing and construction of nuclear power plants. This obstruction by local interest groups such as fishermen, farmers, senior citizens and others unexpectedly added to the compensation costs needed to assure success.

Construction costs per kilowatt rose from 90,476 yen in 1970 (Japan Atomic Power Company's Tsuruga No. 1) to 345,264 yen in 2011 (Electric Power Development Co.'s Ohma No. 1, still under construction). Decommissioning and reprocessing of irradiated fuel were covered in the nuclear generation price, but companies like Tepco raised load factors and trimmed operating expenses in order to maintain a competitive marginal cost (6.1 yen/kWh). Alternative generation sources such as hydro-electric (7.9 yen/kWh), thermal (9.1 yen/kWh) and solar energy (30.5 yen/kWh) continued to lag behind the curve.

As oil prices rise once again on the world spot market, the need to juggle multiple objectives in Japan's national energy policy becomes all the more pressing. Hydro-electric and geothermal power are both environmentally friendly, but the best sites have either been captured already (hydro) or require legal revisions to the protection of

national parks to explore further (geothermal), thus adding financial risk to limited reward. Wind power may be touted in Denmark, but in Japan questionable geography, avian dangers and limited generation output at higher cost make it less practical.

Before the nuclear renaissance in the United States, the mere mention of nuclear power in the media often conjured up negative images of mushroom clouds, radioactive waste disposal, contamination leaks and the like. Japan's media largely avoided such a negative image in its five major dailies in the name of "just-the-facts" (fuhun futo). Will Japan's current nuclear crisis finally change its image from neutral to negative? No one knows.

But a short-term test of both the premier's rhetoric and the electorate's stomach for nuclear power rests with the fate of two nuclear power plants currently under construction: Shimane No. 3 owned and operated by Chugoku Electric and Ohma No. 1. Both took over 10 years to site; both cost billions of yen to construct; and both would cost the taxpayer much more to decommission. If Japan has truly soured on nuclear power, we should all watch with great interest what becomes of these reactors over the next 12-24 months. ☸

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