

## Asia Embraces Nuclear Power: at what cost?

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By Michael Casey

ULSAN, South Korea — Led by fast-growing China and India, Asia is going nuclear in a big way to feed its ravenous appetite for energy.

The strains of economic growth are already showing. Energy shortages have forced Chinese factories to scale back production, and farmers in India often have power for only half the day. Both countries say their future growth is at risk unless they diversify their energy mix.

South Korea, the world's second-biggest coal importer and third-biggest oil importer, already depends on nuclear reactors for 40 percent of its power and is talking of increasing that to 60 percent by 2035.



Four nuclear reactors at the Wolsong Nuclear Power Plant. Photograph by Lee Jin-man

Korea Hydro and Nuclear Power is building four reactors and plans four more by 2017. Two

of them are 1,000-megawatt reactors going up in Ulsan, lighting as many as 2.4 million homes in South Korea's industrial heartland.

Along with homemade reactors, Asia's plans hold out the promise of a bonanza for American companies such as Westinghouse and General Electric, which already have a strong presence in the region. Westinghouse has helped build 14 nuclear plants in South Korea and provided technology for almost half of Japan's 55 nuclear units. GE, meanwhile, has helped build 36 reactors in Japan, India and Taiwan.

"We expect Asia to become a leader in the use of commercial nuclear power," said Timothy Collier, president of Westinghouse Korea. Asia needs a reliable electricity source, he says, and "Nuclear offers the opportunity to do that free of the dependence on oil."

### On the boards

Eighteen reactors — about 70 percent of the world's total under construction — are going up in Asia, and another 77 are planned or proposed, according to the Nuclear Energy Institute, an industry advocacy group based in Washington, D.C.

Japan depends on nuclear plants for a third of its power and plans to double its nuclear capacity by 2050. Australia wants to build its first plant, and Indonesia has vowed to go nuclear, even though it's vulnerable to earthquakes, floods and landslides.

According to the World Nuclear Association, a group that promotes nuclear energy, China plans to increase its nuclear capacity from 6.6

gigawatts to 40 gigawatts by 2020 with the addition of 30 nuclear plants, mostly in heavily populated, industrialized coastal regions where demand and pollution levels are highest.



Chinese nuclear power plants

India intends to go from just under 3 gigawatts to 20 gigawatts by 2020 with the addition of 31 plants, mostly in the west where much of its heavy industry lies.

India's nuclear industry received a boost in March after it signed a civilian nuclear pact with the U.S. Under the deal awaiting congressional approval, the United States will give India nuclear technology and fuel in return for India's permission for international inspections and safeguards at 14 reactors.

"Nuclear power has to play an increasing role in our electricity generation plans," Indian Prime Minister Manmohan Singh told Parliament last year. "Our desire is to attain energy security to enable us to leapfrog stages

of economic development obtained at the least possible cost."

Greenpeace, the environmental movement, continues to lead the charge against nuclear power, warning that Asian countries about to embrace the atom need to think hard about the potential consequences.

No country in Asia has a permanent site for the estimated 40,000 tons of toxic spent fuel produced so far, according to the International Atomic Energy Agency, the U.N.'s nuclear watchdog, which opponents say could become a target for terrorists or end up polluting the groundwater. There is also the fear that nuclear power could become a cover for countries with weapons ambitions such as North Korea.



Nuclear Waste

"We think nuclear energy is inherently unsafe," said Gerd Leipold, executive director of Greenpeace International. "You have the waste problems. You have the accident problems. For all of these reasons, we think countries should invest in renewable energy and energy efficiency."

Many of the biggest concerns revolve around Indonesia, which has said that it will build its first reactor by 2015 on Java — the same island where an earthquake killed more than 5,700 people in May, and where the Mount Merapi

volcano is threatening to erupt.

The announcement prompted a warning from the Australian Institute in Canberra that, "Although the risks of a major [nuclear] accident are very low, a cloud of radiation blowing over northern Australia would pose a severe danger to public safety."

But with oil prices spiking, and fossil-fuel emissions being blamed for global warming, the allure of atomic power is growing worldwide, and the nuclear accidents at Three Mile Island and Chernobyl which set back the industry for a generation are receding from the forefront of public memory.

The United States and Russia are reviving long-dormant nuclear plans while France, which gets 80 percent of its power from nuclear plants, is a leader of the industry's renaissance.

Every 1,000-megawatt reactor, the NEI says, saves 7.9 million barrels of oil or 3.4 million tons of coal a year and eliminates 34,000 tons of polluting sulfur dioxide and 11,000 tons of nitrogen oxide.

China's energy supply leans heavily on coal, said Andy White, president of GE's nuclear division. "They realize if they are going to play a senior role in the world's economy, they have to do something about the environment. ... I think nuclear is the key answer to their portfolio."

Twenty nuclear power plants dot the South Korean countryside and what public reaction there is tends to be mixed. In the 1990s residents demonstrated against the Yonggwang Nuclear Power plant on the southwest coast, and vendors still complain they have difficulty marketing their fish and vegetables because of the plant's stigma.

But the area is poor, and some residents say they're more annoyed that it wasn't chosen last

year for a permanent nuclear-waste site since that would have brought in millions in government aid.

Asia's biggest problem isn't new reactors, but what to do with the spent fuel.

It took South Korea 19 years just to find a burial site for low-level waste such as contaminated clothing and spare reactor parts, and it still has nowhere to dump its 6,500 tons of fuel.

### **No takers**

Taiwan, which has three plants and is building a fourth, has been thwarted at finding a long-term solution for its waste. First it tried North Korea and the Marshall Islands but was blocked by protests. Taiwan has stored 100,000 barrels of nuclear waste on a tiny island, but protests from aboriginal group are forcing it move the waste to another site, as yet unchosen, by 2013.

"After nearly 50 years of the nuclear-power experiment, nobody has demonstrated a solution to this problem. In the absence of a viable solution, expanding the rate of waste production is just irresponsible," professor Ian Lowe of Griffith University in Brisbane, Australia, wrote in a September report released by a coalition of Australian environmental groups.

Britain, France, Russia and Japan have opted for fuel reprocessing, which can extract plutonium and combine it with uranium to create oxide fuel, or MOX. But the extracted plutonium can be weaponized and is therefore vulnerable to theft for misuse, warns the Union of Concerned Scientists, a U.S. advocacy group.

### **Japanese concerns**

In Asia, nuclear reactors seem to have their biggest problems in Japan. Nuclear power has

always been a tough sell in the only country ever hit by an atomic bomb, and opposition has grown following a series of deadly accidents and shutdowns.

A 1999 reprocessing plant accident outside Tokyo killed two workers and exposed hundreds to radioactivity, while in 2004 five workers were killed at a plant in western Japan in the country's worst nuclear-plant accident.



### Plant under construction at Tomari

Safety problems have also left its nuclear fuel-cycle program in a shambles. The country's first experimental fast-breeder reactor, Monju, was shut down after more than a ton of volatile liquid sodium leaked from its cooling system in 1995.

*Michael Casey is an environmental reporter for the Associated Press. This article appeared in the Seattle Times on July 28, 2006. Published at Japan Focus on August 2, 2006.*