

# Nuclear: Still a Contender

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Nuclear fission appeared to lead the race as an energy alternative decades ago, as countries began building reactors. Worldwide, about 440 plants now generate 16 percent of the planet's electric power, and some countries have gone heavily nuclear. France, for instance, gets 78 percent of its electricity from fission.

The allure is clear: abundant power, no carbon dioxide emissions, no blots on the landscape except an occasional containment dome and cooling tower. But along with its familiar woes—the accidents at Three Mile Island and Chernobyl, poor economics compared with fossil fuel plants, and the challenge of radioactive waste disposal—nuclear power is far from renewable. The readily available uranium fuel won't last much more than 50 years.

Yet enthusiasm is reviving. China, facing a shortage of electric power, has started to build new reactors at a brisk pace—one or two a year. In the U.S., where some hydrogen-car boosters see nuclear plants as a good source of energy for making hydrogen from water, Vice President Dick Cheney has called for "a fresh look" at nuclear. And Japan, which lacks its own oil, gas, and coal, continues to encourage a fission program. Yumi Akimoto, a Japanese elder statesman of nuclear chemistry, saw the flash of the bomb at Hiroshima as a boy yet describes nuclear fission as "the pillar of the next century."

In the town of Rokkasho at the northernmost tip of Honshu Island, Japan is working to get around the limits of the uranium supply. Inside a new 20-billion-dollar complex, workers wear pale blue work suits and an air of patient haste. I looked in on cylindrical centrifuges for enriching uranium and a pool partly filled with rods of spent nuclear fuel, cooling. Spent fuel is rich in plutonium and leftover uranium—valuable nuclear material that the plant is designed to salvage. It will "reprocess" the spent fuel into a mixture of enriched uranium and plutonium called MOX, for mixed oxide fuel. MOX can be burned in some modern reactors and could stretch the fuel supply for decades or more.

Reprocessing plants in other countries also turn spent fuel into MOX. But those plants originally made plutonium for nuclear weapons, so the Japanese like to say that theirs, due to start up in 2007, is the first such plant built entirely for peaceful use. To assure the world that it will stay that way, the Rokkasho complex includes a building for inspectors from the International Atomic Energy Agency, the United Nations' nuclear watchdog, who will make certain that none of the plutonium is diverted for weapons.

That doesn't satisfy nuclear energy opponents. Opposition has mounted in Japan after fatal accidents at the country's nuclear plants, including one that killed two workers and exposed others to radiation. Shortly after my visit to Rokkasho, about a hundred protesters marched outside the plant in a blizzard.

A bigger controversy would greet what some nuclear proponents think is a crucial next step: a move to breeder reactors. Breeders can make more fuel than they consume, in the form of plutonium that can be extracted by reprocessing the spent fuel. But experimental breeder reactors have proved to be temperamental, and a full-scale breeder program could be an arms-control nightmare because of all the plutonium it would put in circulation.

Akimoto, for one, believes that society has to get comfortable with fuel reprocessing if it wants to count on nuclear energy. He spoke to me through an interpreter, but to emphasize this point he jumped into English: "If we are going to accept nuclear power, we have to accept the total system. Sometimes we want to get the first crop of fruit but forget how to grow the trees."