

# Nuclear Power Development: Removing Roadblocks

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*The use of nuclear power to generate electricity is growing worldwide. More than 100 nuclear power plants are under construction or in various stages of planning, and many existing plants are expanding. [See the figure.]*



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President Obama recently announced an \$8.33 billion federal loan guarantee for the construction of a pair of nuclear reactors in Georgia. The president also said he wants to triple the amount of loans the federal government guarantees in order to jumpstart seven to 10 new nuclear power projects over the next decade. The guarantees should lower borrowing costs and make financing easier to obtain. However, until the government meets its legal obligation to provide storage for spent nuclear fuel and high-level radioactive waste, only a few new nuclear reactors are likely to be built. Fortunately, solutions are available if the government is willing to embrace them.

**Politics and Nuclear Waste.** The most problematic nuclear waste in the United States is spent fuel rods from nuclear reactors. The problem is largely a creation of the federal government. In the early 1970s, the now defunct Atomic Energy Commission tightened regulations on the nascent U.S. nuclear recycling industry, which increased costs and made recycling uneconomical. As a result, the sole recycling plant in the United States closed and construction on a second facility was halted. In 1977, due to fear of nuclear proliferation, President Jimmy Carter signed

an executive order that officially banned nuclear fuel reprocessing.

With waste building up, Congress passed the 1982 Nuclear Waste Policy Act (amended in 1988) to ensure proper long-term storage. The act required the U.S. Department of Energy to develop and maintain an underground storage facility for nuclear waste:

- The site had to meet strict criteria, including the ability to safely contain 77,000 metric tons of material for up to 10,000 years.
- The material had to be accessible for 50 years in the event President Carter's ban was reversed and a recycling program was allowed.
- To pay for storage, a tax was levied on the nuclear power industry.

After 26 years and more than \$8 billion (collected from nuclear operators), the Energy Department determined that Yucca Mountain, Nevada, was a satisfactory storage place. However, despite scientific evidence that Yucca Mountain is safe, lawsuits and political wrangling have prevented use of the site as a storage facility. In fact, the Obama administration recently zeroed out spending on Yucca Mountain, announcing that the program would be terminated.

**Reducing Waste through Recycling.** The uranium in spent nuclear fuel rods can be reprocessed

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into new fuel. Most of the nuclear waste disposal problem would be eliminated if the government ended its prohibition on recycling.

In addition, recycling used fuel rods would provide a nearly endless source of domestic energy. The United States has abundant uranium (raw nuclear fuel) sources. Indeed, at current levels of use, accessible uranium reserves can provide an estimated 300-year worldwide supply of fuel, according to the International Atomic Energy Agency. One kilogram of natural uranium contains as much energy as 38.5 tons of coal, but only about 3 percent of that energy is utilized in conventional reactors. Thus, recycling existing and future spent fuel rods would provide a virtually unlimited supply of nuclear fuel. Even greater nuclear fuel supplies can be liberated from more than 15,000 plutonium pits removed from dismantled U.S. and Soviet nuclear weapons.

### Reducing Greenhouse Gas

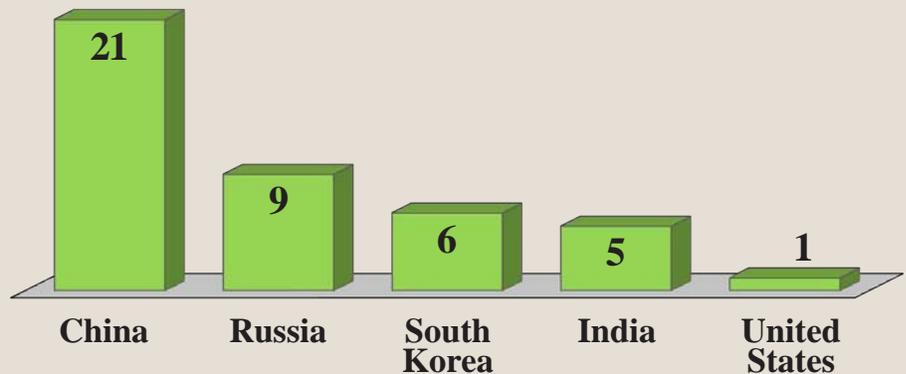
**Emissions.** Moreover, in a carbon conscious world, nuclear power emits little carbon dioxide (CO<sub>2</sub>), whereas other energy sources emit far more:

- Coal-fired power plants produce 1,041 tons of CO<sub>2</sub> per gigawatt hour (one billion watt hours) of electricity generated.
- Natural gas plants produce 622 tons of CO<sub>2</sub>.
- Solar generators produce 39 tons of CO<sub>2</sub>.

By contrast, nuclear power plants generate only 17 tons of CO<sub>2</sub> per gigawatt hour of electricity produced. This is especially important should the United States adopt limits on CO<sub>2</sub> emissions in order to address concerns about climate change.

### Nuclear Reactors under Construction

(in selected countries)



Source: "Nuclear Power Plants Information: Under Construction Reactors by Country," International Atomic Energy Agency, March 2010.

**Storing Nuclear Waste.** Even with recycling, nuclear energy production will create radioactive waste. Thus, the question of storage remains. Fortunately, even if Yucca Mountain is not an option, the United States already has a location successfully storing high-level radioactive waste.

The Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico, has been operating for more than nine years. More than 100,000 containers of radioactive material — equivalent to about 280,000 55-gallon drums — have been stored in a massive bedded (layered) salt deposit there. The salt in the formation is self-sealing: It flows like sand to fill in, or seal, the disposal chambers completely. The location is remote, but has sufficient infrastructure for ongoing disposal operations.

WIPP has been extensively monitored for human health and environmental risks for 15 years, including six years before operations began. The Carlsbad Environmental Monitoring and Research Center at New Mexico State University report-

ed that from 1993 to the present there has been no evidence of an increase in contaminants in the ground, air or water near WIPP. Indeed, due to the unique self-sealing and impermeability properties of the salt, radiation levels have not exceeded the baseline measured before the operation began.

The main impediment to using the location as a central depository for spent nuclear fuel rods is the current legal requirement that waste be retrievable for up to 50 years. Once waste is stored in WIPP, it isn't coming out again.

**Conclusion.** The disposal of used nuclear fuel rods remains a roadblock to expansion of U.S. nuclear power capacity. Reprocessing used fuel rods would dramatically reduce the amount of waste requiring long-term storage. It would also dramatically increase domestic energy supplies. With or without recycling, sites like WIPP offer a safe, ready solution.

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