

The future of nuclear energy

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Last March, the world watched closely as Japan struggled to contain a series of equipment failures, hydrogen explosions and releases of radioactive materials at the Fukushima Daiichi Nuclear Power Plant.

The historic [tsunami](#) following the 9.0-magnitude earthquake destroyed the [reactors](#)' connection to the power grid, causing them to overheat. Hundreds of people were exposed to increased levels of radiation. Thousands more were evacuated. Although Japanese officials have since declared the plant stable, the cleanup will be expensive and is expected to take decades.

A year later, however, the United States is moving forward with [nuclear power](#). For the first time since 1978, the National Regulatory Commission has approved two new plants. The \$14 billion facilities will be built just outside Augusta and operated by Atlanta-based Southern Company. They're scheduled to be up and running by 2016 and 2017 and should produce about 10 percent of Georgia's power.

"It's smart to continue generating nuclear power in the United States," said Marilyn Brown, professor in Georgia Tech's School of Public Policy. "It is a reliable, cost-competitive option that doesn't contribute to air pollution or contribute to greenhouse gas emissions." Brown helps shape the nation's energy policies as a board member of the Tennessee Valley Authority (TVA) and chair of the company's Nuclear Oversight Committee.

Brown said that nuclear power plants are expensive to build, compared

to natural gas facilities.

“But they are clearly worth the investment,” she said. “A nuclear plant produces no carbon dioxide emissions and four times the power of a typical natural gas facility. Fourteen billion is a big number, but the plants should stay online for 50 to 70 years.”

Despite the benefits, critics will always point to the risk of a nuclear catastrophe. These are the nation’s first approved nuclear facilities since Pennsylvania’s Three Mile Island accident in 1979. Experts contend that modern plant designs are much safer than those built previously.

“The new plant designs are passively safe, so there are far fewer issues to worry about, like those that occurred with the older plants at [Fukushima](#) with the loss of off-site power,” said Glenn Sjoden, Georgia Tech professor of nuclear and radiological engineering. “With the new plants, you have a convection cooling loop that uses gravity and runs by itself for days in the event of lost power. There would be no active pumping required. . . . The more modern designs and precautions taken make nuclear the best option to satisfy our energy needs.”

Since last year’s incident, the Nuclear Regulatory Commission has been reviewing existing U.S. plants to ensure that they can withstand earthquakes, floods and other natural disasters and making retrofit upgrades when necessary, Sjoden said.

Critics point to nuclear waste as another challenge with nuclear power. Each of the nation’s 104 plants store the radioactive waste on-site in steel casks protected by concrete and other safety systems. These are safe too, Brown said, because of careful construction and maintenance.

Nuclear waste would be a nonissue if the U.S. reprocessed its spent fuel like other nations such as France, Sjoden said.

“Like most nations, they recycle their used fuel, since 95 percent of the fuel can be recycled back into the reactor and used again, making nuclear power the most ‘green’ energy source out there,” Sjoden said. “Burying the waste, as we do in the United States, is completely wasteful.”

The [United States](#) generates almost 20 percent of its energy from nuclear plants, the same amount as natural gas. Coal supplies 50 percent. The remainder is generated from hydropower and other natural sources.

“We must develop more renewables sources, such as wind, solar and biopower,” says Brown. “Industry leaders, business and the general public must also become more energy efficient. That is the key to our future.”

Provided by Georgia Institute of Technology

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