CRS Issue Statement on Nuclear Energy

Mark Holt, Coordinator
Specialist in Energy Policy

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Nuclear energy is viewed by its supporters as a virtually inexhaustible and clean source of power. But the industry has been hampered by construction cost overruns, delays by regulators and interveners, concerns about nuclear weapons proliferation, and controversy over nuclear waste disposal. Nuclear power plants now supply one-fifth of the U.S. demand for electricity, although no new U.S. reactors have been ordered since the 1970s and none have begun operation during the past 13 years. But as the price of conventional fossil fuels has grown more volatile, the economics of nuclear power have begun to appear more attractive. In addition, concern about carbon dioxide emissions from fossil fuels, particularly coal, has led some former critics of nuclear energy to reconsider its merits.

Federal incentives may play a key role in the future of U.S. nuclear power. Under the Energy Policy Act of 2005 (P.L. 109-58), new reactors are eligible for tax credits, loan guarantees, and payments for regulatory delays. Those incentives—combined with volatile fossil fuel prices and carbon dioxide concerns—have led to license applications for more than two dozen new power reactors. Proposals for additional federal incentives, such as increased loan guarantees, are likely to be a major subject of congressional debate.

Reprocessing of spent nuclear fuel is a potential means of recovering “unburned” uranium and plutonium for recycling into new fuel and reducing waste. Concern that reprocessing could contribute to nuclear weapons proliferation led President Carter to terminate federal support for commercial reprocessing in 1977. The Energy Policy Act of 2005 directed the Department of Energy (DOE) to proceed with the Advanced Fuel Cycle Initiative (AFCI) to develop “proliferation-resistant” reprocessing technologies. The Bush Administration’s Global Nuclear Energy Partnership (GNEP) aimed to attract commercial interest in applying AFCI technology to a new generation of nuclear power plants that would burn reprocessed fuel. The Obama Administration has redirected DOE’s fuel cycle research program toward fundamental science and away from near-term deployment.

Nuclear waste disposal is vital to the continued operation and expansion of the nuclear power industry. DOE submitted a license application in June 2008 for the nation’s first repository for high-level waste and spent nuclear fuel, planned for Yucca Mountain, Nevada. The inventory of high-level waste and spent fuel, currently estimated at 58,000 metric tons, would likely exceed the repository’s 70,000 metric ton limit set by the Nuclear Waste Policy Act of 1982 by the time the repository could begin operation. The repository’s capacity, environmental compliance, and other nuclear waste issues have been the subject of numerous legislative proposals. President Obama has taken steps to halt the Yucca Mountain project and plans to establish a “blue ribbon” commission to develop alternative waste management options.

Safety has been a fundamental issue for nuclear power since its inception. Congressional concern about nuclear power plant safety since 2001 has focused particularly on the potential consequences of terrorist attacks. The Energy Policy Act of 2005 included several significant nuclear security measures that had been debated since the attacks. Other safety issues have also unexpectedly arisen from time to time, despite the good safety record of most plants in recent years.
Issue Team Members

Mark Holt, Coordinator
Specialist in Energy Policy
mholt@crs.loc.gov, 7-1704

Stan Mark Kaplan
Specialist in Energy and Environmental Policy
skaplan@crs.loc.gov, 7-9529

Anthony Andrews
Specialist in Energy and Energy Infrastructure Policy
aandrews@crs.loc.gov, 7-6843

Paul K. Kerr
Analyst in Nonproliferation
pkerr@crs.loc.gov, 7-8693

David M. Bearden
Specialist in Environmental Policy
dbearden@crs.loc.gov, 7-2390

Mary Beth Nikitin
Analyst in Nonproliferation
mnikitin@crs.loc.gov, 7-7745

Mark Gurevitz
Information Research Specialist
mgurevitz@crs.loc.gov, 7-7204

Adam Vann
Legislative Attorney
avann@crs.loc.gov, 7-6978
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