



A Resurgence of Nuclear Power Poses Significant Challenges

Advocates of nuclear power are promoting a “nuclear renaissance” based on claims that a new generation of reactors will produce relatively cheap electricity while solving the threat posed by global climate change. U.S. power producers have proposed building more than 30 new nuclear reactors—and some proponents have called for building as many as 300 plants by mid-century. The industry faces enormous challenges to realizing this vision, however.

Though nuclear power is sometimes touted as a “domestic” energy resource that can displace reliance on imported fuels and stimulate the economy, about 80 percent of U.S. nuclear fuel is imported. Furthermore, nuclear power will displace little if any imported oil because very little oil is used to generate electricity today. Finally, most major nuclear plant components will be manufactured by overseas corporations such as France’s AREVA and Japan’s Mitsubishi Heavy Industries.

Economic and Financial Challenges

Ensuring that new nuclear plants will be economical—even assuming that owners of fossil fuel-fired power plants are required to pay for their heat-trapping emissions—represents a huge challenge. Contrary to industry and government predictions of only a few years ago, cost estimates for new nuclear plants have skyrocketed well above many other low-carbon alternatives. The current average estimate of \$9 billion per plant would lead to large rate increases and threaten the financial viability of many companies.

Along with numerous subsidies, Congress has already authorized \$18.5 billion in loan guarantees for builders of new nuclear plants, but

the industry is demanding in excess of \$100 billion more. Neither Wall Street nor the industry is willing to finance an expansion of nuclear power without using taxpayers to shield the industry from the economic risks of this expensive technology. The history of the nuclear and financial industries, however, shows that shielding investors from risk leads to speculation, asset abandonment, and costly taxpayer bailouts. The first generation of nuclear plants cost ratepayers and taxpayers more than \$300 billion; current industry proposals could put taxpayers and ratepayers at risk for much more.

Safety and Security Challenges

The industry has abandoned its claims from the previous decade that the next generation of nuclear plants would be “inherently safe.” New plant designs are still vulnerable to large radiation releases from accidents, sabotage, and terrorist attack. Widespread adoption of reprocessing technology, which some in the industry still advocate, would add the risk of nuclear materials being stolen to build nuclear weapons. Furthermore, the fear and distrust caused by a nuclear accident would threaten the viability of the entire industry.



Waste Disposal Challenges

While nuclear waste can be stored safely for the short term (in on-site concrete casks), long-term storage is critical if the industry is to grow substantially. But after 50 years of nuclear power generation, no country has been able to license a long-term waste repository. The proposed Yucca Mountain site in Nevada has been plagued with technical, managerial, and political problems at a cost to taxpayers of more than \$13.5 billion to date. The Obama administration has announced that after 20 years of scientific analysis and contentious debate, the government will cease to pursue that site as a permanent repository—and no other site has been identified.

Water Resource Challenges

Nuclear reactors require enormous volumes of water as coolant. During some droughts in both Europe and the United States, nuclear plants have had to reduce their power output or shut down completely. This could become a major limiting factor for industry expansion as global warming exacerbates drought conditions in some regions.

Siting and Permitting Challenges

The size and unique risks of nuclear plants make siting and permitting especially difficult. While surveys have shown some increasing public acceptance of nuclear power during the last few years, it is still ranked less desirable than all other types of generation except perhaps coal. The Nuclear Regulatory Commission's plant licensing process has been streamlined to limit opportunities for public input and challenge, but the process has never been evaluated for its impact on licensing time, safety, and public confidence.

Infrastructure Challenges

The nuclear infrastructure has been in decline for two to three decades and would need to be rebuilt to accommodate any expansion. But there are only half as many nuclear engineering programs at U.S. colleges as there were in the mid-1970s, and only 80 companies are qualified to produce nuclear-grade materials—down from 400 two decades ago. Most importantly, only two manufacturing facilities in the world are capable of making heavy components such as reactor pressure vessels.

Thus, the industry can produce only an average of 12 plants per year globally until about 2030, increasing to 54 plants per year between 2030 and 2050. This makes it unlikely that more than a few plants per year could be installed in the United States through 2030 even under the most optimistic scenario. Expanding the global nuclear industry by 1,000 to 1,500 new 1,000 MW plants (300 of which have been suggested for the United

States) would require the construction of 11 to 22 additional uranium enrichment facilities, as well as a new Yucca Mountain-sized waste repository every four years.



Source: Jupiter Images

A Better Direction

Given the need to reduce carbon emissions 80 percent or more by mid-century, the nuclear power option should not be taken off the table. But rather than pushing the premature deployment of new plants through massive public subsidies and loan guarantees, the industry and government should attempt to resolve critical economic, technical, and safety issues before committing the United States to a large-scale nuclear resurgence. For more information on these and other concerns, see the Union of Concerned Scientists reports *Nuclear Power in a Warming World* (2007) and *Nuclear Loan Guarantees: Another Taxpayer Bailout Ahead?* (2009).

More information is available online at www.ucsusa.org

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