Nuclear Energy

Today there are 438 commercial nuclear power plants operating in 30 countries. These reactors supply 16 percent of global electricity, an important consideration in a world where energy demand is growing rapidly. But they also pose a tempting target for terrorists, and damaging them—whether intentionally or by accident—could have catastrophic effects. Further, as nuclear materials are unearthed from mines and distributed across the globe, they contaminate soil, air, and water, damaging the environment and people's health.[1]

Simulated attacks on nuclear power plants have shown that many reactors are poorly secured. In both the United States and Russia, government agencies have launched mock attacks on reactors, only to find that power plant defenses are often inadequate to prevent infiltration and the planting of fake bombs. Twenty-seven of the 57 simulated attacks in the United States during the 1990s revealed significant vulnerabilities that could have caused reactor "core damage" and "radiological release." Even environmental groups have been able to simulate attacks on power plants successfully. In 2003, to expose the plant's vulnerability, Greenpeace activists stormed the United Kingdom's Sizewell power plant and scaled the reactor without resistance.[2]

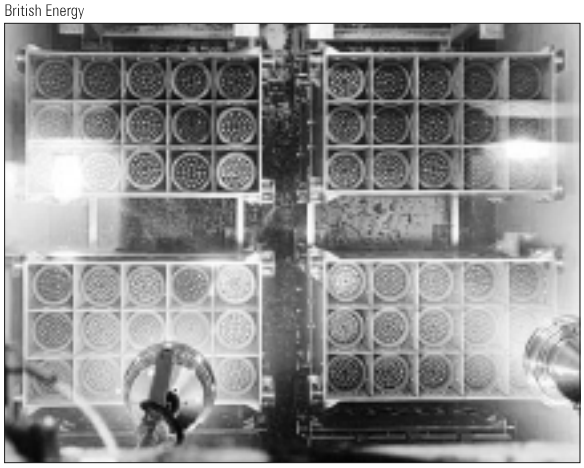
Sabotage of nuclear reactors is not the only threat. As history has shown, construction flaws and human errors can have disastrous effects when not caught in time. Since the dawn of the nuclear age, there have been hundreds of nuclear accidents. While most have been relatively minor, a few have been catastrophic—the worst of which occurred in Chernobyl, Ukraine, in 1986. A reactor meltdown caused at least 6,000 deaths, as well as elevated rates of thyroid cancer, significant environmental damage, and the eventual resettlement of more than 370,000 people.[3]

There have also been many near misses. In 2002, for example, at the Davis-Besse power plant in Ohio, boric acid ate a hole through a 17-centimeter reactor vessel head. If it had gotten through the remaining half-centimeter of steel that contained the coolant, a meltdown could have occurred. As a 2004 Union of Concerned Scientists study warned, many of the 103 U.S. nuclear power plants are now entering the last phase of life, which increases the probability of reactor failure and possibly disaster.[4]

Even if there are no attacks or accidents, nuclear materials threaten global security more subtly. In 2002, some 65,000 tons of uranium were used in the world's commercial power plants—36,000 tons of which were extracted from uranium mines. These mines often threaten surrounding communities, creating dust and tailings that can spread radioactive contamination. In Kyrgyzstan, for instance, at least 2 million tons of uranium waste currently sit in 23 tailing ponds in Mailuu-Suu. Left over from Soviet uranium mining and milling operations, this waste is at risk of spilling into the local river and could easily contaminate the Fergana river valley and its 6 million inhabitants.[5]

Some of the most radioactive waste does not sit near old mines but on-site at nuclear power plants in the form of spent fuel. Often, like the reactors, it is inadequately secured and poses security risks. While finding secure long-term storage facilities to safeguard this waste is essential, the challenge will be finding suitable sites that will remain geologically stable for hundreds of thousands of years—which is how long uranium remains hazardous. Currently the United States is planning to build a repository in Yucca

British Energy



Spent fuel rods in a storage pond at a British nuclear plant

Mountain in the state of Nevada. Critics question the appropriateness of this site, however: it is geologically unstable, and water in the repository could corrode the storage casks and contaminate regional groundwater stores.[6]

One immediate way to reduce the nuclear threat would be to decommission as many nuclear weapons as politically feasible and convert them into fuel. There is a dual benefit to converting highly enriched uranium into nuclear fuel: it lessens the potential of weapons-grade uranium falling into terrorists' hands and it reduces the need to mine more uranium, thus slowing the influx of new nuclear materials into circulation. Already the United States and Russia are converting warheads through the Cooperative Threat Reduction Initiative. Over the past 10 years, about 8,000 Russian nuclear warheads have been dismantled and converted into nuclear fuel—providing half of the uranium needed to run U.S. nuclear power plants.[7]

While its advocates often claim that nuclear energy will help reduce the threat of climate change, they rarely incorporate the entire fuel cycle into their considerations. According to the Oeko-Institut, when indirect emissions are included nuclear power produces from one-and-a-half to three times the carbon dioxide per kilowatt-hour that wind power does. Add to this the pollution, health effects, and safety risks of this energy source, and nuclear power becomes less and less a reasonable option.[8]

To completely eliminate the threat that nuclear energy poses, nuclear power plants will need to be phased out entirely. While this may seem impossible in some countries—for instance, in France 78 percent of the electricity comes from nuclear power—Belgium, Germany, Sweden, and Spain are planning to eliminate this energy source over the next 20–30 years. Yet this may be more of a countertrend than trend: around the world, 28 new reactors are under construction and another 35 are being planned, including in some countries that have not built new plants in decades. In 2002, Finland's parliament voted to build a new reactor—the first in 20 years. The likely 8-percent rise in nuclear capacity over the next five years will increase the circulation of nuclear materials, in turn adding to security threats, pollution, and damage to health.[9]

Admittedly, facilitating the phaseout of nuclear energy will be a considerable challenge, as it is one of the most protected industries in the world. But by terminating the massive subsidies that the industry receives, removing government-paid catastrophe insurance and insurance exemptions, and factoring in the environmental and social costs of nuclear power, policymakers can make the price of nuclear power reflect its true costs.

—Erik Assadourian