

# Dirty, Dangerous and Expensive: The Truth About Nuclear Power

In recent years, the administration has sought to revitalize the nuclear power industry by exploiting growing concerns about global warming and energy insecurity to promote nuclear power as a clean, safe and affordable way to curb our emissions of greenhouse gases and reduce our dependence on foreign energy resources. Yet despite the claims of the administration and industry proponents, a thorough examination of the full life-cycle of nuclear power generation reveals nuclear power to be a dirty, dangerous and expensive form of energy that poses a number of serious risks to human health and national security. From the 2,000 metric tons of high-level radioactive waste<sup>1</sup> and 12 million cubic feet of low-level radioactive waste<sup>2</sup> produced annually in the U.S., to the serious risk of nuclear accidents and nuclear terrorism, to the billions of dollars in handouts received in the form of subsidies, tax breaks and limited insurance liability, nuclear power is not the solution to our concerns over climate change and energy supplies.

## Neither Clean Nor Emissions-Free

Nuclear power is touted by its advocates as a clean, emissions-free source of energy that can help to mitigate global warming. Yet each year, enormous quantities of radioactive waste are created during the nuclear fuel process. In fact, the production of 1,000 tons of uranium fuel (less than two percent of annual global consumption) generates approximately 100,000 tons of radioactive tailings and nearly one million gallons of liquid waste carrying heavy met-

als and arsenic in addition to its radioactivity.<sup>3</sup> Further, more than 54,000 metric tons of highly radioactive spent fuel has already accumulated at reactor sites around the U.S. for which there currently is no permanent repository.<sup>1</sup> Even without any new nuclear production, the inventory of commercial spent fuel in the U.S. would already exceed the 63,000 metric ton statutory capacity of the controversial Yucca Mountain repository by its earliest possible opening date of 2017.<sup>4,5</sup>

Although it is true that the actual generation of electricity through the process of nuclear fission does not produce greenhouse gases, and while life cycle estimates<sup>6,7,8</sup> of greenhouse gas emissions from nuclear power generation vary considerably, to state that nuclear power produces zero emissions is false. From ore mining and enrichment of uranium to processing and storage of nuclear waste, the nuclear fuel cycle requires tremendous

amounts of energy, most of which is derived from fossil fuels that produce significant quantities of global warming gases. Additionally, the materials and processes involved in both the construction and decommissioning of nuclear power plants also contribute to greenhouse gas emissions. Growth of the nuclear industry would actually cause the greenhouse gas intensity of nuclear power production to rise by exhausting the earth's limited supply of rich uranium ores. As plant operators are forced to use poorer quality ores, the energy required to extract and refine the uranium will increase, as will the associated global warming emissions.



## Serious Safety Concerns

Despite proponents' claims that it is safe, the history of nuclear energy is marked by a number of disasters and near disasters. The 1986 Chernobyl disaster (Ukraine) is one of the most frightening examples of the potentially catastrophic consequences of a nuclear accident. In the months following the accident, 31 people died from acute radiation sickness and an estimated 220,000 people were displaced from their homes. While subject to uncertainty given the limitations of epidemiological studies, the long-term effect of exposure to radioactive fallout from Chernobyl is expected to cause between 14,000 and 17,400 fatal cancers in Europe and the former Soviet Union, with the possibility that the death toll could be even higher.<sup>4</sup>



In 1979, the United States had its own disaster following an accident at the Three Mile Island Nuclear Reactor in Pennsylvania. Although there were no immediate deaths, the incident had serious health consequences for the surrounding area. A 1997 study found that those people living downwind of the reactor at the time of the event were two to ten times more likely to contract lung cancer or leukemia than those living upwind of the radioactive fallout.<sup>9</sup> The dangers of nuclear power have been underscored more recently by the near miss of a catastrophic meltdown at the Davis-Besse reactor in Ohio in 2002, which in the years preceding the incident had received a near-perfect safety score.<sup>3</sup>

Climate change may further increase the risk of nuclear accidents. Heat waves, which are expected to become more frequent and intense as a result of global warming, forced the shut down of reactors in France, Spain and Germany in July of 2006.<sup>10</sup> And during the European heat wave in the summer of 2003,

cooling problems at reactors in France forced engineers to tell the government that they could no longer guarantee the safety of the country's 58 nuclear power plants.<sup>3</sup>

## Proliferation, Loose Nukes and Terrorism

The inextricable link between nuclear energy and nuclear weapons is arguably the greatest danger of nuclear power. The same process used to manufacture low-enriched uranium for nuclear power production also can be employed for the production of highly enriched uranium for nuclear weapons. As it has in the past, expansion of nuclear power could lead to an increase in the number of both nuclear weapons states and 'threshold' or 'breakout' nuclear states that could quickly produce weapons by utilizing facilities and materials from their 'civil' nuclear programs. This proliferation scenario already has played out once in South Africa in the 1980s and many fear that it may now be playing out again in Iran. Additionally, expanded use of nuclear power would increase the risk that commercial nuclear technology will be used to construct clandestine weapons facilities. This was the proliferation route taken by Pakistan, which remains outside the Nuclear Non-Proliferation Treaty despite its nuclear weapons capability.

More widespread deployment of nuclear power also may facilitate efforts by terrorists to acquire materials for the production of a radioactive 'dirty' bomb and raise the threat of direct attacks on nuclear facilities. According to the Congressional Research Service, nuclear power plants are not designed to withstand attacks using large aircrafts, such as those used on September 11, 2001.<sup>11</sup> A well-coordinated attack could have extremely severe consequences for human health and the environment; a study by the Union of Concerned Scientists concluded that a major attack on the Indian Point Reactor in Westchester County, New York could result in 44,000 near-term deaths from acute radiation sickness and more than 500,000 long-term deaths from cancer among individuals within 50 miles of the plant.<sup>12</sup>

## Simply Too Expensive

In 1954 then Chairman of the Atomic Energy Commission Lewis Strauss promised that the nuclear industry would one day provide energy “too cheap to meter.”<sup>4</sup> Yet more than 50 years and tens of billions of dollars in federal subsidies later, nuclear power remains prohibitively expensive. Even among the business and financial communities, it is widely accepted that nuclear power would be economically unviable without government support.<sup>13</sup> Despite this poor economic performance, the federal government has continued to pour money into the nuclear industry – the Energy Policy Act of 2005 alone included more than \$13 billion in subsidies, tax breaks and other incentives for nuclear power. Loan guarantees of nearly \$9 billion are included in the administration’s FY08 budget as an incentive for more plants. No other fuel source receives this type of incentive plus the billions of dollars in guaranteed insurance provided by the Price-Anderson Act.

This money would be much better spent on increasing energy conservation, efficiency and developing renewable energy resources. In fact, numerous studies have shown that improving energy efficiency is the most cost-effective and sustainable way to concurrently reduce energy demand and curb greenhouse gas emissions. At favorable sites, wind power already is less expensive than nuclear power on a per kilowatt hour basis. And while photovoltaic power is currently more expensive than nuclear energy, the price of electricity produced by the sun, as with wind and other forms of renewable energy, is falling quickly. Conversely, the cost of nuclear power is rising.<sup>3,13</sup> It is important to note that there is no waste from wind and solar energy, much less waste that has to be isolated and safeguarded for tens of thousands of years at a cost of billions of dollars.

## Making the Safe, Sustainable Investment

It is clear that alternatives to fossil fuels must be developed on a large scale. However, nuclear power is neither renewable nor clean and therefore not a wise option. Even if one were to disregard the waste problems, safety risks and poor economics, nuclear power is both too

slow and too limited a solution to global warming and energy insecurity. Given the urgent need to begin reducing greenhouse gas emissions as quickly as possible, the tremendously long lead times required for the design, permitting and construction of nuclear reactors renders nuclear power an ineffective option for addressing global warming. Further, the effectiveness of nuclear power as a low-carbon energy source is dependent on the availability of rich uranium ore – a finite resource that would be quickly depleted by an expansion of nuclear power.



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Were an accident to occur any time during the next ten years, it is likely that any planned nuclear power plants would be scrapped, leaving a significant shortage in the national electric power base load. Establishing policies that would meet projected energy demands with nuclear power is a risky endeavor when those plants may never be built and operated.

When the very serious risk of accidents, proliferation, terrorism and nuclear war are considered, it is clear that investment in nuclear power as a climate change solution is not only misguided, but also highly dangerous. As we look for solutions to the dual threats of global warming and energy insecurity, we should focus our efforts on improving energy conservation and efficiency and expanding the use of safe, clean renewable forms of energy to build a new energy future for our nation.

## Endnotes

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