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Nuclear Power and the U.S. Energy Future

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More than two-thirds of states now require that a percentage of their electric power come from approved "renewable" energy sources. Federal legislation mandating a nationwide standard has also been proposed.

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The U.S. Supreme Court ruled that the Environmental Protection Agency has the authority to regulate CO_2 emissions resulting from energy use, and Congress is debating bills with the same goal. These developments have the potential to strain power supplies as demand for electricity is projected to increase 26 percent from 2007 to 2030, according to the U.S. Energy Information Agency (EIA).

To meet this growing demand, nuclear energy remains one of the safest and most reliable forms of energy available — it also emits no greenhouse gases. Yet, the EIA projects a slight decrease in nuclear power use: from 19 percent of total electricity generation in 2007 to 18 percent in 2030.

Nuclear power is reliable, sustainable and clean. Policymakers need to consider it as a long-term solution to America's energy demands.

Nuclear Power Is Reliable. Not counting hydropower, renewable energy represents less than 2 percent of total generating capacity. This includes solar and wind, which supply an unpredictable amount of power because the sun does not always shine and the wind does not always blow, or blow within an acceptable range of speeds to provide either baseload power (required to keep electric power flowing) or peaking power (required to meet daily spikes in demand). Thus, solar and wind require backup from coal, natural gas or nuclear power plants for day-to-day baseload power or for on-demand peaking power.

By contrast, the output from nuclear power plants can be adjusted based on user demand and to keep the electric grid at maximum efficiency.

Nuclear Power Is Sustainable. At current rates of consumption with present technologies, uranium reserves in the United States can supply all of the world's existing reactors for 300 years. An additional supply of nuclear fuel is readily available, after reprocessing, in the more-than-15,000 plutonium pits removed from dismantled U.S. nuclear weapons. There are additional supplies of plutonium from dismantled Soviet warheads that have been shipped to the United States for disposal. A reprocessing plant is being built in South Carolina to turn these warheads into a reliable power supply.

An even larger fuel supply can be found in spent fuel rods from existing reactors. One kilogram of natural uranium contains as much energy as 38.5 tons of coal, but conventional nuclear reactors only utilize approximately 3 percent of that energy.

Thus, recycling could provide an almost unlimited supply of nuclear fuel in the United States.

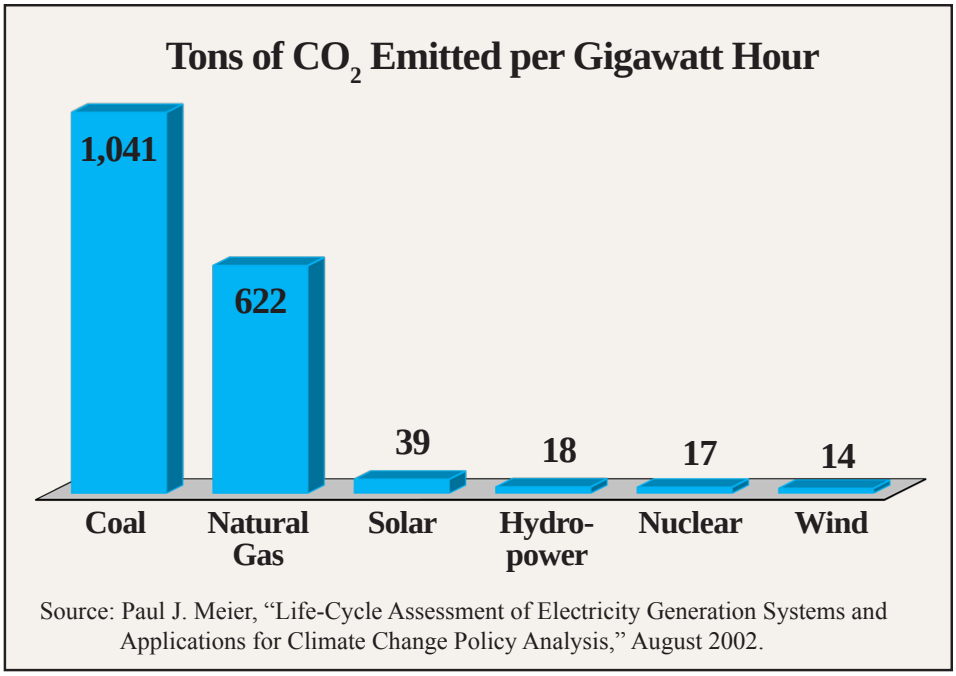
Recycling spent fuel would significantly decrease the problem of nuclear waste disposal. Reprocessing can also be a boon to local communities and create jobs. For example, two reprocessing facilities in France employ 11,000 workers and generate more than $600 million for the local economy.

Nuclear Power Is Clean. Nuclear power has among the lowest CO_2 emissions of all energy sources. Paul J. Meier of the University of Wisconsin analyzed CO_2 emissions from various electric power sources over their entire lifecycle — including such activities as mining and drilling, plant construction and operation, and disposal of waste products. Meier found that for every gigawatt hour (one billion watt hours) of electricity generated:

- Coal emits 1,041 tons of CO_2 equivalent.
- Natural gas emits 622 tons of CO_2 equivalent.
- Solar power emits 39 tons of CO_2 equivalent.
- Hydropower emits 18 tons of CO_2 equivalent.

Nuclear power, by contrast, emits only 17 tons of CO_2 per gigawatt hour — less than half that of solar power and only slightly more than that emitted by wind turbines (14 tons per gigawatt hour). [See the figure.] Thus, from a greenhouse gas perspective, nuclear power is among the most earth friendly.

Nuclear Power Is Safe. Today, spent nuclear fuel is kept in over 100 facilities across the country. To ensure proper long-term storage of high-level waste, the 1982 Nuclear Waste Policy Act (amended in 1988) required the U.S. Department of Energy (DOE) to develop and maintain an underground storage facility as a central repository. The DOE required the site chosen for the facility to meet strict criteria, including the ability to safely contain 77,000 metric tons of material for up to 10,000 years.



Source: Paul J. Meier, "Life-Cycle Assessment of Electricity Generation Systems and Applications for Climate Change Policy Analysis," August 2002.

After 26 years and $8 billion (collected from nuclear reactor operators) the DOE determined that Yucca Mountain, Nevada, is a satisfactory site. Yucca Mountain is more than 100 miles away from the closest major population center and 1,000 feet underground. By contrast, most of the existing storage facilities are located at nuclear power plants and many are near major population centers.

History shows that the risk from transporting the fuel from power plants to a storage facility is slight. Areva, a multinational industrial conglomerate, has been reprocessing nuclear fuel for France and other countries around the world for nearly 30 years. In those 30 years, they have never had a nuclear accident, theft of material or death of a worker due to the handling of fuel. In fact, Areva has won numerous awards for quality and safety.

The science behind Yucca Mountain is solid. However, politics has delayed the safe storage of the country's accumulated spent fuel in a single, isolated, geologically stable facility.

Conclusion. Nuclear power is a safe and reliable source of energy. The technology exists today for nuclear power to safely provide America's energy needs. Policymakers should remove barriers that prevent nuclear energy from being fully utilized.

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