



Today's debate: Nuclear energy Nuclear power earns fresh look, despite past woes

Our view: **Changes since Three Mile Island argue for Bush plan.**

On the surface, nuclear power has had a bad couple of decades. The last permit for a new power plant was issued in 1979. The last new plant went online in 1996. Because of attrition, the number of reactors in service has fallen almost 10% in the past decade.

Yet despite that, the amount of energy generated by those plants has been increasing quietly to almost 20% of the nation's total supply today, from 11% in 1979, with hardly a peep about health or safety problems. So despite some raised eyebrows, the Bush administration is on the right track in reviving nuclear as a potential energy source.

Vice President Cheney, who is fashioning an energy policy due next month, is already championing a return to nuclear power. While several questions would need answers first, the current energy crunch proves the nation needs more power. Why not give nuclear a new hearing?

The debate has been largely foreclosed since 1979, when a reactor at Pennsylvania's Three Mile Island leaked radioactive steam into the atmosphere. And it was hammered shut after the 1986 meltdown at the Soviet Union's crude Chernobyl reactor, an event that killed 40 and exposed hundreds of thousands more to harmful radiation levels.

For all of that, with shortages causing energy prices to spike, the United States cannot afford to reject any potential source of safe, clean, affordable power. And although the nuclear industry still has much to prove and much to live down, it also has made considerable progress

toward resolving at least a few of its worst first-generation problems.

Among them was the lack of uniformity among power-plant designs. Unlike France, Canada and other nations, the United States imposed few limits on reactor design. This allowed American utilities to custom-build their plants, with calamitous results.

Because each plant was different, operators were unable to share the cost of training personnel or of developing expensive modifications. Federal regulators meanwhile were swamped by the variety. Costs skyrocketed, and amid constant stories about construction flaws, unreliable federal oversight and inadequate safety design, public confidence plummeted.

The learning curve has been steep and punishing: 22 plants closed since 1971; plans for 124 others canceled. Through the 1970s and 1980s, the industry rarely ran above 60% of capacity and investors, taxpayers and ratepayers shelled out billions for partially built plants that were abandoned, and finished plants that never went online.

Today, though, remaining plants are running at almost 90% capacity and producing energy at just over half the cost of natural gas, according to the Nuclear Energy Institute, an industry lobby. And they do so while producing virtually none of the gases that cause climate change. This makes them, like alternative energy sources such as the sun and wind, an attractive alternative to plants that burn dirty, costly fossil fuels.

The industry has had less success with its other major millstone: waste disposal. Nuclear plants have generated about 35,000 tons of radioactive waste, most of it stored at the plants in special pools or canisters. But the plants are running out of room, and even if approval is granted this year, a permanent storage facility at

Worst U.S. nuclear accident:

Steam pours from a cooling tower of a nuclear reactor at the Three Mile Island power plant near Middletown, Pa., in February 1979. In 1979, a partial meltdown of the reactor-core fuel caused a release of radioactive material into the atmosphere.

A nuclear timeline

- **1942:** First sustained nuclear reaction, Chicago.
- **1954:** First nuclear-powered submarine, the USS Nautilus, launched.
- **1954:** Congress allows commercial development of nuclear power by private companies.
- **1957:** First American commercial reactor, Shippingport, Pa.
- **1960-78:** Golden Age. 179 construction permits issued; 66 new plants licensed to run at full power.
- **1978:** Last two orders for new nuclear power plants.
- **1979:** Three Mile Island, partial core meltdown.
- **1986:** Chernobyl, Soviet Union, core meltdown.
- **1996:** Last new American plant goes online at Watts Barr, Tenn.
- **2000:** Current status: 103 reactors producing 754 billion kilowatt-hours, about 20% of total national supply.

Source: Energy Information Administration; USA TODAY research.

Yucca Mountain in Nevada won't open for a decade or more while construction and permitting are completed. Still to be resolved are questions about the transportation of waste, Yucca's capacity and what to do in the interim.

Anxiety over storing spent fuel (which can remain radioactive for tens of thousands of years), combined with lingering fears of a catastrophic accident, continues to inspire strong resistance to nuclear plants. Even in California, where energy prices are jumping 50%, a recent *Los Angeles Times* poll found opposition to more nuclear power plants running almost 2 to 1.

In response, the industry points out that other industries are even more dangerous. No one has ever

died as a result of an accident at an American nuclear power plant. But 54,000 have died in civil-aviation plane crashes. Whether such comparisons are fair or not, the fact remains that since 1979, the industry has had an admirable, even enviable, safety record.

Ultimately, of course, the marketplace will decide when nuclear energy returns to favor. And it doesn't seem that will be any time soon. Construction costs are still far too high; it's cheaper and faster to build natural-gas plants. Any Bush plan will also need to fully address the waste issue. That's essential to any expansion of capacity. Still, the nation's energy demands invariably require a mix of energy sources, and there's no compelling reason nuclear shouldn't be a candidate.

Need for nuclear is passé

Opposing view:

It's too costly and too risky. More energy-efficient alternatives exist.

By Amory B. Lovins and L. Hunter Lovins

The nuclear industry wants to resuscitate its product. Sorry—it already died of an incurable attack of market forces.

Overwhelmed by huge construction and repair costs, the industry achieved less than 1/10th the capacity and 1/100th the new orders that proponents predicted, the greatest disappointment in industrial history. Only centrally planned energy systems (Russia, Taiwan, the Koreans, Japan) still propose nuclear plants.

"If a thing is not worth doing," said economist John Maynard Keynes, "it is not worth doing well." Even ignoring risks—proliferation, waste storage and disposal, and uninsurable accidents—nuclear power is uncompetitive and unnecessary.

After a trillion-dollar taxpayer investment, the energy delivered to consumers by nuclear power is little more than that delivered by wood and waste. Globally, nuclear power produces less energy than renewables. In the 1990s, its capacity rose by 1% a year vs. 17% for solar cells and 24% for wind power.

Enthusiasts claim hypothetical new reactors might deliver a kilowatt-hour of electricity for 6 cents vs. 10-plus cents for post-1980 plants. (Nearly 3 cents pays for delivery to customers.) But super-efficient

gas plants or wind farms cost 5 cents to 6 cents; co-generation of heat and power often 1 cent to 5 cents. The cost of saving a kilowatt-hour through efficient lights, motors and other electricity-saving devices is under 2 cents. They're all getting cheaper. So are the next winners: fuel cells and solar cells—where a pound of silicon can produce more electricity than a pound of nuclear fuel.

Efficient use is the nation's largest and fastest-growing energy source: bigger than oil, growing 3.1% a year. Just electricity efficiency can save four times' nuclear power's output, at one-sixth its operating cost.

Those faster, cheaper, safer options emit little or no pollution, and most are climate-safe. But replacing power from coal-fired plants with nuclear power, as usually proposed, is the least-effective solution to global warming. Why? Suppose delivering a new nuclear kilowatt-hour cost 6 cents, while saving a kilowatt-hour through efficient use cost 3 cents (both assumptions favorable to the nuclear power industry). Then the 6 cents spent on the nuclear kilowatt-hour could instead have saved two kilowatt-hours through efficiency investments. That's a two-for-one savings.

Nuclear salesmen scour the world for a single order; makers of alternatives enjoy brisk business. Let's profit from their experience. Taking markets seriously, not propping up failed technologies at public expense, offers a stable climate, a prosperous economy and a cleaner and more peaceful world.

Amory B. Lovins and L. Hunter Lovins are co-CEOs of the Rocky Mountain Institute