



Why Nuclear Power Is Obsolete

- “The failure of the US nuclear power program ranks as the largest managerial disaster in business history...” (Forbes, 1985)
- “Once claimed to be too cheap to meter, nuclear power is now too expensive to matter.” (The Economist, 2001)
- “CBO considers risk of default on such a loan guarantee (for nuclear power plants) to be very high—well above 50%.” (Congressional Budget Office, 2003)
- “We view nuclear generation plans as a “bet the farm” endeavor for most companies, due to the size of the investment and length of time needed to build a nuclear power facility.” (Moody’s, June 2009)
- “2009 was the seventh year of the so-called “Nuclear Renaissance,” but it looks a lot like the US nuclear industry of the 1980s, a decade of no new orders, multiple delays and cancellations, hefty defaults, *and emerging cheaper alternatives.*” (Mark Cooper, Institute for Energy and the Environment, December 2009)

Reason #1: Costs are Huge and Continue to Rise

- ◆ Since the CBO estimated the risk of default on loan guarantees for nuclear power plants to be over 50% in 2003, the estimated costs for nuclear power have risen three-fold, about \$3,000 per kilowatt to \$8,000 to \$9,000.
- ◆ The cost to build one nuclear unit (plants may consist of two or three) of 1,000 megawatts is estimated at \$10 to \$12 billion.
- ◆ Nuclear power remains the most expensive energy resource, except for coal with carbon capture and sequestration.
- ◆ The additional cost of building 100 nuclear reactors compared to investment in least cost energy efficiency and renewables is estimated at \$2 to \$4.5 trillion.

- ◆ Historically, the nuclear industry has had cost overruns of 250% for new construction. This continues today. Finland's Olkiuoto reactor being built by Areva of France was 3 years behind schedule and 50% over budget as of June 2009.
- ◆ Citi Investment Research and Analysis believes that the costs associated with construction, power price, and operating nuclear plants could "bring even the largest utility company to its knees financially."

Reason #2: Financially Unviable

- ◆ Of 26 license applications since 2007, 19 plants have been cancelled or delayed. All private sector projects have suffered a credit rating downgrade.
- ◆ The estimated \$500 billion over 50 years in government tax incentives, liability for accidents, R&D, and loan guarantees have made no difference in the viability of nuclear power. From 2005 to 2008, 33 proposed US plants received not a dime of private investment despite new subsidies worth 100+% of construction costs.
- ◆ The chance of defaulting on loans is considered to be over 50%.

Reason #3: Negative Economic Consequences

- ◆ If large utility companies cannot handle the costs, the economy certainly cannot. High utility rates from nuclear plants depress economic growth.
- ◆ Affordability is now a middle class issue, not just a low-income issue. High-cost electric options will put additional pressure on household finances.
- ◆ Efficiency and renewables can generate 3 times as many jobs as nuclear investments. These alternatives generate net jobs while nuclear investments depress job growth due to excessively high costs. A 20 to 30% efficiency gain in the US would create 500,000 to 1.5 million net jobs by 2030.

Reason #4: Reliability Problems

- ◆ Of the 132 US nuclear plants built, 21% were permanently closed due to reliability issues while 27% completely failed for a year or more at least once. Nuclear plants must shut down for refueling and maintenance 39 days every 17 months.

Reason #5: The Nuclear Waste Issue Cannot be Solved

- ◆ High-level nuclear wastes remain toxic for 250,000 years.
- ◆ Reprocessing is not an answer. This generates massive volumes of radioactive wastes while reusing only 1% of spent fuel rods. Areva's (France's) La Hague reprocessing plant dumps 100 million gallons of liquid radioactive wastes into the English channel annually. Gaseous radioactive emissions from the plant are even larger. A French government report in 2000 deemed reprocessing uneconomic, costing \$25 billion more than simply storing the waste.
- ◆ In 2003, US DOE estimated that cleaning up 100 million gallons of high-level nuclear wastes leaking from tanks at former plutonium reprocessing facilities would cost \$100 billion.

Reason #6: Insidious Threat to Public Health

- ◆ Nuclear power plants routinely emit low-levels of radioactive isotopes which represent a significant public health threat. Two examples are *strontium 90* and *tritium*. High levels of strontium 90 were found in children's teeth downwind from a nuclear reactor in Florida in a 2003 study. Children with cancer had strontium 90 levels 85% higher than children without cancer. Tritium emissions form tritiated (radioactive) water that poses risks of birth defects, early pregnancy failures, and, if ingested, increased cancer risks.

Reason #7: Chronic Design Problems

- ◆ New designs for nuclear reactors are under increasing scrutiny. NRC considers the new passive safety systems to raise the chances of a meltdown by 100-fold. In November 2009, France had to agree to modify its EPR reactor design due to safety concerns voiced by France, the UK, and Finland. The NRC found significant safety issues with the new Westinghouse AP 1000 reactor design in October 2009, which could delay nearly 50% of the proposed reactors for the US.

Reason #8: Cheaper, Cleaner Alternatives that Can Meet Electric Demand

- ◆ Cost of alternatives is decreasing while cost of nuclear is increasing. Energy efficiency, renewables, and distributed power are all cheaper and can be deployed much more quickly than nuclear power plants can be built.
- ◆ 50% of the nation's electric demand can be met with energy efficiency. Energy efficiency is 4 to 5 times cheaper than nuclear power.
- ◆ In 2008 distributed renewables added 40 billion watts and received \$100 billion in private investment; nuclear power added no power and received no private investment dollars.
- ◆ Wind energy is 3 times less expensive than nuclear. US land-based wind capacity is considered to be 2.5 times that of current electric generation. Sea-based capacity is considered to be 90% of current electric generation in the US.
- ◆ Solar photovoltaic costs dropped 25% in one year. At 20% efficiency and one percent of US land area solar power would generate 8 times the total of US electric generation.
- ◆ Despite substantially more government support worldwide for nuclear power, distributed power (decentralized power generation) accounted for 28% of capacity additions from 2004 to 08, with nuclear accounting for only 2%. The output of these resources surpassed nuclear output in 2006.

Reason #9: Technological Advances on the Customer Side of the Electric Meter

- ◆ The new FERC chairman said, "I think base load capacity is going to become an anachronism." (Federal Energy Regulatory Commission Chairman Jon Wellinghoff, April 2009.)
- ◆ Advances in distributed wind, solar, fuel cell, storage (batteries) coupled with off-the-shelf energy efficiency and the advent of the smart grid are making base load nuclear (and coal) plants obsolete from a financial and technological standpoint.

Reason #10: Excessively Long Planning Horizons and Lack of Infrastructure

- ◆ It takes about 15 years to build a nuclear plant from concept to completion, at which time technological advances, efficiency and renewable investments, and market changes will make them obsolete.
- ◆ Nuclear Power also faces a tight supply chain. One facility in Japan is the only manufacturer of large reactor pressure vessels in the world.

Reason #11: Ineffective at Addressing Climate Change

- ◆ Wind power and distributed power are 3 times more cost-effective at reducing CO2 emissions than nuclear.
- ◆ Efficiency is 10 to 20 times more effective.

Reason #12: Squanders Public and Private Capital Used Better Elsewhere

- ◆ An expansion of nuclear power will divert public and private resources away from energy efficiency and renewable investments, the true solutions to cost, climate change, public health, and job creation in the energy sector.
- ◆ "The failure of the US nuclear power program ranks as the largest managerial disaster in business history..." (Forbes, 1985)
- ◆ "Once claimed to be too cheap to meter, nuclear power is now too expensive to matter." (The Economist, 2001)

- ◆ “CBO considers risk of default on such a loan guarantee (for nuclear power plants) to be very high—well above 50%.” (Congressional Budget Office, 2003)
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