WHY A FUTURE FOR THE NUCLEAR INDUSTRY

IS RISKY

BASED IN PART ON PRESENTATIONS BY

PETER BRADFORD

Former Chair, New York State Public Service Commission,
Former Chair, Maine Public Utilities Commission,
Former Commissioner, U.S. Nuclear Regulatory Commission.

DAVID SCHLISSEL

Synapse Energy Economics, Inc.

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Sponsored by a coalition of environmental, health, social investment and public interest organizations concerned about the impacts of nuclear power including:

Friends of the Earth,

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U.S. Public Interest Research Group (PIRG).

For more information contact

LESLIE H. LOWE
Interfaith Center on Corporate Responsibility
tel: 212-870-2623 | fax: 212-870-2023
llowe@iccr.org or visit www.iccr.org

SARA BARCZAK
Southern Alliance for Clean Energy
tel: 912-201-0354
sara@cleanenergy.org or visit www.cleanenergy.org

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INTRODUCTION

Talk of a "nuclear renaissance" abounds. The accidents at Chernobyl and Three Mile Island are receding in public memory. Promises of improved safety and performance are coupled with billions of dollars of subsidies. However, the claims that nuclear power is a necessary energy source for displacing greenhouse gases hasn't convinced investors that new nuclear power plants will be safe and profitable investments.

New nuclear power plants will not be cost competitive with other electricity generating alternatives. Wind power and other renewable technologies, combined with energy efficiency, conservation and cogeneration can be much more cost effective and can be deployed much sooner than new nuclear power plants. Building expensive new nuclear plants will divert private and public investment from the cheaper and readily available renewable and energy efficiency options needed to protect our climate.

In competitive markets, new nuclear power plants will be bad investments. At the same time, worldwide private equity and venture capital investments in clean energy continue to grow. Worldwide investment in renewable energy capacity was almost $40 billion in 2005 and the renewable energy markets continue to grow robustly.[1]

DESPITE THE SIGNIFICANT SUBSIDIES PROVIDED IN THE ENERGY POLICY ACT OF 2005 (EPACT 2005), INVESTMENTS IN NEW NUCLEAR PLANTS REMAIN VERY RISKY

- The estimated cost of $1,500-$2,000 per KW for new nuclear plants is unlikely to be achieved and has recently been revised upward for some companies.
- The prices of recently built nuclear power plants in Japan were much higher, ranging between $1,796 and $2,827 per KW, in 2003 dollars.[2]
- The subsidies provided in EPACT 2005 are limited to a few plants and some require Congressional appropriations which are not guaranteed. Moreover, Standard & Poor's analysis of EPACT 2005 has concluded that the bill has few implications for the credit quality of nuclear developers and that the regulatory risk for new nuclear construction remains high, given the possibility that a plant for which construction has started may never actually commence operations.[3]
- None of the new nuclear power plant designs under consideration in the U.S. have actually been built. The industry's optimistic construction time and cost estimates are unproven and theoretical.
- Despite massive subsidies and R&D investments, there has not been an order for a new nuclear power plant in the U.S. for almost three decades.[4]
- Even with the subsidies in EPACT 2005, the U.S. Department of Energy has moved its target for bringing a new nuclear unit online from 2010 to 2014.[5]

1 "Renewables Global Status Report: 2006 Update," Renewable Energy Policy Network for the 21st Century, 2006, at pages 2-5, available at http://www.ren21.net/globalstatusreport/download/RE_GSR_2006_Update.pdf.

2 "Economic Future of Nuclear Power," The University of Chicago for the U.S. DOE, August 2004, at pages 2-14.

3 "Energy Policy Act 2005 has Limited Credit Implications: S&P," Nuclear Engineering International News, August 18, 2005, available at http://www.neimagazine.com/story.asp?sc=2030540&ac=7969460 and "Long-Awaited Energy Act Has Marginal Credit Implications for U.S. Utility And Oil And Gas Companies," Standard & Poor's, August 1, 2005.

4 "Nuclear Power: Economics and Climate Protection Potential," Amory Lovins, Rocky Mountain Institute, September 11, 2005, at page 9, available at http://www.rmi.org/images/other/Energy/E05-08_NukePwrEcon.pdf.

5 Statement of Samuel W. Bodman, Secretary of Energy, Before the Committee on Science, U.S. House of Representatives, Concerning the Department of Energy's FY 2007 Budget, February 15, 2006. available at http://resourcescommittee.house.gov/science/hearings/full06/Feb15/bodman.pdf.

- A recent article in The Energy Journal, published by the International Association for Energy Economics, concluded that in current liberalized markets, investors have no incentives to back the construction of new nuclear power plants because of their capital intensity, "engineering difficulties" and "regulatory creep."[6]

- Nuclear construction cost estimates in the U.S. have been notoriously inaccurate. In fact, the estimated costs of some existing nuclear units were wrong by factors of two or more. The total estimated cost of 75 of today's nuclear units was $45 billion (in 1990 dollars).[7] The actual cost turned out to be $145 billion (also in 1990 dollars). This $100 billion cost overrun was more than 200 percent above initial cost estimates.

  - New billion dollar mega-projects traditionally cost much more than their original estimates. As a result, a 1988 RAND Corporation study concluded that "the data on cost growth, schedule slippage and performance shortfalls of mega-projects are certainly sobering, but the most chilling statistic is that only about one in three of these projects is meeting its profit goals."[8]

  - Standard & Poor's stated that "given that construction [of new nuclear plants] would entail using new designs and technology, cost overruns are highly probable."[9]

  - The DOE's Energy Information Administration has clearly and concisely stated that "new [nuclear] plants are not expected to be economical."[10]

  - A 2003 study by the Massachusetts Institute of Technology forecasted that the base case real levelized cost (present value of building and running a plant for its lifespan) of electricity from new nuclear reactors with an estimated 85 percent capacity would be $.067 per kilowatt hour over a projected forty year operating life more expensive than from pulverized coal or natural gas.[11]

  - A 2005 assessment by Synapse Energy Economics, Inc. showed that the levelized cost of electricity from a new nuclear power plant would be $.068 per kilowatt hour, which was significantly higher than obtaining the same amount of energy from a combination of wind and gas-fired capacity and energy efficiency measures.[12] Additional studies have also concluded that overnight capital costs, lead construction times and interest rate premiums are likely to place the cost of electricity from any future nuclear power plants within the range of $.06 to $.07 per kilowatt hour.[13]

- Nuclear utilities have acknowledged that there are significant economic risks associated with the operation of nuclear power plants.

  - Plant O&M and capital expenditures could increase or the nuclear plant(s) could experience outages as a result of events at other operating nuclear power plants, new rules or regulations issued by the U.S. Nuclear Regulatory Commission (NRC), or as the result of deficiencies identified by the NRC.[14]

- Restructuring of the electric utility industry brings additional uncertainty to the ownership of new nuclear power plants. Without captive customers from whom increased costs can be recovered, plant owners are exposed to the risks of higher O&M expenses, higher decommissioning costs, and the lost revenues and higher costs of extended unit outages.

  - For example, Standard & Poor's stated that "Decommissioning risk remains an important factor in determining credit quality of U.S. firms and weighs more in the analysis of competitive nuclear generators. This is the case because, again, a regulatory process cannot provide recovery for underfunding."[15]

6 "Nuclear Power: A Hedge against Uncertain Gas and Carbon," Fabien A. Roques, William J. Nuttall, David M. Newbery, Richard de Neufville, Stephen Connor, The Energy Journal, Vol. 27, n. 4., 2006.

7 Study prepared by the Energy Information Administration of the U.S. DOE, "An Analysis of Nuclear Power Plant Construction Costs," 1986.

8 "Understanding the Outcomes of Megaprojects: A Quantitative Analysis of Very Large Civilian Projects," Edward W. Merrow, RAND Corporation, March 1988.

9 "Credit Aspects of North American and European Nuclear Power," Standard & Poor's, January 9, 2006.

10 Annual Energy Outlook 2005, Energy Information Administration, available at http://www.eia.doe.gov/emeu/plugs/plfeb05.html.

11 "The Future of Nuclear Power – Summary Report," MIT, 2003, available at http://web.mit.edu/nuclearpower/pdf/nuclearpower-summary.pdf.

12 Affidavit of Bruce Biewald, Synapse Energy Economics, in U.S. NRC Docket No. 52-007-ESP, at page 23.

13 "Insurmountable Risks: The Dangers of Using Nuclear Power to Combat Global Climate Crisis – Summary," Brice Smith, Institute for Energy and Environmental Research, 2006, at page 6, available at http://www.ieer.org/reports/insurmountablerisks/summary.pdf.

14 For example, see the Testimony of Thomas Aller, in Iowa Utility Board Docket No. SPU-05-15, at page 15.

15 "Credit Aspects of North American and European Nuclear Power," Standard & Poor's, January 9, 2006.

WALL STREET HAS EXPRESSED SERIOUS CONCERNS ABOUT THE CREDITWORTHINESS OF COMPANIES THAT PURSUE NEW NUCLEAR PLANTS

- Standard & Poor's Ratings Services found that "an electric utility with a nuclear exposure has weaker credit than one without and can expect to pay more on the margin for credit. Federal support of construction costs will do little to change that reality. Therefore, were a utility to embark on a new or expanded nuclear endeavor, Standard & Poor's would likely revisit its rating on the utility." [16]
- Standard & Poor's has also expressed concern that "from a credit perspective, [2005 Energy Policy Act] provisions may not be substantial enough to sustain credit quality and make [nuclear generation] a practical strategy."[17]
- The credit rating service Fitch reminds potential investors that "the overarching concern [regarding nuclear power generation] is the financial effect of an extended outage, forcing the generating company to buy potentially more expensive replacement power on the spot market to honor any existing supply commitments."[18]

NUCLEAR POWER PLANTS ARE STATED TERRORIST TARGETS: A SUCCESSFUL ATTACK COULD HALT NEW CONSTRUCTION EVEN AFTER SIGNIFICANT EXPENDITURE

In testimony before the Select Committee on Intelligence in the U.S. Senate in February 2005, FBI director Robert S. Mueller stated that, "Another area we consider vulnerable and target rich is the energy sector, particularly nuclear power plants. Al-Qa'ida planner Khalid Sheikh Mohammed had nuclear power plants as part of his target set and we have no reason to believe that Al-Qa'ida has reconsidered."[19]

- In October 2001, the Federal Aviation Administration temporarily restricted all private aircraft from flying over 86 nuclear facilities due to threats of terrorist attacks.[20]
- Over 53,000 metric tons of highly radioactive spent nuclear fuel is stored at commercial reactors in the U.S. Nearly 90% of this fuel is stored in cooling pools without adequate protection.[21] According to a recent study by the National Academy of Sciences, a terrorist attack on a spent fuel pool could lead to the release of large quantities of radioactive materials to the environment.[22] Such an event could result in thousands of cancer deaths and economic damages in the range of hundreds of billions of dollars.
- In the event of a major radioactive release from a nuclear power plant, public opinion would likely react strongly against nuclear power (as occurred after the Chernobyl and Three Mile Island accidents), resulting in the halting of construction of any new planned reactors.

16 Ibid.

17 Ibid.

18 "Fitch's Approach to Rating U.S. Wholesale Energy Companies," October 2004.

19 "Testimony of Robert S. Mueller, III, Director, Federal Bureau of Investigation Before the Senate Committee on Intelligence of the United States Senate," February 16, 2005, available at http://www.fbi.gov/congress/congress05/mueller021605.htm.

20 "FAA Restricts All Private Aircraft Flying Over Nuclear Facilities," October 30, 2001, available at http://www.faa.gov/news/press_releases/news_story.cfm?newsId=5446.

21 "Spent Nuclear Fuel Storage Locations and Inventory," Anthony Andrews, Congressional Research Service, updated 2004.

22 "Safety and Security of Commercial Spent Fuel Storage: Public Report," Committee on the Safety and Security of Commercial Spent Fuel Storage, National Research Council, 2006, available at http://newton.nap.edu/catalog/11263.html#toc.

WEAKNESSES IN NUCLEAR REGULATORY COMMISSION (NRC) OVERSIGHT OFFER TROUBLESOME INDICATIONS THAT THE NRC IS PUTTING THE NUCLEAR INDUSTRY AHEAD OF SAFETY AND PUBLIC CONFIDENCE

- In recent years, the NRC appears to have retreated into a similar pro-industry mindset that was described in the assessment of the March 1979 accident at the Three Mile Island nuclear power plant that was prepared by a Presidential Commission: "We find that the NRC is so preoccupied with the licensing of plants that it has not given primary consideration to overall safety issues. […] With its present organization, staff and attitudes, the NRC is unable to fulfill its responsibility for providing an acceptable level of safety for nuclear power plants."[23]
- For example, shortcomings in the U.S. nuclear regulatory process were clearly implicated in the 2001 near-accident at the Davis-Besse plant in Ohio. The NRC Inspector General's report on that incident found that there was a clear connection between cost considerations and NRC laxity in the fact that the licensee sought and the NRC staff allowed the Davis-Besse plant to operate without performing important inspections, and that this situation was driven in large part by a desire to lessen the financial impact that would result from an early shutdown.[24] A loss of coolant accident at Davis-Besse might well have eliminated all discussion of a nuclear revival in the U.S.
- NRC surveys have showed that almost half of all NRC employees thought that their careers would suffer if they raised safety concerns and nearly one-third of those who had raised safety concerns felt they had suffered harassment and/or intimidation as a result. [25]
- Streamlined licensing processes for construction and operating permits eviscerate public involvement as a check on laxity in the licensing process.

NUCLEAR POWER WILL NOT REDUCE U.S. DEPENDENCE ON ENERGY SUPPLIES FROM ABROAD

- The U.S. is importing more oil each year – most of it from the world's most unstable regions – increasing our country's economical and political vulnerability and making oil dependency among the largest threats to our economy and national security.
- Increasing reliance on nuclear power will not reduce our nation's dependency on foreign sources of oil – only about 3% of the electricity produced in the U.S. is from petroleum and almost none of that petroleum comes from the Middle East.[26]
- Nuclear power's only substantial contribution to oil displacement in the U.S. comes in regions in which natural gas displaced by nuclear power can penetrate further into oil's share of the markets, such as space heating in New England. [27]
- Indeed, transportation is the sector that accounts for most of U.S. oil consumption – about two-thirds of the country's oil consumption is used by vehicles, which corresponds to roughly 13 millions barrels a day.[28] Thus, possible nuclear power development would not have any influence over these statistics.

23 "Report of the President's Commission on the Accident at Three Mile Island: The Need for Change," October 1979, pages 51, 56.

24 "NRC's Regulation of Davis Besse Regarding Damage to the Reactor Vessel Head," NRC Inspector General, Case No. 02-03S, December 30, 2002, at page 23.

25 "Special Evaluation: OIG 2002 Survey of NRC's Safety Culture and Climate," Office of the Inspector General, U.S. Nuclear Regulatory Commission, December 11, 2002, OIG-03-A-03; "Audit Report: Review of NRC'S Differing Professional View/Differing Professional Opinion Program," Office of the Inspector General, U.S. Nuclear Regulatory Commission, September 20, 2000, OIG-00-A-07.

26 U.S. Energy Information Administration, Electric Power Generation by Fuel Type (2004), available at http://www.eia.doe.gov/fuelelectric.html.

27 "Nuclear Power's Prospects in the Power Markets of the 21st Century," Peter A. Bradford, Nonproliferation Education Center, February 2005, available at: http://www.npec-web.org/Essays/Essay050131%20NPT%20Bradford%20Nuclear%20Powers%20Prospects.pdf.

28 "Peaking of World Oil: Impacts, Mitigation and Risk Management," Hirsch et al, Science Applications International Corporation, Department of Energy, February 2005, available at http://www.netl.doe.gov/publications/others/pdf/Oil_Peaking_NETL.pdf.

PERMANENT STORAGE OF SPENT NUCLEAR FUEL REMAINS UNRESOLVED

One of the riskiest elements of building new nuclear plants is that the long-term disposition of the waste is far from being resolved. The planned Yucca Mountain repository in Nevada is almost 20 years behind schedule and may never open. The projected opening date for this permanent spent fuel repository has been delayed countless times and, according to the Department of Energy, the current target date of 2017 is a "best-achievable schedule."[29]

A plan proposed by the Bush Administration, the Global Nuclear Energy Partnership (GNEP), that would allow the reprocessing of spent nuclear fuel, will face significant technical, legal, and political challenges and cannot be counted on as a realistic solution. Reprocessing results in large amounts of waste still needing disposal, and much of the technology essential to GNEP is unproven and undeveloped. Indeed, similar attempts to reprocess spent fuel in the past have been unsuccessful and the DOE does not have a lifecycle cost analysis for the program.

Interim storage of waste at Idaho National Engineering & Environmental Laboratory

- Reprocessing would be a dangerous shift in U.S. global nonproliferation policy and would increase the likelihood that a terrorist could obtain fissile material to build a nuclear bomb. Moreover, DOE is trying to build momentum for the program before deliberations have been conducted by Congress to determine whether this path is in the best interests of U.S. national and energy security, as well as fiscally sound, even if it should eventually prove technically feasible.
- Reprocessing would increase the number of nuclear waste streams to be managed and secured and is the most polluting part of the nuclear fuel cycle. It would not alleviate the problem of used (spent) fuel storage on reactor sites or the need for a permanent waste repository.[30]
- U.S. taxpayers are still paying several billion dollars each year to clean up contamination from reprocessing programs in the 1960s and 1970s for nuclear weapons at the Hanford Site (WA) and the Savannah River Site (SC), as well as the reprocessing of naval irradiated fuel at the Idaho National Laboratory (ID) and commercial reprocessing at West Valley (NY), which all make this new reprocessing push unlikely and illogical.

29 Statement of Edward F. Sproat, III, Director for the Office of Civilian Radioactive Waste Management, U.S. Department of Energy, Before the Subcommittee on Energy and Air Quality, Committee on Energy and Commerce, U.S. House of Representatives. September 13, 2006, available at http://www.ocrwm.doe.gov/info_library/program_docs/testimonies/SPROAT9-13Testimony_FINAL.pdf.

30 Spent fuel rods must remain in on-site cooling pools for at least five years until they have cooled sufficiently to be transported. Reprocessing waste does not eliminate long-lived radioactive elements that necessitate secure storage for hundreds of thousands of years. GNEP proposes to transmute much of the nuclear waste, but this technology as yet to be proven.

WHAT ABOUT GLOBAL WARMING?
BETTER SOLUTIONS EXIST

- Climate change is one of the most pressing threats of our time and it is imperative that we take swift and decisive action to avert its most severe impacts. However, building more nuclear power plants is not the answer.
- The claim that "we need all energy options" to face growing energy needs is disingenuous. On the contrary, we cannot afford all energy options. Further investment in nuclear power would squander the limited financial resources that are available to implement meaningful climate change mitigation policies.
- Nuclear power's role in mitigating climate change (and in reducing oil dependence) is constrained because its impact is limited to the electric sector.

Wind power and other renewables, such as solar and bioenergy, coupled with energy efficiency, conservation and cogeneration are much more cost effective and can be deployed much faster. Building new nuclear power plants will divert private and public investment from the cheaper, readily available options needed to protect our climate. Each dollar invested in electric efficiency in the U.S. displaces nearly seven times as much carbon dioxide as a dollar invested in nuclear power, and nuclear power saves as little as half as much carbon per dollar as wind power and cogeneration.[31]

- Recent studies analyzing the potential of nuclear power to combat global warming have concluded that between 1,000 and 2,000 new nuclear reactors would have to be built around the globe in the next decades to achieve a meaningful impact on CO_2 emissions.[32] These projections point to a clearly infeasible schedule, as new reactors would have to come online every few weeks.
- A 2005 study by Synapse Energy Economics, Inc. showed that the U.S. can substantially reduce global warming pollution through efficiency improvements in power generation. In fact, the report concludes that modest investments in efficiency and renewable energy would reduce global warming pollutants from the electricity sector by 47% by 2025.[33]

IMPACTS OF GLOBAL WARMING INCREASE
RISKS OF OPERATING NUCLEAR POWER PLANTS

- Heat waves in the summer of 2006 forced U.S. and European utilities to shut down some reactors and reduce operations at others. Some companies in Europe also had to secure exemptions from regulations in order to discharge overheated water into the environment and others were forced to buy electricity on the spot market.[34]
- Rise in frequency and intensity of catastrophic weather events pose additional risks to nuclear plants' safety because reactors are particularly vulnerable to the effects of flooding, hurricanes, and tornados, as severe storms can disable the on and off-site power systems necessary to operate the plants' safety mechanisms.

31 "Return of the Nuclear Salesmen: Global Warming Gives Them a New Sales Pitch," Dave Reed, Rocky Mountain Institute Newsletter, Vol. XVI, #1, Spring 2000, pages 25 and 15, available at http://www.rmi.org/images/other/Newsletter/NLRMIspring20.pdf.

32 "The Future of Nuclear Power – Summary Report," MIT, 2003 and "Insurmountable Risks: The Dangers of Using Nuclear Power to Combat Global Climate Crisis – Summary," Brice Smith, Institute for Energy and Environmental Research, 2006, at page 6, available at http://www.ieer.org/reports/insurmountablerisks/summary.pdf.

33 "A Responsible Electricity Future: An Efficient, Cleaner and Balanced Scenario for the US Electricity System," Bruce Biewald et al. Synapse Energy Economics, Inc. and National Association of State PIRGS, May 2005, available at http://www.uspirg.org/uploads/w7/0S/w70S27rKo2G0k0LMyQqBNg/AResponsibleElectrictyFuture.pdf .

34 "Nuclear Power's Green Promise Dulled by Rising Temps," Susan Sachs, The Christian Science Monitor, August 10, 2006, available at http://www.csmonitor.com/2006/0810/p04s01-woeu.html; and "U.S. Heat Wave Heads to Northeast, May Break Records," update to Bloomberg News, July 31 2006, available at http://www.bloomberg.com/apps/news?pid=20601087&sid=aNtzVaLCaNc8&refer=home.

RENEWABLE ENERGY INVESTMENTS ARE BOOMING WHILE PRICES FOR CONSUMERS KEEP DROPPING

- Worldwide investment in renewable energy capacity was almost $40 billion in 2005. In the U.S., renewable power capacity expanded to 23 GW.[35]
- In 2005, wind energy in the U.S. grew by almost 2,500 MW of installed capacity – a 35% increase in just one year.[36] Total wind-generating capacity in the United States now stands at over 9,000 MW, enough to power more than 2.3 million average American homes.[37]
- Venture capital investment in U.S. based solar companies totaled more than $150 million in 2005 – double the investment from the previous year.[38]
- The International Energy Agency predicts a cost reduction up to 25% for wind power and 50% for solar photovoltaics from 2001 to 2020.[40]
- In the global marketplace, nuclear power is already losing to its faster, cheaper, less financially risky competitors that are NOT centralized power stations.
  - In 2005, micropower (low-carbon fossil-fueled cogeneration, 2/3 of it gas-fired, plus decentralized renewables) added 4 times as much output and 8 times as much capacity as nuclear power.
  - These alternatives have eclipsed nuclear power in both capacity (in 2002) and output (in 2006) .
  - In 2005, micropower provided 32% of the additional global electrical output and was mostly financed by private risk capitol. Thus, investors focusing on actual market behavior must conclude that nuclear power is not preferred.[39]

HOW THE EVOLUTION OF POWER SUPPLY MARKETS AFFECTS NUCLEAR POWER

Assessing the future of nuclear power begins by understanding the past. Nuclear power is a technology force fed into an unsophisticated power supply selection process at a pace too fast for the nuclear industry to assimilate the lessons of operating experience. Moreover, the evolution occurred in ways that concealed or understated the real costs and problems, assuring a series of unpleasant surprises, deepening public mistrust, and, ultimately, reform of the power supply selection processes under which nuclear power had momentarily thrived.

- A real nuclear revival will not exist until private capital is available to build plants, which will require market prices that assure competitive success and profitability. However, even with their ability to compete on the basis of operating costs, the most recent sales of nuclear units have not been at prices that would support the building of a new plant.[41]
- In short, nuclear power's asserted comeback rests not on a newfound competitiveness in power plant construction, but on an old formula: massive government subsidies and licensing shortcuts, and perhaps, guaranteed purchases with risks borne by customers. Climate change has replaced oil dependence as the bogeyman from which supposedly only nuclear power can save us.

35 "Renewables Global Status Report: 2006 Update," Renewable Energy Policy Network for the 21st Century, 2006, at pages 2-5, available at http://www.ren21.net/globalstatusreport/download/RE_GSR_2006_Update.pdf.

36 "U.S. Wind Industry Ends Most Productive Year, Sustained Growth Expected for At Least Next Two Years," American Wind Energy Association, January 24, 2006, available at http://www.awea.org/news/US_Wind_Industry_Ends_Most_Productive_Year_012406.html.

37 "Global Wind 2005 Report," Global Wind Energy Council, 2005, available at http://www.gwec.net/fileadmin/documents/Publications/Global_WindPower_05_Report.pdf.

38 Ibid, page 4.

39 "The Rise of Micropower" Armory Lovins, Rocky Mountain Institute, Updated July 2006, available at www.rmi.org/sitepages/pid171.php#E05-04.

40 "Renewable Energy," International Energy Agency, available at http://www.iea.org/textbase/papers/2002/renewable.pdf.

41 The MIT study, in discussing the 2002 sale of 88% of the Seabrook station, notes that the price "implies that the market value of a fully licensed and operational nuclear power plant with a good performance record is less than half of the most optimistic cost estimates for building a new nuclear power plant....Comparable analyses of other nuclear power plant sales come to very similar conclusions. The market value of nuclear plants is far below their replacement cost, a result that is inconsistent with merchant investment in new nuclear plants." ("The Future of Nuclear Power," Appendix 5, p. 140.)

CONCLUSION

The genesis of nuclear power was the "Atoms for Peace Program" which was intended to make the public more comfortable with the horrifying destruction of the nuclear bomb. Originally, the promise was that the technology would provide energy that would be "too cheap to meter." However, in the last 50 years, nuclear energy subsidies have totaled close to $145 billion and amount to more taxpayer dollars for R&D than for all other energy sectors combined. In fact, nuclear power became the energy that is "too expensive to matter."

A nuclear revival is financially risky. The likelihood of large numbers of new nuclear units being built on the basis of favorable economics is very unlikely. Nuclear power is not competitive today and for nuclear power to succeed it must achieve major cost cuts, avoid even one serious accident, resolve the nuclear waste storage and disposal issue in an enduring way, sever its links to proliferation of nuclear weapons, and get the benefit of its status as a lower carbon-emitting power source. However, even if all of these things occur over the next decade, success will not be guaranteed. Nuclear power may still be more expensive and offset much fewer greenhouse gas emissions than a portfolio of renewable and energy efficiency options.

Photography

Front Cover, Saturn x-ray device, Credit: U.S. Department of Energy.

Back Cover, Environmental workers at Fernald, Credit: U.S. Department of Energy.

P6, Interim storage of solid transuranic waste at Idaho National Engineering & Environmental Laboratory, Credit: U.S. Department of Energy.

P9, Indian Point power plant, on the Hudson River, 24 miles north of New York City, Credit: Elena Pousada.

For more information contact

LESLIE H. LOWE
Interfaith Center on Corporate Responsibility
tel: 212-870-2623 | fax: 212-870-2023
llowe@iccr.org
www.iccr.org

SARA BARCZAK
Southern Alliance for Clean Energy
tel: 912-201-0354
sara@cleanenergy.org
www.cleanenergy.org