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Is there a nuclear revival in the United States?

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INTRODUCTION AND OVERVIEW

The pervasive view both inside and outside of the United States is that the U.S. is having a nuclear revival – or in the parlance of nuclear proponents, a "nuclear renaissance". This perception is the result of a well-funded lobbying and public relations campaign conducted by the nuclear industry for more than a decade. The industry has succeeded in obtaining large subsidies and positive rhetoric ("safe, clean nuclear power") from elected officials. In May 2001, the Bush Administration released its National Energy Policy, which embraced the construction of new reactors as a key component.[1] The Energy Policy Act of 2005, which largely enacted this policy into law, included $7 billion in subsidies, plus loan guarantees and other incentives for new reactors. The Obama Administration has continued to supply both the rhetoric and subsidies, including announcing the first nuclear loan guarantee for two reactors in Georgia.

The media has also been a cheerleader for the nuclear industry. Since the early 2000s, slews of media reports have predicted the "nuclear renaissance", dismissing the unresolved economic, waste and safety problems of nuclear power.[2] Recent articles have discussed the "setbacks" and "challenges" in the so-called renaissance, but the press generally continues to assume that it will happen.[3]

An examination of what is actually happening "on the ground", however, with the enormous economic and technical issues facing the proposed new reactor projects in the U.S., results in a very different conclusion. The fact is that the U.S. will start to construct as many new reactors as the federal government and states are willing to heavily subsidize, but the projects may never be completed. With the long construction periods, decreased electricity demand and rapidly increasing costs of new reactors, large subsidies may still not be enough to make a new reactor project competitive with cheaper alternatives, especially natural gas, efficiency, and a range of renewable technologies. Nor are large subsidies for a few first-mover reactors sufficient to kick-start the industry and make the technology economically competitive without subsidies. The question facing U.S. policymakers is whether to attempt to restart an industry that will require large taxpayer subsidies indefinitely.

This paper will examine whether there is a nuclear revival in the U.S. **Part I** examines the current status of existing reactors in the U.S., the Nuclear Regulatory Commission's rush to rubber stamp 20-year license renewals, and public opposition to relicensing these aging reactors. **Part II** looks at the key actors who are part of the decision-making process about whether build new reactors, and what influence they have on the process. **Part III** then describes the existing federal and state subsidies for new reactor construction. **Part IV** reviews the status of proposed reactor projects in the US. Finally, **Part V** examines the new and expanded federal subsidies that were proposed in the 111th Congress, and explores whether all of these subsidies are enough to create a viable nuclear revival in the U.S.

1 National Energy Policy Development Group, *National Energy Policy*, May 2001, http://www.wtrg.com/EnergyReport/National-Energy-Policy.pdf

2 See, for example, Barbara Wall, "Nuclear Power Industry Feels the Wind at Its Back", *The New York Times*, August 4, 2001, http://www.nytimes com/2001/08/04/your-money/04iht-mnuke_ed2_.html
or Jeff Jacoby, "The coming nuclear renaissance", *Boston Globe*, March 29, 2009, http://www.boston.com/bostonglobe/editorial_opinion/oped/articles/2009/03/29/the_coming_nuclear_renaissance/

3 See, for example, Matt Wald, "A Setback in the *Nuclear Renaissance*", *The New York Times*, April 23, 2009, http://green.blogs.nytimes.com/2009/04/23/a-setback-in-the-nuclear-renaissance/
or Paul Davidson, "Nuclear power inches back into energy spotlight", *USA Today*, March 30, 2009, http://www.usatoday.com/money/industries/energy/environment/2009-03-29-nuclear-power-energy-return_N.htm

PART I:
Nuclear Reactor Status Quo in the U.S.

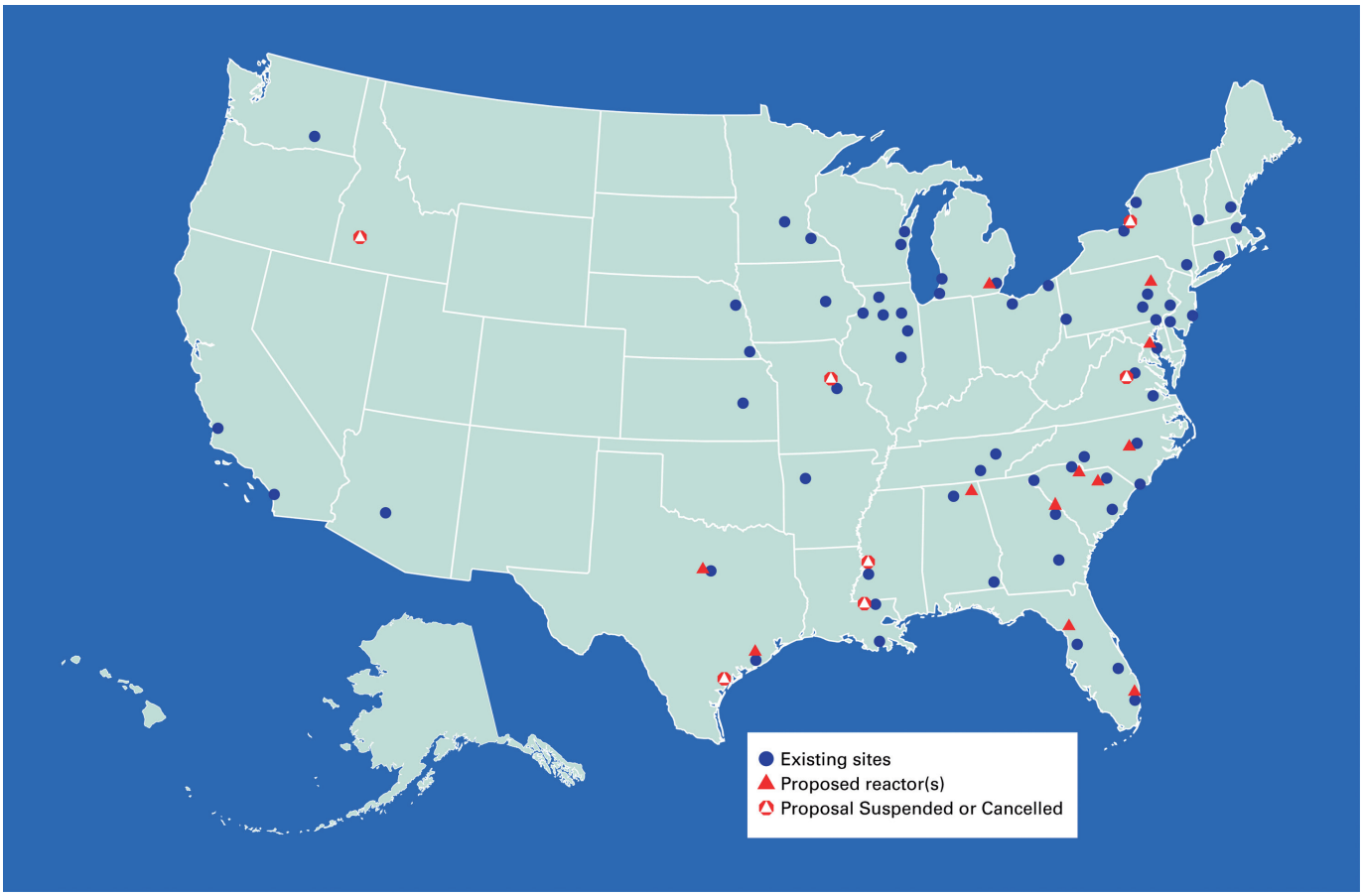
The U.S. currently has 104 operating nuclear reactors, which provide a total of about 20% of U.S. electricity net generation.[4] Operating nuclear reactors are located at 65 sites in 31 of the 50 states, most of which are in the eastern US (see *Figure 1*). The U.S Nuclear Regulatory Commission (NRC) is the federal agency responsible for reactor licensing and ensuring their safe operation.

NRC: Watchdog or Rubber Stamp for License Extensions?

Reactor operating licenses are valid for 40 years, but the NRC is in the process of extending licenses (also called "license renewals") for another 20 years. Reactor operators are allowed to apply for license extensions 20 years before the 40-year license expires, even though relicensing only takes 22 to 30 months.[5] The NRC has streamlined license extensions, so that many issues have already been decided in a generic analysis and cannot be raised in the relicensing of a specific reactor.[6] Relicensing largely focuses on managing the aging of passive reactor equipment, such as pipes. Any components that move are assumed to be covered by the ongoing maintenance program, even if the current program is not well-managed. The NRC has complete discretion over regulating the ongoing maintenance program, and it is nearly impossible for the public to challenge it.

Many other important issues are also excluded from review in relicensing. For example, the impacts of storing additional low- and high-level radioactive waste indefinitely on-site and of population and vehicle traffic growth on the sufficiency of 20-year-old emergency evacuation plans, have already been determined

Figure 1 – Map of existing and proposed reactor sites in the United States



4 Nuclear Energy Institute, Resources & Stats, U.S. Nuclear Power Plants, http://www.nei.org/resourcesandstats/nuclear_statistics/usnuclearpowerplants/, Viewed August 2010.

5 U.S. Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Division of License Renewal, *Frequently Asked Questions on License Renewal of Nuclear Power Reactors, Final Report*, March 2006, Page 26, http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1850/sr1850_faq_lr.pdf

6 U.S. NRC Regulations 10 CFR Appendix B to Subpart A – Environmental Effect of Renewing the Operating License of a Nuclear Power Plant, http://www.nrc.gov/reading-rm/doc-collections/cfr/part051/part051-appb.html

to be "small" at all reactor sites.[7] The public safety threat posed by over-packed spent fuel pools is also off-limits, despite the fact that the National Academy of Sciences has concluded that these pools are at risk from terrorist attacks.[8] The NRC claims that it has "mitigated" the threat, though the agency will not release any information about the measures taken. In addition, the NRC has set up additional procedural hurdles that limit the ability of the public to challenge the generic analysis and participate in the proceeding. Few have been able to successfully intervene.

The NRC has not turned down a single renewal application thus far: 59 reactors have received extensions and another 20 reactors have pending applications.[9] A September 2007 audit by the NRC's Office of Inspector General concluded that in over 70% of the reviewed license renewals, NRC staff did not verify the technical safety information provided by the reactor operators and routinely copied word-for-word entire sections of the industry's application into the NRC's safety review document.[10] Not surprisingly, the public tends to view the relicensing process as an NRC "rubber stamp" that gives perfunctory approval to all license extensions.

Five reactors are now operating past their 40-year licenses. Many of the reactors that have received extensions would never be approved for construction today. For example, in some designs the spent fuel pool is located several stories above ground and outside the containment dome, making it vulnerable to air attack. If all existing reactors are given license renewals, reactors that started up in the 1980s will be licensed to operate into the 2040s. There are proposals to eventually extend licenses to a total of 80 years.[11]

Safety Problems with Aging Reactors

Safety problems at operating reactors have galvanized public opposition to relicensing. The oldest commercial reactor is Oyster Creek in New Jersey, which received its operating license in 1969. Oyster Creek has had a myriad of safety problems, including the release of 1 million curies of radioactivity into the environment in 1979, after the Three Mile Island accident.[12] When Exelon Nuclear filed for the license extension of Oyster Creek in 2005, the NRC had relicensed about 30 reactors without admitting a single public intervenor. For the first time in relicensing, a state filed a contention with the NRC, raising the issue that the reactor's elevated spent fuel pool was vulnerable to aircraft impact; the NRC denied the contention and a court upheld the decision. Also for the first time in relicensing, the NRC admitted a coalition of six public interest organizations that had requested a hearing on the severe corrosion of the reactor containment. The NRC ultimately granted the 20-year license extension in 2009, despite evidence of corrosion in the containment structure.[13] However, a program is now in place to monitor the corrosion, which would not have been implemented without the public intervention.

Within days after the Oyster Creek renewal was approved, tritium was found leaking from buried pipes under the reactor. The pipes were never inspected in the relicensing process. Radioactively contaminated water has leaked, spilled or been unintentionally released from nearly all reactors in the U.S., some of which were not detected for many years.[14] Exelon is the only nuclear operator that has committed to digging up the pipes and replacing them.[15]

In Vermont, the state legislature voted to deny the Entergy the ability to proceed with relicensing of Vermont Yankee. According to Vermont law, the state legislature must agree to the license extension before the state Public Service Board decides whether to issue a new state license. In February 2010, Vermont state senators voted down a bill that would have authorized the Public Service Board to complete its process. As a result, the legislators rejected the license extension by stopping the process. Without a license extension, the reactor must be shut down in 2012.

This decision was the result of significant public opposition created by ongoing and dramatic accidents, as well as perceived lies by the owner, Entergy. In 2007, part of the cooling tower collapsed as a result of corrosion, leaking thousands of gallons of cooling water. In January 2010, it was discovered that underground pipes, which Entergy had denied existed, were leaking radioactive tritium at alarming rates. Water under the site was found to have 120 times the legal limit of tritium. According to the NRC, leaking pipes are not illegal until the contamination moves offsite and is

7 *Ibid.*

8 Committee on the Safety and Security of Commercial Spent Nuclear Fuel Storage, National Research Council, *Safety and Security of Commercial Spent Nuclear Fuel Storage: Public Report*, 2006, http://www.nap.edu/catalog.php?record_id=11263

9 Nuclear Energy Institute, Resources & Stats, License Renewal, http://www.nei.org/resourcesandstats/nuclear_statistics/licenserenewal/, Viewed August 2010.

10 U.S. Nuclear Regulatory Commission Office of the Inspector General, Audit Report, *Audit of NRC's License Renewal Program*, September 6, 2007, OIG-07-A-15, http://adamswebsearch2.nrc.gov/idmws/DocContent.dll?Library=PU_ADAMS^PBNTAD01&ID=072500038&Page=1

11 NRC/DOE Workshop, U.S. Nuclear Power Plant Life Extension Research and Development, *Life Beyond 60 Workshop Summary Report*, February 19-21, 2008, http://www.ne.doe.gov/pdfFiles/LifeAfter60WorkshopReport.pdf and Remarks Prepared for NRC Chairman Dale E. Klein, "Life Beyond 60" Workshop, February 19, 2008, Delivered by EDO Luis Reyes on behalf of the Chairman, http://www.nrc.gov/reading-rm/doc-collections/commission/speeches/2008/s-08-013.html

12 Paul Gunter, Beyond Nuclear, *Leak First, Fix Later: Uncontrolled and Unmonitored Radioactive Releases from Nuclear Power Plants*, April 2010, page 15, http://www.beyondnuclear.org/storage/documents/LeakFirst_FixLater_BeyondNuclear_April182010_FINAL.pdf

13 Stop The Relicensing of Oyster Creek coalition, press release, "NRC Licensing Board Gives Go Ahead for First Ever Public Hearing on Nuclear Reactor Licensing Extension at Oyster Creek", June 19, 2007, http://www.nirs.org/reactorwatch/licensing/strocpressrelease06192007.pdf

14 David Lochbaum, Union of Concerned Scientists, *Regulatory Roulette*: *The NRC's Inconsistent Oversight of Radioactive Releases from Nuclear Power Plants,* September 2010, http://www.ucsusa.org/assets/documents/nuclear_power/nuclear-power-radioactive-releases.pdf

15 Ben Leach, "Parent company calls Oyster Creek leaks top priority", *pressofAtlanticCity.com*, October 23, 2009, http://pressofatlanticcity.com/news/press/ocean/article_f3152311-a5e7-5672-98fe-ea1b973b1b49.html

above the standard. Once the radiation moves offsite, however, it is extremely difficult, if not impossible, to remediate. Public interest groups argue that the NRC has failed to enforce its own regulations requiring that its licensees must control, monitor, and cap radioactive releases.[16] Entergy's campaign to convince the public that tritium is a "low-level" radionuclide that is not dangerous and that jobs at the site must be preserved was not successful.

Vermont is an unusual case: it is the only U.S. state that has a role in reactor relicensing due to a deal – struck by the state and Entergy when Entergy wanted to buy the reactor – that allows the state to prevent relicensing. The Atomic Energy Act of 1954 makes licensing of nuclear facilities the exclusive purview of the federal government; therefore, it is not clear whether the state's decision will upheld if Entergy challenges it in court.

Oyster Creek and Vermont Yankee are not the only examples of public opposition to operating reactors. As another example, there has been a long history of opposition to the Diablo Canyon reactors in California, including one of the largest acts of civil disobedience opposing nuclear reactors in the U.S. The primary issue raised by the public is the safety threat posed by the numerous earthquake faults in the area. In 2008, a new earthquake fault was discovered at the site. Despite the fact that the seismic study will not be completed until 2013, the Pacific Gas & Electric Company (PG&E) has applied for a license extension 15 years before the current license expires. The NRC recently granted hearings on four issues raised by a local group, San Luis Obispo Mothers for Peace, including whether PG&E should have to wait until after the seismic study is completed before applying for a license extension.

16 Paul Gunter, op. cit., pages 20-30 and Dave Lochbaum, op. cit., pages 4-5.

PART II:

Actors and Their Influence in the Decision to Build New Reactors

Despite the fact that all additional nuclear electricity since 1996 has been from existing reactors, most federal elected officials and media are focused on the construction of new reactors.[17] Decisions about whether to license and build new nuclear reactors involve many entities, however, including the nuclear industry, electric companies, U.S. states, Congress, the Administration, the Nuclear Regulatory Commission, and the public. The influence of each of these actors in the decision-making process varies greatly.

The Nuclear Industry

The "nuclear industry" in the U.S. is largely represented by its lobbying arm, the Nuclear Energy Institute (NEI). NEI describes itself as "the policy organization of the nuclear energy and technologies industry and participates in both the national and global policy-making process", tasked with "ensur[ing] the formation of policies that promote the beneficial uses of nuclear energy and technologies in the United States and around the world".[18] According to NEI, it has nearly 350 members in 19 countries. Members range from utilities, universities, research laboratories, reactor vendors, nuclear manufacturers, fuel suppliers, nuclear medicine companies, and labor unions.[19]

The nuclear industry vastly out-resources the public interest community that works on nuclear power issues. Between 1999 and 2009, the nuclear industry spent $645 million on lobbying and almost $63 million on campaign contributions.[20] The amount has increased dramatically in recent years: the industry spent as much on lobbying in 2008 as in 1999 and 2000 combined. NEI has increased campaign contributions to Democrats ($9.6 million in 2008) and gave the maximum allowable to the Blue Dog PAC and Moderate Democrats PAC ($10,000 each), which are supposed to represent the fiscal conservative wing of the Democratic Party. NEI has also garnered the support of 21 unions by promising future union jobs and has recruited new legislative champions, such as Sen. Lisa Murkowski (R-AK), ranking member of the Senate Energy Committee and the highest recipient of campaign contributions. Although there are no nuclear reactors in Alaska and no proposed new reactors, Sen. Murkowski has become one of the biggest nuclear proponents in the Senate.[21]

Outside of traditional campaign contributions, the nuclear industry also donates to lawmakers' charities, for which there is no limit to how much can be donated. The total amount of these corporate donations is unknown because the foundations are not required to report donors and, although Congressional rules require corporations with lobbyists to report such donations, corporations do not always do so.[22] It is also not known how much the nuclear industry has spent on advertisements, but nuclear industry ads are prominently and regularly placed in newspapers, radio, and TV promoting nuclear as "clean energy". An ad by the French nuclear company Areva that used hip dance music was particularly popular.[23]

In 2006, NEI created the Clean and Safe Energy Coalition (CASEnergy Coalition), an "Astroturf" organization disguised as a grassroots initiative to promote nuclear power. NEI hired the public relations firm Hill & Knowlton, best known for its campaign to convince the public that cigarettes do not cause cancer,[24] to promote the organization. NEI also hired Patrick Moore, who is advertised as a "co-founder and former leader" of Greenpeace, and Christine Todd Whitman, former New Jersey Governor and former Environmental Protection Agency administrator, to co-chair the CASEnergy Coalition.[25] They promote nuclear power through public speeches, media interviews and outreach to elected officials. Greenpeace has denounced Patrick Moore as a "paid spokesperson for polluting companies".[26]

Another other key strategy for the nuclear industry is to advocate the packaging of nuclear subsidies with renewable subsidies.

17 Including license extensions; uprates (an increase in maximum power level); and the restart of Browns Ferry Unit 1 in Alabama, which was shut down in 1985 because of operational and management problems and restarted in 2007.
18 Nuclear Energy Institute, About NEI, http://www.nei.org/aboutnei/, Viewed August 2010.
19 Nuclear Energy Institute, About NEI, Membership, http://www.nei.org/aboutnei/membership/, Viewed August 2010.
20 Judy Pasternak, "Nuclear energy lobbying working hard to win support", Investigative Reporting Workshop, American University School of Communication, http://investigativereportingworkshop.org/investigations/nuclear-energy-lobbying-push/story/nuclear-energy-working-hard-win-support/ January 24, 2010, http://investigativereportingworkshop.org/investigations/nuclear-energy-lobbying-push/story/nuclear-energy-working-hard-win-support/.
21 Sen. Murkowski recently lost her primary election, though she has announced that she intends to stay in the election as an independent candidate. John McCormick and Patrick O'Connor, "Alaska Senator Murkowski Seeks Re-Election in Write-In Campaign", *Bloomberg Businessweek*, September 18, 2010, http://www.businessweek.com/news/2010-09-18/alaska-senator-murkowski-seeks-re-election-in-write-in-campaign.html
22 Eric Lipton, "Congressional Charities Pulling In Corporate Cash", *The New York Times*, September 5, 2010, http://www.nytimes.com/2010/09/06/us/politics/06charity.html?_r=1
23 Areva Commercial, YouTube, http://www.youtube.com/watch?v=0LFw7UUnN18, Viewed August 2010.
24 SourceWatch, How Tobacco and PR Grew Up Together, http://www.sourcewatch.org/index.php?title=How_Tobacco_and_PR_Grew_Up_Together, Viewed September 2010.
25 CASEnergy homepage, http://casenergy.org/, Viewed September 2010.
26 Greenpeace, media release, "Greenpeace Statement On Patrick Moore", October 10, 2008, http://www.greenpeace.org/usa/en/media-center/news-releases/greenpeace-statement-on-patric/

Members of Congress who might oppose stand-alone nuclear subsidies are less likely to challenge them when they are bound up with subsidies for the renewable industry. For the most part, the renewable industry has refused to challenge the nuclear industry, even though they are competing for the same limited resources. One reason is that companies investing in renewable energy are also investing in nuclear, so there are conflicts within corporations themselves that sit on boards of renewable trade associations. The renewable industry has fought back on including in nuclear in a renewable (sometimes called "clean") energy standard. In Arizona, an effort to modify the state's renewable energy standard to include nuclear and hydropower was met with heavy resistance from the state's up-and-coming solar industry. The solar industry essentially threatened to pull out of Arizona if the bill progressed, and as a result, the bill was not passed into law.[27]

Electric Companies

An electric company in the U.S. can range from a large multistate private company invested in various types of energy to a small, local private company to public cooperatives and municipal-owned companies. Electric companies tend to favor the concept of nuclear power because one reactor produces a lot of electricity at one time. While individual electric companies make the decision to pursue licensing and construction of new reactors, these decisions are not made in a vacuum. Federal and state subsidies, incentives, and cheerleading rhetoric are all part of the consideration. This is not a one-way street: many companies also lobby for these nuclear subsidies and incentives and are members of NEI. If enough subsidies are provided, then the company can be left with none of the risk, but all of the profits from large power facilities.

In the last round of reactor construction, half of the original orders were canceled and at least one utility went bankrupt while others had to be restructured due to cost overruns and insufficient demand.[28] Currently operating reactors in the U.S., however, are often cash cows for electric companies because capital costs were shunted to ratepayers and paid off in "stranded costs" when some states restructured (or "deregulated") their electricity sector. Ironically, ratepayers in these deregulated states experienced above-market regulated rates in the 1980s and then paid for stranded costs to get the reactors off the utilities' books in the 1990s.

Moreover, some nuclear operating companies made enormous profits in deregulation. In about one-third of the states in which the electric industry was restructured,[29] ownership of the transmission grid was separated from electricity generators and the generators joined a regional transmission organization in which the wholesale price of generation is set by the most expensive resource that is necessary to meet demand in a given period (usually an hour). This "market clearing price" is then paid to all of the electricity sold in that hour.[30] In 2005, the state of Connecticut filed a complaint with the Federal Energy Regulatory Commission because the price of natural gas was high and Dominion was making windfall profit from its operating reactors (FERC denied the complaint in 2006).[31]

Some electric companies have acknowledged that new reactors are expensive and risky, and are basically waiting for other companies to build first. Even the largest nuclear company in the U.S., Exelon, is not pursuing any construction and operating licenses now. As recently as May 2010, Exelon President John Rowe said, "As long as we have $4 gas and no carbon price, we're not going to bet on a new nuclear plant".[32] A smaller company Xcel Energy also has no plans to build a new reactor: "We have to weigh the risk of the cost of building a nuclear power plant, considering the size of our company and the tremendous capital outlay that it takes to build a plant like that".[33]

U.S. States

Individual states influence the choices that electric companies make in several ways: (1) in regulated states,[34] the state public utility commission has to approve the need for the power facility and whether the utility can increase rates to pay for it, (2) in deregulated states,[35] states can set power purchasing requirements for utilities; and (3) all states can establish policies, including standards and subsidies, to encourage utilities to build certain kinds of power facilities or to reduce demand through efficiency. Given the high cost of new reactors, most proposed nuclear projects are in regulated states in which utilities are assured of being able to pass costs off to consumers. See **Part III** for more details about state subsidies for nuclear power.

27 E*nvironmental Leader,* "Solar Industry Fights Arizona Bill That Favors Nuclear, Hydro", February 24, 2010, http://www.environmentalleader.com/2010/02/24/solar-industry-fights-arizona-bill-that-favors-nuclear-hydro/

28 Public Service Company Of New Hampshire Business Information, Profile, and History, http://companies.jrank.org/pages/3413/Public-Service-Company-New-Hampshire.html, Viewed September 2010, and Thomas McCarroll, John S. DeMott, and Barbara B. Dolan, "Generators of Bankruptcy", *Time,* July 23, 1984, http://www.time.com/time/magazine/article/0,9171,952457,00.html

29 An additional seven states have suspended deregulation. Energy Information Administration, map, Electricity Restructuring By State, http://www.eia.doe.gov/cneaf/electricity/page/restructuring/restructure_elect.html, Viewed September 2010.

30 Some nuclear companies agreed to forego the wholesale price for purchase power agreements for a certain period of time.

31 Office of the Attorney General, State of Connecticut, press release, "Attorney General, OCC, Biz Group, Power Coop Seek $970 Million In Power Rate Cuts, End to Windfall Profits For Nuke, Coal Plants", September 12, 2005, http://www.ct.gov/ag/cwp/view.asp?A=1949&Q=302074 and Office of the Attorney General, State of Connecticut, press release, "Attorney General Blasts Fed Regulators For Denying Rule Changes That Would Save CT Ratepayers $1 Billion", October 12, 2006, http://www.ct.gov/ag/cwp/view.asp?A=2426&Q=321046

32 Marianne Lavelle, "New Nuclear Energy Grapples With Costs", *National Geographic Daily News,* May 20, 2010, http://news.nationalgeographic.com/news/2010/05/102005-new-nuclear-energy-grapples-with-costs

33 John Tomasic, "Xcel says it has no nuclear plans for Colorado", *The Colorado Independent,* February, 22, 2010, http://coloradoindependent.com/47935/xcel-says-it-has-no-nuclear-plans-for-colorado

34 Regulated states have vertically integrated electricity monopolies in which the company owns the generator and the transmission grid and sells directly to users.

35 In deregulated states, ownership of the transmission grid is separated from the generators, who then compete to sell electricity to the grid.

Virtually all of the licensing decisions about nuclear power are made by federal government of the United States, but states do have a limited role.[36] Under the Clean Air Act, the U.S. Environmental Protection Agency can authorize states to regulate water intake/output by the reactor.[37] States and local governments also have control over zoning of land use.

Nuclear Regulatory Commission (NRC)

Under the Atomic Energy Act of 1954, all of the other radiological health and safety decisions related to licensing, operating, and decommissioning reactors reside within the federal Nuclear Regulatory Commission (NRC). The NRC is headed by a Commission of five people nominated by the President for 5-year staggered terms. The Chair is named by the President. There are currently 3,848 employees working at the NRC.[38] In 2007, it was estimated that about one-third of the critical staff would be eligible to retire by 2010, leaving a large experience gap at the agency.[39] The NRC has been on a hiring spree for the past few years and is even constructing a new building because the two existing towers in Rockville, Maryland are insufficient.

The NRC is under a lot of pressure from Congress to quickly license new reactors. Nuclear proponents in Congress tend to blame the NRC for holding up the "nuclear renaissance" and continue to promote legislation that will further speed up the licensing process. (See **Part V** for more details.) At the same time, the public has seen numerous instances in which NRC has bent over backwards to accommodate the nuclear industry and allowed industry profit to trump public safety. In 2002, this lax relationship towards regulation and safety nearly led to a catastrophe when the NRC allowed FirstEnergy to delay making repairs on its reactor at Davis-Besse in Ohio. In fall of 2001, the NRC's staff had drafted an order to require Davis-Besse to be shut down for safety inspections, arguing that safety margins at the plant had been seriously compromised. But the NRC's management postponed that order for six weeks, claiming they required absolute proof of danger before they would act. The reactor vessel head turned out to be so corroded by boric acid that a mere 3/8 inch of metal cladding was left to prevent a reactor meltdown.[40] The pressure vessel was replaced in 2004, but cracks caused by boric acid corrosion have already been found in the new one. As in 2002, NRC failed to require FirstEnergy to shut down the reactor within six hours of discovery of the boric acid leaks, as required by NRC regulations.[41] The NRC has decided to allow FirstEnergy to patch the leaks and continue operating the reactor until October 2011, when the vessel head will be replaced once again.[42] In August 2010, FirstEnergy applied for a 20-year license extension.[43] Not surprisingly, many public interest nuclear experts have concluded that forcing NRC to further accelerate licensing would pose a serious risk to public safety.[44]

Congress

The federal legislative branch passes laws that set national energy policy and oversees the NRC and the U.S. Department of Energy. These laws are largely in the form of subsidies and incentives to induce private industry to make certain choices. Once enacted, these subsidies and incentives are extremely difficult to eliminate, such as the Price-Anderson Act that limits the nuclear industry's liability to about $11.5 billion in the event of an accident. The Act was originally intended to help get the nuclear industry started. Price-Anderson is still in place 53 years later and has been extended to new reactors built before 2025.

Some members of Congress are ardent and vocal supporters of nuclear power. The House Republican energy plan, as well as Sen. Lamar Alexander (R-Tennessee), is calling for 100 new reactors by 2030, a goal that even the nuclear industry is not promoting.[45] (NEI has been calling for 45 new reactors by 2030[46]). While this is one extreme, many other members of Congress believe that it is in the interest of U.S. national security to have nuclear reactors.[47] This "interest" can be in the form of meeting U.S. energy demand, climate goals, or even paradoxically, nonproliferation objectives.

36 National Association of State PIRGs, *Challenging Nuclear Power in the States: Policy and Organizing Tools for Slowing the "Nuclear Renaissance"*, Spring 2006, http://cdn.publicinterestnetwork.org/assets/77a5720057d51cd79d06b495ca8f18fe/US-Challenging-Nuclear-Power-in-the-States.pdf

37 All but four US states and the District of Columbia have Clean Water Act permitting authority. U.S Environmental Protection Agency, State NPDES Program Authority, http://www.epa.gov/npdes/images/State_NPDES_Prog_Auth.pdf, Viewed September 2010.

38 U.S. Nuclear Regulatory Commission, ,2009-2010 Information Digest, NUREG-1350, Volume 2, August 2009, Page 23, http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1350/v21/sr1350v21.pdf#page=23

39 U.S. Government Accountability Office, *Human Capital: Retirements and Anticipated New Reactor Applications Will Challenge NRC's Workforce*, January 2007, GAO-07-105, http://www.gao.gov/new.items/d07105.pdf

40 Union of Concerned Scientists briefing, *Davis-Besse: The Reactor with a Hole in its Head*, 2002, http://www.ucsusa.org/assets/documents/nuclear_power/acfnx8tzc.pdf

41 Union of Concerned Scientists petition to the NRC, Subject: Request for Restoration and Maintenance of Adequate Protection of Public Health and Safety at the Davis-Besse Nuclear Plant, April 5, 2010.

42 Letter from Mark A. Satorius, NRC Regional Administrator, to Mr. Barry Allen, Site Vice President of FirstEnergy Nuclear Operating Company, Subject: Confirmatory Action Letter – Davis-Besse Nuclear Power Station, June 23, 2010.

43 *License Renewal Application: Davis-Besse Nuclear Power Station*, August 2010, http://www.nrc.gov/reactors/operating/licensing/renewal/applications/davis-besse/davis-besse-lra.pdf

44 Physicians for Social Responsibility, press release, "Experts warn proposed climate/energy legislation would deregulate new nuclear reactors in much the same way that oil drilling oversight was 'streamlined' before BP spill", June 23, 2010, http://www.psr.org/nuclear-bailout/resources/062310-release.pdf

45 GOP.gov, News from House Republicans, Republicans Introduce the American Energy Act, http://www.gop.gov/energy, Viewed September 2010; Sen. Alexander, who is adamantly opposed to wind power because the turbines are ugly, recently released a book of his speeches on nuclear power, entitled "Going to War in Sailboats" (http://alexander.senate.gov/public/?a=Files.Serve&File_id=1588261e-d195-4983-a3a4-309d8a828425).

46 Nuclear Energy Institute, Public Policy, Industry Priorities for the 111th Congress, http://www.nei.org/publicpolicy/industry-priorities-for-the-111th-congress/, Viewed August 2010.

47 Such as in Section 312 of the American Clean Energy and Leadership Act (S.1462): http://energy.senate.gov/public/_files/s1462pcs1.pdf (not passed into law).

Support for nuclear is not a Republican issue alone, though the Republican Party has tried to paint the Democrats as "anti-nuclear". In fact, several of the proposed new reactors are in districts or near district represented by Democrats and are strongly supported by them. For example, the Majority Leader of the House of Representatives Steny Hoyer (D-Maryland) represents the district in which the next loan guarantee for a proposed reactor is likely to be announced.

While Republicans and conservative Democrats denounce government spending and "big government", they often also support new reactors. Since no new reactors will be built in the U.S. without vast subsidies and large taxpayer risk, it is unclear how these two diametrically opposed positions can be sustainable. The so-called "Tea Party", which has several dozen candidates for federal seats across the U.S., is even more vociferously opposed to government spending and government intervention. However, when one Tea Party candidate in a Texas district where two new reactors are being proposed came out opposed to loan guarantees, his Democratic challenger attacked him and he immediately recanted.[48]

The Administration

While the U.S. President does not order an electric company to build a new reactor, he can use his position to promote the industry and redefine it. The idea of a so-called "nuclear renaissance" given a big boost with the Bush Administration's May 2001 Energy Policy, which calls for streamlining of the regulatory and licensing process, reprocessing of spent fuel, and a deep geological waste site.[49] President George W. Bush often advocated for "clean and safe nuclear power". Four years later, the Energy Policy Act of 2005 was signed into law, which provides over $7 billion in nuclear subsidies, plus an undefined amount of loan guarantees and other incentives.[50]

President Obama has continued to promote the nuclear industry, although this rhetoric has changed since the 2008 presidential campaign. The Obama-Biden New Energy for America plan concluded that "before an expansion of nuclear power is considered, key issues must be addressed including: security of nuclear fuel and waste, waste storage, and proliferation".[51] These issues have yet to be resolved, but since January 2010, President Obama has put an enormous amount of his Administration's weight behind new nuclear reactors:

- in his 2010 State of the Union address, President Obama defined "clean energy" as nuclear power, drilling for oil and gas, and coal;
- in January 2010, Energy Secretary Chu announced the members of the Blue Ribbon Commission on America's Nuclear Future, which is tasked with making recommendations on a solution to managing the US spent fuel and high-level radioactive waste. The panel is represented by members adamantly in favor of restarting the U.S. nuclear industry, including former Sen. Pete Domenici; the CEO of Exelon; the labor union federation, AFL-CIO; and a former NRC Chairman. The panel does not include any scientists from the public interest community nor any experts from the communities located near this waste;
- in its Fiscal Year 2011 budget request, the Department of Energy requested authority to hand out an additional $36 billion in loan guarantees for new reactors, which would triple nuclear loan guarantees to a total of $54.5 billion;
- in February 2010, President Obama personally announced the first loan guarantee of $8.3 billion offered to Southern Company and its partners for two new reactors at Vogtle in Georgia.

Some press and pundits have framed the Administration's support for new reactors to gain support for a climate bill from reluctant Republicans, but no Republican votes for climate were ever obtained from this strategy.

Illinois-based Exelon, the largest nuclear reactor operator in the U.S., has close ties to the President, even saying that they are "proud to be the President's utility".[52] In 2004, Exelon was the fourth largest contributor to Obama's senate rate.[53] Although presidential candidate Obama did not accept money from Political Action Committees (PAC) in 2008, Exelon employees donated over $200,000.[54] Frank Clark, chairman and CEO of Commonwealth Edison, which is owned by Exelon, raised over $200,000 as an Obama bundler.[55] White House Chief of Staff Rahm Emanuel and senior advisor David Axelrod are both closely tied to Exelon as well.[56]

President Obama points to the advice of his "Nobel prize-winning" Energy Secretary Steven Chu, who says that nuclear power is necessary to meet climate goals.[57] The U.S. Department of Energy (DOE) has long been a strong advocate of nuclear power. In 1974, Atomic Energy Agency was split into an independent regulator (NRC) and an energy research agency, because it became

48 Tom Benning, "GOP House candidate Bill Flores backtracks on loans for nuclear power plants", *The Dallas Morning News*, May 22, 2010, http://www.dallasnews.com/sharedcontent/dws/news/politics/state/stories/DN-edwards_22tex.ART.State.Edition1.14099151.html

49 National Energy Policy Development Group, *op. cit.*

50 Public Citizen, *Nuclear Giveaways in the Energy Policy Act of 2005*, http://www.citizen.org/documents/NuclearEnergyBillFinal.pdf

51 *Barack Obama and Joe Biden: New Energy For America*, http://www.barackobama.com/pdf/factsheet_energy_speech_080308.pdf

52 Jonathan Fahey, "Exelon's Carbon Advantage", *Forbes Magazine*, January 18, 2010, http://www.forbes.com/forbes/2010/0118/americas-best-company-10-exelon-utility-tax-carbon-windfall.html

53 SourceWatch, Barack Obama/Campaign Financing, http://www.sourcewatch.org/index.php?title=Barack_Obama/Campaign_Financing, Viewed September 2010.

54 Judy Pasternak, *op. cit.* and OpenSecrets.org of the Center for Responsive Politics.

55 SourceWatch, *cit.op.*

56 Judy Pasternak, op. cit. and Jonathan Fahey, op. cit.

57 The White House, Office of the Press Secretary, *Remarks by the President on Energy in Lanham, Maryland,* February 16, 2010, http://www.whitehouse.gov/the-press-office/remarks-president-energy-lanham-maryland; The Peter Behr, "Administration Puts Its Own Stamp on a Possible Nuclear Revival", *The New York Times*, February 2, 2010, http://www.nytimes.com/cwire/2010/02/02/02climatewire-the-administration-puts-its-own-stamp-on-a-p-76078.html; and Steven Chu, "Why We Need More Nuclear Power", *Facebook*, February 22, 2010, http://www.facebook.com/notes/steven-chu/why-we-need-more-nuclear-power/336162546856

apparent that regulating and promoting the nuclear industry were conflicting mandates for the same agency.[58] DOE continues to have an incompatible mixture of mandates, with about 65 percent of its requested FY2011 budget in nuclear weapons and weapons site cleanup, not energy. Of DOE's requested budget for energy research and development, 44% is allocated for nuclear energy.[59] DOE is also responsible for managing the spent fuel from the U.S. Department of Defense nuclear submarines.

The Public

For the most part, the U.S. general public is not paying much attention to the proposed new reactors. Both proponents and opponents cite public polls on nuclear power, which indicate that people are more supportive than in early 2000s of the concept of new reactors, especially if it is framed as "energy independence" and "jobs", but are less supportive if asked if they want to host one in their community.[60] Almost all of the proposed new reactors in the U.S. are at sites with operating reactors, because the communities are generally supportive of the jobs created.

At the same time, environmental, taxpayer, and public health organizations, as well as grassroots activists, prominent economists, thought-leaders and others throughout the U.S. continue to oppose new reactors. Most of this debate is focused on federal subsidies, which are essential for the construction of new reactors, and on radioactive waste, since President Obama has canceled Yucca Mountain and reprocessing has become the "solution" promoted by nuclear proponents.

It is extremely difficult and costly for the public to participate in NRC's licensing process for new reactors. The process has been accelerated in two major respects since the last round of reactor construction in the U.S. In the Energy Policy Act of 1992, Congress collapsed the former two-step licensing process (construction permit review followed by operating license review) into a one-step Construction and Operating License (COL) process.[61] In 2004, the NRC further truncated the licensing process by eliminating the public's right to take depositions or cross-examine opposing witnesses in individual licensing hearings. In order to get a public adjudicatory hearing, the public must file contentions supported by expert testimony with a licensing board comprised of three NRC judges, usually within 60 days of NRC's announcement of the hearing opportunity. The board then decides whether to admit the contentions and grant the hearing. Although a lawyer is not required in order to intervene, managing an intervention without one is very challenging because of the high volume of procedural motions, legal requirements for filings, technical and legal jargon, and numerous deadlines.

The nuclear industry has vastly more financial and human resources than citizen groups are able to muster. A license intervention that involves several contentions and paid lawyers and experts could cost a citizen group from $100,000 to $500,000.[62] Without being an official party to the intervention, however, it is difficult to obtain information, raise issues, or participate in a meaningful way. One primary reason to participate in licensing is to have an opportunity to challenge the decision in court later, though this is rarely a successful strategy because the courts tend to defer to agency decisions.

58 The Energy Reorganization Act of 1974 established an "Energy Research and Development Administration", which was later consolidated into the "Department of Energy" by the Department of Energy Organization Act of 1977.

59 Robert Alvarez, *The U.S. Department of Energy's Fiscal Year 2011 Budget Request*, PowerPoint, February 12, 2010, Page 2, http://www.ips-dc.org/reports/doe_fy_2011_budget_request

60 Angus Reid Public Opinion, Vision Critical Practice, press release, *Many Americans, But Not a Majority, Endorse Nuclear Power*, March 2, 2010, http://www.visioncritical.com/wp-content/uploads/2010/03/2010.03.02_Nuclear_USA.pdf and Yale Project on Climate Change and George Mason University Center for Climate Change Communication, *Global Warming's Six Americas, January 2010*, Page 14, http://environment.yale.edu/uploads/SixAmericasJan2010.pdf

61 A nuclear company has the option of applying first for an Early Site Permit (ESP), which approves a site as suitable for a nuclear reactor, but does not allow a company to build the reactor itself until it obtains a COL. (A Limited Work Authorization, which can be obtained with an ESP, allows the utility to clear the site, excavate, and build infrastructure such as roads, bridges, parking lots, railroad spurs, drinking water systems, sewage treatment facilities, fences, transmission lines, and support buildings.) The ESP, which is valid for 20 years with a possible 20-year extension, does not address the need for power, the cost of electricity, or possible alternative sources of electric generation. The issues that are resolved in an ESP, such as water impacts of the proposed reactor, cannot be raised again in the COL process unless the public can prove a significant change since the ESP was approved. NRC Regulations 10 CFR § 50.10 License required; limited work authorization, http://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0010.html

62 Nuclear Information and Resource Service, NIRS Briefing Paper, "The NRC'S Reactor Licensing Process: An Overview", September 2006, Page 6, http://www.nirs.org/reactorwatch/licensing/licensingprocess.pdf

PART III:
Existing Federal and State Nuclear Subsidies

The only serious proposals to construct new reactors are those that have large federal or state subsidies lined up, or are at the top of the list for potential future subsidies. The two most important subsidies are federal loan guarantees and Construction Work in Progress, state laws that allow utilities to charge ratepayers for the cost of construction before a license is obtained. Even these subsidies, however, may not be enough to complete the construction of new reactors, so more subsidies have been proposed.

Massive Federal Subsidies for New Reactors

Most of the slew of subsidies for new reactors were enacted in the Energy Policy Act of 2005, including taxpayer-funded licensing, "risk insurance" to pay the industry for delays in licensing, "such sums as necessary" to construct a reactor in Idaho, 20-year reauthorization of limited liability for the nuclear industry in the event of an accident or attack, production tax credits, and federal loan guarantees for new reactors.[63] Most of these subsidies have yet to actually be used, because the nuclear industry has yet to obtain a license to construct a new reactor.

In addition, the DOE has already signed contracts with 12 utilities guaranteeing to remove spent fuel from 21 proposed reactors within ten years after their operating licenses expire. If this deadline is not met, U.S. taxpayers must pay the spent fuel storage costs.[64] U.S. taxpayers are currently paying contract damages for failing to remove spent fuel from existing reactors by the 1998 statutory deadline. So far, $565 million have been paid to utilities, with an additional $790 million pending and an expected $1 billion of damage payments per year for the next 10 years. Ratepayers receiving electricity from nuclear reactors pay one mil (one-tenth of one cent) per kilowatt-hour into a Nuclear Waste Fund to pay for a geologic repository for the spent fuel; the Fund currently has about $22 billion.[65] The last estimated cost for the proposed repository at Yucca Mountain in Nevada before the license application was withdrawn by the Obama Administration was nearly $100 billion.[66]

Most Crucial Nuclear Subsidy: Loan Guarantees

The most important subsidy for new reactors are the loan guarantees authorized in EPACT 2005, called the Title XVII Loan Guarantee Program for the title in which was established. The U.S. Department of Energy (DOE) is responsible for implementing Title XVII. The program was ostensibly created to support "innovative" technologies, including renewable energy, fossil energy, hydrogen fuel cells, carbon capture and sequestration technologies, efficient technologies, pollution control equipment, refineries, and "advanced" nuclear power. "Advanced" is not defined in the law. In its regulations, DOE has defined "commercial technologies", which are *not* eligible for loan guarantees under this program, as "in general use if it has been installed in and is being used in three or more commercial projects in the United States in the same general application as in the proposed project, and has been in operation in each such commercial project for a period of at least five years".[67] Given that new reactors will take at least five to ten years to build, a large amount of loan guarantees for the same design could be offered before the design is considered "commercial". This increases the risk for taxpayers, because it could be many years before it is known whether a technical or economic problem will arise that will cause that design to be abandoned.

Under Section 504(b) of the Federal Credit Reform Act,[68] which was enacted to protect U.S. taxpayers from the risk of federal credit programs, Congress must provide authority for the government to commit to loan guarantees, either by (1) appropriating the subsidy cost or (2) by setting a limit on the amount of loan guarantees in which the borrower pays the credit subsidy cost (sometimes called "self-pay" loan guarantees).

63 For a complete list of subsidies currently available for new reactors in the United States, see Physicians for Social Responsibility, *Existing Subsidies and Incentives for New Nuclear Reactors*, Updated February 28, 2010, http://www.psr.org/assets/pdfs/existing-subsidies-and-incentives.pdf

64 *Backgrounder on New DOE Contracts for Commercial High-Level Radioactive Waste Disposal*, http://www.ieer.org/reports/DOE_WasteContracts2010/NewWasteDisposalContractsBackgrounderFINAL3.pdf

65 *Ibid.*

66 "Yucca Mountain life-cycle costs escalate 67%", *PowerNews*, Source: DOE, http://web.hermesemessenger2.com/tfg/public/Update_Links.asp?EmailAddress=LWHEELER45@AOL.COM&ScheduleID=1219&IssueID=298&FileName=http://web.hermesemessenger2.com/tfg/public/newsletters/present/ISSUE298/article915.html&ArticleID=915

67 US Department of Energy 10 CFR § 609.2, Loan Guarantees for Projects That Employ Innovative Technologies, Definitions, 2008, http://edocket.access.gpo.gov/cfr_2008/janqtr/pdf/10cfr609.2.pdf

68 Federal Credit Reform Act of 1990, Section 504(b), http://www.usaid.gov/policy/ads/600/fcra.pdf, APPROPRIATIONS REQUIRED.
– Notwithstanding any other provision of law, new direct loan obligations may be incurred and new loan guarantee commitments may be made of fiscal year 1992 and thereafter only to the extent that –
(1) new budget authority to cover their costs is provided in advance in an appropriations Act;
(2) a limitation on the use of funds otherwise available for the cost of a direct loan or loan guarantee program has been provided in advance in an appropriations Act; or
(3) authority is otherwise provided in appropriation Acts.

The credit subsidy cost, the net present value of the estimated long-term cost to the federal government of the loan guarantee, is assessed for each project that gets a loan guarantee. No Title XVII loan guarantee can be made unless Congress has appropriated the credit subsidy cost or the borrower has paid the credit subsidy cost to the federal government upfront. In 2008, Congress authorized $18.5 billion in nuclear loan guarantees, which was intended to cover 4 projects (7 reactors). With the cost escalation of new reactors, this will now only cover 2 projects (3 reactors).

President Obama requested an additional $36 billion in nuclear loan guarantee authority in his FY2011 budget request, but failed to budget for the cost of the loan guarantee, estimated by the Office of Management and Budget to be 1% of the authorization ($360 million). The pending House bill includes $25 billion in nuclear loan guarantees and another $25 billion for renewable loan guarantees, while the pending Senate bill has $10 billion for nuclear, $7 billion for fossil fuels, and about $3.8 billion for renewables. Given it is an election year, it is not clear that these two versions of the bill will ultimately be reconciled and passed into law. Knowing this, the Obama administration tried to put nuclear loan guarantees into several unrelated bills. The House included $18 billion in loan guarantees, half for nuclear and half for renewables, in its emergency war supplemental bill. The Senate ultimately rejected the additional spending in the bill, which also included funding for teachers and first-responders. Then the Administration tried to allocate some of the existing authority for fossil fuel loan guarantees to nuclear, but coal-state members of Congress rejected that proposal. It is very likely that there will be an effort to put nuclear loan guarantees into any moving bills through the end of the year. If they are not successful, DOE will have to wait until 2011 to get additional authority.

Nuclear Loan Guarantees: Just How Risky Are They?

Proponents argue that nuclear loan guarantees pose no risk to U.S. taxpayers, because the borrower pays the credit subsidy cost. But both CBO and the Government Accountability Office (GAO) have concluded that calculating this fee is extremely difficult and likely to be underestimated, leaving taxpayers on the hook for projects that default. Moreover, CBO found an inherent problem in federal loan guarantees: a higher, accurate fee could actually discourage the borrower from accepting the guarantee.[69]

How much projects will actually pay in credit subsidy cost is unknown, because DOE does not intend to make public the subsidy cost fee. The nuclear industry has been asking for a fee of 1% of the guarantee; according to DOE, the average fee for *existing* renewable technology projects will likely be 15% of the guarantee.[70]

In 2003, the Congressional Budget Office estimated that the default rate for new reactors is "very high – well above 50 percent". The CBO has since blogged that the 2003 estimate is "not necessarily" relevant today.[71] However, the blog pointed to high construction cost, technical risks, and delays from licensing as factors that will influence the risk of loan guarantees. The fact is that these conditions, in addition to the significant decrease in electricity demand, appear even direr today than in 2003.

State Subsidies Shift Costs and Risks to Ratepayers

A state can also provide various subsidies and incentives to encourage the development of new reactors in that state. The most significant subsidy is Construction Work in Progress, sometimes called Cost Recovery, which allows utilities to charge ratepayers in advance for the construction cost of new reactors before they are even federally licensed to be built. If the reactor is not built or is abandoned mid-construction, there is not necessarily a provision for returning this money back to ratepayers.

Thus far, six states have enacted CWIP laws.[72] The CWIP laws have not worked out as well as the industry hoped. Rate hikes that have been approved thus far by public utility commissions have been met with significant public opposition. In Florida, the governor fired two Public Service Commissioners who approved rate hikes (despite the CWIP law allowing for it). When he replaced them with two people who voted against additional rate increases, the state legislature refused to confirm them, because they were not "congenial" and "cooperative" enough.[73] The two utilities proposing to build four reactors in the state have now indicated that they may apply for federal loan guarantees as well.

In order to pass the CWIP law in Georgia, the state legislature exempted large industrial customers from having to pay the CWIP costs, leaving even more burden on residential ratepayers. Two organizations (one taxpayer and one environmental) separately sued the state; the court ruled that the lawsuit was premature because the utility had yet to request any CWIP rate increase. Missouri has rejected CWIP, largely due to opposition from large industrial companies and AARP, an organization that represents 40 million retired people, the majority of whom are on fixed incomes. As a result, the utility AmerenUE suspended its proposed reactor in the state. In North Carolina, the utility Duke Energy is attempting to enhance the state's CWIP law (the proposal is being called "Super CWIP").

About 16 U.S. states have some form of moratoria on new reactors that prevent the construction of new reactors until there is a permanent solution for the spent fuel and/or nuclear power

69 Congressional Budget Office, "Department of Energy's Loan Guarantees for Nuclear Power Plants", *Director's Blog,* March 4, 2010, http://cboblog.cbo.gov/?p=478

70 US Government Accountability Office, *Department of Energy: Further Actions Are Needed to Improve DOE's Ability to Evaluate and Implement the Loan Guarantee Program,* July 2010, GAO-10-627, Page 3, http://www.gao.gov/new.items/d10627.pdf

71 Congressional Budget Office, *op. cit.*

72 These include Florida, Georgia, Louisiana, Mississippi, North Carolina, and South Carolina.

73 Mary Ellen Klas and Nandini Jayakrishna, "FPL rate-hike foes on Public Service Commission ousted by panel", *The Miami Herald,* July 1, 2010, http://www.miamiherald.com/2010/07/01/v-print/1709516/fpl-rate-hike-foes-ousted-by-state.html#ixzz0sQh2neir

is economically competitive and/or the legislature or voters approve it.[74] These laws were largely enacted in the 1980s, when it became apparent that new reactors projects were an enormous burden on ratepayers and utilities.

The nuclear industry has been trying for several years to overturn these state moratoria, especially in Wisconsin, Minnesota, and Illinois. At one point, NEI had four full-time employees working to overturn the Wisconsin state ban.[75] Citizen opposition has been very strong. In Wisconsin, a state legislative committee voted to overturn the state ban, but only if CWIP was outlawed. The sponsor of the bill to remove the moratorium pulled his bill. Later, the full Senate voted to overturn the moratorium without the CWIP provision, but the session ended before further action was taken. Thus far, no state has repealed its moratoria, but it is clear that the nuclear industry will continue to work on them.

74 David L. Lovell, memo, Re: State Laws Limiting the Construction of New Nuclear Power Plants, *Wisconsin Legislative Council Staff Memorandum,* November 29, 2006, http://www.legis.state.wi.us/lc/committees/study/2006/NPOWR/files/memo2_npowr.pdf

75 Diane Farsetta, "Wisconsin's Balance of Power: The Campaign to Repeal the Nuclear Moratorium", *PRWatch.org*, Center for Media and Democracy, March 26, 2009, http://www.prwatch.org/node/8291

PART IV:

Status of New Reactor Projects

Reactor Design Problems May Delay New Licenses

No reactor designs that are being proposed have received final certification from the Nuclear Regulatory Commission and no new construction and operating licenses have been issued yet. The original plan for the NRC's new licensing process was that the industry would certify "standardized" designs, which could then be referenced in a Combined Construction and Operating Licenses (COL) application. However, deadlines for federal loan guarantees applications led the nuclear industry to quickly submit 17 COL applications to the NRC between September 2007 and October 2008. The result is that the NRC is currently reviewing five reactor designs and 22 COL applications at 13 sites (*Figure 1*).[76] According to NRC Chairman Greg Jazcko, the NRC "may be approaching a final decision" on the first COL license in 2012.[77] However, ongoing technical issues with reactor design certifications may further delay the issuance of COLs.

The AP1000 was initially certified in 2006, but in response to the NRC's pending aircraft crash rule for new reactor designs, Westinghouse filed an amended design in 2007.[78] The amended design made significant changes to the certified version and is still undergoing NRC review. In October 2009, the NRC announced that it was concerned that the AP1000 design, proposed for over half of the projects, would not withstand natural disasters like earthquakes, hurricanes and tornados.[79] The vendor Westinghouse has not met deadlines for responding to the outstanding technical issues, so there is currently no schedule for completing the design certification.[80] In addition, an independent analysis of the design has raised additional questions about whether the steel containment vessel would rust and allow radioactively contaminated air to escape from the concrete containment vessel in the event of a reactor accident.[81] The NRC's Advisory Committee on Reactor Safeguards has heard a presentation on the issue.

In July 2010, the NRC announced that it is concerned that the day-to-day and emergency systems of the French EPR design, proposed for two projects, are not sufficiently independent and could fail at the same time, and that the overall design is "highly complex".[82] The NRC stated that it will not know if the certification review schedule will be impacted until Areva submits detailed information about the new design.[83]

The vendor of the US-APWR design, which is proposed at two reactor sites, is in the process of performing new seismic analysis based on design changes. The NRC staff has stated that the process has been delayed by at least 6 months and that further delays are possible, depending on the complexity of the unresolved issues and on the ability of Mitsubishi Heavy Industries to meet deadlines.[84]

The other two designs, the ESBWR and the ABWR, are proposed for one project each. Three utilities have abandoned the ESBWR design: Exelon at Victoria County in Texas, now an Early Site Permit; Entergy at Grand Gulf in Mississippi and at River Bend in Louisiana, both projects suspended; and Dominion at North Anna in Virginia, now proposing an APWR. According to a letter from Exelon to the NRC in November 2008, Exelon abandoned the design because "technologies other than the ESBWR provide the project greater commercial and schedule certainty", as well as increase Exelon's ability to get a federal loan guarantee.[85] In March 2010, the vendor GE-Hitachi submitted its seventh revision of its application, though NRC staff indicates that it is currently on track for certification in September 2011.[86]

76 U.S. Nuclear Regulatory Commission, *Expected New Nuclear Power Plant Applications,* Updated June 21, 2010, http://www.nrc.gov/reactors/new-reactors/new-licensing-files/expected-new-rx-applications.pdf

77 Gregory B. Jaczko, Written Testimony to the Senate Committee on Environment and Public Works Subcommittee on Clean Air and Nuclear Safety, May 5, 2010, Page 8, http://www.nrc.gov/about-nrc/organization/commission/comm-gregory-jaczko/jaczko-statement-5-05-10.pdf

78 U.S. Nuclear Regulatory Commission, Design Certification Application Review - AP1000 Amendment, http://www.nrc.gov/reactors/new-reactors/design-cert/amended-ap1000.html, Viewed August 2010.

79 U.S. Nuclear Regulatory Commission, "NRC Informs Westinghouse of Safety Issues with AP1000 Shield Building", NRC News, October 15, 2009, http://www.nrc.gov/reading-rm/doc-collections/news/2009/09-173.html

80 Letter from the NRC to Westinghouse, Subject: Progress Report on the Review of the AP1000 Design Certification Application, September 1, 2010, ML102300415.

81 Arnold Gunderson, Post *Accident AP1000 Containment Leakage: An Unreviewed Safety Issue*, Fairewinds Associates, Inc., April 21, 2010, http://www.fairewinds.com/AP1000-Containment-Leakage-Report-Fairewinds-Associates-Inc

82 U.S. Nuclear Regulatory Commission, "NRC Informs AREVA of safety issues with EPR reactor design's computer systems", NRC News, July 23, 2010, http://www.nrc.gov/reading-rm/doc-collections/news/2010/10-130.html and Letter from the NRC to Areva, Subject: Status of the U.S. EPR Design Certification Application Regarding Digital Instrumentation and Controls Review, July 22, 2010, ML101940253.

83 *Ibid.*

84 Letter from NRC to APWR, "Schedule Change for the United States – Advance Pressured Water Reactor Design Certification", April 28, 2010, ML100830739.

85 Letter from Exelon to NRC, Subject: Exelon Nuclear Texas Holdings, LLC, Victoria County Station, Units 1 and 2, Notification to Designate Alternative Reactor Technology for Victoria, County Station, Units 1 and 2 Combined License Application (COLA), NRC Dockets Nos. 52-031 and 52-032, November 24, 2008, NP-08-2004.

86 U.S. Nuclear Regulatory Commission, ESBWR Design Certification Review, http://www.nrc.gov/reactors/new-reactors/design-cert/esbwr/dc-review.html, Viewed September 2010.

The NRC's certification of the ABWR will expire in 2012 and it is currently being reviewed for recertification. The amended design will have to address compliance with the NRC's new aircraft attack rule. There is currently no NRC schedule for the safety review of the amended design.[87]

Of the 13 COL proposals being reviewed by the NRC, about one-third have announced delays of three to six years from initial plans. *Table 1* lists the reactor projects that have announced delays.

Leading New Reactor Projects Are Troubled

President Obama personally announced the first nuclear "conditional" loan guarantee of $8.33 billion for two AP1000 reactors in Georgia. The conditions of the loan guarantee are not public, though DOE has stated that one condition is that the company must get an NRC license. An NRC license, however, does not eliminate the risk of default. In the last round of reactor construction in the U.S., half of the reactors that received NRC construction permits were canceled.[90] The utility proposing to build the new Vogtle reactors, Southern Company and its partners, asked for an extra month to decide whether to accept the loan guarantee. Although the details are not public, it was widely reported that Southern Company was negotiating with DOE and OMB to reduce the subsidy cost fee.[91]

Three projects are at the top of the list for the remaining $10.2 billion in loan guarantee authority: Calvert Cliffs in Maryland, South Texas in Texas, and VC Summer in South Carolina. There is only enough authorized for one of these projects. None of these projects are promising:

- **Calvert Cliffs:** In addition to the ongoing design certification problems with the EPR, a recent report by the former head of EDF, Francois Roussely, concluded that the EPR is expensive

Table 1: Proposed Reactor Projects with Announced Delays (since January 2008)[88]

Proposed site, State	Number of Reactors	Delay
Bellefonte, Alabama	1	4-6 years (from 2016 to 2020-2022)
William States Lee, South Carolina	2	5 years (from 2016 to 2021)
Levy County, Florida	2	3 years (from 2016/2018 to 2021/2023)
Turkey Point, Florida	2	Beyond 2018

At least twelve proposed reactors have been suspended or canceled since 2008 (see *Table 2*).

Table 2: Suspended or Canceled Reactor Projects (since January 2008)[89]

Proposed site, State	Number of Reactors	Status
Bellefonte, Alabama	3	Suspended
Callaway, Missouri	1	Suspended
Grand Gulf, Mississippi	1	Suspended
River Bend, Louisiana	1	Suspended
Nine Mile Point, New York	1	Suspended
Amarillo, Texas	2	Canceled (never applied)
Victoria County, Texas	2	COL application changed to Early Site Permit
Utah	1	Never applied, now considering an Early Site Permit
TOTAL	**12**	

87 U.S. Nuclear Regulatory Commission, Review Schedule for the Design Certification Application Review – ABWR Amendment, http://www.nrc.gov/reactors/new-reactors/design-cert/amended-abwr/review-schedule.html, Viewed September 17, 2010.

88 Based on the factsheet *Nuclear Power: The Renaissance That Wasn't,* http://www.psr.org/nuclear-bailout/resources/the-renaissance-that-wasnt.pdf August 2010 version.

89 *Ibid.*

90 Peter Bradford, "We may be on the hook for more nuclear plants", *Atlanta Journal-Constitution,* June 22, 2010, http://www.ajc.com/opinion/we-may-be-on-555182.html

91 Margaret Newkirk, "Southern Co. agrees to federal loan for nuke expansion", *Atlanta Journal-Constitution,* June 18, 2010, http://www.ajc.com/business/southern-co-accepts-federal-552648.html

and complex.[92] In August 2010, EDF set up a provision against potential future losses on its investment in the project.[93] In addition, Constellation has cut its spending on the project and is in a dispute with the French utility Electricite de France, which is co-owner of the proposed Calvert Cliffs project.

- **South Texas:** In February 2010, the City of San Antonio pulled out of 85% of its investment in the South Texas reactors after it became known that the estimated project costs had skyrocketed to $18.5 billion. Since then, the Japanese company TEPCO has committed to invest a mere $155 million if NRG gets a loan guarantee, with an option of an additional $125 million investment within one year.[94] NRG has not announced any additional investors in the project.

- **VC Summer:** In addition to the AP1000 design certification issues, the Supreme Court of South Carolina recently rejected a $483 million rate increase for a "contingency fund" to cover costs from the construction of the two reactors.[95] Credit rating agencies have downgraded the credit rating of the utility SCE&G and its partners proposing to build the two reactors.

According to House Majority Leader Hoyer, the Calvert Cliffs project is next in line for a loan guarantee.[96] NRG, the company proposing the South Texas reactors, has stated that it will cancel its project if DOE announces Calvert Cliffs without funding for other projects.[97] Regardless of whether these projects receive U.S.-taxpayer backed loan guarantees, it will not be enough. Both projects are proposed for states with "restructured" electricity markets and would have to compete against the wholesale price of electricity. In Texas, where the South Texas project is located, a recent market monitor report on the ERCOT wholesale market concluded that cost of new reactors exceeds the revenue they would get in the market by 30 to 50 percent.[98] Both projects are also looking to foreign governments to provide additional loan guarantees: the French government in the case of Calvert Cliffs, which is proposing to build the French EPR design, and the Japanese government in the case of South Texas, which is proposing the Japanese ABWR design.

92 Tara Patel, "EDF Net Income Tumbles 47% After Outlook Dims for Nuclear Project in U.S.", *Bloomberg*, July 30, 2010, http://www.bloomberg.com/news/print/2010-07-30/edf-reports-47-drop-in-first-half-profit-amid-french-u-s-nuclear-delays.html

93 François Roussely, Report Summary: Future of the French Civilian Nuclear Industry, 16 June 2010, Translated by the Institute for Energy and Environmental Research, Takoma Park, Maryland, http://www.psr.org/nuclear-bailout/resources/roussely-report-france-nuclear-epr.pdf

94 NRG Energy Inc., press release, "Tokyo Electric Power Company to Be a Partner in South Texas Project Nuclear Expansion", May 10, 2010, http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9NDUzMTR8Q2hpbGRJRD0tMXxUeXBIPTM=&t=1

95 South Carolina Judicial Department, Supreme Court of South Carolina, 26856 – SC Energy Users Committee v. SC Public Service Commission, Opinion No. 26856, Heard April 6, 2010 – Filed August 9, 2010, http://www.judicial.state.sc.us/opinions/displayOpinion.cfm?caseNo=26856

96 Paul West, "Hoyer: Calvert Cliffs first in line for nuclear loan guarantee", *The Baltimore Sun*, July 1, 2010, http://articles.baltimoresun.com/2010-07-01/news/bs-md-calvert-cliffs-loan-20100701_1_loan-guarantee-calvert-cliffs-unistar-nuclear-energy

97 David Crane, NRG Energy Inc, "More Than Megawatts", PowerPoint, Deutsche Bank 2010 Alternative Energy, Utilities & Power Conference, May 12, 2010, Page 18, http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9MzAxMjU5M3xDaGlsZElEPTM4MjI0OXxUeXBIPTI=&t=1

98 Potomac Economics, LTD., Independent Market Monitor for the ERCOT Wholesale Market, *2009 State of the Market Report for the ERCOT Wholesale Electricity Markets*, July 2010, Page XX, http://www.puc.state.tx.us/wmo/documents/annual_reports/2009annualreport.pdf

PART V:

New Reactors Still Not Economically Competitive

More Federal Nuclear Subsidies Proposed

Enacting a federal climate bill that puts a price on carbon would benefit utilities that have operating reactors. According to Exelon, a price on carbon will result in a windfall profit of $1 billion per year, just by running its current fleet of reactors.[99] But even in a carbon-constrained environment with currently available subsidies, new reactors are not economically competitive with other energy alternatives. Thus, proposed climate and energy legislation became vehicles for providing even more subsidies for nuclear power. Although it is unlikely that these bills will pass into law in the near-term, they illustrate the kind of subsidies that the nuclear industry is seeking.

A Senate energy bill passed by the Energy and Natural Resources Committee[100] and the House-passed climate bill[101] would both establish a new loan guarantee program called the Clean Energy Deployment Administration (CEDA). The Senate version moves Title XVII under CEDA control, while the House version keeps Title XVII administered by DOE. The purpose of CEDA in both bills is to "promote access to affordable financing for accelerated and widespread deployment" of clean energy, energy infrastructure, energy efficiency, and manufacturing technologies. Nuclear power and coal are eligible under the definition of "clean energy technologies" in both versions. CEDA would be authorized to provide direct credit support, like loan guarantees and direct financing, as well as indirect support. The Senate version of CEDA, however, would authorize an unlimited amount of loan guarantees with no congressional authority required.

The Senate version of CEDA exempts Title XVII loan guarantees from Sec. 504(b) of the Federal Credit Reform Act of 1990. An exemption from this section means that appropriators no longer have the authority to set a limit on these commitments, thereby allowing DOE to give out unlimited "self-pay" loan guarantees. According to the Congressional Budget Office (CBO), the Senate bill would give DOE "permanent authority to guarantee such loans without further legislative action or *limitations*"[102] [emphasis added]. According to CBO, "large capital projects", specifically new reactors and coal plants, would benefit from the Senate version of CEDA.[103] The Nuclear Energy Institute calls CEDA a "permanent financing platform" for new nuclear reactors.[104]

Several Senate climate legislative proposals were introduced or released in draft. The bill that got the most attention was the American Power Act (APA), drafted by Sens. Kerry (D-MA), Lieberman (I-CT) and Graham (R-SC). Sen. Graham dropped his support for the bill before it was released, but the nuclear provisions that he advocated for remained in the bill. The bill expands many of the existing subsidy programs, including tripling nuclear loan guarantees to $54 billion, tripling risk insurance to $6 billion, increasing production tax credits from 6,000 MW to 8,000 MW, and suspending the duty on import of nuclear parts for another 10 years. The bill also includes large new tax breaks and grants to publicly owned utilities, which are tax-exempt. According to an independent analysis, just two of these tax breaks, accelerated depreciation of new reactors from 15 years to 5 years and a 10% annual investment tax credit, would be worth $1.3 to $3.0 billion per reactor, depending on the reactor design. This is equivalent to 15 to 20 percent of the current total projected all-in cost of a reactor.[105] The bill also includes mandates to DOE, such as publishing a 5-year strategy on the web to "lower effectively the costs of nuclear reactors" and siting a spent fuel reprocessing and fast reactor research and development center at a national laboratory. Finally, the bill also proposes to further shortcut the NRC's licensing process by eliminating the NRC's ability to prevent startup even if fundamental safety components were compromised and setting an impossibly high standard for including an evaluation of the need for power, the cost of the new reactor, and alternative energy sources within the NRC licensing process, as well as other provisions.[106]

The Kerry-Lieberman bill was highly controversial, but this controversy was not due to the massive subsidies for nuclear power, but rather to other issues, such as pricing carbon and trading credits, eliminating Environmental Protection Agency authority to regulate CO_2, and removing states' authority to implement stronger standards than the federal government.

99 Ryan Grim, "Internal Memo: Nuclear Power Company Could Make A Billion A Year From Climate Change Law", *The Huffington Post*, Updated July 24, 2009, http://www.huffingtonpost.com/2009/06/23/internal-memo-nuclear-pow_n_219256.html

100 American Clean Energy Leadership Act of 2009 (ACELA, S. 1462), http://energy.senate.gov/public/_files/s1462pcs1.pdf

101 American Clean Energy and Security Act (ACES, H.R. 2454), http://energycommerce.house.gov/Press_111/20090701/hr2454_house.pdf

102 Congressional Budget Office Cost Estimate, S. 1462 *American Clean Energy Leadership Act of 2009*, September 30, 2009, Page 9, http://www.cbo.gov/ftpdocs/106xx/doc10637/s1462.pdf

103 *Ibid.*, page 10.

104 Nuclear Energy Institute, *Legislative Proposal to Help Meet Climate Change Goals by Expanding U.S. Nuclear Energy Production*, October 28, 2009, http://www.nei.org/resourcesandstats/documentlibrary/newplants/policybrief/2009-nuclear-policy-initiative

105 Doug Koplow, Earth Track, Inc., memorandum to Friends of the Earth, Subject: Review of accelerated depreciation, investment tax credit, and production tax credit provisions of Senator Kerry's and Senator Lieberman's American Power Act, 17 June 2010, http://www.foe.org/sites/default/files/MoreKerryLiebermanNukeGiveaways.pdf

106 For more information, see Physicians for Social Responsibility, *The American Power Act Includes Big Nuclear Giveaways That Harm Taxpayers, Ratepayers, and Public Safety*, http://www.psr.org/resources/apa-nuclear-subtitle-summary.pdf

A Competitive Industry Cannot be Built on Subsidies

With decreased electricity demand, rapidly increasing costs of new reactors, and cheaper alternatives, especially natural gas, efficiency, and a range of renewable technologies, it remains an open question whether loan guarantees and the other existing subsidies are sufficient to construct a few new reactors. It is quite clear, however, that subsidizing 7 to 10 "first mover" reactors, as recommended in a recent MIT report,[107] will not create an economically competitive industry.

Cheap natural gas has become the primary competitor for new reactors. Constellation CEO Mayo Shattuck has repeatedly stated that a loan guarantee and higher natural gas prices are prerequisites for the company to build the new reactor at Calvert Cliffs in Maryland.[108] According to Exelon CEO John Rowe, the price of natural gas would have to increase to at least $8 per million BTUs and carbon would have to be priced at $25 per ton in order to make new merchant reactors competitive with natural gas plants.[109] The Energy Information Administration predicts that natural gas prices will not increase above $8 per million BTU until 2030.[110] If the House climate bill were to pass, the U.S. Environmental Protection Agency predicts that the price of carbon would be less than $25 per ton until at least 2030.[111] In addition, the cost of nuclear construction must not increase faster than the rate of inflation, which has never happened in the history of the industry. Only if all of these conditions were met would new reactors be cost competitive with natural gas after 2030.[112]

At the same time, the two-year economic recession has caused electricity demand to plummet in the U.S. Just a few years ago, utilities projected large increases in electricity demand to justify the need for new reactors in the states. These projections are unlikely to be met for at least a decade and nuclear utilities are beginning to recognize this publicly. Progress Energy recently announced that it is reconsidering two reactors in North Carolina due to decreased demand in the state and high construction costs of new reactors.[113] NEI President and CEO Marvin Fertel announced at the Annual Symposium of the World Nuclear Association in September that the U.S. nuclear revival is going to be delayed due to low demand and low natural gas prices.[114]

In addition, the U.S., which uses more electricity per capita than other industrialized nations, has an enormous potential for decreasing demand further through efficiency measures. While the fate of climate change legislation is unclear in the next two years, it is possible that Congress will pass efficiency standards, such as building codes, appliance standards and weatherization of buildings that will further decrease the need for large central facility generation.

Finally, the U.S. has large renewable energy resources that are significantly cheaper than new reactors. While the estimated construction cost of new reactors has quadrupled in the last decade, the cost of renewable technologies continues to decrease. Currently, the estimated cost of electricity from a new reactor is between 12 cents and 20 cents per kilowatt-hour, compared to wind and biomass which cost between 5 cents and 10 cents per kilowatt-hour.[115] Efficiency measures are even cheaper at 3 cents per kilowatt-hour.

The theory that the U.S. government just needs to subsidize a few "first mover" reactors and then the costs will come down has been recently debunked in a report by Mark Cooper at the Institute for Energy and the Environment at the Vermont Law School. By comparing the U.S. and French nuclear programs, he found that mechanisms that reduce costs for other types of technologies, such as a learning curve, design standardization, or economies of scale, do not decrease the cost of new reactors. He found that both the U.S. and French programs have had increasing costs over time. If the U.S. nuclear industry is infused with massive nuclear subsidies, according to Dr. Cooper, "nuclear power will remain a ward of the state, as has been true throughout its history in France, a great burden on ratepayers, as has been the case throughout its history in the U.S., and it will retard the development of lower cost alternatives, as it has done in both the U.S. and France".[116]

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107 Massachusetts Institute of Technology, *The Future of the Nuclear Fuel Cycle*, Summary Report, 2010, http://web.mit.edu/mitei/docs/spotlights/nuclear-fuel-cycle.pdf

108 Christine Buurma, "UPDATE: New Nuclear Reactor Depends On Loan Guarantee – Constellation", *Fox Business*, March 29, 2010, http://www.foxbusiness.com/story/markets/industries/utilities/updatenew-nuclear-reactor-depends-loan-guarantee--constellation/

109 "Exelon's Rowe says gas prices may slow new reactors", *Daily Herald*, September 10, 2010, http://www.dailyherald.com/story/?id=406979

110 U.S. Energy Information Administration, Forecasts and Analyses, U.S. Data Projections, Natural Gas – Prices, Annual Energy Outlook, http://wwEw.eia.doe.gov/oiaf/forecasting.html

111 U.S. Environmental Protection Agency, *Supplemental EPA Analysis of the American Clean Energy and Security Act of 2009 H.R. 2454 in the 111th Congress*, January 29, 2010, Page 18, http://www.epa.gov/climatechange/economics/pdfs/HR2454_SupplementalAnalysis.pdf

112 Mark Cooper, email correspondence with Michele Boyd, September 10, 2010.

113 John Murawski, "Nuclear plant looks less likely", *newsobserver.com*, September 16, 2010, http://www.newsobserver.com/2010/09/16/683890/nuclear-plant-looks-less-likely.html

114 "US new build plans delayed", *World Nuclear News*, 17 September 2010, http://www.world-nuclear-news.org/NN-US_new_build_plans_delayed-1709108.html

115 Mark Cooper, *The Economics of Nuclear Reactors: Renaissance or Relapse?*, Institute for Energy and the Environment, Vermont Law School, June 2009, http://www.vermontlaw.edu/Documents/Cooper%20Report%20on%20Nuclear%20Economics%20FINAL%5B1%5D.pdf

116 Mark Cooper, *Policy Challenges of Nuclear Reactor Construction, Cost Escalation and Crowding Out Alternatives*, Institute for Energy and the Environment, Vermont Law School, September 2010, http://www.vermontlaw.edu/Documents/IEE/20100909_cooperStudy.pdf

CONCLUSION

It is clear that the U.S. is not having a nuclear revival. Additional U.S. nuclear generation is more likely to come from running existing reactors beyond their current licenses than from a large number of new reactors. A couple of U.S. utilities may start to construct a few heavily subsidized reactors, but given decreased electricity demand, low natural gas prices, efficiency potential, increasing cost of new reactors, and decreasing costs for renewables, the reactors may not be completed. A couple of new reactors heavily subsidized by the federal government and states do not constitute a "nuclear renaissance". As shown by the history of the nuclear industry, large subsidies for a few first-mover reactors are not sufficient to kick-start the industry and make the technology economically competitive without subsidies. In the current economic recession, finding the funds to subsidize even a handful of new reactors has not been easy for nuclear proponents. The question for U.S. policymakers is "does the U.S. want to perpetuate an industry completely dependent on unending public subsidies to survive?".