Nuclear Power Plant Loan Guarantees:

An Unacceptable Risk

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Introduction

The federal nuclear loan program, like the cost of building new reactors, is in danger of spiraling out of control: the administration seeks to increase the money available for the program in the US Department of Energy's (DOE's) budget; and members of Congress are attempting to create a new agency within the DOE with authority to give unlimited guarantees. The government must offer the loan guarantees if it wants a nuclear revival, because private sources of capital will not accept the risk entailed in financing construction of new reactors.

The private investors are right to be fearful. The estimated prices of reactors are rising and such conditions as a shortage of skilled workers and reactor components make additional increases likely. Reactor designs, which with one exception are not licensed or are undergoing essential modification, inject major uncertainties into proposed schedules. The top four proposals for loan guarantees (Vogtle, Calvert Cliffs, Summer, South Texas) all have significant problems. Additional applicants for the guarantees are even weaker and are, in some cases, dropping or postponing their plants.

The risk of default on loan guarantees has been estimated by the Congressional Budget Office and the Government Accountability Office as about fifty percent. The cost to US taxpayers of lender default at this rate, if the government recovers half of the money guaranteed, an optimistic assumption, would be well over $100 billion, depending on the number of plants built and construction costs.

The nation does not need to run this risk. The main supposed justification for a nuclear revival is that nuclear power plants need to be constructed to replace fossil fuel plants and thus to mitigate climate change. This theme, pushed by the nuclear industry, is simply untrue. Dollar for dollar one can replace more fossil fuel with efficiency and renewables than with nuclear power.

At a time of rising federal debts, it is incomprehensible that an administration committed to cutting governmental expenditures would embark on such a waste of taxpayer money as nuclear loan guarantees. This speaks much of the power of the millions of dollars that the nuclear industry has spent on lobbying.

The expanding loan guarantee program

In Title 17 (Incentives for Innovative Technologies) of the Energy Policy Act of 2005, Congress authorized the US Department of Energy (DOE) to issue Treasury-backed loan guarantees. The Appropriations Committee gave the DOE the authority to distribute $18.5 billion for new reactors in fiscal year 2008, and the following year extended this authorization without any time restriction. On June 20, 2008 DOE solicited applications for the guarantees. It received nineteen applications for twenty-one reactors from seventeen companies, seeking in total $122 billion.

In early summer 2009, DOE whittled down the list to four companies: Georgia Power, a subsidiary of Southern Company (Vogtle); Unistar Nuclear Energy (Calvert Cliffs); Scana Corp. (Virgil C. Summer), NRG Energy (South Texas). As of this writing, the DOE is expected to award the first loan guarantee to Southern Company for two reactors at Plant Vogtle in Georgia. The award will be conditional. Utilities cannot receive an actual guarantee until any plants

concerned have been granted their combined construction and operating licenses (COLs) by the US Nuclear Regulatory Commission (NRC).

The proposed DOE budget for fiscal year 2010-11 would increase the amount of money available for loan guarantees for innovative energy technologies. For nuclear power facilities, it adds $36 billion in new loan authority. Thus, if the budget is passed as proposed, the total available, including the previous $18.5 billion, will be $54.5 billion. Alongside the $36 billion for nuclear power plants in the budget is a mere $500 million in a credit subsidy to support $3 billion to $5 billion in loan guarantees for innovative energy efficiency and renewable energy projects.

Meanwhile, the prospects of a Clean Energy Deployment Administration (CEDA) lurk in the background. CEDA would be an agency within DOE, which would be authorized to provide direct loans, loan guaranties, and other forms of financial assistance for clean energy projects.

A version of CEDA was included in the Waxman-Markey American Clean Energy and Security Act (ACES), HR 2454, the energy bill that passed the House last year. Another and more generous version was a part of the American Clean Energy and Leadership Act (ACEL), SB 1462, which was passed by the Senate Energy and Natural Resources Committee but did not get through the full Senate. CEDA resurfaced in early December of 2009, when Senators John Kerry (D MA), Lindsey Graham (R SC), and Joseph Lieberman (D CT) announced that they were putting forward a "framework" for climate legislation. The "framework," intended to send a signal to the negotiators in Copenhagen, included CEDA.

Given such bipartisan support, CEDA is likely to be a prominent part of any climate/energy legislation proposed in the Senate in 2010. In fact, Democrats have indicated that

they are willing to add nuclear subsidies to climate legislation in order to persuade Republicans to vote for it.[1] CEDA may even be included in legislation unrelated to energy or climate. At the end of January 2010 Senator Jeff Bingaman (D NM), chairman of the Senate Energy Committee, circulated a "Dear Colleague" letter to other senators, seeking their support for the CEDA concept. Bingaman intends to attach CEDA to any legislation into which he can insert it, the Nuclear Information and Resource Service charges.[2]

CEDA, as presented in SB 1462 and analyzed by the Congressional Budget Office (CBO), would modify the terms of the federal loan guarantee program established under Title 17 of the Energy Policy Act of 2005. "The bill would exempt the title 17 program from the provisions in the FCRA [the Federal Credit Reform Act] that require such programs to receive an appropriation. The effect of this exemption would be to give DOE permanent authority to guarantee such loans without further legislative action or limitations."[3] "Based on the volume of applications pending under the title 17 program, CBO estimates that, in the absence of any statutory limits, DOE would guarantee an additional $100 billion in loans for nuclear power projects over the next 10 years and close to another $30 billion in loans for fossil and other large capital projects."[4] Commentators fear that loans for nuclear power would exceed the CBO's $100 billion estimate, since the estimate is based only on the number of pending applications.

. CEDA, as presented in SB 1462, would be governed by a nine-member board, appointed by the president with the consent of the Senate. The board would select the recipients and determine how much money each would receive without any oversight from Congress or the public. The bill places no restriction on how much money can go to any one technology and no requirement that technologies offering the fastest, most cost-effective carbon reduction be funded first. Thus the board could fund nuclear energy and clean coal without restriction Recipients of

the loan guarantees would have to pay unspecified subsidy fees, but the costs of defaults to taxpayers are expected to be far larger than the fees.

Questionable administration by the DOE

The DOE has little experience in administering loan guarantees and the experience it does have is not reassuring. According to the National Taxpayers Union and others, "In the late 1970s and early 1980s, the DOE offered billions in loan guarantees for the development of synthetic fuels. Due in large part to poor administration and market changes, the federal government was forced to pay billions to cover the losses."[5] The Government Accountability Office (GAO) charged in 2008 that the government did not yet have the mechanisms and checks in place to manage a large loan guarantee program.[6] The DOE needs to create "a mechanism for monitoring the program, and ensure that it has the resources to assess and monitor the financial condition of applicants and recipients," the Union of Concerned Scientists writes.[7] Creating the new entity CEDA within the department is not likely to remedy the situation.

Congress initially authorized guarantees of only 80% of plant financing. If a lender has is putting its own money on the line, it will be careful not to invest in something that is overly risky. DOE disregarded this guidance, and its final rule[8] allows DOE to guarantee up to 100% of any loan or debt obligation for a nuclear project, if the loan does not equal more than 80% of the project's total cost.[9] The rule is so open ended as to allow a utility to rely on consumer rate increases, intended to cover the costs of initial financing and NRC licensing, as its 20% equity stake .

Additional subsidies available to the nuclear industry

In considering the prospects of loan guarantees, we should not forget that in lobbying for them, the industry is attempting to add to an already lavish assortment of federal and state subsidies. Several were created, along with the loan guarantee program, by the Energy Policy Act of 2005. Others are longer lived.

The *Price-Anderson Act* passed in 1957, to jump-start the industry, and periodically renewed shields the industry from much of the liability for a nuclear accident. The act requires each plant operator to buy all the private insurance that is available—presently $300 million—and to pay fees into a fund to compensate for damages above that amount. The fund currently contains $10 billion, although an accident could cause damage to health and the environment far in excess of that amount. Above $10 billion, Congress would have to decide what to do and presumably it would pay the compensation with tax dollars.

Construction Work in Progress (CWIP) laws in certain states allow utilities in those states to pass on the cost of construction of nuclear plants to ratepayers before the plants have been completed and are producing electricity. Florida, South Carolina, and Georgia have such laws in place.

The Production Tax Credit included in the Energy Policy Act of 2005 provides advanced nuclear facilities with a 1.8 cents per kilowatt hour tax credit for the first eight years of operation of reactors constructed before 2021. The credit given each year will be limited to 6000 megawatts of nuclear capacity.

Stand-by Support or risk insurance would compensate a utility for the cost of delays in construction and authorization of new reactors, including delays caused by the NRC and interveners in licensing proceedings. Congress allocated $2 billion to this program.

Support of nuclear research and development by the federal government has been a huge subsidy over the years. Taxpayers for Common Sense has calculated that the federal government spent $83 billion on research and development from 1948 through 2008.[10]

Industry Funding and Lobbying

Why are Congress and administrations so willing to come to the rescue of the nuclear power industry? The industry has waged a skillful campaign to gain influence with both. Money has played a big role. According to the Investigative Reporting Workshop at American University, the nuclear industry in the past decade spent $600 million on lobbying and almost $63 million on campaign contributions. In the first three quarters of 2009 the nuclear industry devoted $84 million to lobbying for nuclear subsides and other favorable treatment; and during the first six months of the year nuclear interests gave $3.5 million to congressional candidates.[11]

The industry, moreover, has developed a network of allies that speak for it. Key among these is the Clean and Safe Energy Coalition (CASEnergy Coalition), created by a public relations company paid by the Nuclear Energy Institute (NEI). [12] The leading lights of the coalition are Patrick Moore, touted as a past leader in Greenpeace, and Christine Todd Whitman, former governor of New Jersey and former administrator of the Environmental Protection Agency. The financial relationship between CASEnergy and the nuclear industry is kept in the background if not outright hidden, as Moore and Whitman drive home the idea that nuclear energy will rescue the planet from global warming.

The NEI has won over labor unions to its cause, by promising to ensure that new plants are built by unionized workers. The NEI has also given union officials access to utility officials and elected Mark Ayers of the AFL-CIO and an officer of the electrical workers' union to its

board.[13] The unions' support of nuclear energy has helped to persuade Democrats to support nuclear subsidies. .

Past record of the industry

Some idea of the riskiness of loan guarantees and the wastefulness of other subsidies for the nuclear industry can be gained from the industry's past performance. In the 1950s the United States government, keen to show the world that nuclear energy had peaceful applications, generously subsidized the fledgling industry. In 1954 Congress revised the Atomic Energy Act allowing private ownership of reactors and fissionable material. The following year the Atomic Energy Commission announced a Power Reactor Demonstration program under which it would help with the design and construction of commercial plants. The small reactors Dresden (1955), Indian Point (1955) and Yankee Rowe (1956) were ordered; but officials of Westinghouse and General Electric informed Congress that their companies would not go ahead with nuclear development unless the private sector was protected from liability for a nuclear accident.[14] Congress passed the Price-Anderson Act to encourage the nuclear industry.

A report in 1962 by Glenn Seaborg also helped turn the tide. It stated that nuclear power was about to become economically competitive and that building larger reactors would make nuclear-generated electricity less expensive. A decision by Westinghouse and General Electric to offer large reactors at fixed, low prices appealed to utilities. Turnkey contracts forced the vendors to absorb all rises in costs from changes in design, the price of materials, or construction problems. The vendors did so with the hope of obtaining more lucrative sales later.

After ordering was underway, the manufacturers changed their pricing policy to "cost-plus" contracts, under which utilities rather than vendors paid for cost overruns. The years 1965-

1968 opened what is known as the "great bandwagon market." Forty-nine reactors were ordered. Capital was available, interest rates were low, the use of electricity was increasing, and the future of nuclear-generated electricity seemed assured. After a pause in 1969, the market took fire again in 1970-74 with 149 reactors ordered.[15]

However, the fairy tale soon faded. In the early 1970s the costs of constructing reactors started to spiral upwards for multiple reasons, including requirements for increased safety features, delays in construction, cost overruns, and rising interest rates. General inflation and the increasing cost of construction caused increases in the price of electricity, which led to a decline in electricity use, making the construction of new reactors less attractive. The last order of the 1970s was placed in 1977. Construction on the final plant to be completed, TVA's Watts Bar I, began in 1974. The plant began commercial operation in 1996.

Meanwhile, half of the more than two hundred reactors ordered in the 1960s and 1970s "were cancelled with abandoned costs in the tens of billions of dollars. Those reactors that were completed suffered dramatic cost overruns."[16] "On average, the actual costs for each reactor were almost three times higher than the original projection for the reactor."[17] Also, "on average the final cohort of great bandwagon market reactors cost seven times as much as the cost projection for the first reactor of the great bandwagon market. The great bandwagon market ended in fierce debates in the press and regulatory proceedings throughout the 1980s and 1990s over how such a huge mistake could have been made and who should pay for it."[18]

In 1985 a cover story in *Forbes* magazine, for example, stated, "The failure of the U.S. nuclear power program ranks as the largest managerial disaster in business history, a disaster on a monumental scale. The utility industry has already invested $125 billion in nuclear power with

an additional $140 billion to come before the decade is out, and only the blind, or the biased, can now think that most of the money has been well spent."[19]

In what the Union of Concerned Scientists describes as the first nuclear bailout, the nation paid an estimated $40 to $50 billion (in 2006 dollars) in costs for abandoned plants, with at least half of that borne by ratepayers; and ratepayers paid well over $200 billion (in 2009 dollars) in cost overruns for completed plants.[20] In a second bailout, the ratepayers paid an estimated additional $40 billion in "stranded" costs for nuclear plants as a result of the industry's being restructured in the 1990s to increase competition.[21] "Stranded costs" are the difference between a utility's remaining investments in nuclear plants and the market value of those plants.[22]

A repetition of the seventies and eighties

In regard to prices. Today prices of reactors are again escalating. In 2002 the industry and DOE estimated that new reactors would cost $1,200 to $1,500 per kilowatt. At this rate a reactor would cost $2 billion to $3 billion in total. However, the 21 reactors for which 17 utilities requested loan guarantees from DOE in 2008 had a total estimated cost of $188 billion, on average $9 billion per reactor.[23] Mycle Schneider et al. have calculated that in less than ten years the average price per kilowatt has risen from about $1,000 to $5,000 "before significant construction experience has been accumulated. Even by the standards of the nuclear industry, this is a remarkable record of increase," they note drily.[24] When Congress appropriated $18.5 billion for loan guarantees, it thought that it was providing for as many as four reactors. Now it is evident that the $18.5 billion will only be enough for two or three reactors.

In regard to postponements and cancellations. At the same time utilities are withdrawing or postponing plans for new reactors. Peter A. Bradford, an adjunct professor at Vermont Law School and a former member of the U.S. NRC, summed up in late 2009, "Of 26 new nuclear reactor license applications submitted to the NRC since 2007, nine have been canceled or suspended indefinitely in the last 10 months. Ten more have been delayed by one to five years."

In regard to the need for government assistance. Today private investors will not invest in new nuclear reactors without government incentives. Bradford states, "Capital cannot be raised for nuclear power plants, because they are too expensive to compete. Indeed, a new nuclear plant has yet to make a competitive bid to provide power." "Cost estimates for new reactors tripled, while natural gas prices declined precipitously."[25]

In July 2007 six large investment banks (Citigroup, Credit Suisse, Goldman Sachs, Lehman Brothers, Merrill Lynch, and Morgan Stanley) told the DOE that they were not willing to lend capital for new nuclear plants unless taxpayers bore all the risk. They justified this position, "We believe these risks, combined with the higher capital costs and longer construction schedules of nuclear plants as compared to other generation facilities, will make lenders unwilling at present to extend long-term credit. . . . [L]enders and investors in the fixed income markets will be acutely concerned about a number of political, regulatory and litigation-related risks that are unique to nuclear power, including the possibility of delays.[26]

In November 2009 Citi Investment Research and Analysis, a division of Citigroup Global Markets released a report entitled *New Nuclear—The Economics Say No*. It stated, "Three of the risks faced by developers—Construction, Power Price, and Operational—are so large and

variable that individually they could each bring even the largest utility company to its knees financially."[27]

An unsafe place for investments

Private investors are correct in their assessment of the industry. Apart from the staggering estimated cost of new nuclear reactors, conditions are not conducive to the start-up of new plants on time and within budget. Because there has been little construction activity in the industry for more than twenty years, the nation lacks skilled workers to which the utilities can turn. It also lacks companies qualified to manufacture parts for nuclear reactors. An assessment by DOE of the US nuclear power plant construction infrastructure found that major equipment for the reactors currently proposed, including reactor pressure vessels and steam generators, will have to be imported.[28] Competition among utilities for workers and for reactor parts will help to drive up prices and cause delays, which themselves cause price increases.

Then there is the problem of reactors designs, a key to the success and safety of any nuclear revival. As of mid-2009, the NRC had received licensing applications for 26 new reactors using five different "advanced" designs. The NRC has certified only two of these designs, the Advanced Boiling Water Reactor (ABWR) from GE Hitachi Nuclear Energy (GEN) and the Advanced Passive 1000 (AP 1000) from Westinghouse, now owned by Toshiba and partners. Only one of the five types has been constructed and is in operation anywhere in the world, the ABWR. The fact that the reactor designs are largely untested and for three of five reactor types not even certified ensures delays in construction, likely to further increases in costs.

Four ABWRs are operating in Japan, and one is under construction in Japan and two in Taiwan. However, it is not clear to what extent experience gained in Asia can be applied to the

United States, the Union of Concerned Scientists points out.[29] In the United States the reactor is being offered by GE Hitachi, which originally developed it, and independently by Toshiba. The NRC certified GE Hitachi's design in 1997. The license was for fifteen years, and GE Hitachi has expressed the intention of applying in 2010 to extend it.. Toshiba must replace some of the features that are specific to GE Hitachi and to renew NRC certification.[30]

The AP 1000 was certified by the NRC in 2006; but Westinghouse has since submitted amendments to the certified design for consideration. While studying the amendments, the NRC found basic problems with the shield building, which it is forcing Westinghouse to address. The shield building surrounds the reactor's primary containment. It protects the primary containment from severe weather such as hurricanes, earthquakes, and tornadoes; and provides "a radiation barrier during normal operation." On October 15, 2009, the NRC staff informed Westinghouse "that the company [had] not demonstrated that certain structural components of the revised AP1000 shield building can withstand design basis loads." Westinghouse will have to modify the design and to carry out tests to [31]prove that it will perform as required. How long it will take to gain certification of the amended design is not known.

The AP 1000 reactor is under construction at two sites in China. The cost target of the first, at SanMen, had a $1000 per kilowatt construction cost target; but, according to current estimates, this figure is expected to rise to $3500 per kilowatt.[32]

The other three reactor designs that are proposed for the new generation of U.S. nuclear reactors are the Evolutionary Pressurized Water Reactor (EPR) from the French giant Areva, the Economic Simplified Boiling Water Reactor (ESWBR) from GE Hitachi, and the Advanced Pressurized-Water Reactor (APWR) from Mitsubishi Heavy Industries.

The EPR (Evolutionary Pressurized Water Reactor, known in Europe as the European Pressurized Water Reactor) has become notorious for its problems in Europe. Three reactors are under construction, one each in Finland, France, and China. The Finnish reactor, Olkiluoto 3, being constructed on a turnkey basis by Areva, is more than three years behind schedule and at least 55% over budget for a cost of $7 billion, close to $4,400 per kilowatt.[33] Areva and the utility, Teollisuuden Voima Oy (TVO), are now suing each other over the delays and the increased cost. Flamanville 3 in France, the construction of which is being managed by the utility Electricité de France (EDF), has had quality control problems and has suffered delays. The newspaper *Le Figaro* reported January 19, 2010, that the reactor is now two years behind schedule. At the same time it is at least 20% over budget after two years of construction.[34] Construction in China at Taishan did not start until December 2009.

Problems with plant design are likely to slow construction of EPRs. November 2, 2009 the safety authorities of France, Finland, and the United Kingdom published a joint announcement stating that each has found problems with the control and information systems in the EPR, which Areva and the licensees in the three countries must correct. The basic issue is that the safety systems "used to maintain control of the plant if it goes outside of normal operating conditions" are not independent of the control systems "used to operate the plant under normal conditions." Independence is important because the safety systems must not fail when the control systems fail. The NRC's review of the EPR is not expected to be completed before the middle of 2011.

The ESBWR is a boiling water reactor producing about 1550 MW and offered by GE-Hitachi. The NRC is still evaluating it and may complete its study in 2010. GE Hitachi submitted the reactor to U.K. regulatory authorities for consideration, but removed it from

consideration in 2008. No orders have been placed for it. Six of the recent applications to the NRC for licenses were based on the ESBWR, but four of these have been withdrawn. The reactor's prospects are therefore poor.[35]

The APWR is a 1700 MW pressurized water reactor. As yet no APWRs have been ordered anywhere in the world, although Mitsubishi expects to receive orders from Japan within a year or two. The reactor is not likely to be certified by the NRC before 2012. The only U.S. utility proposing to build APWRs is Luminant Generation Company, which has applied for a icense to build two APWRs, Comanche Peak 3 and 4, at its site in Texas.

Weak candidates for loan guarantees

The four finalists for loan guarantees based on the now-available $18.5 billion are all weak. Taxpayers for Common Sense sums up the situation in a sentence, "Each of these projects has experienced and continue to face rising cost estimates, delays related to reactor designs and credit downgrades." [36] Unfortunately these four projects with all their problems appear to be the best available. In other words, there is no backlog of credible proposed reactors for the additional dollars in loan guarantees that the government is preparing to bestow.

Summer Units 2 and 3

South Carolina Electric and Gas (SCE&G), a subsidiary of SCANA Energy, has submitted a combined operating license for two 1,117 MW AP1000 reactors to be built at the V.C. Summer site near Jenkinsville, South Carolina. One operating reactor is located at the site. The reactors would be built by SCE&G in partnership with the state-owned Santee Cooper utility. As discussed above, the AP1000 design must be revised to give adequate protection from hurricanes and tornadoes.

SCE&G's early estimate of the cost for the two reactors was $9.8 billion without financing and transmission charges. However, in May 2009 the company admitted that there could be a more than $500 million increase. South Carolina Public Service Commission's approval of the Summer reactors in February 2009 and a CWIP law, forcing rate payers to pay in advance even if the project fails are being challenged by Friends of the Earth before the South Carolina Supreme Court. A hearing is likely in March 2010, according to Tom Clements of Friends of the Earth.[37]

Plant Vogtle, Units 3 and 4

The cost of constructing Vogtle 1 and Vogtle 2, which went on line near Waynesboro, Georgia, in 1987 and 1989 respectively, helped to bring an end to the expansion of nuclear power in the 1970s and 1980s. The cost rose from an estimate of $660 million for four reactors to an expenditure of $8.7 billion for two.[38]

Now Southern Company intends to build two more units, each 1117 MW Westinghouse AP 1000 reactors, the same troubled reactor type proposed for Georgia. Southern Company would oversee construction and serve as the operator, but Georgia Power, a subsidiary of Southern; Oglethorpe Power Corporation; the Municipal Electric Authority of Georgia; and The City of Dalton, Georgia would share ownership.[39] Georgia Power estimates that its 45.7% share of the cost will be $6.4 billion, which would make the total cost for the two reactors $14 billion. The company speaks of this as the "in-service cost," which appears to mean including financing.[40] Through an intense lobbying campaign, Southern has pushed Construction Work in Progress (CWIP) legislation through the Georgia legislature. Under CWIP, the company will be allowed to pass to ratepayers $2 billion in expenses over nine years after the planned plants are licensed.

The NRC approved Southern for an Early Site Permit in August 2009. Southern hoped to receive its combined construction and operating license (COL) in 2011, but problems with the AP 1000 are likely to delay the authorization. Furthermore, Southern's plans to begin operating the first reactor in 2016 and the second in 2017 may be derailed by lawsuits

Calvert Cliffs Unit 3

Unistar, a joint project of Constellation Energy and EDF [41] is planning to build a 1600 MW Evolutionary Power Reactor (EPR). Michael Mariotte of the Nuclear Information and Resource Service reports that Constellation Energy has admitted that the reactor will cost $10 billion, not including financing, and reports that PPL Electric Utility has projected that an identical EPR in Pennsylvania will cost $13-15 billion, including financing. PPL's estimate works out to a staggering $9,000 per kilowatt. As discussed earlier, the EPR reactor design is problematic.

The foreign influence in Calvert Cliffs raises questions. EDF in 2009, with the approval of the Maryland Public Service Commission purchased 49.99% of Constellation. EDF's partnership with Constellation in Unistar was and is a 50/50 relationship. Therefore EDF now clearly dominates Unistar. The manufacturer of the EPR is the French energy giant Areva. The majority owner of both EDF and Areva is the French government. Unistar hopes to get part of its financing from the French government's export-import bank, a likely scenario if acceptable to US authorities, since French President Nicolas Sarkozy is personally marketing Areva's reactors abroad. The NRC has ordered hearings on the involvement of France in Calvert Cliffs to be held before the Atomic Safety and Licensing Board.

In November 2009 Standard & Poor's Ratings Services downgraded Constellation's credit rating to BBB-, considered to be just above junk bond level, largely based on a condition that prevents Constellation from drawing money from its subsidiary, Baltimore Electric and Gas, if cost overruns occur at Calvert Cliffs or elsewhere.

South Texas Projects Units 3 and 4

The San Antonio municipal utility CPS Energy in a joint venture with NRG Energy (itself in NINA, a partnership of NRG and Toshiba) is proposing to build two ABWR reactors, the only ABWR reactors currently planned for the United States. Each will be about1380 MW and located at NRG's South Texas Project Site near Bay City, Texas. (The reactors are to be manufactured by Toshiba.) As the result of a $4 billion escalation in cost that NRG concealed from CPS, the two have become embroiled in a legal battle. An NRG press release of 2006 had given the cost as $5.2 billion. CPS Energy wants to be able to withdraw from the venture but retain ownership of the money that it has already invested in the plant and of the plant itself. NRG is fighting this. Meanwhile, ratepayers are battling CPS over a proposed increase in their rates. NRG has suggested that DOE move forward on the application for a loan guarantee, because other investors may want to continue the project if CPS pulls out completely.[42] The situation in February 2010 is fluid, however, and in mid-month, media reports indicated that CPS may decide not to withdraw from the reactor.

Risk of default

"Federal loan guarantees do not reduce the risks associated with new nuclear power plants; they merely transfer those risks from the companies building the plants to taxpayers. The level of risk will depend on how many plants are built, the percentage of costs the government

guarantees and how many companies default on their loans," the Union of Concerned Scientists points out.[43]

The Congressional Budget Office stated in 2003 that it "considers the risk of default on such a loan guarantee to be very high—well above 50 percent."[44] The situation has not changed, except that the CBO was writing in 2003 about projects that would be financed with 50 percent equity and 50 percent debt. Therefore private investors would presumably be cautious. Today we are looking at 80 percent debt and 20 percent equity, with loan guarantees covering as much as 100% of the debt.

The Government Accountability Office in 2008 assumed a default rate of 50.85 percent and a recovery rate of 50 percent for the nuclear loan guarantee program. The percentages, taken together result in a loss rate of 25.42 percent of the sums guaranteed under the program.[45]

Dollar loss for taxpayers

Given the potential problems ahead to the nuclear industry, the 25.42 percent figure now seems optimistic. However, the Union of Concerned Scientists has calculated the potential loss to taxpayers, on this basis. For one hundred new plants at the current average cost of $9 billion per plant, the loan guarantees would total $720 billion; for one hundred new plants at $13.5 billion (assuming a 50 percent increase in today's average costs), the loan guarantee would total $1.08 trillion. If approximately 25 percent is lost, the loss to the U.S. treasury and to taxpayers would be $180 billion for the less expensive plants; and $270 billion for the more expensive.

A counterproductive approach to climate change

The nuclear energy industry has fostered the idea that nuclear reactors are necessary to mitigate climate change. As a matter of fact, they would hinder the battle to slow climate change, because of the opportunity factor. Money spent on nuclear energy cannot be spent on efficiency and renewables, and efficiency and renewables are more cost effective than nuclear energy in replacing fossil fuels.

The Nuclear Energy Institute and its spokespeople are fond of telling the public that the nuclear industry's electricity production costs are below two cents per kWh and thus below those of power plants fueled by coal and natural gas. In doing so they are speaking of completed plants. A major part of the cost of nuclear electricity lies in the cost of construction of the plant. The construction costs of plants now operating in the United States have already been paid off or transferred and are not part of yearly expenses. For new plants, they certainly will be, and in calculating the cost of new nuclear plants, the industry often fudges the issues by referring to "overnight costs," the cost of a plant if it were magically constructed overnight so that interest paid on loans, and the increase of expenses over time, such as the rising cost of materials, do not enter into the calculations. A far more accurate reflection of construction and other costs are what are called "busbar costs," "all the costs necessary to operate a reactor. These are the costs passed on to the consumer"[46]. Spokespeople for the nuclear industry are fond of comparing the operating costs of the existing fleet of reactors or overnight costs for new reactors with busbar costs for renewable energy. A more accurate comparison is needed.

Cooper, after comparing analyses of energy costs calculated by a variety of entities, states, "Given the overnight costs put forward by utilities, busbar costs would be in the range of 12 cents to 20 cents per kWh." On the other hand, improvements in efficiency cost about 2.5 to

5 cents and renewables, excluding solar photovoltaics, 7 to 10 cents per kWh. "Therefore the average cost of these alternatives is likely to be less than 6 cents per kWh."[47]

Actually, as Cooper notes, solar photvoltaics are not yet able to compete with nuclear power plants as regards cost. In several studies they have been found to be two to five times as expensive as nuclear reactors. However, they are likely to come down in price. The nuclear industry stresses that nuclear reactors may come down in price, but what is more likely is that renewable energy technologies will do so. Meanwhile, biomass, wind, geothermal, landfill, and some solar are "substantially" less expensive than new nuclear plants.[48]

Furthermore, they are available today, whereas nuclear plants will take years to build. A study by the Rand Corporation, not an environmental organization, projects that 35 % of the energy that the Energy Information Administration forecasts will be consumed in 2030 can be obtained from alternative, non-centralized sources.[49] The Rand Corporation does not include efficiency as an option, but a recent study from the Union of Concerned Scientists does so. It posits that, in 2030, one-third of projected demand would come from energy efficiency, and that about a quarter of the remaining demand would come from new sources of renewable energy.[50] In other words, renewable energy and energy efficiency measures would together meet more than 50% of demand in 2030.[51]

Wind energy showed phenomenal growth in the United States in 2009, as 9922 MW of wind power were installed. The new facilities raised the total installed wind power in the nation from 25,237 MW to 35,159 MW.[52] *The newly installed wind power is the equivalent of six EPRs or almost nine AP 1000 reactors.* New nuclear plants are not needed and would not even

be part of the political discussion had they not been hyped and pushed by the nuclear energy industry and its supporters.

Time to turn around

Cooper points out that, when shown on a graph, the patterns of cost escalation for nuclear plants during the bandwagon market and in the twenty-first century are approximately the same. The big difference is that in the twenty-first century the plants have not yet been constructed. We are dealing with estimates rather than past expenditures. Therefore we have the opportunity to stop the waste of dollars and other resources and prevent the risk to the United States economy that a massive nuclear loan guarantee program would entail.

Fiscal conservatives, safe-energy activists, and other concerned citizens need to work together to end the nuclear loan guarantee program. Phone calls and e-mails to members of Congress (the capital switchboard is 202-224-3121) and the administration (the White House comment line is 202-456-1111; the DOE switchboard 202-586-5000), letters and opinion pieces in newspapers, blogs and other postings on the Internet are needed now.

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