

Federal Clean Energy Loan Guarantees: Their Moral Hazards

Pamir Wang

If you ask any American if they support a program that guarantees energy security, job creation, innovation, and carbon abatement at little to no cost, he or she will surely respond positively. Clean energy loan guarantee proponents tout these benefits and more to justify further loan guarantees for commercial nuclear plants and other commercial clean energy projects.¹

But as the recent \$535 million loss that the Solyndra solar project incurred demonstrates, the costs and political risks of clean energy loan guarantees can be significant. Clean energy loan guarantees, moreover, are likely to inhibit innovation and increase the overall cost of borrowing for these purposes. At a minimum, they distort crucial market signals that determine where capital should be invested, causing unmerited lower interest rates and a reduction of capital in the market for more worthy projects. Public loan guarantees for new nuclear plant construction are particularly risky because of these project's high construction costs.

The nuclear industry downplays these risks, yet they have hedged their bets. Nuclear utilities have painstakingly limited the financial exposure to their own reactor projects by taking out loans under separate corporate entities. This assures that the U.S. government can't reach into their pockets if the nuclear project bellies up.²

The default rate of new reactors is in dispute; some argue that it is as high as 50 percent; others argue that is much lower. What is clear,

however, is the credit ratings of nuclear utility companies. Two of the five nuclear loan guarantee finalists had the lowest ratings of all the applicants, and a third was on the brink of being rated a junk bond.³ Standard and Poor's latest 2010 study on past corporate bond defaults found that corporations with junk bond ratings are significantly more likely to default than those with investment grade bonds (see Figure 3).⁴

All of this suggests that it would be best if federal clean energy loan guarantees were eliminated. If this is impractical, at the very least, they should not be expanded: Six years after Congress created clean energy loan guarantees, \$10 billion still remains up for grabs for new nuclear power facility projects alone. Creating more federal energy loan guarantee authority will only increase what are already substantial risks in the government's portfolio.

The Case for More Clean Energy Loan Guarantees, Including for Nuclear

Supporters of federal loan guarantees for clean energy projects contend that this subsidy promotes innovation, energy security, and carbon abatement.⁵ President Obama has also lent support for such guarantees by arguing that increased nuclear electricity generation is critical to reducing U.S. dependence on fossil fuels.⁶ Loan guarantee proponents also maintain that difficulty in securing financing is the main roadblock preventing private industry from constructing new low emission electrical generating plants. They argue that subsidized financing levels the playing field with fossil fueled generators because renewable and nuclear energy sources are still more expensive. Even though the commercial nuclear industry is mature, the industry also insists that loan guarantees are necessary and appropriate to offset the regulatory processes that continue to hamper nuclear power's expansion as compared to renewables and fossil fuels. In this regard, their concerns have been heightened recently by the U.S. NRC safety regulatory board, which has called for increased scrutiny of new reactor safety after the Fukushima disaster.

Government loan guarantees reduce capital costs through lower borrowing interest rates. This results in greater use of debt (80 percent) in proportion to equity (20 percent) to finance the project and up to \$15

billion dollars saved over the life of the loan.⁷ Privately funded power generating projects typically require 40-50 percent equity.⁸

When it comes to loan guarantees for new nuclear plant construction, nuclear power supporters make several additional arguments. Compared to other renewables, new reactors require a massive capital investment upfront to cover the immediate construction costs.⁹ Upon completion, however, the cost of maintaining a reactor is low. This initial capital burden often makes loan guarantees a necessary component of new nuclear projects.

Finally, loan guarantees for commercial energy projects are popular with Congress and the Executive. Congress can approve billions of dollars in loan guarantees with little or no immediate impact to federal appropriations because they are almost entirely off budget. Additionally, since the costs of these guaranteed loans are unlikely to surface for many years – i.e., only when and if the project actually fails – political officials can low-ball the costs when they grant the guarantees and are generally able to skirt political blame years later when or if the project defaults.

How DoE Clean Energy Loan Guarantees Work

Under the Energy Policy Act of 2005 (EPACT 2005), the Department of Energy (DoE) provides loan guarantees to “support innovative clean energy technologies that are typically unable to obtain conventional private financing due to high technology risks.”¹⁰ Under Section 1703 of EPACT 2005, the federal government can guarantee 80 percent of the project’s total cost, so the remaining 20 percent must be funded by private equity.¹¹ DoE approves loan guarantees, and for large exposures such as new reactor projects, the Federal Financing Bank (FFB), an arm of the U.S. Treasury Department, disburses the loan. The loan guarantee ceiling for new reactor construction is currently set at \$18.5 billion, although legislation to increase it up to \$54 billion has been proposed both in Congress, and as a part of President Obama’s FY 2011 budget.¹²

Although there have been 14 nuclear loan guarantee applications submitted since 2005, only one \$8.33 billion loan guarantee of the \$18.5 billion for new reactor construction has been approved.¹³ An

additional \$4 billion has been set aside for uranium enrichment facilities, \$2 billion of which has been conditionally awarded to AREVA for an enrichment plant that it hopes to build in Idaho.

If a recipient company defaults on their loan, the FFB pays the remainder of the debt and repossesses all of the assets from the unfinished project.¹⁴ The company's other assets may be seized as well, but the limited liability companies that are legally responsible for new reactors typically do not have much collateral. The Office of Management and Budget (OMB) has estimated that only 55 percent of the loan can be recouped from the sale of project assets (raw materials, etc. that were already purchased).¹⁵

An additional barrier to reckless corporate behavior is the credit subsidy fee, mandated under section 504(b) of the Federal Credit Reform Act of 1990 (FCRA). It stipulates that an applicant with a fully federally backed loan guarantee must pay a credit subsidy fee, "meant to protect taxpayers from the risk of federal credit programs."¹⁶ The cost of the fee is determined by DoE with guidance from the OMB based on the "current value of risk of default."¹⁷

When nuclear loan guarantee supporters want to downplay the public's fears that these loan guarantees are risky; they argue that the credit subsidy fees are high enough to cover the risk default.¹⁸ Arguably, the Calvert Cliffs 3 project's 11 percent credit subsidy fee is a good example of this, but Constellation Energy, the utility company in charge of it protested the 11 percent as too high. The industry complains that the fees are much too high when they want to secure specific loans, and argue that the program is impractical unless the credit subsidy fees are set at 1-1.5 percent of the loan.¹⁹

If determined realistically, the credit subsidy can hedge against the risk of default. When the credit subsidy cost is too low, however, "taxpayers are at risk because if the borrower defaults and the credit subsidy fee is not sufficient to cover the losses, the shortfall must be covered with higher future taxes, lower future government benefits, or cuts in other spending."²⁰ DoE chooses not to disclose the credit subsidy fees for nuclear loan guarantees, but Energy Secretary Chu has publicly stated his expectation for credit subsidy fees to be between the industry supported 0.5-1.5 percent of the loan guarantee.²¹

To understand how high or low the credit subsidy fee should be, it is critical to identify whether the state utility is a regulated or a merchant system. In a merchant system, the utility company is required to sell their electricity at market price, which is lower than the state regulated utility rate. In a regulated state utility, private utility companies have the option of asking the state utility board for permission to set rates above market price to compensate for fluctuations in demand, as well as charge ratepayers in advance for construction. For example, on top of the \$8.33 billion loan guarantee Georgia Power Co./Southern Co. received for their two new Vogtle reactors, ratepayers in their jurisdiction will pay the additional \$6.1 billion needed through pre and post- construction rate hikes.²² Investors consider utilities in regulated state systems to be a safer investment, because revenues are mandated through rate controls. Although the merchant system encourages competition, the fluctuation of market energy prices is riskier for investors. For this reason, the credit subsidy fee is higher in merchant utility states than in regulated utility states.²³

The Case against Federal Commercial Energy Loan Guarantees, Especially for Nuclear

There are four reasons not to increase federal clean energy loan guarantees. First, the risk of default for new energy projects is generally higher than admitted by project advocates, and nuclear's risk of default is significantly higher than most. Second, contrary to those who argue that loan guarantees pump more capital into the market, such mandated financing reduces the amount of money available for more promising projects. Private investors flock to government backed projects, irrespective of the project's inherent merits, siphoning capital away from unsubsidized projects that are potentially more viable and could succeed if it were not for the government's distortion of market signals. This also reduces the overall rate of energy technology innovation. Third, with the most capital intensive of commercial energy projects – e.g., clean coal and nuclear – the political costs of admitting they might be failing discourages government officials from taking timely action to terminate the projects even when the signs that they are failing are clear. A modern day example is federal support for money losing corn ethanol production, where the federal government has simply mandated increased production and consumption by law and, more recently, the

Solyndra project.

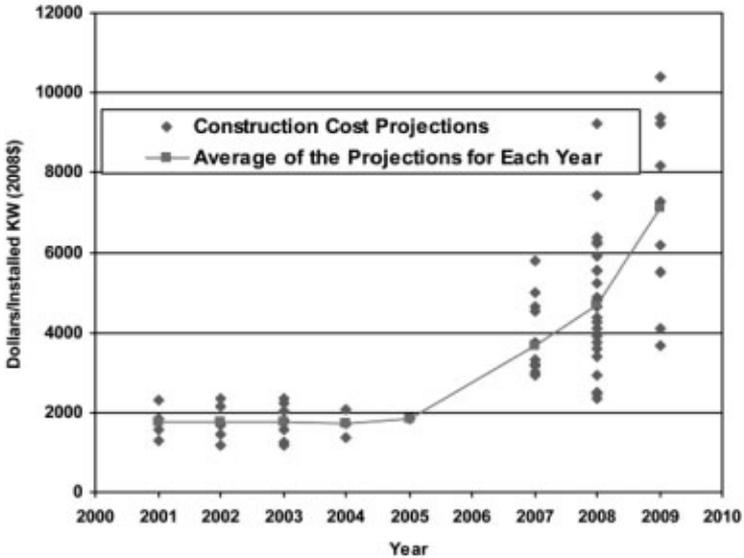
Finally, there is a unique cost for increasing loan guarantees to new nuclear power projects, which relates to nuclear weapons proliferation. Before passage of the Energy Policy Act of 2005, U.S. officials insisted that oil and gas-rich Iran's investment in nuclear power had no economic justification. This argument made sense and put Iran on the diplomatic defensive. Shortly after the passage of the Act, which substantially increased federal subsidies for new nuclear power plants, though, the U.S. backed off this point. Now, it no longer is an argument the U.S. can make without appearing hypocritical.

Loan Defaults

Of all the arguments against making more loan guarantees, the most powerful one turns on just how many more Solyndras — i.e. defaults — are likely. When you examine what those most informed about the nuclear industry say, specialists such as credit raters and government auditing entities, they all project a high likelihood of default. The Congressional Budget Office (CBO) has warned that federal loan guarantees for new nuclear plants are particularly risky because of the significant frontloaded capital costs associated with their construction, which translates into billions of dollars lost if a reactor defaults.²⁴ These risks might be tolerable if the estimated rates of default for new nuclear projects were low; unfortunately, the reverse is the case. First, in 2003 the CBO determined that default rates could be as high as 50 percent.²⁵ They have since replaced this estimate with a list of variables affecting default that evades making any specific estimate of the likelihood of new reactor defaults. The 2011 CBO report does state that higher equity financing lessens the default risk, but at 20 percent equity, new reactors do not have very much collateral equity. Given the historical reactor construction default record, the 50 percent default rate is not hard to believe. During the 1970s nuclear boom, half of the 200 reactors ordered were never completed.²⁶ For the reactors that were actually completed, their actual cost was two to three times more than their projected cost.²⁷ The construction time period for building these reactors also ended up being much longer than anticipated. This pattern of frequent defaults and significant time and cost overruns is likely to continue (see Figure 1).

Second, nuclear utilities seem worried enough about the prospect of defaulting that they've organized themselves to limit the possible financial fallout they might suffer. As the CBO noted in its August

Figure 1
Rising Costs of Nuclear Power Plant Construction



2011 study, “utilities that invest in nuclear power may be able to limit the liability to their shareholders—and thereby increase the risk to the government— by structuring their nuclear facilities as legally separate entities.”²⁸ Most nuclear loan guarantee applications were submitted through a limited liability company (LLC), a legally separate subsidiary of a larger parent company. The key reason to organize themselves this way is to reduce risks. As one legal counsel notes, the parent company of an LLC bears, “little risk...of being found liable for the negligence or wrong-doing of the subsidiary,” and, “Courts are not likely to permit a litigant to “pierce the corporate veil” of a corporation and reach the assets of its parent shareholder.”²⁹

While limiting liabilities this way is commonplace among private corporations, providing federal loan guarantees to such operations is risky to the U.S. taxpayer. This may protect the major stockholders of nuclear utility stock, but it's dicey for the U.S. Treasury to back such operations. After all, the taxpayer must pay for debts incurred from default, but

can't access the assets of the parent company. Under current law, when a project defaults private investors who funded 20 percent of the loan get paid back with the sale of assets before the U.S. taxpayer, who holds 80 percent of the project investment.³⁰ The CBO has estimated that as much as 50 percent of the loan might be recouped by seizing assets, so after 20 percent of the project's total cost is paid to private investors, what's left on average would be no more than 30 percent of the DoE loan for the federal government. Based on these projections, the Treasury would have to pay an average of 70 percent of each defaulted multi-billion federal dollar loan guarantee.

Yet another way nuclear investors have revealed their fear of possible defaults is their unwillingness to pay the full costs of default insurance. Consider the Calvert Cliffs 3 debacle from late 2010. The Calvert Cliffs 3 application, submitted by Unistar Nuclear (an LLC under joint ownership by Areva and Constellation Energy), was selected as one of the four loan guarantee recipients. The project's prospects for default in the merchant utility state of Maryland were higher than if it was proposed in a regulated utility market where utility companies can charge ratepayers for the construction costs before and after the plant is built. As such, the Department of Energy was forced to impose a significant credit subsidy fee for the loan.

In Calvert Cliffs 3's case, the DoE set the fee at 11.6% of the \$7.6 billion dollar loan guarantee.³¹

Even as nuclear critics complained that the fee was too low, Unistar objected that it was too high. In 2010 alone, Constellation increased campaign contributions to \$4 million for various Congressmen and executive agencies in effort to lower their credit subsidy fee. Ultimately, rational minds prevailed, DoE balked at any reduction, and Constellation Energy pulled out of the project, citing an "unreasonably burdensome" credit subsidy fee.³² What this history suggests is that when the credit subsidy fee is set at a reasonable level, applicants see no advantage to seeking the guaranteed loan, and are not as interested in building nuclear plants.

This is referred to as adverse selection, and happens when "the likelihood that borrowers who have reason to think their project is

riskier than the guarantor believes it to be will accept the guarantee fee offered, whereas borrowers who believe their project is relatively safe will be more likely to decline the offer of a guarantee they view as overpriced.”³³ Although companies with sounder projects may still opt for federal loan guarantees, companies with risky projects are most likely to pursue a federal loan guarantee because their only other option is to cancel the project.³⁴

The result is a heavy concentration of risky projects in the federal government’s portfolio.

This assessment is hardly speculative. Bond rating companies, like Moody’s, Standard & Poor’s, and Fitch Ratings, who examine the creditworthiness, or financial health, of electric utility companies on a regular basis, routinely confirm the risk in backing many of these companies with their corporate bond ratings.³⁵ Based on S&P’s rating system, AAA is the highest rating, and D is the lowest rating. Each letter indicates a different degree of the obligor’s ability to meet their financial commitments. The lower the rating, meaning the further down the alphabet and the fewer total letters, the less likely a company is expected to repay their debts. Bonds rated below BBB- are considered non-investment grade, or “junk” bonds.³⁶ Corporate bond ratings indicate a company’s creditworthiness and also impact borrowing interest rates because the lower the bond rating, the higher premium a company is charged for borrowing money.³⁷

The bond ratings of the final five parent companies that recently received federal energy loan guarantees were CCC, BB-, BBB-, BBB+, and A.³⁸ Non-recipient applicants who completed both parts of the loan guarantee process had credit ratings ranging from A- to BBB-. Alarming, two of the five companies approved for loan guarantees were rated junk status, and a third was on the cusp.³⁹ The two companies with the lowest credit ratings of the entire group were selected to the last round. Some of the companies with the best ratings didn’t even apply for a loan guarantee. Whatever the method of distributing loan guarantees, it is obvious that the recipients selected include the applicants most likely to default. This illustrates adverse selection because the least creditworthy companies have the most to gain from a federal loan guarantee.

Figure 2

The chart below includes information on parent utility companies, their S&P corporate bond ratings, and their progress in the loan guarantee application process, where applicable.

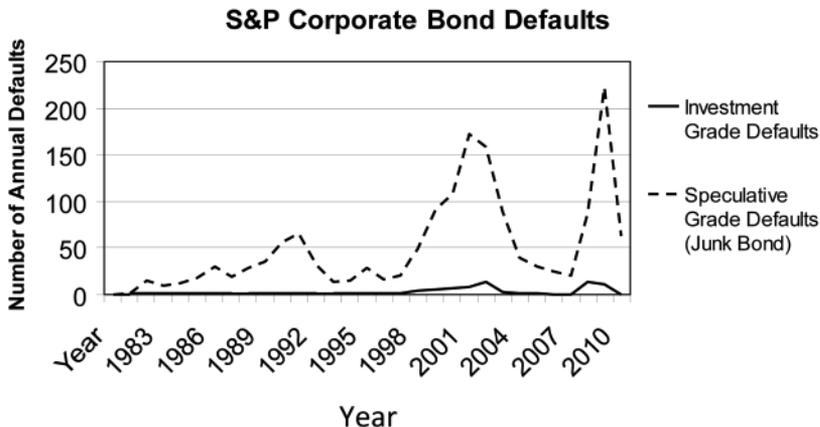
Parent Company	S&P Rating	ST	App Progress
G.R. Chapman Limited Partnership	N/A	TX	Didn't Apply
DTE Energy Co.	BBB+	IL	Didn't Apply
Progress Energy Inc.	BBB+	FL	Didn't Apply
NextEra Energy, Inc	A-	FL	Didn't Apply
Entergy Corp	BBB	LA	Part I only
Entergy Corp	BBB	MS	Part I only
Progress Energy Inc.	BBB+	FL	Part I only
Areva/Constellation Energy	BBB+/BBB-	NY	Part I only
PPL Corp	BBB	PA	Part I and II
Ameren Corp	BBB-	MO	Part I and II
Dominion Corp	A-	VA	Part I and II
Duke Energy Corp	A-	SC	Part I and II
Exelon Corp	BBB	TX	Part I and II
Energy Future Holdings Corp	CCC	TX	Alternate to Final 4
Southern Co	A	GA	Conditional Handed Out
SCANA Corp	BBB+	SC	Made to Final Stage
NRG Energy Inc	BB-	TX	Made to Final Stage
Edf/Constellation Energy (12/08 downgrade-still received approval of LG in 2009)	A-/BBB-	MD	Made to Final Stage and Passed the Offer

The Logic of Overriding Market Signals and Creating New Capital: A Myth

Corporate bond ratings are important for determining the cost of capital, which drives where money is invested. Government intervention through subsidies distorts these market signals, which is one reason why market respondents, such as venture capitalists, make more economical decisions than the federal government. When the government subsidizes one portion of the market, what they subsidize becomes the safest investment, regardless of the actual merits of the project. A venture capitalist's sole purpose is to earn a return, so when there are

Figure 3

The chart below represents S&P's findings on corporate bond ratings and default. Investment grade ratings are AAA through BBB-. Speculative ratings range from BB+ to CCC⁴⁰



fewer distortions, they more likely to invest in what is most likely to succeed. The government's purposes span a range of interests, often conflicting with bottom line profits.⁴¹ It is sometimes argued, though, that the federal government must intervene in the market because some projects are so capital intensive, they would not be built without federal support. However, the high initial capital requirement is no excuse for government intervention because recent history suggests otherwise. The Alaska pipeline project was privately financed at \$7 billion (\$35 billion in 2007 dollars).⁴²

It also is argued that since the Federal Reserve can print and distribute money, so too, can the federal government easily create and allocate net new capital. If true, this would provide financing for risky projects without impeding the resources available to finance sound projects.

Unfortunately, loan guarantees do not increase the overall capital available in the market; they do the reverse. There is only a finite amount of capital in the market, so loan guarantees hog capital that might have been available for privately viable projects. By the law of supply and demand, limiting the supply of capital increases the cost of borrowing for others in the market.

Investors will always put their money behind government supported projects before private ones. As the Government Accountability Office

has noted, “guarantees would make projects it (the federal government) assists financially more attractive to private capital than conservation projects not backed by federal guarantees. Thus both its loans and its guarantees will siphon private capital away...”⁴³ Investors prefer government supported projects because they will get their money back even if the project defaults. If not for government interference in market signals of risk, these venture capitalists may have chosen to invest in more viable, innovative technological startups.

Why, then, do federal loan guarantee programs enjoy so much support? Besides the factors already detailed, lobbying is also a major consideration. Although corporations claim they don’t dictate political agendas, they try by spending billions of dollars to secure favorable federal support. To use Constellation Energy’s Calvert Cliffs 3 loan guarantee again as an example, Constellation Energy contributed \$3.97 million in 2010 when the conditions of their loan guarantee were being finalized. \$3.97 million is a \$1.47 million increase from 2009, and \$2.3 million more than 2011 contributions. H.R. 2454, described in Constellation Energy’s lobbyists’ reports as, “Issues related to nuclear loan guarantees, foreign investment and global climate change,” was the second most cited legislation in 2010 lobbying reports.⁴⁴

A Word on Carbon

Some environmentalists and industry officials argue that the economic case against nuclear energy loan guarantees ignore the value of nuclear’s zero emissions because no price (tax) has yet been set for reducing carbon. This, however, ignores the analysis and conclusions industry itself have

Figure 4

The past price and futures price (from the NYMEX) of natural gas, per million BTU⁴⁶

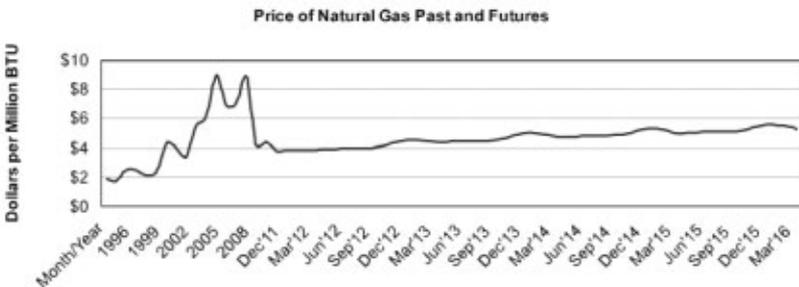
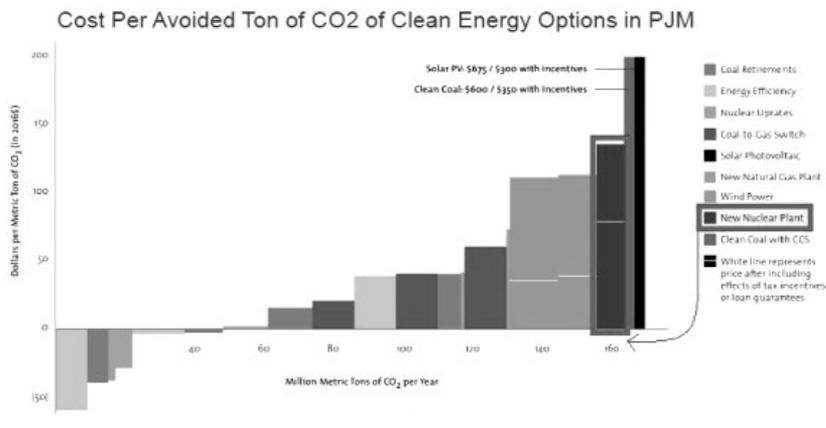


Figure 5

PJM Supply Curve of GHC Abatement Opportunities⁴⁷



made, John Rowe, the president of Exelon, the largest merchant nuclear utility in the U.S., recently noted that his firm’s ability to close and swap dirty coal plants with cleaning burning natural gas-fired plants made building new nuclear reactors uneconomical for the next decade or two.⁴⁵ This is especially true in light of the declining electricity consumption and the price of natural gas (see Figures 4 and 5). Of the most economical methods of carbon abatement, McKinsey and others have determined that new natural gas plants, energy efficiencies, and even nuclear upgrades are the best. New nuclear reactors are one of the most expensive methods of carbon abatement, and take much longer to build than natural gas plants (5 years for nuclear, 18 months for natural gas).

Conclusion

Loan Guarantees: Less Please

Mr. Rowe has also argued against expanding the federal energy loan guarantee program. He says expanding the program is unnecessary, and he has a good point. \$18.5 billion in loan guarantees has already been set aside for new nuclear construction, and yet only one loan guarantee has been disbursed in the six years since the passage of EPACT 2005. With \$10 billion remaining, the expansion of loan guarantee funds will add unnecessary risk to the federal government’s portfolio. As already noted, the companies now slated to receive loan guarantees are also some of the likeliest to default. Keeping the current

loan guarantee ceiling, then, risks little. Certainly, the longer the further expansion of federal energy loan guarantees is put on hold by Congress, the stronger the facts against loan guarantees will resonate.

Endnotes

1. Loan guarantees are only one of more than twenty-three different government subsidies to the commercial nuclear industry.
2. See for example, Edward Markey, “Nuclear Loan Guarantees Should be Subject to Scrutiny,” Congressman Ed Markey, September 23, 2011, markey.house.gov/press-release/sept-23-2011-markey-nuclear-loan-guarantees-should-be-subject-scrutiny.
3. John C. Slocum and John J. Reed, “Maximizing U.S. federal loan guarantees for new nuclear energy,” Bulletin of Atomic Scientists, July 29, 2009, www.thebulletin.org/web-edition/features/maximizing-us-federal-loan-guarantees-new-nuclear-energy.
4. Diana Vazza, Nicholas Kraemer, Rafat Khan, and Nivritti Richhariya, “2010 Annual Global Corporate Default Study And Rating Transitions,” Standard and Poor’s, March 30, 2011, www.standardandpoors.com/ratings/articles/en/us/?assetID=1245302234237.
5. “New Nuclear Plants: An Engine for Job Creation, Economic Growth,” Nuclear Energy Institute, smr.inl.gov/Document.aspx?path=DOCS/Reading%20Room/economics/10_WHITEPAPER-NewNuclearPlants-AnEngineforJobCreationEconomicGrowth%5B1%5D.pdf.
6. Joe Stephens and Carol Leonnig, “During Solyndra probe, Energy Dept. has to move billions in loans,” Washington Post, September 16, 2011, www.washingtonpost.com/politics/during-solyndra-probe-energy-dept-has-to-move-billions-in-loans/2011/09/16/gIQRiXYYK_story.html; Kristi Swartz, “Vogtle nuclear project heads to final approval phase,” Atlanta Journal-Constitution, September 26, 2011, www.ajc.com/business/vogtle-nuclear-project-heads-1189080.html.
7. Doug Koplow, “Nuclear Power: Still Not Viable without Subsidies,” Union of Concerned Scientists, February 2011, p. 6, www.ucsusa.org/assets/documents/nuclear_power/nuclear_subsidies_report.pdf.
8. Stan Kaplan, “Power Plants: Characteristics and Costs,” Congressional Research Service, November 13, 2008, p. 22, www.fas.org/sgp/crs/misc/RL34746.pdf.
9. Other renewable sources have the cost spread out over the life of the project, making the cost of failure much lower. Cap investment in renewables is also front-loaded.
10. U.S. Department of Energy, DOE Title 1703 Loan Programs, lpo.energy.gov/?page_id=39. Private investors are unwilling to fund risky endeavors because of the likelihood of failure will result in a large financial loss. The benefit of dumping this risk onto taxpayer funded Federal Financing Bank is not clear.
11. Utility companies with sizeable foreign state investors will turn to foreign export credits to finance much of the remaining 20% of the loan. In effect, the new reactors are financed solely on debt, limiting the company’s liabilities by reducing the assets DOE is able to seize. See B.J. Csik, “The Challenge of Financing Nuclear Power Plants,” International Atomic Energy Agency, IAEA-SM-353/9, p. 80, www.iaea.org/inis/collection/NCLCollectionStore/_Public/31/007/31007028.pdf. Some nuclear utilities are joint holding companies between domestic and foreign entities, so the remaining 20% of the projects can be financed by foreign debt. Even though the US gov. guarantees 80% of the project, the federal gov. guarantees 100% of the loan (companies take multiple paths of financing, including loans not exceeding 80 percent of the total project that is covered by the US gov. and foreign export credits/selling corporate bonds/equity/private capital investment for the remaining 20 percent).

12. James Lardner, "U.S. to nuclear power industry: please take our subsidies," Remapping Debate, May 4, 2011, www.remappingdebate.org/article/us-nuclear-power-industry-please-take-our-subsidies. There are also \$4 billion in loan guarantees set aside for the construction of enrichment facilities.
13. The loan guarantee was approved for two additional reactors at Georgia's Vogtle plant. Commercial nuclear energy is a mature industry; although the industry claims regulatory uncertainty, their commercial representatives boast of the simpler design and enhanced safety features of third generation reactors. Since regulatory hurdles are frequently safety related, the enhanced safety features should withstand scrutiny from the Nuclear Regulatory Commission. The commercial nuclear industry's \$18 billion in nuclear loan guarantees should be adequate to process through new regulatory uncertainties.
14. The government then has the option of selling off the assets if the project is not operable, or taking over operation if the project has been completed. Since the loans for large commercial projects are often large, a company can still default on its loan if their completed project is more expensive to operate than their combined revenue.
15. "Taxpayer Risks with the Loan Guarantee Program," Taxpayers for Common Sense, www.psr.org/nuclear-bailout/resources/tcs-taxpayer-risks-with-the.pdf.
16. "Unlimited Taxpayer Liability in Clean Energy Deployment Administration (CEDA)," Union of Concerned Scientists, www.ucsusa.org/nuclear_power/solutions/unlimited-taxpayer-liability-CEDA.html.
17. Ibid.
18. Jim Hopf, "Solyndra, and its possible impacts on nuclear," ANS Nuclear Cafe, November 29, 2011, ansnuclearcafe.org/2011/11/29/solyndra-impacts/.
19. The public will have a hard time determining exactly how adequate of a hedge the credit subsidy fees are, because they are kept private unless a company chooses to disclose the amount.
20. U.S. Congressional Budget Office, Federal Loan Guarantees for the Construction of Nuclear Power Plants, August 2011, p. 13, cbo.gov/publication/41510.
21. See "Unlimited Taxpayer Liability," Union of Concerned Scientists. The credit subsidy cost is a crucial aspect of the loan guarantee because it is taken into serious consideration by companies competing for loan guarantees. Of the two nuclear loan guarantee applications approved, one company rejected the loan guarantee because of the credit subsidy fee, and the other credit subsidy fee remains undisclosed. Note that the subsidy fee that was rejected was along the lines of what Congress assumed for renewable projects (likely lower risk than nuclear) in the ARRA funding.
22. Julie Johnsson, "Southern Gambles on First U.S. Nuclear Reactors in 30 Years," Bloomberg News, September 27, 2011, www.bloomberg.com/news/2011-09-27/southern-gambles-on-first-u-s-nuclear-reactors-in-a-generation.html. Southern Co.'s customers are paying the equivalent of 75% of the DOE loan guarantee.
23. Constellation Energy's Calvert Cliffs 3 project is an example of a credit subsidy fee which was set higher than they anticipated at 11.6%, resulting in their defection from the loan guarantee program. They cited the costliness of the credit subsidy fee as the reason for their decision.
24. U.S. Congressional Budget Office, Federal Loan Guarantees, p. 7.
25. U.S. Congressional Budget Office, S.14 Energy Policy Act of 2003 CBO Cost Estimate, 2003, www.cbo.gov/sites/default/files/cbofiles/ftpdocs/42xx/doc4206/s14.pdf.
26. Mark Cooper, "The Economics of Nuclear Power: Renaissance or Relapse?" Nonuclear.se, June 2009, p. 34, nonuclear.se/files/cooper200906economics_of_nuclear_reactors.pdf.

27. Cooper, "The Economics of Nuclear Power," p. 35.
28. U.S. Congressional Budget Office, Federal Loan Guarantees, p. 7.
29. "Subsidiary Control and Liability Issues," Thompson & Thompson, PC, www.t-tlaw.com/cor-02.htm.
30. Brian Wingfield and Julie Johnsson, "Markey calls for scrutiny of nuclear-power loan guarantees." Bloomberg, September 23, 2011, www.bloomberg.com/news/2011-09-23/markey-calls-for-scrutiny-of-nuclear-power-loan-guarantees-1-.html.
31. As opposed to the speculated 1% for the Vogtle plants in Georgia, a regulated utility state. See Johanna Neumann, "Let Calvert Cliffs 3 die," The Baltimore Sun, October 14, 2010, articles.baltimoresun.com/2010-10-14/news/bs-ed-calvert-cliffs-20101014_1_new-reactor-nuclear-reactors-calvert-cliffs.
32. Ibid. \$4 million in lobbying was significantly more than the years prior and contributions in 2011.
33. U.S. Congressional Budget Office, Federal Loan Guarantees, p. 7.
34. This is especially true for companies in merchant utility states.
35. "Bond Ratings," Fidelity Investments, www.fidelity.com/learn-about-fixed-income-bonds/bond-ratings.
36. Ibid.
37. This process is most valuable because of its efficiency in evaluating and allocating capital across the risk spectrum to ensure balance of maximum innovation and success.
38. Junk bond status is defined as lower than BB. CCC- is defined as in default with little prospect for recovery.
39. For comparison, as of June 2011, Greece's debt was rated CCC. See "S&P cuts Greece's debt rating to CCC, sees default risk rising 'significantly,'" Los Angeles Times, June 13, 2011, latimesblogs.latimes.com/money_co/2011/06/greece-bond-rating-ccc-sp-default-euro-bailout.html.
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