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# Assessing Renewable Energy Loan Guarantees in the United States

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## Abstract

Conceived as an idea to push financing toward underdeveloped clean energy technology to improve the environment, promote economic growth, and produce a more secure energy supply, the Title XVII loan guarantee program has likely failed to meet these objectives. Instead, it has been used as a political tool, exposed taxpayers to unnecessary risk, diverted funding from alternative clean energy investments, and primarily benefitted large, politically connected corporations.

**Keywords:** alternative energy, incentives, loan guarantees, renewable energy finance

## 1. Introduction

Conceived as an idea to push financing towards underdeveloped clean energy technology to improve the environment, promote economic growth, and produce a more secure energy supply [1] the Title XVII loan guarantee program has likely failed to meet these objectives. Instead, it has been used as a political tool, exposed taxpayers to unnecessary risk, diverted funding from alternative clean energy investments, and primarily benefitted large, politically connected corporations.

The loan guarantee programs supported under Title XVII in general aim to provide financing to projects that would otherwise be unable to secure funding in the private market. When governments initiate loan guarantee programs, they generally target fledgling companies or struggling industries. In contrast, the Department of Energy program targets specific technologies irrespective of the company investing in them. The Loan Programs Office (LPO) offers loan guarantees under authority granted in Title XVII of the Energy Policy Act of 2005 and expanded in the American Recovery and Reinvestment Act of 2009. Loan guarantees are currently available only under Section 1703, which funds high-risk clean energy technology. While the LPO still oversees loan guarantees made under the Section 1705 program (of Solyndra fame), that program that expired in 2011 [2]. The latter program was more expansive and thus makes up the lion's share of the LPO's portfolio [3]. The LPO presides over a third program financing advanced vehicle technology, but that program utilizes direct loans rather than loan guarantees and will not be discussed in this testimony.

Government loan guarantee programs present a number of policy difficulties and the Department of Energy's program is no exception. I explore how the Department's loan guarantee program distorts markets, misdirects funds, and fails to promote truly innovative technology.

## **2. Loan guarantee programs in general**

Loan guarantee programs, offered both by governments and the private sector, are intended to close a fiduciary gap between burgeoning ideas and private investment. By promising to cover loan payments if a company fails, loan guarantors allow entrepreneurs easier access to private capital. Progenitors of government programs argue that private capital is too risk averse to properly finance whatever it is they seek to subsidize. Credit guarantees in private agreements are used to mitigate risks when individuals are considering investments, but the lender is unsure of the borrower's ability to repay the loan [4].

Not all cases in which "promising" technology fails to secure private financing can be considered justification for government intervention. The inability of high-risk projects to get private backing is a feature of a free market system, not a bug. The free market is generally good at making strategic, risk-conscious investments. Evidence from the Richmond Federal Reserve Bank indicates that loan guarantees indeed attract riskier investments and encourage entrepreneurs to overinvest [5]. This is a classic moral hazard problem; when the costs of risks are removed without a corroborating reduction in reward, entrepreneurs will take risks more flagrantly [6]. The burden of proof lies with those who claim that private financiers are indeed failing particular markets. Even then, as the aforementioned Richmond Federal Reserve study concluded, grants, direct loans, or other public financing options might be superior.

Some economists do argue that adverse selection among lenders, lender apprehension about particular technologies, industries, or geographical areas, or the existence of a credit crunch can all offer theoretical justification for loan guarantees. Loan guarantee programs, offered both by governments and the private sector, are intended to close a fiduciary gap between burgeoning ideas and private investment. By promising to cover loan payments if a company fails, loan guarantors allow entrepreneurs easier access to private capital. Progenitors of government programs argue that private capital is too risk averse to properly finance whatever it is they seek to subsidize. Credit guarantees in private agreements are used to mitigate risks when individuals are considering investments, but the lender is unsure of the borrower's ability to repay the loan [4].

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Still others attest that clean energy technologies ought to be subsidized by the government because they provide social benefits in excess of what can be returned to lenders, prompting private markets to underinvest. While clean energy technology does not create any positive externalities per se, it does crowd out carbon-emitting sources of energy and therefore may counteract a negative

externality. Of course, there are more direct and efficient ways of targeting the carbon problem, but subsidizing clean energy is often taken as a politically viable next best alternative [4].

### **3. History and background**

If there is one reason to be skeptical of loan guarantee programs in general, it is the paucity of conclusive academic research on their effectiveness. In my review of the academic literature it became glaringly obvious that there is still much important research to be performed on the questions of the loan guarantee program's effects, its costs and benefits, and best program design [7–13]. Data that is exact enough to make meaningful conclusions is difficult to collect. Studies are often too specific, meaning they examine one particular program and may not provide generalizable results, or too broad to have enough data to employ proper statistical analyses. This problem is further compounded by the many types of loan guarantee programs. Some provide funding for businesses to start-up, others guarantee business expansions, and in the program in question today, encourage the use of certain technologies.

As illustrative examples, here is what preliminary economics research has said about some international forays into loan guarantees. A French program targeting new firms was said to have no impact on the total number of companies, to increase their average size, and significantly increase their risk of default [14]. An investigation into a Malaysian small and medium sized enterprise program claims “there is sufficient evidence that the Scheme has failed to meet all [its] objectives” [15].

### **4. Policy issues in the loan guarantee program**

The loan guarantee program is well-intentioned, as most policy is, but its designers failed to fully consider many unseen effects. The US Department of Energy's program has deterred investment in other areas and made it more difficult for some to receive private investments, been used as a political tool, encouraged malinvestment, and primarily benefitted established companies with plenty of preexisting access to capital for research and development.

One key insight from policy analysis is that we must measure what matters. In the case of loan guarantee programs, simply because the program expands entrepreneurs' access to credit does not make the program a success. There are other important aspects that must be considered. Government action is not justified merely because there is a market failure. Government ought to act to fix market failures only when the net gains from resolving those problems, given the possibility of government failure, are positive. As Professor and governor of the Central Bank of Ireland Patrick Honohan writes, “With many competing pressures for public funds, an economically coherent argument in favor of a subsidized credit guarantee system needs to go a lot further than the observation that such a scheme would increase availability of credit” [4].

Federal loan guarantees can only be said to serve a public benefit if they accomplish what economists call additionality, meaning the program must be offering loans to projects that would not have otherwise garnered funding in the open market. A program that extends government assistance to projects and companies that would have no trouble securing private financing accomplishes little, adds unnecessary administrative costs, and puts taxpayer money at risk.



Some exploratory research on the additionality of loan guarantee programs for energy technology from both the DOE and USDA reveals poor additionality [16]. The early evidence suggests few loans are extended that would not otherwise be attained. Given the size and robust access to financing of many companies seeking Title XVII funding, which I will discuss momentarily, poor additionality should come as no surprise.

Even if government loans managed to accomplish perfect additionality, this alone would not be sufficient justification for the continuation of a program. Many conceive of loan guarantee programs as marginally shifting the risk calculus for private investment. In other words, guarantees allow projects that would previously have been considered barely too risky to finance to get funding. Realistically, loan guarantees completely shift the entire calculation of private investors. Securing a government loan guarantee proves to be a highly political process. Private capital often follows public capital. Despite that statement's appealing tenor, this is not a positive outcome. It means only the politically connected are funded and the extent of that problem is compounded beyond the bare dollar value of the government program.

The source of problems with government support for particular energy sources is that corporations and interest groups subvert the program to serve their private interests. Funding is allocated by political processes instead of the free choice of individuals who judge it to be a worthwhile investment. The fundamental problem at the heart of the Solyndra scandal, for example, was not that the business failed after securing a loan guarantee. After all, some failure will arise out of any loan guarantee program. Rather, the evidence that emerged following that failure demonstrated that Solyndra's path to securing a government loan guarantee had been dictated by political pressure, not market viability. As documented in a chapter of *Nature Unbound*, Solyndra's application rushed through or even skipped critical oversight steps in order to reach approval before a California trip President Obama had planned. Even when failure was imminent, personnel at the Department of Energy urged even more funding to be pumped into Solyndra in an attempt to save face, despite warning from the OMB [17].

The 2015 Inspector General's report on Solyndra confirmed that "the Department missed opportunities to detect and resolve indicators that portions of the data provided by Solyndra were unreliable" and that employees "felt tremendous pressure, in general, to process loan guarantee applications [...] based on the significant interest in the program from Department leadership, the Administration, Congress, and the applicants" [18]. Solyndra shed light on this malfeasance, but political interference is a structural problem with loan guarantee programs, not merely the fault of a single public officer, agency, or administration.

One point that is too often underemphasized is that this argument against government interference applies equally to subsidizing fossil fuels. When President Carter's administration pushed for energy independence it meant government support for coal companies along with the research funding for and promotion of renewables [19, 20]. These are at least equally problematic, and considering their size, perhaps even more so.

Most Section 1705 funding has gone to large corporations who already have access to capital for investments in research, development, and deployment. Recipients of LPO guarantees include multiple Fortune 200 companies, utility companies, and multinationals. Many are wholly owned by yet larger companies [21]. The application process itself all but ensures that only large, established companies will be capable of participating in the program. Applicants can expect to pay between \$150,000 and \$400,000 in fees before even being considered [22].

The full ramifications of supporting mainly large corporations are rarely understood. It does not simply mean that large corporations make risky investments and leave taxpayers to pick up the tab, but the fundamental problem is that it makes it more difficult for new ideas to emerge since it further entrenches established ideas. Research on new energy technology has stalled at least in part because of government's involvement. Government support, as a previous chief marketing officer at Tesla Motors complained, may make it easier for those who receive support, but it also makes it more difficult for new ideas to gain private funding and grow [23].

Loan guarantee programs, like any subsidy, move resources towards the subsidized good. A subsidy redirects private capital towards the subsidy because it lowers the risk and changes the risk calculation investors go through. In general, the subsidized industries see growth and investment. The unsubsidized, however, see lower investment. The subsidy distorts the market signals of profit and loss to appear as if the subsidized industries provide more value than they do.

The net result of loan guarantee programs is likely a loss in meaningful innovation. This is the fundamental problem with loan guarantees. Even if the additionality was 100 percent, the program employs poor methodology to pick those to subsidize. Political power and lobbying prowess, not the collective intelligence of all individuals in the market, allocate the funding of these programs. My analysis indicates that the unseen costs are much greater than anticipated. To some extent this position rests on a counterfactual--how do you measure what did not happen? The question of what could have been, the opportunity cost of these loans, is a serious consideration even if it is a difficult empirical one.

## 5. Conclusions

Preliminary examinations on the Department of Energy and USDA's programs have been discouraging, though the entire literature pleads for more concerted research efforts. The political problems associated with the funding justify further skepticism towards Section 1705 and Section 1703, as do the characteristics of their recipients.

The primary take away from my analysis is that government's attempt to promote innovation has likely done exactly the opposite. In place of these programs government would do better to simply step out of the way of entrepreneurs and individuals. As the development of the technology industry demonstrates, allowing experimentation and markets to drive innovation is a promising avenue for improving the world. In contrast to policymakers propensity to want to plan for every contingency, permissionless innovation, an idea developed by the Adam Thierer, is more likely to provide the new ideas needed to solve energy and environmental issues [24]. It calls for government officials to clear a path for entrepreneurial experimentation unfettered by precautionary regulation.

A policy of permissionless innovation is more likely to find successful solutions to the pressing environmental and energy questions, such as the potential dangers from climate change and the health issues caused by pollution, than government bureaucrats choosing projects to fund based on political considerations.

## Conflict of interest

The authors declare no conflict of interest.

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