

Advanced Energy Manufacturing Tax Credit

Stefan Toepler
George Mason University

A remarkable feature of much of the evolving public administration literature on governance is that much of the evidence is based on research examining contractual relationships. On the one hand, a lot of public/private provision of public services does take the form of point-of-service contracts. On the other, the contract tool, and to some extent grants as well, exhibit features that lend themselves most easily to studying the effects of networks on the production of public services.

While this project also focuses on various areas deploying contracts and grants as primary tools, it also sought to examine fields where a rather different form of tool, namely tax credits, was deployed by the federal government to achieve the objectives stipulated under the American Recovery and Reinvestment Act (Recovery Act) of 2009. Do these fields show similar dynamics than those relying on grants or contracts, particularly in view of the federal government's ability to mobilize and steer vast networks of other public and private actors?

The answer that the experience of one of such credits, the Advanced Energy Manufacturing Tax Credit, suggests is No. Private actors were involved in the 48C implementation process, but only tangentially. This paper will provide an overview and analysis of the Advanced Energy Manufacturing Tax Credit and seek to assess its overall results as well as its impact on networks.

Pre-Recovery Act

Also known as the 48C tax credit after the section of the Internal Revenue Code that authorizes it (herein referred to as 48C tax credit or 48C program), the Advanced Energy Manufacturing Tax Credit was a new tool created under the Recovery Act and did not have any direct precedents in federal energy policy before. However, various other forms of tax credits and incentives existed beforehand to support federal clean energy objectives. Some of these other tax incentives were also extended, expanded or modified through the Recovery Act and were available to eligible producers as an alternative or a supplement to the 48C credit. Notwithstanding depreciation allowances, among the more important ones of these various tax incentives are the Production Tax Credit and the Investment Tax Credit (or cash grants).

The Production Tax Credit (PTC) was first introduced in the Energy Policy Act of 1992. Targeted at certain renewable energy technologies, including wind, biomass, geo-thermal, landfill gas/solid waste or hydropower, it allows producers to take an inflation-adjusted credit against corporate income tax for ten years. Available for two years at a time and re-authorized periodically, the PTC lapsed several times in the first half of the 2000s, leading to immediate drops in wind power investments, signaling the credits importance for certain types of renewable energy. It was last re-authorized in the Recovery Act.¹

¹ Gilbert Metcalf, 2009, Investment in Energy Infrastructure and the Tax Code. NBER Working Paper 15429. www.nber.org/papers/w15429

An Investment Tax Credit (ITC) for a range of commercial renewable energy projects was introduced in 2005, covering various solar, photovoltaic, wind, geothermal, biomass, and other type of projects. The ITC provides a credit of either 30% (for solar, fuel cell and small wind projects) or 10% of qualifying project costs. The ITC was expanded under the Recovery Act, which also included provisions to make these tax incentives more useful to energy providers. Specifically, the Recovery Act allowed PTC-eligible projects to elect the ITC instead, and ITC-eligible projects were granted a time-limited option to receive cash grants instead.

These adjustments were meant to address issues resulting from the dwindling investment funds available to clean energy projects as a result of the financial crisis. Highly capital-intensive in the initial phases, clean energy technologies tend to be highly dependent on the availability of financing, most of which comes from investment banks and other “tax equity” investors.² These investors are primarily interested in gaining access to tax deductions, credits and other incentives available to clean energy projects. This takes place through the formation of complex financial partnerships with clean energy firms, which might otherwise have little use for an incentive such as the PTC, because initial operations remain unprofitable for long periods of time after start-up. Rather colorfully, one author described the situation as such:

“Until the Recovery Act, the government’s main instrument for subsidizing renewable energy development came in the form of tax credits. But many renewable firms couldn’t use them because, like most startups, they struggled to turn a large enough profit. The solution was to partner with investment banks, such as Lehman Brothers, which would provide financing in exchange for the tax credit, which they could use to offset other earnings. Wind farms were tethered like a power line to the titans of Wall Street. So when the banking system collapsed and credit froze, the clean energy industry came crashing down with it.”³

To address the issue of the financial crisis induced lack of investment partners that could utilize the benefits of tax credits, the Recovery Act allowed eligible renewable energy companies to elect cash grants in lieu of the tax credits (Section 1603 cash grants) for a limited time, thus providing a more direct subsidy. As such, tax credits and similar incentives were a well-established tool of energy policy before the Recovery Act; and the Act addressed and expanded existing credits. The 48C program was added as an additional tax incentive for clean energy technology with the express objective to stimulate domestic manufacturing capacity (as opposed to generation and transmission).

Overview of the Advanced Energy Manufacturing Tax Credit

The credit was created in Section 1302 of the Recovery Act, which provided a total of \$2.3 billion in credits for investments in “qualifying advanced energy projects” to support the re-equipment or expansion of existing, or the establishment of new, manufacturing facilities for various types of clean energy products. According to IRC Section 48C, qualifying projects included:

² Mark Bolinger, Ryan Wisser, Karlynn Cory, and Ted James, PTC, ITC, or Cash Grant? An Analysis of the Choice Facing Renewable Power Projects in the United States. March 2009. Berkeley National Laboratory.

³ Michael Grabbell, Money Well Spent? The Truth Behind the Trillion-Dollar Stimulus, the Biggest Economic Recovery Plan in History. New York: Public Affairs, 2012.

- Solar, wind, geothermal and other renewable energy equipment;
- Energy storage for electric or hybrid vehicles;
- Transmission and storage of renewable energy sources;
- Energy storage systems
- Equipment for capturing and sequestering carbon dioxide;
- Technology for renewable fuel refining or energy conservation;
- Plug-in electric vehicles or component parts; or
- Other advanced energy projects for reducing greenhouse gas emissions.
- 48C-supported manufacturing projects receive a 30% tax credit in the year in which the qualifying project is put in service. Covered were investments that were made after February 17, 2009, the day President Obama signed ARRA into law.

As a collaborative effort between the Treasury and Energy Departments, the 48C program was intended to several different objectives in both energy policy and economic development at the same time. In an August 2009 release, for instance, Secretary of the Treasury Tim Geithner was quoted as saying: “This program will help encourage innovation in design of clean energy technologies [and add] an important new dimension to the incentives created in the Recovery Act to improve energy efficiency, and develop alternative sources of energy.”

Energy Secretary Steven Chu at the same time focused on the economic aspects by noting that the 48C credits "will help create thousands of high quality manufacturing jobs in some of the highest growth segments of the economy [providing] an opportunity to develop our global leadership in clean energy manufacturing and build a secure, sustained base of jobs for America's workers."⁴

Apart from the economic development and job creation objectives of ARRA, the larger energy policy concern underlying the 48C program was that the US was standing to lose out in the increasingly globalized clean energy manufacturing industry. In addition to clean energy technology leading countries in Western Europe (such as Denmark, Spain and Germany) and Asia (such as Japan and South Korea), China in particular has been emerging as a growing manufacturer as well as consumer of clean energy products.⁵

The clean energy market world-wide is predicted to grow substantially over the next decade, with global investments expected to reach \$600 billion by 2020. At the same time, the renewable energy products trade deficit has increased in recent years, export market shares are declining and the US has become the largest lean energy technology import market. As most jobs are in manufacturing rather than installation and maintenance of clean energy products, the growth of overseas manufacturing at the expense of US production capacity pose a serious policy challenge.⁶

⁴ Department of the Treasury, “Treasury, Energy Announce more than \$2 Billion in Recovery Act Tax Credits for Energy Manufacturers.” 8/13/2009. <http://www.treasury.gov/press-center/press-releases/Pages/tg262.aspx>

⁵ Atkinson, R., “Clean Technology Manufacturing Competitiveness: The Role of Tax Incentives.” Testimony before the Senate Finance Committee, Subcommittee on Energy, Natural Resources, and Infrastructure, May 20, 2010.

⁶ Atkinson, R., Hackler, D. et al., Strengthening Clean Energy Competitiveness. Washington, DC: ITIF, Breakthrough Institute and Brookings Metropolitan Policy Program. June 2010.

Implementation Process and Timeline

Although the introduction of the 48C program must be seen as part of the nation's larger energy policy, as a tax credit, the authority for it rests with the Department of the Treasury. However, Section 48C stipulated that the Secretary of Treasury to work in consultation with the Secretary of Energy in developing the program. The tax credits were awarded on a competitive basis. Selection criteria were statutorily prescribed and included likely commercial viability as well as

- Greatest direct and indirect impact on domestic job creation;
- Greatest net impact on air pollutants and greenhouse gas reductions;
- Greatest technological innovation and commercial deployment potential; and
- Shortest timeframe for project completion.
- Additional program policy factors were also considered, such as diversity of geography, technology and project size, and regional economic development.

In the development of the program, the Internal Revenue Service (as the responsible service within the Treasury Department) coordinated the overall program parameters with the Department of Energy and then essentially "contracted" the DoE to evaluate and rank applications. There were no formal mechanisms for external input, but the agencies provided opportunities to meet with interested parties, such as various manufacturers and industry groups, and receive comments to help inform the development of the application process. The release of IRS Bulletin 2009-37 containing the program description and application guidelines in August 2009 was accompanied by a conference call, which made official from both the Treasury and Energy Departments available to answer questions by interested parties, including manufacturer representatives, industry groups and tax law and consulting firms.

The 48C tax credits were awarded through a two-stage application process.⁷ The first stage required preliminary and final applications for a recommendation of the Department of Energy (DoE). This required a uniform application format that allowed for a standardized review of highly technical information pertaining to the evaluation criteria. The DoE provided recommendations for projects that met eligibility (as advanced energy project) and economic viability requirements as well as a ranking of projects based on the above list criteria to the Treasury Department's Internal Revenue Service (IRS).

In a second stage, applicants that received DoE recommendations needed to apply for certification to the IRS. Starting with the highest ranked DoE recommendation, the IRS allotted the full amount of the requested credit until the total available credit amounts were exhausted. The implementation of the tax credit proceeded on a fixed and fairly tight time schedule. Preliminary applications for the DoE recommendations were due on September 16th, 2009, or just seven months after ARRA was signed into law, with final DoE applications due on October 16th, 2009. The second round applications for certification were due to the IRS by December 16, 2009, which then was scheduled to accept or reject applications by January 15, 2010. There

⁷ See IRS, "Qualifying Advanced Energy Project Credit," Notice 2009-72. Internal Revenue Bulletin 2009-37, September 14, 2009. www.irs.gov/irb/2009-37_IRB/ar06.html

were also provisions for a second allocation round for the following year in case the available \$2.3 billion in tax credits were not fully allocated during the initial allocation round.⁸

Post-award Oversight

Post-award oversight procedures were also spelled out at the beginning of the program and involve information that the tax credit recipients must supply to the IRS. Specifically, recipients – within one year of the acceptance date—must provide documentation that all requisite construction permits were secured and that the project has sufficiently progressed to ensure that it will be placed in service within the following three years. All projects supported by the initial 48C tax credits must be in service no later than January 2014.

Recipients that successfully comply with these requirements claim the tax credit in the year of the project's completion. However and in contrast to other tools, particularly grants and contracts, there is no room for negotiation. Failure to provide the requisite documentation within the first year of acceptance or failure to bring the project in service within three years thereafter will result in a forfeit of the credit. Likewise, significant changes to the project that might have impacted the DoE recommendation and ranking of the project will also result in a forfeit. Post-award oversight thus only involves compliance checks by the IRS.

In some ways, the 48C tax credit was intended to steer and help accelerate manufacturing investment decisions that eligible companies might have taken anyway in some shape or form. As such, the investment decision is subject to the accountability demands of the recipient company's regular stakeholders, such as owners, shareholders, and investors, which are here largely aligned with the government's interests and thus reduce the need for anything more elaborate than basic compliance checks.

Program Reception and Impact

Slightly ahead of schedule, the White House announced the allocation of the 48C tax credits in a press release on January 8, 2010.⁹ With more than 500 applications requesting a total of \$8 billion in tax credits, the Recovery Act-authorized \$2.3 billion in credits went to 183 manufacturing projects in 43 states, obliterating the need for a second allocation round. Based on employment effects estimated in awardee applications, approximately 17,000 new jobs would be created directly within the four-year span until all projects must be in service; corresponding private sector investment in these projects would amount to about \$5.5 billion; and ripple effects of the spending might support as much as 41,000 additional jobs indirectly.¹⁰

⁸ IRS, "Qualifying Advanced Energy Project Credit," Notice 2009-72. Internal Revenue Bulletin 2009-37, September 14, 2009. www.irs.gov/irb/2009-37_IRB/ar06.html

⁹ White House, "President Obama Awards \$2.3 Billion for New Clean-Tech Manufacturing Jobs: Recovery Act Tax Credits to Enable More Than \$7 Billion in New Manufacturing Projects and Create Tens of Thousands of Jobs." January 8, 2010. www.whitehouse.gov/the-press-office/president-obama-awards-23-billion-new-clean-tech-manufacturing-jobs

¹⁰ White House, "Fact Sheet: \$2.3 Billion in New Clean Energy Manufacturing Tax Credits." January 8, 2010. www.whitehouse.gov/the-press-office/fact-sheet-23-billion-new-clean-energy-manufacturing-tax-credits

With roughly only one-third of applications and a little more than one-quarter of the applied for credit amounts served, the 48C program can thus be considered an instant success from a demand point of view. The availability of a sufficient number of eligible projects that did not get funded let the Administration to call on Congress to allocate an additional \$5 billion in credits to expand the program.

Despite its apparent initial success, the 48C program is limited by its relatively small size. The total Recovery Act spending for clean energy-related issues is estimated at some \$90 billion,¹¹ of which the 48C credits then account for just about 2.5 percent. Likewise, the 48C program is overall among the smaller tax expenditures for the energy industry at large. As shown in Table 1, the Congressional Research Service estimates the total energy-related tax incentives at close to \$60 billion dollars for the years 2011 to 2015. Renewable energy projects claim \$43 billion, or nearly three-quarters of the total. Accounting for credits already claimed for projects that went into service in 2009 and 2010, the remaining 48C allocation of \$1.4 billion will be dwarfed in the near-term by spending on the Recovery Act-created option on cash grants in lieu of production or investment tax credits with \$16 billion, alternative fuel credits of \$12 billion, Production Tax Credits of \$9 billion, and Investment Tax Credits of \$2.5 billion.

Table One: Energy-related Tax Incentives

Tax Incentives for	2011-15 Costs
Fossil Fuels	\$12.5 billion
Renewable Energy, <i>therein</i> :	\$43.1 billion
<i>Production Tax Credit</i>	\$9.1 billion
<i>Investment Tax Credit</i>	\$2.5 billion
<i>Cash grants in lieu of tax credits (1603 grants)</i>	\$15.9 billion
<i>Alternative Fuel Credits</i>	\$11.8 billion
<i>48C tax credits*</i>	\$1.4 billion
<i>Other Renewable</i>	\$2.4 billion
Energy Efficiency and Conservation	\$4.5 billion
Alternative Vehicle Technology	\$2.5 billion
Other	\$7.6 billion
Total	\$59.2 billion

*The difference to the overall \$2.3 billion appropriation for the program reflects tax credits claimed for projects that were put into service in 2009 and 2010.

Source: Based on Molly Sherlock and Margot Crandall-Hollick, Energy Tax Policy: Issues in the 112th Congress, CRS Report for Congress, March 28, 2012, Congressional Research Service, Table 1

Still, in a global clean energy economy that is currently estimated at \$260 billion, the 48C program was a not insignificant policy marker for the US. Industry analysts are ready to credit the 48C program with encouraging foreign renewable energy companies to enter the US market

¹¹ Joseph Aldy, A Preliminary Review of the American Recovery and Reinvestment Act's Clean Energy Package. Faculty Research Working Paper Series RWP11-048, December 2011. John F. Kennedy School of Government, Harvard University

and establish production facilities here.¹² While a variety of other policy programs and incentives, both of and outside the Recovery Act, also play important roles,¹³ the 48C program did play a significant part in generating investments that overall in 2011 started to outpace China's clean energy investments again for the first time in three years.¹⁴

Concerns

Overall, the 48C program was implemented quickly and efficiently and avoided the problems and delays that plagued many other aspects of the Recovery Act, including for example the weatherization effort in the energy arena (see respective Shared Governance project case study). In most ways, it remained below the radar screen that focused attention on other clean energy-related issues or broader Recovery Act programs. The tax credits did neither draw much public attention nor any significant academic or industry analysis. In his review of the Recovery Act's clean energy provisions, for example, Joseph Aldy, who served as Special Assistant to the President for Energy and Environment in 2009 and 2010, refers to the 48C program only in passing.¹⁵

While the reasons behind this relative disinterest must remain subject to speculation, contributing factors may be the generally uncontroversial nature of the programs objectives (ie, establishing a domestic manufacturing presence, and manufacturing jobs, in a global growth industry) as well as different priorities within the broader clean energy policy debate.

Despite the positive reception of the program, a few concerns have nevertheless been noted. A persistent issue in the renewable energy field has been that the majority of component parts of clean energy projects (such as wind towers and turbines or solar photovoltaic cells and panels) have been imported from overseas. This included Recovery Act-funded projects, which then appeared to create clean energy manufacturing jobs overseas rather than in the US.

While the 48C program and the advanced battery manufacturing grants constituted the primary Recovery Act programs to focus on domestic clean energy manufacturing capacity building, some questions were raised about the significant shares of 48C credits that were awarded to

¹² Felicity Carus, "Wind Rush: Europeans Take the Credit." Aol Energy. November 17, 2011. www.aol.com.

¹³ Not counting tax incentives administered through the Treasury Department, the Department of Energy's recovery funds allocation amounted to \$35 billion and many programs helped spur additional private investments. As an example, the Advanced Battery Manufacturing grants program supported the production of vehicle batteries, electric drive components, and purchase and testing of electric vehicles with \$2.4 billion in recovery funds, but requiring a cost share. A non-ARRA incentive is the Production Tax Credit, an income tax credit for utility-scale electricity generated through turbines, that was introduced in 1992 with a 10-year lifespan. This tax credit is seen as crucial for sustaining investments particularly for the wind power industry and the Obama Administration was seeking an extension of the Production Tax Credit along with the 48C program.

¹⁴ Dept of Energy, "Secretary Chu's Remarks at the World Renewable Energy Forum Press Availability- As Prepared for Delivery." May 16, 2012. energy.gov/articles/secretary-chus-remarks-world-renewable-energy-forum-press-availability-prepared-delivery; see also Atkinson, R., "Clean Technology Manufacturing Competitiveness: The Role of Tax Incentives." Testimony before the Senate Finance Committee, Subcommittee on Energy, Natural Resources, and Infrastructure, May 20, 2010.

¹⁵ Joseph Aldy, A Preliminary Review of the American Recovery and Reinvestment Act's Clean Energy Package. Faculty Research Working Paper Series RWP11-048, December 2011. John F. Kennedy School of Government, Harvard University

foreign-based companies to establish or improve manufacturing facilities in the US, thereby crowding out smaller and younger US firms rather than granting them a much needed competitive edge. Moreover, in a globalized industry, many larger clean energy companies maintain manufacturing facilities in various parts of the world, including low-wage Asian countries. This would allow them to shift labor-intensive manufacturing operations overseas, while only maintaining less labor-intensive manufacturing in the US, thereby undermining the future growth of a robust manufacturing presence in the US with the concomitant level of high-paying manufacturing jobs.¹⁶

While this may or may not be a significant issue in the future, a number of adjustments to the 48C program have been suggested if the program will be extended into the post-Recovery Act era. Specifically, some of the evaluation criteria of the initial allocation were designed to support the Recovery Act's immediate goals rather than serving longer-range industrial development objectives. This includes the criterion of "shortest timeframe to project completion," which favored projects already underway, which were also projects that would have likely gone forward even without the tax credit's subsidy.

The "greatest domestic job creation" criterion similarly provides a bias, as it may discourage innovative and promising projects that happen to be more capital than labor intensive. In contrast, technological innovation and commercialization should be weighed more heavily and manufacturing projects that aim at capturing economies of scale, developing production know-how, expose domestic manufacturers to international competition and focus on domestic component production should be emphasized.¹⁷

Network Impacts

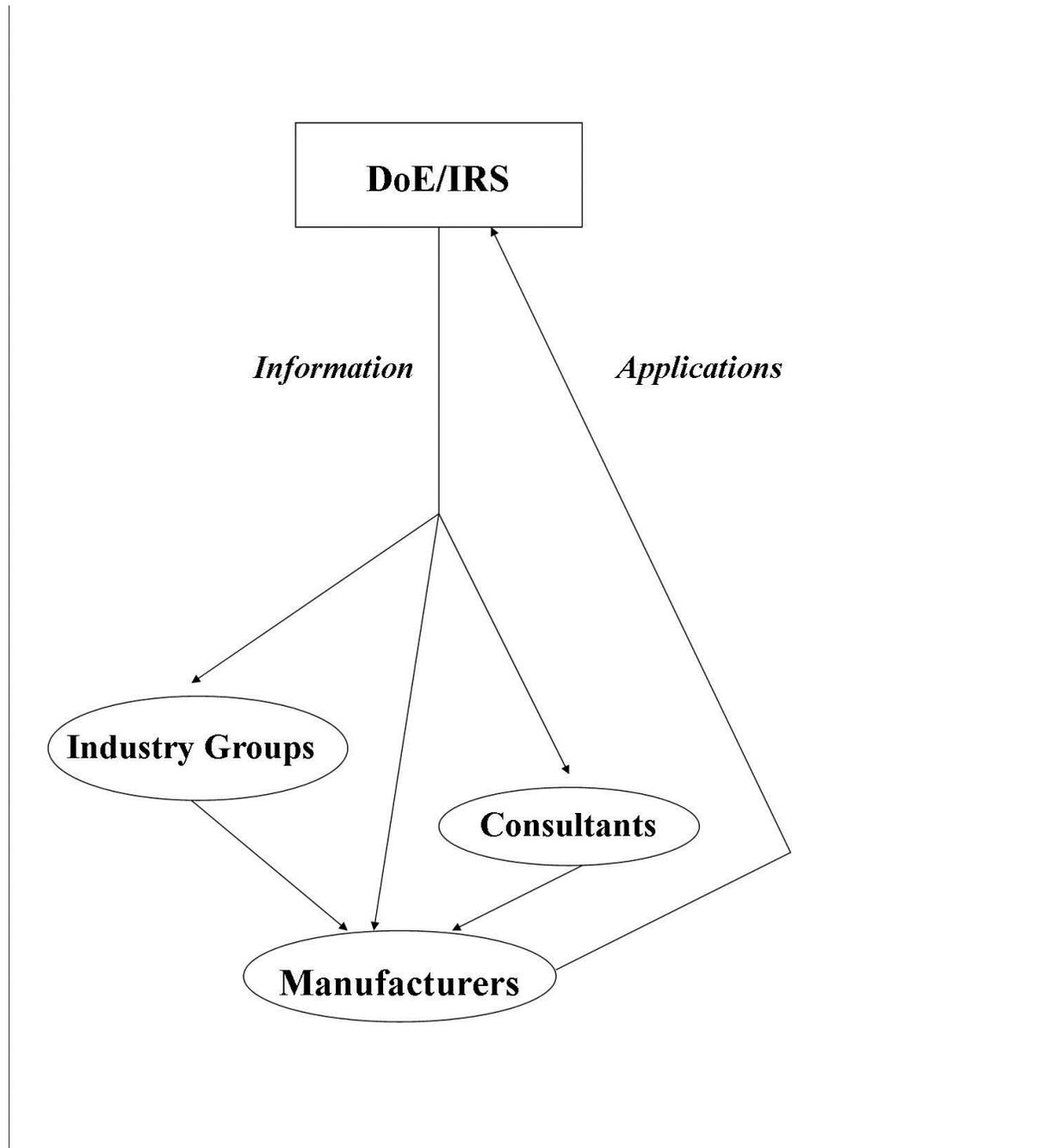
As a new policy instrument that got developed and implemented fairly rapidly (eg, seven months time span from the Recovery Act becoming law to the due date for preliminary applications), there were no 48H-specific networks to be mobilized. Interested parties had opportunities to contact the federal agencies to provide informal comments and input in the development of the application process and guidelines. After the announcement of the application procedures, pre-existing networks in the clean energy arena geared towards monitoring federal developments picked up information about the 48H eligibility criteria and application requirements from DoE and IRS announcements, and published or re-published the pertinent information for further distribution to their own membership and client bases. As pictured in Figure 1, whereas large manufacturers were likely to pick up this information on their own, smaller manufacturers were able to receive information through their industry and umbrella groups or law, accounting or consulting firms that they were in contact with.

¹⁶ Matthew Mayrl and Phil Mattera, *Winning the Race: How America Can Lead the Global Clean Energy Economy*. San Francisco: Apollo Alliance, March 2010

¹⁷ Robert Atkinson, *Clean Technology Manufacturing Competitiveness: The Role of Tax Incentives*. Testimony before the Senate Finance Committee, Subcommittee on Energy, Natural Resources, and Infrastructure. May 20, 2010.

Figure One: 48-C Relationships

Redistributing pertinent federal information is a basic member service of industry groups and



trade associations. For consultants, such as law, accounting, tax, government relations or general management consulting firms, it is a form of business development. Especially smaller and newer manufacturers lacking sufficient in-house capacity, or foreign companies unfamiliar with the US tax regimes, may turn to consulting firms to help with feasibility studies as well as proposal development and preparation. As an example, one such firm included information about the tax credits in a newsletter shortly after the Recovery Act was signed, noting:

“We will continue to monitor and await guidance from the Treasury Department on this program, but in the meantime, taxpayers with potentially eligible projects, should prepare to reserve a place in line (and apply) for these credits. With a limited allocation of \$2.3 billion nationwide, it will be important to act swiftly once details of the program are announced. [Consulting firms’s tax group] can assist taxpayer’s with this process, including analysis of qualifying projects as well as application for the credits with the Treasury Department.”

A different firm described the process of working with their client in retrospect as such:

The firm “was notified approximately 10 days before the application deadline that [a client] was interested in pursuing a 48C Tax Credit application ... Our first step was an exhaustive information gathering exercise ... Simultaneously, [the firm] put together a detailed proposal outline, which highlighted all of the needed components for a successful proposal. Once the [firm’s] information gathering process was complete, most of our team spent 5 days on-site with [the client]. In this time, we completed a first draft of the proposal. Being on-site allowed us to easily access needed team members when questions arose ... At the end of the 5 days on-site with [the client], [the firm] had compiled all of the necessary client input for a successful application. From there, the team refined the narrative and supplemented it with appropriate market data to strengthen the client’s argument for funding. A complete draft was reviewed internally and by [the client]. Upon completion of final edits and review, the application was submitted to the Department of Energy in the format requested in the RFP.”¹⁸

Whether or not clean energy manufacturers utilized consultants to help with the preparation, the process ended with manufacturer’s submission of the recommendation application to the DoE and later on the certification application to the IRS.

Overall and in contrast to the other areas considered as part of Share Governance project, the 48C tax credit thus does not exhibit any discernible network impacts. Or perhaps more precisely, while manufacturers may have tapped their own business networks (ie, consulting firms) to aid in the application preparation, the administration of the 48C tax credit did not involve the kind of public networks that require the kind of steering and coordinating that is otherwise often required of federal managers to ensure that non-federal institutions and organizations involved in these networks remain focused on the federal objectives of the program. Arguably, there is a variety of different reasons to help account for this.

Firstly, network steering issues typically arise where a range of horizontal relationships are involved. In the 48C tax credit case, notwithstanding the role of industry groups and consulting firms in information distribution and proposal preparation, the relationship between the IRS (as the credit awarding authority) and the individual applying manufacturer is vertical and direct.

Relatedly, networking increases the uncertainty about the ability to deliver to sought-after public objectives. Here the reward is more or less made available after the fact (rather than before delivery of the required good or service), which makes it very difficult for recipients to re-direct or mis-appropriate public resources or to engage in outright fraud. In general, manufacturers can only apply the tax credits after they have notified the IRS in writing that the supported project has been placed into service.

¹⁸ LNE Group Helps Flabeg Win a \$10.2 Million 48C Tax Credit.
www.lnegroup.com/Clients/CaseStudies/CaseStudyDisplay?id=31

Alternatively, credit may be claimed earlier for so-called “qualified progress expenditures,” which in turn require proof that such expenditures have been incurred. Moreover, if manufacturers violate conditions of the agreement (eg, significant changes, time overruns, failure to keep the project in service for five years after completion), any unused parts of the tax credit are forfeit and the already used credits are subject to recapture.¹⁹ This places a verification burden on the IRS (eg, ensuring that projects actually went into service and stayed in service for five years), but this does not appear to be too overly complex, since specific manufacturing facilities are the subject.

Thirdly, the 48C program was conceived as a one-time commitment that would come to an end after the distribution of the initial \$2.3 billion appropriation. As such, it did not lend itself to the creation of an institutionalized network structure whose own vested interests over time might countermand the initial program objectives. Had the credit been structured as a multi-year allocation, the beginnings of a specialized network might conceivably have emerged. As noted above though, as the program unfolded, it did not even require a second allocation round. Multi-year allocations were, of course, not a design factor. To the contrary, the Recovery Act’s intention was to push the money out as soon as possible. The January 8, 2010 White House fact sheet on the 48C program stated in this context: “The statute favors the selection of projects that are in service early. As a result, some of the selected projects already have been completed and begun operation.”²⁰

Fourthly and in a similar vein, the 48C tax credit was introduced into the equivalent of a “seller’s market,” with the “demand” for such tax credits far outstripping the available “supply” of the initial \$2.3 billion allocation by a factor of three or so. For clean energy manufacturers that had facility investments underway or under near-term consideration, the tax credit offer was a low-hanging fruit. It was a desirable subsidy option that furthered their own business interests without requiring changes in business strategy (presumably manufacturers did fall back on already planned projects rather than developing new ones from scratch in the short time frame), while requiring only a limited investment of time and resources for the application process. Arguably, the need to employ, and perhaps even help build new networks would have been much greater if the supply of suitable, technically-sufficient eligible projects had been more constraint. If future 48C program extensions would be more targeted and selective along those lines discussed above, for example, federal managers might need to rely more heavily on third parties to help find and develop eligible manufacturing capability to support through the program.

Finally, it bears noting that the experience of the 48C program does not necessarily present a representative case study of the use (or non-use) of network relationships in the tax credit as a tool of government action at large. Rather to the contrary, the structure of the Production Tax Credit as well as the Investment Tax Credit in the clean energy arena suggest a more complex set of network relationships between clean energy producers and investment banks and other types of financiers. This appears to be quite similar to the complex networks deployed with the New Markets Tax Credit, as amply demonstrated in the respective case study of this project.

¹⁹ IRS, “Frequently Asked Questions About the Qualifying Advanced Energy Project Credit (Internal Revenue Code section 48C)” <http://www.irs.gov/businesses/article/0,,id=242505,00.html>

²⁰ White House, “Fact Sheet: \$2.3 Billion in New Clean Energy Manufacturing Tax Credits.” January 8, 2010. www.whitehouse.gov/the-press-office/fact-sheet-23-billion-new-clean-energy-manufacturing-tax-credits

In the 48C case, the economic benefits of the credit accrue directly to the recipient, which keeps the underlying economic rationales relatively straightforward. While this can also be the case with other kinds of tax credits, the complication of networks arises where the economic benefits provided by the tool are either shared among different third parties (producers and investors) or where the public objective is split from the economic interest (as may be the case in nonprofit/for-profit network collaborations). In the case of the 48C tax credit, by contrast, the public objective and the economic interests of the applicants are closely aligned.

Conclusion

Following in a long-standing tradition of using tax incentives to pursue energy policy objectives, the Advanced Energy Manufacturing Tax Credit program utilized \$2.3 billion of the Recovery Act's total stimulus package to subsidize the creation, expansion or retro-fitting of clean energy manufacturing facilities in the United States. A collaboration between the Department of Energy and the Treasury Department's Internal Revenue Service, the program involved a fairly straightforward application process and was implemented in a timely fashion in line with the Recovery Act's intention to make stimulus monies available as quickly as possible.

Greeted with a strong response from clean energy manufacturers, the \$2.3 billion allocation was fully awarded to eligible projects in less than eight months after the Recovery Act became law. The program is expected to create about 17,000 new jobs directly and another 41,000 indirectly in addition to stimulating \$5.5 billion in private investments. With several hundred applications requesting several billions in tax credits that could not be funded with the Recovery Act allocation, the program is generally considered a success and has escaped both controversy and closer scrutiny.

There are some concerns about the share of foreign companies among the successful applicants for these credits, as well as some suggestions on how the program could usefully be modified to better serve energy policy objectives after the Recovery Act, if Congress will consider a future re-authorization, as requested by the Obama Administration in the past. But overall, there appears to be widespread consensus that the 48C program has been a solid contribution to firm up the domestic supply-side of the clean energy policy equation.

In terms of network impact, the 48C tax credit turns out to be a tool of government action that does not rely to a significant extent on public-private networks to achieve the program's public objectives. Third parties, in particular industry groups and consulting firms, were involved in re-distributing federal program information, and, to some extent, in helping clean energy manufacturer's through the application preparation process. But for the most part, the public objective (primarily to create construction and manufacturing jobs) closely aligned with the business interests of the program's targeted beneficiaries (clean energy manufacturers), obliterating the need for more complex relationships between various third parties that would have posed the kind of steering problems that federal managers otherwise encounter in more network-dependent tools and programs.

In addition, the short-term and one-off nature of the program may have discouraged the development of new, or greater use of existing, networks in the field, as did the near

overwhelming demand for the credits. If the program were institutionalized and refined to targeted more specialized manufacturing projects, more of a role for networks in the process might evolve in the future.

Finally, contrasting the experience of the Advanced Energy Manufacturing Tax Credit with those of other kinds of tax credits suggests that it would be inadvisable to generalize about network uses, impacts and implications for federal managers for the tax credit tool at large. While network issues were not apparent in the 48C program, a case could be made that networks play more of a role in the Production Tax Credit, whereby various third parties (clean energy producers and investors) aim to untangle the more complex underlying economic incentives. The New Markets Tax Credit case study of this project likewise provides a view of the role of networks in the tax credit tool that contrasts significantly with the 48C credits.

At a minimum, this suggests that the importance of networks should not be taken for granted either across the broad spectrum of tools available for government action or necessarily across the different variations that may be inherent within any given type of tool. Considerable more work is needed to understand the variables and conditions that trigger network activity in order to provide federal managers with better guidance on how and when to anticipate network issues to arise.