Fiscal Policies Supporting Renewable Energy in the United States: A Brief Survey

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Introduction

Recent renewable energy development in the United States has been motivated by a mix of federal- and state-level fiscal and regulatory policies. These policies are varied and diverse, especially among states, and are not summarized in their entirety here. Instead, the following brief summary focuses on the subset of state and federal policies that have played the largest role in the recent growth of renewable energy use and manufacturing in the United States. The emphasis of this summary is on fiscal policies, though state-level renewable portfolio standards (RPS) are also mentioned due to their importance. Policies that have played prominent roles in the past, but that are no longer primary drivers for growth, are not discussed here; a wide variety of regulatory policies (other than RPS) are also excluded.

In summary, the primary drivers for renewable energy development in the U.S. at the federal level in recent years have included: the Production Tax Credit (PTC), Investment Tax Credit (ITC), the Treasury Grant Program; and accelerated tax depreciation. At the state level, the primary drivers for renewable energy development have included state-level RPS programs as well as a variety of state-level cash incentive programs. In addition to these programs, several other federal and state programs are also summarized here, each of which is intended – in part – to support domestic manufacturing of renewable energy equipment: (1) the federal loan guarantee program; (2) the federal manufacturing tax credit; (3) state and local fiscal incentives to encourage the manufacturing of renewable energy equipment; and (4) federal and state R&D funding.

Federal PTC, ITC, Treasury Grant

As authorized by the Energy Policy Act of 1992 and amended over time, the federal government offers an inflation-adjusted Production Tax Credit (PTC) for power generated by certain types of renewable energy projects, including wind, closed- and open-loop biomass, geothermal, landfill gas, municipal solid waste, qualified hydropower, and marine and hydrokinetic facilities. For wind, closed-loop biomass, and geothermal power, the inflation-adjusted credit stood at 2.2¢/kWh in 2010; the other eligible technologies receive half of the PTC's value (1.1¢/kWh in 2010). Currently, wind projects placed in service before the end of 2012 will be eligible to receive the 10-year PTC, while the other renewable technologies have an additional year to come online (i.e., until the end of 2013). The historical importance of the PTC especially to the U.S. wind power industry is illustrated by the pronounced lulls in wind power capacity additions in the three years (2000, 2002,

and 2004) in which the PTC lapsed, as well as the increased development activity often seen during the year in which the PTC is otherwise scheduled to expire.[1]

The federal government has also provided an Investment Tax Credit (ITC) for certain other types of energy projects, including solar, fuel cells, and small wind projects (all of which are eligible for a credit equal to 30% of the project's qualifying costs), as well as geothermal, microturbines, and combined heat and power projects (all of which are eligible for a credit equal to 10% of the project's qualifying costs). In general, the ITC is currently available to qualified projects that are placed in service prior to the end of 2016, though the geothermal credit has no expiration date, and the solar credit will (unless otherwise extended) revert to 10%, rather than expiring altogether, at the end of 2016. Under the Recovery Act of 2009, however, renewable energy projects eligible to take the federal PTC were also given the (temporary) ability to instead take the ITC, expanding the list of technologies eligible for the ITC, at least on a temporary basis. The ITC has, historically, been especially important for solar energy sector in the United States, and has played a large role in motivating the deployment of both customer-sited and utility-scale solar facilities.

Although these two federal incentives will remain important going forward, in 2009 and 2010, the PTC and ITC were overshadowed by the Section 1603 Treasury cash grant program, enacted as part of the Recovery Act in February 2009. Acknowledging the conspicuous absence of tax equity investors in the market following the financial crisis of late 2008, Section 1603 of the Recovery Act enables qualifying renewable energy projects to elect a 30% cash grant in lieu of the PTC or ITC. Relative to the PTC and ITC, the 30% cash grant can provide a significant amount of value to renewable energy projects, especially given a tight financing environment in which finding investors to take advantage of federal tax incentives has been challenging. Not surprisingly, then, the program has been heavily subscribed, with roughly $5 billion in Section 1603 cash grants awarded since the program's implementation in late-July 2009. As one example, more than 6,400 MW – i.e., more than 64% – of all new wind power capacity installed in the United States in 2009 chose the grant. Eligible projects must begin construction by the end of 2010 to be eligible for the grant, however, at which point incentives will revert back to the PTC and ITC, absent a change in federal law extending the program. In the meantime, it is clear that this program has played a large role in supporting the continued expansion of renewable energy use in the U.S. despite the challenging economic climate of the last two years.[2] Moreover, it is expected that a large number of projects will nominally start construction by the end of 2010 to gain access to this program, only to come online in future years.

None of these programs – PTC, ITC, or Treasury Grant – impose any requirements on or provide any encouragement for the sourcing or manufacturing of the equipment used in renewable energy projects. U.S. and non-U.S. companies, and equipment manufacturing within and outside of the U.S., are all eligible under these programs. There has been some political concern expressed in the U.S. Congress about the Treasury Grant program and its lack of "domestic content" requirement, but no such requirements have been imposed. The only "location" requirement is that the projects themselves must be within the border of the U.S. (i.e., projects cannot be located in Canada and Mexico, even if the renewable electricity is delivered to the United States).

[1] Some of the many benefits and impacts of the PTC for the U.S. wind sector are described in: http://eetd.lbl.gov/EA/EMP/reports/63583.pdf.
[2] See: http://eetd.lbl.gov/EA/EMP/reports/lbnl-3188e.pdf.

Federal Accelerated Tax Depreciation

Accelerated tax depreciation enables many renewable energy project owners to depreciate the majority of their investments over a 5-year period for tax purposes, rather than depreciating those assets over a period that more-closely approximates the lifetime of the equipment. Renewable energy property that has access to a 5-year accelerated depreciation schedule includes: solar, wind, and geothermal. In addition, for certain biomass property, the depreciation period is 7 years. The 5-year schedule for most types of solar, wind, and geothermal property has been in place since 1986. The federal *Economic Stimulus Act of 2008,* enacted in February 2008, included a 50% first-year bonus depreciation provision for eligible renewable-energy systems acquired and placed in service in 2008. This provision was subsequently extended for 2009 and 2010, providing additional financial stimulus to renewable energy projects. Though not as valuable as the federal PTC, ITC, and Treasury Grant program, compared to a 15 or 20 depreciation period, the 5-year schedule effectively provides an incentive for wind power plants that equates to roughly 1¢/kWh. As such, though not a primary driver for renewable energy growth, the importance of the accelerated depreciation is significant, and is sometimes underappreciated. As with the PTC, ITC, and Treasury Grant, this program does not impose any requirements on or provide any encouragement for the sourcing or manufacturing of the equipment used in renewable energy projects.

State Renewables Portfolio Standards[3]

Renewables portfolio standards (RPS) have, within the last decade, emerged as the most popular form of policy supporting the deployment of renewable energy technologies at the state level in the United Sates. Though its design can and does vary, at its heart, an RPS simply requires that retail electricity suppliers purchase a growing quantity of renewable energy over time; most jurisdictions allow trade in renewable energy certificates to increase compliance flexibility and facilitate compliance verification.

Renewables portfolio standards have proliferated at the state level in the U.S. since the late 1990s. As of October 2010, 29 states and the District of Columbia had established binding RPS targets which, when fully implemented, will cover 56% of total U.S. retail electricity sales, requiring that a certain percentage of those sales be met with renewable energy.[4] Although the design and final compliance targets of these policies vary widely, many of the RPS programs require that eligible forms of renewable energy contribute 15-25% of retail sales by 2030.

Of all of the state-level policies in place in the U.S., the RPS is currently proving to be the most important in stimulating large amounts of renewable energy additions, especially when coupled with other complementary policies. Of the more-than 37 GW of non-hydro renewable energy capacity added in the U.S. from 1998 through 2009, roughly 61% (23 GW) occurred in states with an active or impending RPS compliance obligation.[5] In total, existing state RPS policies will require roughly 73 GW of new renewable capacity by 2025, representing roughly

[3] See: http://eetd.lbl.gov/EA/EMP/reports/lbnl-154e-revised.pdf.

[4] At the federal level, the U.S. House of Representatives and Senate have, at different times, each passed versions of a national RPS, although none has thus far been signed into law.

[5] Using a more sophisticated approach, Yin and Powers (2010) find that U.S. state RPS programs have had a statistically significant and positive impact on in-state renewable energy development.

6% of total U.S. retail electricity sales in that year and 30% of projected load growth between 2000 and 2025; if these states increase their renewable energy targets, as many have done in the past, or if additional states were to adopt RPS policies, the collective set of state RPS policies would require an even greater quantity of new renewable energy additions.

Wind power has been the primary resource installed as a result of state RPS policies thus far, representing an estimated 94% of all RPS-driven renewable energy capacity additions in the U.S. from 1998-2009; the remaining 6% consists of biomass, solar, and geothermal. This is because, as a 'market-driven' mechanism, a traditional RPS tends to stimulate investments in lower-cost and lower-risk technologies; higher cost technologies will simply not be chosen during the competitive process. That said, with recent cost reductions in solar, more than 20 GW of utility-scale solar capacity is under development in the U.S., primarily in California and the Southwestern U.S. As such, wind is facing increased competition with solar within traditional state RPS obligations. In addition, state RPS policies are increasingly being (re)designed to specifically support greater resource diversity, with solar energy being the most common target of RPS policy designs aimed at promoting renewable resource diversity. As of October 2010, 14 of the 30 RPS policies contained solar-specific "set asides", while four states had developed distributed generation (DG) set-asides that will likely serve, in large measure, to support solar. These programs effectively require that a portion of the overall RPS target is achieved with eligible solar or DG technologies.

State RPS policies define eligible renewable resources differently, but none have required that renewable energy be sourced from renewable energy equipment manufactured in the United States, or from U.S. companies. Many states have tried to encourage (and, in some cases, require) that new renewable generating plants eligible for the state RPS be located within their state boundaries, thereby ensuring some degree of local job growth and economic development benefits. These policies vary substantially among states and are somewhat controversial; in particular, requiring that renewable energy projects be located within the state in question may run afoul of federal law that dictates free inter-state commerce.

State Cash Incentive Programs[6]

Many states offer cash incentives to renewable energy projects or manufacturing facilities, typically restricted to those located within the state's borders. The most common type of incentive is to offer an up-front rebate or ongoing performance-based payment to customer-sited solar energy facilities. In concert with state net metering programs (which exist in various forms in most U.S. states), such programs have been a primary motivator for customer-sited PV deployment. California, for example, is home to the country's largest solar energy market, in part because of the state's incentive programs for customer-sited PV, which aim to deploy 3000 MW of customer-sited PV by 2016 through performance-based incentives and up-front rebates. Many other states (and utilities) have developed similar, if more modest, efforts. In total, 27 states and DC have various types of cash rebate programs targeted towards customer-sited renewable energy technologies.

In some (limited) situations, somewhat higher incentives have been offered to solar installations that use locally manufactured solar equipment, but such policies are relatively rare. When implemented, these additional incentives have been offered to both U.S. and international companies; the focus has been the location of

[6] See: http://www.cleanenergystates.org/Publications/CESA_2008_CEDatabase_Rpt_June2010.pdf, and http://www.dsireusa.org/.

manufacturing, not the ownership of the company itself. In addition to supporting customer-sited PV through rebates and performance-based incentives, state programs sometimes support customer-sited solar applications through loan and other financing programs, and in other cases support larger-scale renewable energy installations, as well as R&D efforts and in-state renewable energy equipment manufacturing industries.

Program designs, funding sources, and funding levels vary widely among states. However, funding for these programs most-typically comes from a systems-benefit charge: effectively a small fee or surcharge applied to retail electricity sales that is then administered by a state agency, a utility, or a designated third party. As of August 2010, 18 states and Washington D.C. had systems-benefit charges for renewable energy. These charges are expected to collect more-than $7.2 billion for renewable energy through 2017 in aggregate, with fees that are typically well below 1% of retail electricity rates.

The impact of these programs has been greatest for customer-sited solar PV. Focusing on a subset of the programs in 13 states, it has been estimated that $1.9 billion in state funding from 1998-2008 had supported 2,500 MW of new renewable energy capacity. In capacity terms, wind has been the largest recipient of funds, followed by PV and biomass. In terms of actual funding and number of projects, however, PV has been the largest recipient, followed by wind and biomass.

Federal Loan Guarantee Programs[7]

The Recovery Act of 2009 also expanded a loan guarantee program that was originally enacted as part of the *Energy Policy Act of 2005*. Through these programs, the federal government guarantees the debt associated with eligible facilities, lowering the commercial risk of those facilities and increasing the availability of low-cost finance.

The original program, under Section 1703, is targeted at projects that manufacture or utilize innovative clean energy technologies. Specifically, the program authorized the U.S. Department of Energy (DOE) to issue loan guarantees for projects that "avoid, reduce or sequester air pollutants or anthropogenic emissions of greenhouse gases; and employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued." The program has been authorized to offer more than $10 billion in loan guarantees for energy efficiency, renewable energy, and advanced transmission and distribution projects, with the DOE actively promoting projects in three categories: (1) manufacturing projects, (2) stand-alone projects, and (3) large-scale integration projects that may combine multiple eligible renewable energy, energy efficiency and transmission technologies in accordance with a staged development scheme. The program has provided limited loan-based investment support for several solar, wind, and other clean energy manufacturing facilities in the U.S. In July 2009, the U.S. DOE issued a solicitation under this program for projects that employ innovative energy efficiency, renewable energy, and advanced transmission and distribution technologies.

The Recovery Act also created a sister loan guarantee program, called the Section 1705 program, for projects using commercially proven technologies. Specifically, the Recovery Act extended the authority of the DOE to issue loan guarantees and appropriated $6 billion for this program. This total was later trimmed to $2.5 billion.

[7] See: http://www.energy.gov/recovery/lgprogram.htm and http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US48F&re=1&ee=1

Under this program, the DOE may enter into guarantees until September 30, 2011. Eligible projects include renewable energy projects that generate electricity or thermal energy and facilities that manufacture related components, electric power transmission systems, and innovative biofuels projects. Funding for biofuels projects is limited to $500 million. The program may be especially beneficial for larger renewable energy projects that are using more-advanced (and therefore somewhat most risky) technologies, such as solar thermal power (CSP), but do date few commitments of funds have been made. In October 2009, the U.S. DOE issued a solicitation under this program.

Thus far, only a few renewable energy projects have received loan guarantee commitments from either program, so the net effect of these programs on renewable energy development and manufacturing has been modest to date. The programs do not strictly require that eligible projects use equipment manufactured by U.S. companies, and in fact initial loan guarantees have gone to companies from around the world. However, any manufacturing facility supported by a loan guarantee (whether developed by a domestic or international firm) must be located within the United States. In addition, "Buy American" provisions exist to require that the materials used in projects or facilities supported by the loan guarantees are, to the degree possible, sourced within the United States. Specifically, the "Buy American" provision stipulates that funds may not be used for a "project for the construction, alteration, maintenance, or repair of a public building or public work unless all of the iron, steel, and manufactured goods used in the project are produced in the United States." There are, however, a number of provisions that provide exemptions to this requirement under certain circumstances.

Federal Clean Energy Manufacturing Tax Credit[8]

To encourage the growth of green manufacturing jobs in the United States, the Recovery Act of 2009 also created a one-time "advanced energy manufacturing tax credit," which provided a 30% tax credit for investments in new clean energy manufacturing facilities. Specifically, the investment tax credit is equal to 30% of the qualified investment required for an advanced energy project that establishes, re-equips or expands a manufacturing facility that produces any of the following: equipment and/or technologies used to produced energy from the sun, wind, geothermal or "other" renewable resources; fuel cells, microturbines or energy-storage systems for use with electric or hybrid-electric motor vehicles; equipment used to refine or blend renewable fuels; and equipment and/or technologies to produce energy-conservation technologies (including energy-conserving lighting technologies and smart grid technologies).

In determining which projects to fund, the U.S. Treasury Department had to consider those which most likely would be commercially viable, provide the greatest domestic job creation, provide the greatest net reduction of air pollution and/or greenhouse gases, have great potential for technological innovation and commercial deployment, have the lowest levelized cost of generated (or stored) energy *or* the lowest levelized cost of reduction in energy consumption or greenhouse gas emissions, and have the shortest project time.

More than 500 applications seeking in excess of $8 billion in Section 48C credits were submitted by the October 2009 deadline, exceeding the $2.3 billion program cap by more than a 3-to-1 margin. In early January 2010, 183 clean energy manufacturing projects spread across 43 states received credit allocations totaling $2.3 billion. Recipients are under no obligation to proceed with their projects, but in order to realize the credit, they must

[8] See: http://www.energy.gov/recovery/48C.htm.

commission their facilities by February 2013. The program represented a one-time opportunity with a single solicitation, but the Obama administration has sought to extend the program for another year, with an additional $5 billion.

Overall, it is expected that this "on-time" program will play a reasonably significant role in encouraging the establishment of domestic renewable energy manufacturing facilities in the U.S., though it is also true that the program in many cases may simply be helping to fund manufacturing facilities that had previously already been planned. The program was not restricted to U.S. companies, and in fact, a large fraction of the awardees are international companies that plan to establish manufacturing facilities in the United States, supported in part by the tax credit.

State and Local Fiscal Incentives for Manufacturing[9]

In addition to those programs described above, states, countries, and cities often also develop varied incentives to try to recruit and lure clean energy manufacturing facilities. Often, manufacturers will negotiate with multiple states and communities in order to seek out the most attractive package of incentives when deciding where to locate. Of course, a variety of other factors are also considered when establishing manufacturing facility locations, and it remains somewhat unclear how important these state and local incentives are, relative to other business factors. As noted by Lantz et al. (2010), "The current distribution of renewable energy equipment manufacturers in the U.S. suggests that state recruitment strategies are most successful when they are a part of a robust, broad-based, economic development strategy. Such strategies often rely on existing resources and economic development programs to develop and maintain a skilled workforce, ensure adequate transportation infrastructure, attract a diverse set of potential raw material and component suppliers, and generally reduce the cost of manufacturing operations. However, successful recruitment strategies also include financial and economic incentive packages that are competitive with those offered in other states and in line with public value of a new manufacturing facility. Under some circumstances, geography and transportation costs may place specific states at a distinct advantage. In addition, some manufacturers seek out large renewable energy markets and states with progressive renewable energy policies."

The actual incentives used by states and communities vary widely, and are not always "standard" incentive packages, but are instead frequently individually negotiated. A 2009 analysis of state programs revealed 19 states that had a total of 26 programs specific to attracting renewable energy companies. Tax credits against corporate income and property levies are the most popular programs, but there are tax exemptions, abatements, and reductions as well. Several states offer grants and loans (including loan guarantees).[10] There are no publicly available data on the absolute magnitude of these incentives in the U.S., however, nor any regularly published information on their form and prevalence.

Federal and State Research and Development Funding[11]

The U.S. federal government and, to a lesser extent, a number of state governments, have for decades helped support renewable energy R&D, including funding national laboratories and private firms. Such activities at the

[9] See: http://www.nrel.gov/docs/fy10osti/46672.pdf.
[10] http://www.areadevelopment.com/taxesIncentives/Nov09/renewable-energy-state-incentives-chart0011.shtml.
[11] http://www1.eere.energy.gov/ba/pba/pdfs/fy10_budget_brief.pdf.

federal level increased substantially, on a temporary basis, with funding received through the 2009 Recovery Act, with funds disbursed primarily by the DOE for a wide variety of purposes.[12] To provide a sense for current, ongoing funding levels, in 2011, the funding request for the DOE's renewable energy R&D activities included: Solar Energy ($320.0 million requested), Wind Energy ($75.0 million requested), Water Power ($30.0 million requested), and Geothermal Technology ($50.0 million requested). In 2009, $240 million of DOE funding was specifically dedicated towards renewable energy R&D.

DOE R&D funding has, for many years, played a significant role in developing the scientific, engineering, and application-based understanding needed to ensure that the U.S. renewable energy industries remain on the cutting edge of innovation. Some states have also developing long-standing R&D programs for renewable energy, including New York and California, often focused on trying to develop their states into a renewable energy innovation and manufacturing hubs. Again, funding has typically included public and private sector R&D efforts, with some recent emphasis on private funding given the significant maturity and scale-up in multiple renewable energy sectors.

[12] http://www1.eere.energy.gov/recovery/.