

Berkeley Lab and the Clean Energy States Alliance

CASE STUDIES OF STATE SUPPORT FOR RENEWABLE ENERGY

Exploring the Economic Value of EPAct 2005's PV Tax Credits

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Introduction

The market for grid-connected photovoltaics (PV) in the US has grown dramatically in recent years, driven in large part by PV grant or “buy-down” programs in California, New Jersey, and many other states. The recent announcement of a new 11-year, \$3.2 billion PV program in California suggests that state policy will continue to drive even faster growth over the next decade. Federal policy has also played a role, primarily by providing commercial PV systems access to tax benefits, including accelerated depreciation (5-year MACRS schedule) and a business energy investment tax credit (ITC).

Since the signing of the Energy Policy Act of 2005 (EPAct) on August 8, the federal government has begun to play a much more significant role in supporting both commercial *and* residential PV systems. Specifically, EPAct increased the federal ITC for commercial PV systems from 10% to 30% of system costs, and also created a new 30% ITC (capped at \$2000) for residential solar systems. Both changes went into effect on

January 1, 2006, for an initial period of two years, and in late 2006 were extended for an additional year. Unless extended further, the new residential ITC will expire, and the 30% commercial ITC will revert back to 10%, on January 1, 2009.

How much economic value do these new and expanded federal tax credits really provide to PV system purchasers? And what implications might they hold for state/utility PV grant programs? Using a generic (i.e., non-state-specific) cash flow model, this report explores these questions.¹ We begin with a discussion of the taxability of PV grants and their interaction with federal credits, as this issue significantly affects the analysis that follows. We then calculate the incremental value of EPAct's new

¹ For an application of this model, and the concepts included in this report, to California, see Ryan Wisser and Mark Bolinger, “Federal Tax Incentives for PV: Potential Implications for Program Design”

http://eetd.lbl.gov/ea/emp/reports/Wisser_Bolinger_CPUC_PV_Tax_03_2006.pdf

and expanded credits for PV systems of different sizes, and owned by different types of entities. We conclude with a discussion of potential implications for purchasers of PV systems, as well as for administrators of state/utility PV programs.

Taxation of State Grants and Interaction with Federal Tax Credits

Perhaps surprisingly, whether or not the Internal Revenue Service (IRS) considers grants made by state/utility PV programs to be taxable income is a critical factor in determining the value of the new and expanded tax credits under EPAct.² This is because, at least for the foreseeable future, most PV systems in the US are likely to be installed with the financial support of a state/utility PV program. If the grants provided by these programs are considered to be taxable income, then a grant recipient can claim the federal ITC (and depreciation if a commercial system) on the full cost or “basis” of the system. If, however, the grants are *not* considered to be taxable income, then the grant recipient must reduce, by the amount of the grant, the basis to which the federal ITC (and depreciation) apply.³ As a result, the taxable or non-taxable status of the grant carries significant federal tax consequences. PV grants frequently buy-down

as much as 50% of installed system costs. If non-taxable, such grants will *cut in half* not only the value of the federal ITC, but also the tax benefits of depreciation (for commercial systems). The economic impact is not trivial. For example, under the assumptions described later, our cash flow model reveals that a residential PV system garners the same value (in terms of net present value of after-tax cash flows) from a \$2.7/W non-taxable grant as it does from a \$4/W taxable grant; conversely, it would take a non-taxable grant of \$5.8/W to provide a commercial system with the same after-tax value as a \$4/W taxable grant.

This example demonstrates not only the magnitude of the impact, but also its disparate effect on residential and commercial PV systems. Because of the \$2000 federal ITC cap for residential systems (which will be binding for all but the smallest systems) and the absence of depreciation benefits, residential systems are better off financially with a non-taxable, rather than taxable, grant. The opposite is true for commercial systems, which are better off paying income tax on the grant, and then applying the uncapped ITC and accelerated depreciation to the full basis of the project.

Given the degree of economic impact at stake, whether or not PV grants are taxable is clearly an important question.⁴ Unfortunately, the IRS has provided limited direct guidance on this issue. Section 61 of the Internal Revenue Code generally defines gross (taxable) income to mean income derived from any source, except as otherwise provided in statute. The IRS broadly interprets this definition to treat government grants as taxable income unless statutorily excluded from taxation.

Though this suggests that PV grants should generally be considered taxable, four possible grounds for exclusion from taxable income

² For earlier work on this topic, see Susan Gouchoe, Lynne Gillette, Christy Herig, 2004. “Are Solar Rebates and Grants for Homeowners and Businesses Taxable?” ASES SOLAR 2004 Proceedings. http://www.dsireusa.org/documents/PolicyPublications/Taxability_ASES_2004.pdf

³ See the conference report to the Crude Oil Windfall Profits Tax Act of 1980, which states that “under present law...if property is financed with nontaxable government grants, the tax basis in the property, for such purposes as depreciation and investment credits (including energy investment credits), is reduced to the extent that the property is financed with such grants.” It goes on to explain that “grants which are taxable are not taken into account under these [credit offset] rules because their taxation serves as a partial offset; similarly, credits against State and local income taxes are not taken into account because the deductibility of these taxes under the Federal income tax implies that the effect of these credits is equivalent to the effect of a taxable grant.”

⁴ Though a useful and otherwise thorough reference document, the March 2006 Solar Energy Industries Association’s (SEIA) “Guide to Federal Tax Incentives for Solar Energy (Version 1.1)” does not directly address this question. For more information, see <http://www.seia.org/manualdownload.php>.

might be explored. Specifically, a PV grant would be considered non-taxable if it were found to be one of the following: (1) a government social welfare payment; (2) a manufacturer or dealer rebate of the purchase price; (3) a contribution to the capital of a corporation; or (4) a utility energy conservation subsidy. Below we discuss each of these possibilities in turn, focusing in particular on what appears to be the most relevant potential exclusion – the possibility that a PV grant might qualify as a utility energy conservation subsidy.⁵

Government Social Welfare Payments: While broadly defining taxable income to cover government grants, the IRS as a matter of public policy has created an exclusion for government welfare payments to individuals. In order to be non-taxable, however, such payments must be based on the recipient's *established need*. Since few if any PV programs require grant recipients to establish need, this exclusion is not particularly applicable (one possible exception might be PV grants offered specifically to low-income households).

Manufacturer or Dealer Rebate of the Purchase Price: Certain reductions in the purchase price of an asset may be considered non-taxable. In Technical Advice Memorandum 8924002, the IRS reviewed its past revenue rulings and concluded that “in order for the receipt of funds to be considered a non-taxable price rebate that reduces the basis of an item of property, several features must be present: (1) the rebate must be based on the purchase price of the item; (2) the manufacturer or dealer of the item must be the party offering the rebate; and (3) the recipient must be able to negotiate or renegotiate the purchase price in an arms-length transaction. ...therefore, a [non-taxable] rebate is treated as a reimbursement of the purchase price and not an accession to wealth.”

Most PV programs fail to meet at least the first two requirements for this price rebate exclusion. Specifically, most programs base their grants on

⁵ The tax analysis that follows does not take into account, and may not be applicable to, third-party-owned PV systems.

the size of the system (e.g., \$/W), rather than on its purchase price. Furthermore, while in some instances state PV programs do provide grants to system retailers or installers, who in turn pass them through to system owners in the form of a reduced purchase price, in substance the grant is from the PV program (the retailer or installer would not have reduced the purchase price without having received the grant) and therefore the price rebate exclusion is not likely to apply.⁶

Contribution to the Capital of a Corporation: Section 118 of the Internal Revenue Code excludes from taxable income contributions to the capital of a corporation. This exclusion applies to money transferred to a corporation (but not other types of businesses, such as LLCs or partnerships) by a government unit in order to obtain an advantage for the general community, rather than for direct services or recompense. Moreover, the contribution must, among other things: (1) become a permanent part of the recipient's working capital and not be used for paying dividends, interest, or anything else chargeable to or payable out of earnings or income; (2) be employed in or contribute to the production of additional income to the recipient; and (3) be bargained for by the recipient.⁷

⁶ It is also worth noting that taxation cannot be avoided by providing grants to retailers or installers, rather than system owners. As shown later in this section (in the discussion of the Section 136 exclusion), the IRS has clearly held that any tax liability (or exclusion from tax liability) associated with a grant rests with the intended recipient (in this case, the system owner), and cannot be shifted to the retailer, installer, or any other third party. Thus, in the event that retailers do pass through taxable grants to PV system purchasers, both parties are obligated to pay income tax on the grant amount (and the system purchaser must also increase the basis of the system to its full, undiscounted value). Though at first blush this may seem like double taxation, it is no different from the more straightforward case in which the grant goes to the system purchaser, who pays income tax on the grant (but does not reduce basis) and provides the retailer with taxable revenue equivalent to the full, undiscounted cost of the system.

⁷ General Counsel Memorandum 37354 (December 21, 1977); Private Letter Ruling 9401035 (October 14, 1993); *Edwards v. Cuba Railroad Co* (268 U.S. 628, 1925); *Detroit Edison Co.* (319 U.S. 98, 1943);

Since, in most cases, a PV grant recipient does not “bargain” for the grant,⁸ and is not obligated to use the grant in the manner specified above, this exclusion might be difficult to justify. Furthermore, given that corporations (as well as other commercial entities) are better off with a *taxable* PV grant, it is unclear why a corporation would ever even try to make the case that PV grants should qualify for the Section 118 exclusion from taxation. Instead, a more conservative (and, incidentally, lucrative) approach would be to simply assume that grants are taxable – which, after all, is the default position taken by the IRS under Section 61 (unless otherwise provided in statute).

Since we have heard anecdotally, however, that at least some (or perhaps even many) corporations in California have, in fact, treated PV grants as contributions to capital, we allow for this possibility in the analysis presented later in this paper.

Utility Energy Conservation Subsidy: Since 1991, Section 136 of the Internal Revenue Code has treated certain utility energy conservation subsidies as non-taxable income. Specifically, Section 136(a) states that “Gross income shall not include the value of any subsidy provided (directly or indirectly) by a public utility to a customer for the purchase or installation of any energy conservation measure.” Section 136(c)(1) defines the term “energy conservation measure” to mean “any installation or modification primarily designed to reduce consumption of electricity or natural gas or to improve the management of energy demand with respect to a dwelling unit.” This definition

U.S. v. Chicago, Burlington & Quincy Railroad (412 U.S. 401, 1973)

⁸ This bargaining requirement would, if taken literally, appear to be difficult to satisfy in the case of most government grants. Revenue Ruling 93-16 (1993-1 Cumulative Bulletin 26), however, addressed this requirement with respect to FAA grants to airport owners. In that ruling, the IRS deemed the grants to be “bargained for” because they were “competitive, highly sought after, and made pursuant to meaningful criteria and conditions” (Kimberly S. Blanchard, “The Taxability of Capital Subsidies and Other Targeted Incentives,” *Tax Notes*, November 8, 1999).

covers some solar energy systems, including PV systems.⁹

A key question relating to this exclusion is exactly what is meant by “provided (directly or indirectly) by a public utility.” Section 136(c)(2)(b) defines the term “public utility” to mean “a person engaged in the sale of electricity or natural gas to residential, commercial, or industrial customers for use by such customers. For purposes of the preceding sentence, the term “person” includes the Federal Government, a State or local government or any political subdivision thereof, or any instrumentality of any of the foregoing.” Clearly, the administrators of most PV programs in the US (excepting those administered by utilities) are not “engaged in the sale of electricity,” and so do not *directly* qualify as a public utility.

But might such programs be considered to *indirectly* provide energy conservation subsidies from a public utility? In many instances, state renewable energy funds (the non-utility administrators of most PV programs in the US) are financed by utilities or their ratepayers, thereby raising the possibility that they are, in fact, *indirectly* providing energy conservation subsidies from a public utility. The conference report to the Energy Policy Act of 1992, however, indicates that Congress inserted the “directly or indirectly” phrasing in Section 136

⁹ Section 210(11) of the National Energy Conservation Policy Act of 1978 (Public Law 95-619) defines “residential energy conservation measures” to include “devices to utilize solar energy or windpower for any residential energy conservation purpose, including heating of water, space heating and cooling...that are warranted by the manufacturer to meet a specified level of performance over a period of not less than three years.” The Energy Policy Act of 1992, which first implemented Section 136 of the tax code, appears to have adopted this definition (at least according to the conference report – the specific adoption or definition does not appear to be codified in the Act or in Section 136 of the code). Finally, the IRS recently found (through a private letter ruling) that the Energy Trust of Oregon’s cash incentives for PV systems do qualify for the Section 136 exclusion, and therefore that PV is an eligible “energy conservation measure.”

to prevent third party contractors (e.g., equipment vendors, such as PV retailers or installers) from taking advantage of the Section 136 exclusion. Specifically, it states:

"...the conferees believe that third party contractors should not be at a competitive advantage or disadvantage with respect to the tax benefits provided by the exclusion. In addition, the conferees believe that when a utility provides a payment to a third party contractor, the utility is indirectly providing the subsidy to the person for whom the contractor is providing the energy conservation measure and the exclusion should apply to such person. Thus, the conference agreement provides that the exclusion applies to any subsidy provided directly or indirectly to a utility customer, if such subsidy otherwise would be included in income. For example, if a public utility provides a subsidy to a customer to partially offset the cost of the installation of an energy conservation measure on the customer's premises, the provision [Section 136] applies to exclude [from taxable income] all or a portion of the value of such subsidy. Likewise, if the public utility provides a payment to an independent contractor so that the contractor can provide for the installation of an energy conservation measure on the utility customer's premises at a reduced price, the [Section 136] exclusion applies to the customer for the indirect subsidy supplied to the customer." [Emphasis added.]

In other words, the conference report discusses the "direct or indirect" subsidy only in the context of independent contractors – e.g., equipment vendors that might otherwise gain "a competitive advantage" if provided access to the exclusion. It does not directly touch on the broader issues of program administration or governmental subsidies.

Earlier IRS revenue and private letter rulings – though on a different statutory provision – do address these broader issues, and in some cases could be interpreted as indicating that the *source* of a program's funds would characterize the program.¹⁰ Subsequently in Private Letter Ruling 853004 (April 30, 1985), however, the IRS indicated that a subsidy administered by a governmental unit would be treated as a government program *whatever the funding source*, suggesting that utility-funded, government-administered programs would not qualify for the Section 136 exclusion. Furthermore, the congressional report on the subsequent enactment of the Section 136 exclusion for utility energy conservation subsidies contains no express repudiation of the IRS' previous position on government subsidies. One might, therefore, expect the IRS to stick to its position taken in Private Letter Ruling 853004 that characterizes a government-administered program as a government program, regardless of the funding source.

Nevertheless, some uncertainty remains over the scope of the exclusion provided under Section 136 as it relates to state PV programs. Specifically, some of the rulings cited above – which, it should be noted, concerned credits and statutory provisions somewhat different from those of interest here – conflict with one another, and only address this issue peripherally (i.e., in commentary not necessary to the legal holding of the case). Furthermore, these rulings distinguish primarily between utility- and government-administered programs, raising the question of how the IRS might characterize programs funded by utilities (or their ratepayers) but administered by *non-utility, non-governmental* entities (e.g., non-profit administrators, such as the Energy Trust of Oregon or the Sustainable Development Fund in southeastern Pennsylvania).

New insight on this question arrived in January 2007, when the IRS found (in a private letter

¹⁰ See Revenue Ruling 81-52 (1981-1 Cumulative Bulletin 9); Revenue Ruling 83-145 (1983-2 Cumulative Bulletin 14); and Private Letter Ruling 8342047 (July 18, 1983).

ruling) that the Energy Trust of Oregon's residential PV incentives do qualify for the Section 136 exclusion from gross income. The ruling seems to rest on the Energy Trust – a 501(c)(3) non-profit – being a *non-governmental* entity that *indirectly* provides the utility-funded (i.e., ratepayer-funded) subsidy. In aggregate, payments made by the Energy Trust to residential customers of a particular utility do not exceed funds collected from that utility, thereby helping to substantiate the program as a utility program that benefits that utility's customers.

With respect to the “directly or indirectly” question, the Oregon ruling simply states that “The legislative history of [Section 136] clarifies that the subsidy need not be provided directly by the public utility to the customer, and that the exclusion [from gross income] applies to the customer to whom a subsidy may be indirectly provided by the utility.” This statement seems to indicate a broader IRS interpretation of the conference report to the Energy Policy Act of 1992 than previously presented in this report. That is, it seems to indicate that the IRS *does not* consider the “directly or indirectly” language to refer only to third-party contractors or equipment vendors who might otherwise benefit (in lieu of the utility's customers) from the Section 136 exclusion. Without further textual clarity, however, a definitive interpretation of the IRS's position on this issue is not possible.¹¹

¹¹ In arguing its case with respect to this “directly or indirectly” issue, the Energy Trust stressed the following: that it is a tax-exempt non-profit entity that was created specifically for the purpose of administering the utilities' conservation and renewable energy programs; that it does so through contractual and “fiduciary-like” relationships with the utilities; that its programs have replaced those previously offered by the utilities; and that it has brought a new-found predictability and stability to conservation and renewable energy programs, thereby benefiting the state of Oregon as well as ratepayers of the participating utilities. It is not clear which, if any, of these arguments influenced the IRS's conclusion that the Energy Trust *indirectly* provides the subsidy on behalf of the utilities.

In short, the IRS rulings to date on Section 136 suggest that otherwise-qualifying subsidy payments provided under a utility-administered program *will* qualify for the exclusion; those provided under a government-administered program likely *will not* qualify for the exclusion (regardless of the funding source);¹² and those administered by a non-profit *might* qualify if the program can be characterized as a utility program. Given, however, a degree of lingering uncertainty, and that private letter rulings may not be used or cited as precedent, individual PV programs seeking clarity on this issue may wish to consult directly with the IRS.

Summary: In summary, though it is difficult to generalize, given the highly factual nature of the law surrounding this issue, it appears that grants made to commercial PV systems will, in most cases, likely not qualify for any of the four exclusions discussed above, and will therefore be considered taxable grants that do not reduce the project's basis to which the federal ITC and depreciation applies. The one potential (though perhaps unlikely) exception would be if PV grants to corporations were determined by the IRS to be contributions to capital under Section 118, in which case corporations – but not other types of businesses, such as partnerships or LLCs – would need to exclude the grants from gross income, and reduce the project's tax basis by the amount of the grant. The taxability of grants made to residential PV systems will vary based on whether those grants are administered (either directly or indirectly) as a utility program under Section 136, with some uncertainty as to

¹² The recent Oregon private letter ruling clouds the issue with respect to governmental administrators. Previous IRS rulings (discussed earlier) suggested that a government-administered program would never be considered a utility program, and therefore would not qualify for the Section 136 exclusion. The recent Oregon private letter ruling, however, suggests that the IRS will, in some cases, allow utility programs that are not administered by a utility to qualify for the exclusion. Hence, it follows that if a governmental administrator can make a strong case that it is administering a utility program, it is possible that the IRS might find the program eligible for the Section 136 exclusion.

what exactly constitutes a “utility” program.¹³ To reflect this outstanding uncertainty, our analysis below allows for the possibility of either taxable or non-taxable grants to both residential and commercial systems.

Analysis

To examine the potential value of EAct’s new and expanded PV tax credits, we developed a cash flow model of a PV system in a generic state that offers a buy-down grant (either taxable or non-taxable) of \$4/W.¹⁴ Our approach was to determine how much this \$4/W grant could be reduced, given EAct’s new or expanded PV tax credits, such that the PV system purchaser would remain indifferent (between pre- and post-EAct conditions) in terms of the net present value of after-tax cash flows. The size of the reduction can be thought of not only as the maximum amount by which a PV program could reduce the size of its grants without causing the after-tax economics of PV to deteriorate (relative to pre-EAct conditions), but also as the maximum value of the EAct credits, on a grant-equivalent, \$/W basis.

The resulting values for systems sized between 1 and 20 kW are shown in Figure 1. For 1 kW residential systems, the new EAct ITC provides the same value as a non-taxable grant of \$1.9/W (or a taxable grant of \$2.7/W).¹⁵ This value, however, drops precipitously to around \$0.5/W non-taxable (or \$0.7/W taxable) for 4 kW systems, and to \$0.2/W non-taxable (or \$0.3 taxable) at 10 kW. This decay in value as system size increases is due to the \$2000 cap on the credit, which contributes an increasingly smaller proportion of total costs as system size increases. Because the 30% commercial ITC is not similarly capped, its value (relative to the 10% ITC available previously) remains fairly constant across different system sizes (even much larger system sizes than shown – e.g., 250 kW), equivalent to a taxable grant of just over \$2.00/W (or non-taxable grant of just over \$1.50/W). Finally, EAct’s PV tax credits provide no value to tax-exempt entities, to those subject to the alternative minimum tax, or to entities with no tax liability for other reasons.

¹³ Section 136 does not apply to commercial systems, and so cannot be used to argue for tax-exempt treatment of grants to such systems. Though Section 136 originally included – with limitations – commercial energy conservation measures as well, these were ultimately stripped out by the Small Business Job Protection Act of 1996.

¹⁴ Other assumptions include: a cash-financed system with a 25-year project life; some economies of scale in installed costs (\$10/W at 1 kW, \$9/W at 2 kW, \$8.5/W at 6 kW, and \$8.2/W at 20 kW, with linear interpolation between these points); 15.4% capacity factor (i.e., 1350 kWh/kW/year); \$0.12/kWh avoided electricity cost, escalating at 3%/year (treated as taxable income for commercial, but not residential, systems); no state tax credits; state depreciation follows federal (i.e., 5-year MACRS); federal ITC reduces basis for federal depreciation by half of the ITC (i.e., 15%); federal ITC does not reduce basis for state depreciation; tax brackets of 28% (federal residential), 34% (federal commercial), and 8% (state residential and commercial); \$4/W grant is either taxable or non-taxable at both the federal and state level; state income tax payments are deductible from federal income; and a 7% nominal discount rate.

¹⁵ The fact that the *taxable* grant-equivalent value is higher than the *non-taxable* grant-equivalent value should not be interpreted to mean that a residential system owner is better off with a taxable grant; indeed, as described earlier at the beginning of the tax analysis section, the opposite is true. Instead, this taxable/non-taxable differential is due to the fact that a taxable grant represents pre-tax income, whereas a non-taxable grant represents after-tax income. Reducing the size of a taxable grant (e.g., in response to EAct) reduces the recipient’s tax liability without impacting the value of the EAct credit; this reduction in tax liability, in turn, allows a further reduction in grant size (a positive feedback) relative to a non-taxable grant.

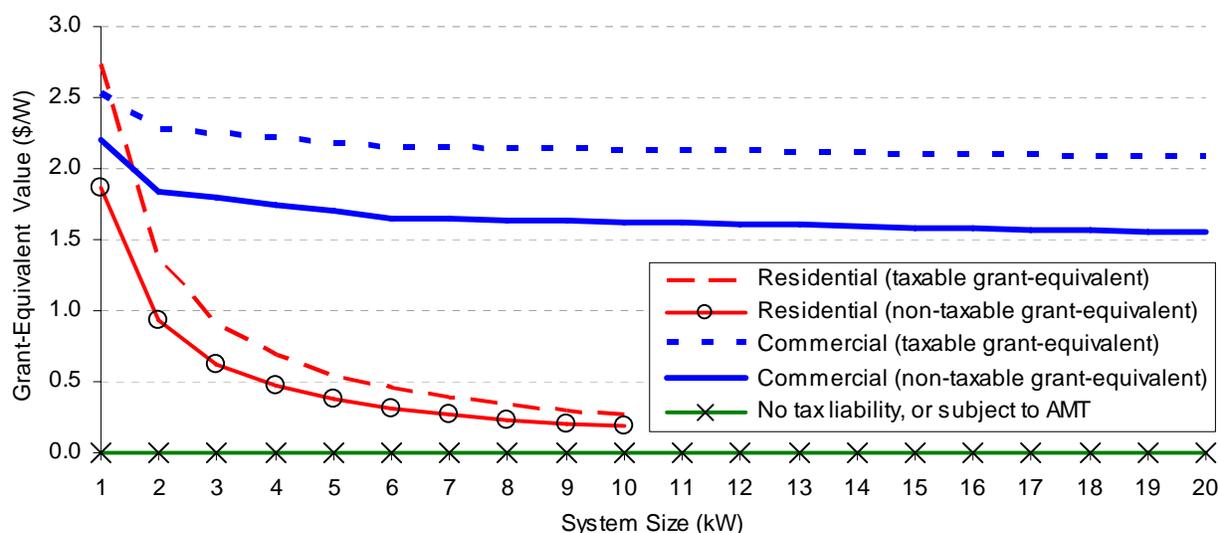


Figure 1. Incremental Value of EPAct PV Tax Credits

Interestingly, with the exception of non-taxable commercial grants, our results are not dependent on our baseline assumption of a \$4/W grant (vs. a \$2/W grant, for example). In the case of a taxable grant, the size of the grant is immaterial (at least for this purpose), as it does not reduce the project's basis, and therefore does not impact the incremental value of the ITC or depreciation. In the case of a residential non-taxable grant, the ITC is almost always (except for the smallest systems) capped at \$2000 – even after reducing the project's basis by the grant amount – so again the size of the grant that we have assumed is, for the most part, immaterial to our results. Commercial non-taxable grants, however, *will* impact the size of the uncapped ITC, meaning that our results for this special (though perhaps unlikely) case will vary depending on the grant size assumed.

Discussion

Results of the analysis presented above hold important implications for both PV system purchasers and administrators of PV programs.

For PV system purchasers, it is clear from Figure 1 that the economic value of EPAct's new and expanded tax credits is strongly dependent on system size as well as the type and

tax status of the system owner. Commercial PV system owners with tax liability will benefit greatly from the expanded ITC, as will owners of small residential systems from the new residential ITC. On the other hand, larger residential systems and systems owned by entities with limited or no tax liability (e.g., municipalities, non-profits) will gain little from the EPAct credits. These differences will no doubt affect the nature of consumer demand for PV while the credits are in effect: home-owners may demand smaller PV systems, while larger entities with limited or no tax liability may increasingly choose third-party ownership to indirectly capture the benefits of these new credits.

At the same time, EPAct's credits may not ultimately be worth as much as the *maximum* values presented in Figure 1,¹⁶ because PV programs could (and in some cases have done so) reclaim some or all of EPAct's value (while

¹⁶ It should be emphasized that the analysis presented in this paper is generic (i.e., not state-specific), and that outcomes will differ in individual states that offer state tax incentives, or present other complexities. State-specific analysis is required to determine the true value of EPAct tax credits under any specific PV program. Footnote 1, for example, provides a citation for analysis conducted specifically for California's PV program administrators.

still leaving system purchasers no worse off than before EAct) by reducing the size of grants offered. Reducing grant size can help to stretch program budgets over a larger number of PV installations, without unduly suppressing growth in the market. Furthermore, by targeting any reductions at those specific system sizes and types that stand to benefit the most from EAct – e.g., commercial and small residential systems – program administrators may help to level the playing field and ensure that EAct does not favor certain market segments (e.g., commercial and small residential systems) while disadvantaging others (e.g., tax-exempt and large residential systems).

Reducing grant size – even in a targeted fashion – by the maximum amounts represented in Figure 1, however, may not be ideal for a number of reasons. Worldwide demand for solar modules and the increase in the cost of silicon feedstock have pushed PV module costs higher in recent years. Program administrators may wish to let the new and expanded federal credits offset this price increase, and perhaps even go a bit further to boost return on investment and thereby stimulate additional demand for PV. Furthermore, EAct's tax credits may not be perceived by consumers to be as valuable as a grant that reduces up-front cash outlays. Finally, unless extended, EAct's new and expanded PV tax credits will expire at the end of 2008.

In part as a result of these factors, the Solar Energy Industries Association (SEIA) has recommended that any reduction in rebate levels not exceed 50% of the estimated value of the Federal ITC.¹⁷ To date, several PV programs, including those in New Jersey, Oregon, and Wisconsin, have reduced their grant levels in

¹⁷ In addition, SEIA recommends that the total program budget be maintained (i.e., so that the program is able to support a greater number PV systems at the reduced grant level), that any reductions in grant size be made in such a way as to not degrade the economics for any customer class (i.e., use differentiated incentives), and that changes be made in a transparent and forward-looking fashion.

response to EAct's new and expanded federal credits. For the most part, these reductions have been relatively modest (except perhaps with respect to larger residential systems) in comparison to the maximum incremental value of the EAct credits presented in Figure 1.

Our findings also have important implications for policy design, and the type of incentive offered. Specifically, many PV programs (including California's new \$3.2 billion, 11-year solar initiative) are considering shifting (or have shifted) from capacity-based incentives (i.e., the \$/W grants described in this paper) to performance-based incentives (i.e., \$/kWh payments over time), at least in part based on the belief that capacity-based incentives reduce the project's basis to which federal tax credits and depreciation apply, making them less valuable than performance-based incentives, which do not reduce basis. As shown in this report, however, capacity-based incentives will only reduce tax basis if they are non-taxable, which in many cases appears unlikely (particularly for commercial systems) given the tax analysis presented above. As such, though there may be good reasons for shifting to performance-based incentives, maximizing the value of federal tax credits may not be among them.

Finally, the fact that residential system owners benefit most from non-taxable grants (while commercial owners prefer taxable grants) has implications for PV program administration. Where possible, *new* PV incentive programs for residential customers would ideally be administered in a way so that non-taxable grants can be provided (e.g., by utilities or non-profits that fall under the Section 136 exclusion). Within existing programs, administrators may want to seek clarification from the IRS – perhaps using arguments that capitalize on some of the uncertainties presented in this report – that their residential (but not commercial) incentives are non-taxable.

ABOUT THIS CASE STUDY SERIES

A number of U.S. states have established clean energy funds to support renewable and clean forms of electricity production. This represents a new trend towards aggressive state support for clean energy, but few efforts have been made to report and share the early experiences of these funds.

This paper is part of a series of clean energy fund case studies prepared by Lawrence Berkeley National Laboratory and the Clean Energy States Alliance. The primary purpose of this case study series is to report on the innovative programs and administrative practices of state (and some international) clean energy funds, to highlight additional sources of information, and to identify contacts. Our hope is that these case studies will be useful for clean energy funds and other stakeholders that are interested in learning about the pioneering renewable energy efforts of newly established clean energy funds. To access or download all the case studies, see: <http://eetd.lbl.gov/ea/ems/cases/> or <http://www.cleanenergystates.org/>

ABOUT THE CLEAN ENERGY STATES ALLIANCE

The Clean Energy States Alliance (CESA) is a non-profit initiative funded by members and foundations to support the state clean energy funds. CESA collects and disseminates information and analysis, conducts original research, and helps to coordinate activities of the state funds. The main purpose of CESA is to help states increase the quality and quantity of clean energy investments and to expand the clean energy market. The Clean Energy Group manages CESA, while Berkeley Lab provides CESA with analytic support.

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