PART 4:

# Understanding Incentives

# SOLAR ELECTRIC INVESTMENT ANALYSIS

Eric Romich • Milton Geiger • Benjamin S. Rashford

PHOTO: ERIC ROMICH

THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

B-1291.4
August 2016

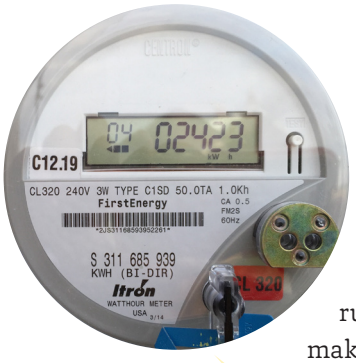
# SOLAR ELECTRIC INVESTMENT ANALYSIS PART 4: UNDERSTANDING INCENTIVES

By Eric Romich, Milton Geiger, and Benjamin S. Rashford



Solar Electric Investment Analysis is a peer-reviewed publication.
Original available at: www.wyoextension.org/agpubs/pubs/B-1291-4.pdf

Suggested acknowledgment: Geiger, Milton; Eric Romich, Benjamin S. Rashford. Solar Electric Investment Analysis. Part 4: Understanding Incentives. B-1291.4. 2016.




# Introduction

Photovoltaic (PV) panels are an increasingly common sight on urban rooftops and rural properties across the U.S. The declining cost of equipment and installation makes installing a behind-the-electric-meter (net metered) solar electric system enticing for many homeowners, businesses, non-profits, and agricultural producers. Evaluating the financial prudence of an investment in solar requires careful consideration of installation costs, the value of production, and operation and maintenance costs.

Unfortunately, some installers are not forthcoming with information necessary to make fully informed investment decisions. Third-party ownership structures, such as leases, further increase the challenge of understanding the viability of an investment. This six-part series distills the information collection and decision process into six parts:

- **Part 1: Estimating System Production** – Site-specific factors can influence the amount of electricity produced by a PV installation.
- **Part 2: Assessing System Cost** – From initial costs to incentives to ongoing insurance expense, the present and expected costs dominate the decision to install a PV system.
- **Part 3: Forecasting the Value of Electricity** – Utility and governmental policies affect how much electricity is worth. Not all electrons are created equal.
- **Part 4: Understanding Incentives** – Federal, state, and local incentives can greatly affect the financial viability of a PV installation.
- **Part 5: Conducting a Financial Analysis** – Accurately evaluating the viability of a PV system requires understanding financial concepts, such as simple payback, net present value, and the levelized cost of energy. Preferences for risk, environmental attributes, and independence also inform these measures of viability.
- **Part 6: PV Solar Example** – The importance of accurate evaluation is clear when applied to a hypothetical project.

***What about small wind, solar thermal, ground source heat pumps, and other renewable energy sources?***

Solar electric is now the dominant type of distributed renewable energy system, but other renewable energy technologies, such as small wind, solar thermal, micro-hydropower, ground source heat pumps, and efficiency upgrades, require similar scrutiny. Systems that provide thermal energy, as opposed to electricity, have less regulatory and policy considerations, but the analysis framework is the same.

We highlight in each part critical questions you must ask yourself and your installer. You will be empowered in the ultimate goal of making an informed decision about whether PV is right for you.

# Understanding Incentives

Developing a PV solar project requires significant upfront capital investments. To help foster the development of PV solar projects, government agencies and utilities offer numerous incentives, such as tax credits, deductions, net metering, grants, and rebates to offset the initial investment. Incentive programs vary widely based upon location (state and utility) and project ownership. For example, businesses and residences are eligible for different incentives. Similarly, folks in Wyoming are eligible for different incentives than those in Ohio. This bulletin helps navigate the all-important incentive landscape as of February 2016. Considering these incentives can maximize the financial return from a PV investment.

## WHAT ARE THE IMPORTANT INCENTIVES?

Despite rapidly declining costs for PV solar, incentives are still important to the cost-effectiveness of a project. Incentives come from four primary sources – federal, state and local government, and utility companies. Each has different reasons for providing incentives, from fostering the growth of energy independence and environmental responsibility (federal), to reducing individual energy costs and demand (state and utility), but all believe renewable energy and energy efficiency merit financial support. Incentives typically target specific sectors, so different incentives exist for residences, businesses, and agricultural producers. For example, a bonus depreciation program serves as an incentive for businesses to invest in PV solar, allowing them to depreciate the value of the project assets over multiple years to reduce taxable income. However, this program provides no benefit to a residential system owner. While the focus of this bulletin is on incentives for agricultural operations, many of the concepts also apply to residential systems. Table 1 details the most significant renewable energy incentives for agricultural operations. The table may seem daunting, but the benefit of harnessing available incentives makes understanding it worthwhile.

### KEY RESIDENTIAL INCENTIVES

Although local or utility programs may exist, the key incentives for residential applications are:

- Residential Renewable Energy Tax Credit (RRETC)
- Net metering policies

The 30 percent RRETC is similar to tax credits for businesses described below.

bit.ly/2bbSqi9 • Jon Callas

| Name | Description | Eligible Technologies | Expiration Date |
|---|---|---|---|
| Business Investment Tax Credit | 30% or 10% tax credit (no limit) | Solar (electric and thermal), small wind – 30%<br>Combined heat/power and geothermal heat pumps – 10% | 12/31/2021 (reduces to 10% in subsequent years) |
| Modified Accelerated Cost-Recovery System (MACRS) | 5-year depreciation schedule | Solar (thermal and electric), geothermal heat pumps, and wind | N/A |
| Net Metering | Allows many RE systems to receive the full retail rate for production up to total consumption and pays avoided cost for excess production | All renewable energy technologies that generate electricity | N/A |
| Renewable Energy Credits | Generated from a qualifying renewable energy system. One megawatt-hour of electricity is equal to one renewable energy credit. | May vary by state; however, most include all renewable energy technologies | N/A – Variable based on state policy |
| USDA - Rural Energy for America Program (REAP) Grants | 25% grant available only to rural small businesses (currently all areas except Cheyenne and Casper); loan guarantees also available | All renewable energy sources | N/A – Variable program funding |

**1 – Business and Agriculture Incentives for Small-scale Renewable Energy Projects**

## FEDERAL BUSINESS ENERGY INVESTMENT TAX CREDIT (ITC)

Originally established in the Energy Policy Act of 2005, the Federal Business Energy Investment Tax Credit (ITC) is one of the most significant renewable energy incentives. Further defined by the Energy Improvement and Extension Act of 2008, the ITC program was scheduled for elimination or drastic reductions after December 31, 2016; however, passage of an omnibus budget bill (Consolidated Appropriations Act) extended these credits for certain renewable energy systems. This extension is exciting news for agricultural operations and businesses planning to install a renewable energy system. The federal ITC program offers system owners a dollar-for-dollar tax credit for eligible (construction and equipment) project costs toward their federal tax liability. For PV solar systems, the tax credit amount is currently set at 30 percent of the eligible project cost and will gradually decrease to 10 percent as shown in Table 2.

Table 2: The Federal Business Energy Investment Tax Credit (ITC) Schedule for Photovoltaic Solar

| | |
|---|---|
| 12/31/2016 | 30% |
| 12/31/2017 | 30% |
| 12/31/2018 | 30% |
| 12/31/2019 | 30% |
| 12/31/2020 | 26% |
| 12/31/2021 | 22% |
| 12/31/2022 | 10% |
| Future Years | 10% |

To accurately assess a project proposal, investors need to determine if cash incentives are subject to federal or state income tax. In most cases, grants are taxable income that must be reported on a income tax return. In general, if you pay taxes on the incentive, you are not required to reduce the basis for calculating the ITC; however, the incentive may not be taxable, in which case you should reduce the net system cost by the amount of the incentive before calculating the ITC.

For additional information, download the Department of the Treasury Internal Revenue Service (IRS) Form 3468 instructions at www.irs.gov/pub/irs-pdf/i3468.pdf.

## DEPRECIATION

Much like investments in other types of equipment, investments in a PV solar system can be depreciated to reduce taxable income. A qualifying PV solar system installed on a farm or business is eligible to depreciate the value of the project assets using the Modified Accelerated Cost Recovery System (MACRS) deduction method over a five-year recovery period. The MACRS deduction method also includes special renewable energy system bonus depreciation. Bonus depreciation is an additional amount that is allowed to be deducted in the year that the asset was placed in service. Equipment put in service before January 1, 2018, can qualify for 50 percent bonus depreciation. Equipment placed in service during 2018 can qualify for 40 percent bonus depreciation, while equipment put in service during 2019 can qualify for 30 percent bonus depreciation.

For equipment that claims a tax credit, the owner must reduce the project's depreciable basis by one-half the value of the ITC. For example, if a system owner claims the 30 percent investment tax credit on a PV solar project, the same project will reduce the depreciable portion of the project assets by 15 percent (half of the total tax credit), allowing the owner to depreciate 85 percent of the project. Table 3 provides an example of how to depreciate a PV solar project that costs $31,000 and claimed a 30% ITC, with zero bonus depreciation, using the MACRS method.

Table 3: PV Solar Project Depreciation Example Using the Modified Accelerated Cost Recovery System (MACRS) Method

| Year | Depreciation Rate[1] | | Depreciable Basis for the System[2] | | Depreciation Amount |
|---|---|---|---|---|---|
| 1 | 20.00% | * | $26,350 | = | $5,270 |
| 2 | 32.00% | * | $26,350 | = | $8,432 |
| 3 | 19.20% | * | $26,350 | = | $5,059 |
| 4 | 11.52% | * | $26,350 | = | $3,036 |
| 5 | 11.52% | * | $26,350 | = | $3,036 |
| 6 | 5.76% | * | $26,350 | = | $1,518 |

[1] Using 5-year recovery period from MACRS Percentage Table Guide Table A1 from IRS Publication 946 (2014).

[2] If you claim the 30% ITC, you must reduce the depreciable portion of the system by 1/2 the tax credit (e.g. $31,000 * .85 = $26,350).

State depreciation schedules may vary, and tax laws are continually undergoing changes. Discuss your project with a qualified tax professional to identify potential alternative depreciation options.

## NET METERING

Much like grants or tax credits, net metering policies promote the development of distributed (on-site) renewable energy systems. Net metering programs vary by state and utility, yet most follow a similar process. In general, electricity produced by a renewable energy system may be used by the home or business load or flow to the utility's distribution system to service other loads. Each electric bill will indicate the net amount of electricity for that billing period (electricity used – electricity produced). If there is net excess generation the utility will apply a credit (kWh or dollar) to the electric bill to offset charges in future months. Each State and Utility may differ in how this credit is applied. In states without net metering the same thing happens yet federal rules for distributed renewable generation are applied.

Most net metering agreements have a true-up period at the end of the year when credits are settled at a predetermined rate between the utility and the system owner. Regulations may restrict some net metering policies to a particular type of electric generation system. Common technologies included

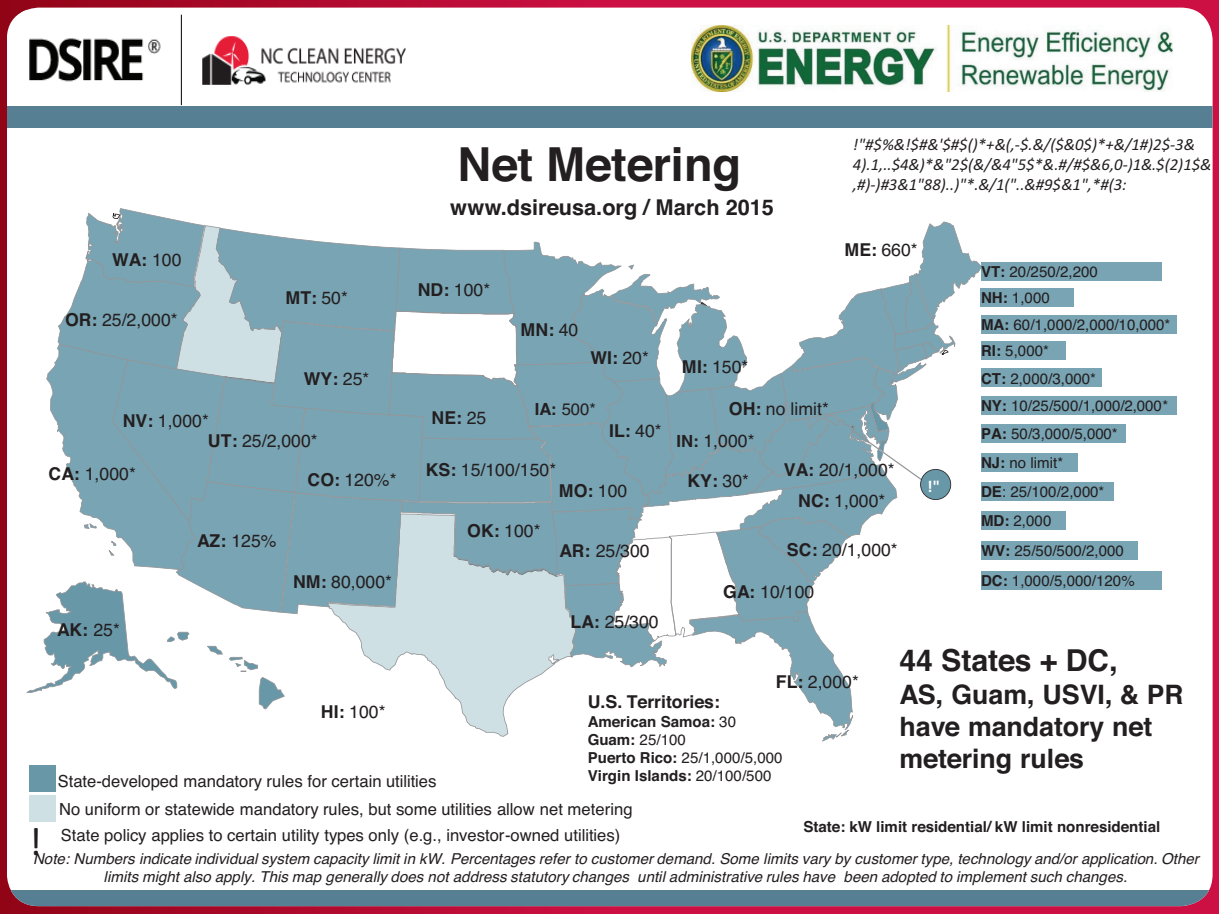



**Figure 1: Net Metering Net Excess Generation Credits (Source: www.dsireusa.org)**

in net metering programs are solar, wind, geothermal, hydroelectric, anaerobic digesters, municipal solid waste, landfill gas, fuel cells, and tidal and wave energy. As shown in Figure 1, most states have established capacity limits within their net metering rules to restrict the size of distributed energy system. Specific capacity limits often differ by states, utilities, customer type, and technology.

As described earlier, net metering provides system owners a credit for excess generation; however, there are different compensation rates for net excess generation. For example, the net metering program in Wyoming typically includes a billing arrangement that applies a kWh credit to a customer's next bill for net excess generation and resolves any balance annually at the seasonal avoided-cost rate. The avoided cost is the cost to an electric utility to procure (or generate) the same amount of energy acquired from another source. This approach allows renewable energy system owners who produce their own electricity to receive the full retail rate for production up to total consumption and pays avoided cost for excess production.

In comparison, the compensation for net excess generation in Ohio is much different. In Ohio, net metering agreements with investor-owned utilities will apply credits for net excess generation to the customer's monthly bill at the unbundled wholesale generation rate, and system owners may request payment for any balance annually. In this example, net metering credits are limited to kWh charges only and will not reimburse system owners for distribution services, transmission services, demand meter fees, or other fixed monthly charges. In other words, even if a PV solar system generates all of

the electricity for a farm, there could still be additional monthly charges remaining on the electric bill. To ensure the accuracy of a financial analysis, identify any costs that will remain and exclude them from the calculation of the electricity savings in a PV solar proposal.

Feed-in tariffs are not as common as net metering agreements, yet several states do have feed-in tariff programs. In general, for eligible PV solar systems, a feed-in tariff establishes a fixed price for the electricity a system generates. Simply put, a feed-in tariff compensates at a predetermined amount (normally above market rate) for all of the electricity from a PV solar system, and the PV system owner continues to purchase electricity from the utility based on its rate structure.

## RENEWABLE ENERGY CREDITS

State-driven policy programs designed to nurture the development of renewable energy projects include renewable portfolio standards, alternative energy portfolio standards, or renewable energy goals. While the details of various renewable energy policies differ, these policies generally require specified utilities or electric services companies to generate a percentage of electricity from renewable energy sources. Renewable energy certificates (RECs) help monitor the generation of electricity from qualifying renewable energy facilities and represent the environmental attributes of renewable energy. Based on production, every time a qualifying renewable energy system generates a megawatt-hour of electricity, the system also creates a REC. Some policies have a specific carve-out for solar, where a Solar Renewable Energy Credit (SREC) is electricity generated by a PV solar energy system. To comply with the policy requirements, utilities or electric service companies can purchase RECs from other renewable energy systems.

The sale of SRECs can generate significant income for PV system owners that can help offset the high upfront installation cost. There are different ways a system owner can sell their SRECs. For example, the owner may choose to directly manage the sale of their SRECs, enter into an SREC agreement with an aggregator or broker, or sell the SRECs directly to the system developer. Some PV solar proposals will try to oversimplify the transaction of SRECs by calling it a discount, rebate, payment, allowance, or refund. Regardless of names, the value of these agreements is significant, and the contract terms can extend for 20 years or more. There has also been ongoing debate related to the taxation of income from SREC sales. Consult a qualified tax professional to determine how to treat SREC proceeds for your project. Additional information on renewable energy credits is available at www3.epa.gov/greenpower/gpmarket/rec.htm.

## GRANTS

There are also some direct cash incentives available for renewable energy projects, such as federal, state, or utility grants. One important incentive program for renewable energy and energy efficiency projects is the USDA Rural Development Rural Energy for America Program (REAP), which helps agricultural producers and rural small for-profit businesses reduce energy costs and energy consumption. REAP provides grants for up to 25 percent of total eligible project costs not to exceed $500,000 and loan guarantees on loans up to 75 percent of total eligible project costs. If the grant and loan program are used together, the total may not exceed 75 percent of the project. The competitive application process does not guarantee funding. Future awards for the USDA REAP program are subject to annual appropriation levels.

Some installers or developers make assumptions and include competitive grants as a key component of their proposals. If a developer includes a grant in a proposal, investors should request details of the funding program and make sure they understand how the grant assumptions influence the proposal.

The Database of State Incentives for Renewables and Efficiency (www.dsireusa.org) website, created by the Department of Energy and North Carolina State University Solar Center, provides a comprehensive list of renewable energy incentives and policies that can be filtered by location, technology, and sector (e.g., you can filter incentive programs for a commercial PV solar project in Ohio).

As with any financial matter, consulting a qualified tax professional to ensure eligibility for tax incentives and grants is strongly encouraged. Please contact a local extension educator if you have additional questions.