INCENTIVES FOR ROOFTOP RESIDENTIAL SOLAR PV

Pro-Solar. Pro-Grid. Pro-Consumer.

Solar energy technology has the power to change the face of modern electricity generation dramatically. From rooftop to community to large-scale projects, consumers across the country are realizing the awesome potential that solar brings to them in the form of clean, affordable, and reliable energy. To ensure that solar energy technology thrives, and that consumers are able to access it, federal, state, county, and even local governments have created incentives to encourage solar technology.

Accordingly, Consumer Energy Alliance (CEA) commissioned Borlick Associates to provide a report that describes and quantifies the amount of incentives consumers have access to in various states across the country. From California to Massachusetts, and from Maine to Arizona, this comprehensive view of solar incentives should help lawmakers, policymakers, regulators, utilities, and consumers at the federal, state, and local level make informed policy, legal, and investment decisions based on the most current information available to ensure the proliferation of solar technology, the continued efficiency of a robust electric grid, and increased access to clean, affordable, and reliable energy sources for all American consumers.

EXECUTIVE SUMMARY

To stimulate renewable energy development, governments at the local, state and federal level have provided a myriad of incentives for residential electricity customers who install solar panels on their roofs, some of which overlap. The combined effect of these incentives is quite significant – particularly in light of the dramatic decline in the cost of solar panels that has recently occurred.

This report aims to inform policymakers by quantifying the total incentives as a percentage of the installed cost of a typical residential solar facility located in each of 15 states, including: Arizona, California, Connecticut, Florida, Georgia, Illinois, Louisiana, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, Nevada, and North Carolina. These states were selected to capture diversity in location, state-level incentive policies, retail tariff designs, and wholesale electricity prices. Accordingly, this report focuses on the following:

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Nature of the Incentives

While a number of financial incentives exist for rooftop residential solar PV users, this report explores the four most prominent and significant types of incentives:

- Incentives provided to residential customers who own solar PV facilities, through tax credits and monetary payments from federal and state governmental entities and electric utilities,
- Incentives provided through state "net energy metering" (NEM) policies,
- Incentives provided to third party owners (TPOs) of residential rooftop solar PV facilities that either lease them or sell the energy they produce to their residential customers through long-term contracts,
- Incentives provided through Renewable Energy Certificates (RECs) that can be sold.

Direct Incentives

This is all residential customers that own solar PV receive the Residential Energy Efficiency Property Credit (REEPC), which is a federal tax credit equal to 30 percent of the solar PV facility's installed cost. In addition to the REEPC, many customers receive one or more of the following incentives:

- State income tax credits and/or deductions,
- State and/or local sales and/or property tax exemptions,
- State renewable energy payments,
- State Public Utility Commission (PUC)-approved incentives provided by the utilities they regulate.

In some states, owners of residential solar PV also receive incentives from their local governmental entities. To simplify the analyses, this report excludes these incentives.

Net Energy Metering (NEM) Incentives

In 44 states and the District of Columbia, residential customers with solar PV can participate in NEM programs offered by their respective electric utilities. These programs bill the customer for the net amount of electricity consumed, i.e., what the customer consumes less the amount the customer produces onsite. Any excess energy produced flows back to the utility and the customer receives a bill credit that is applied to future bills. In effect, the utility purchases all of the customer's solar energy at the energy prices in the customer's retail tariff, which almost always exceed the utility's avoided costs. This report defines the NEM incentive as the present value of the customer's bill savings derived from the NEM program, less the present value of the costs the utility avoids due to the customer's onsite generation, over the 25-year expected economic life of the solar facility.

Third Party Ownership Incentives

Recently, a new business model has emerged - the third party ownership model - where a business entity owns the solar PV system installed on a homeowners' rooftop and either leases the system to the homeowner or sells the energy it produces to the homeowner through a long-term contract. This arrangement creates additional incentives because the third party owner (TPO) depreciates the solar facility as a business asset over just 5 years. In addition, the TPO bases the depreciation deductions and the federal ITC on the facility's fair market value (FMV), which is higher than the installed cost.

Renewable Energy Certificates

A renewable energy certificate (REC) is a property right created for the owner of a renewable resource when it produces one MWh of energy that is certified and reported to one of nine regional tracking systems. RECs created by solar facilities are a special subset often referred to as "Solar Renewable Energy Certificates (SRECs)." RECs have monetary value primarily because the electricity suppliers serving retail customers in 29 states and the District of Columbia must acquire them in order to comply with the renewable portfolio standards (RPS) adopted by these political jurisdictions. Owners of rooftop solar facilities can sell their RECs into one or more regional markets at the prevailing market prices. In addition, in some states, the owners can sell their RECs directly to their host utilities through PUC-mandated programs that pay above-market prices.

Estimates of Incentive Values

Figure 1 illustrates the installed cost and incentives available for a typical nominal 4 KW-dc residential solar PV facility. The incentives shown are simple averages of the 15 state-specific results obtained for residential customers served under their respective utilities' standard tariffs. For comparison, it also presents the installed cost and incentives available for a third party-owned 4 KW-dc residential solar PV facility and by an equivalent amount of capacity from a typical, large-scale fixed-tilt solar PV facility.

As Figure 1 shows, the installed cost of an equivalent amount of utility-scale solar PV capacity (also reported by SEIA for Q1-2015) is about half that of the residential solar PV facility. It also reveals that large-scale solar PV facilities receive incentives (all from the federal government) equal to only about 58 percent of installed cost. Because a solar PV facility's initial investment essentially determines the resource cost of the electricity it produces, large-scale solar PV produces electricity at a much lower resource cost than residential solar PV.

Figures 2 and 2A present the state-by-state incentive estimates for customer-owned residential solar PV in each of the 15 selected states. The incentives to customer-owned residential solar PV in 8 of the 15 states cover more than the customer's cost of installing the facilities. An additional 7 states provide incentives that cover more than three-quarters of the installed cost of the solar PV facilities.

Conclusions

Based on the various incentives and certificates at the federal, state, and local levels offered to solar PV rooftop users, this report will demonstrate the following conclusions to provide a foundation and context for policymakers to make well-reasoned and informed decisions regarding solar policy within their jurisdiction.

Existing Incentives For Residential Solar PV Are Significant

The combined effect of the incentives in many states collectively exceeds the total cost of installing a solar PV facility – particularly for third party-owned facilities.

Third Party-Owned Solar PV Facilities Receive Significant Incentives

When a customer leases a solar PV facility or purchases its energy output through a long-term contract, the TPO receives the federal ITC and 5-year accelerated depreciation, significantly enhanced by basing them on the fair market value of the facility, rather than its installed cost.

Existing Incentives May Change the Economics of Future Investments in Solar

The non-incentivized cost of producing a kWh of energy with residential solar PV is much higher than the non-incentivized cost of producing a kWh of energy with a large-scale solar PV; consequently, incentivizing residential solar PV may not be the economically efficient way to increase solar penetration.

The NEM Incentive Shifts Costs onto Less Affluent Customers

Net metering programs, which pay residential PV solar customers high rates for their excess electricity production, shift fixed utility infrastructure costs onto non-solar customers, who a number of reports show are typically less affluent than customers with solar PV.

Incentives For Residential Solar PV Vary Widely Among The States

The total incentives for customer-owned residential solar PV facilities vary significantly among the states. Four factors create these disparities: (1) different state direct and REC incentives for residential solar energy, (2) different residential retail tariff designs, (3) different avoided utility costs and, (4) (for third party-owned facilities) different contract pricing strategies. Still, on a dollar per-kW basis, even the smallest package of total incentives far exceeds the incentives provided to large-scale solar PV projects.

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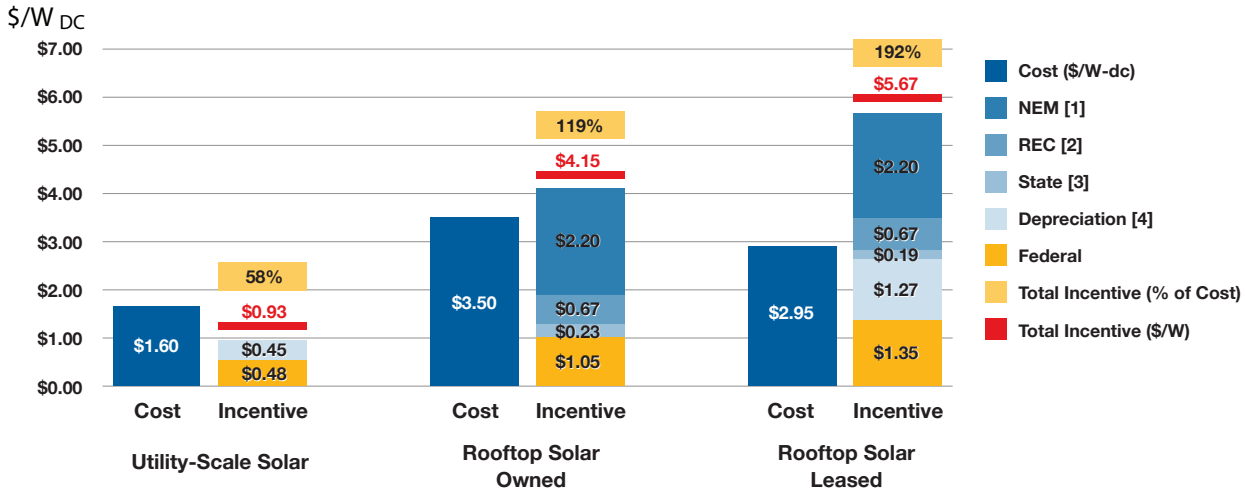
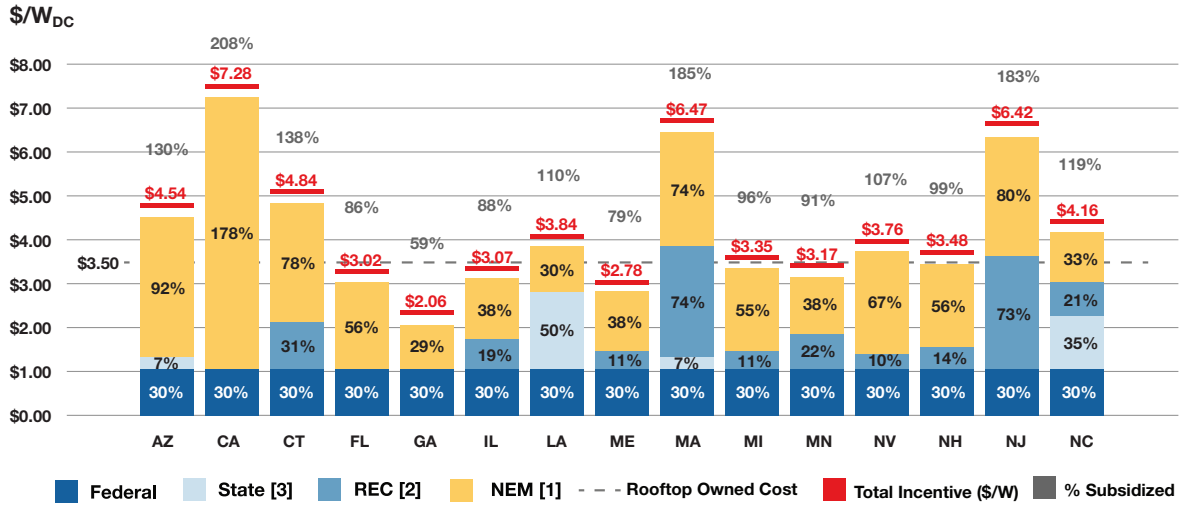
Figure 1. Incentives Available for a 3.9 kW-dc Residential Solar PV Facility and an Equivalent Amount of Utility-scale Solar PV Capacity ($/W$_{DC}$)



1. NEM incentive is the difference between the present values of the customer's bill savings and the utility's avoided costs over the facility's life. For Rooftop Leased, the incentive flows to the homeowner and is largely passed through to the Third-Party Owner as a lease or PPA payment.
2. Renewable Energy Certificates / Credits are incentives available through applicable programs.
3. Incentives mandated by state legislatures are upfront and/or performance-based compensation, often through the state tax code.
4. Depreciation is based on renewable-specific 5-year MACRS.

Figure 2. Incentives Available for Customer-Owned Residential Solar PV in Selected States, as a Percentage of Installed Cost (3.9 kW)



1. NEM incentive is the difference between the present values of the customer's bill savings and the utility's avoided costs over the facility's life. For the typical lease, the incentive flows to the homeowner and is largely passed through to the Third-Party Owner as a lease or PPA payment.
2. Renewable Energy Certificates are incentives available through applicable programs.
3. Incentives mandated by state legislatures are upfront and/or performance-based compensation, often through the state tax code.

Figure 2A. Incentives Available for Customer-Owned Residential Solar PV in Selected States, as a Percentage of Installed Cost (6 kW)

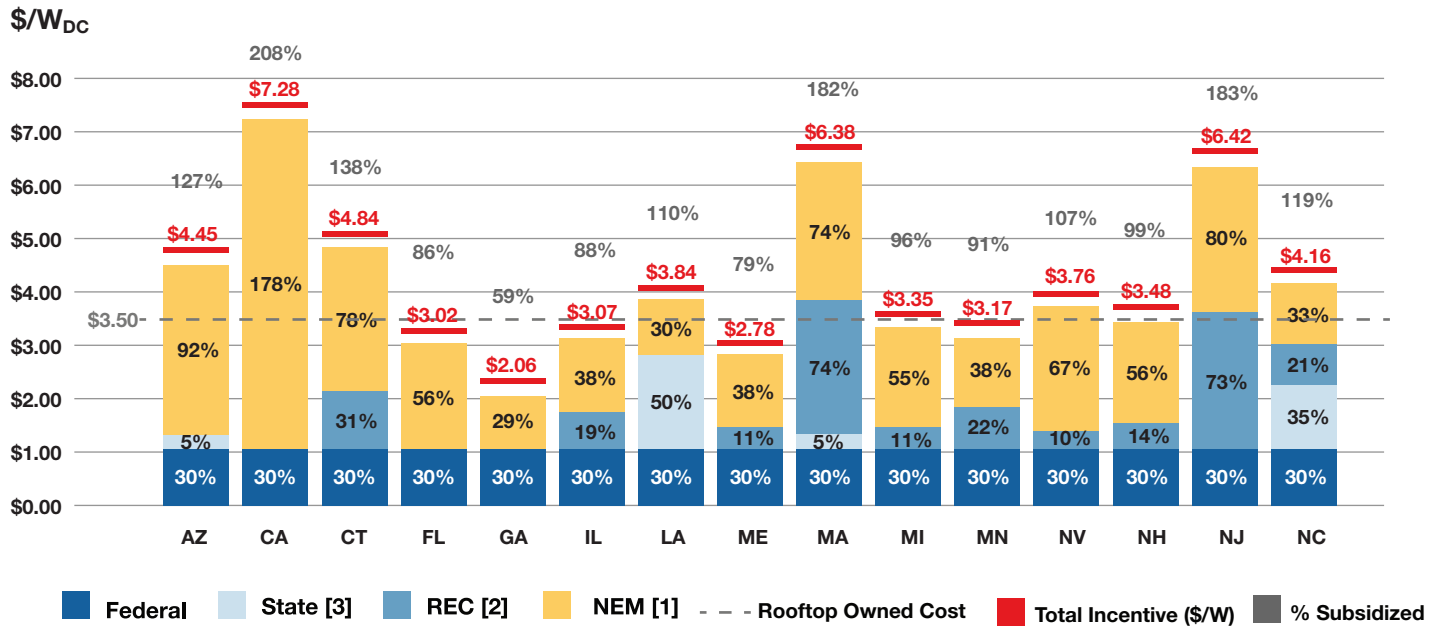


Figure 3. Total Incentive ($) for Typical Rooftop Owned System (3.9kW)

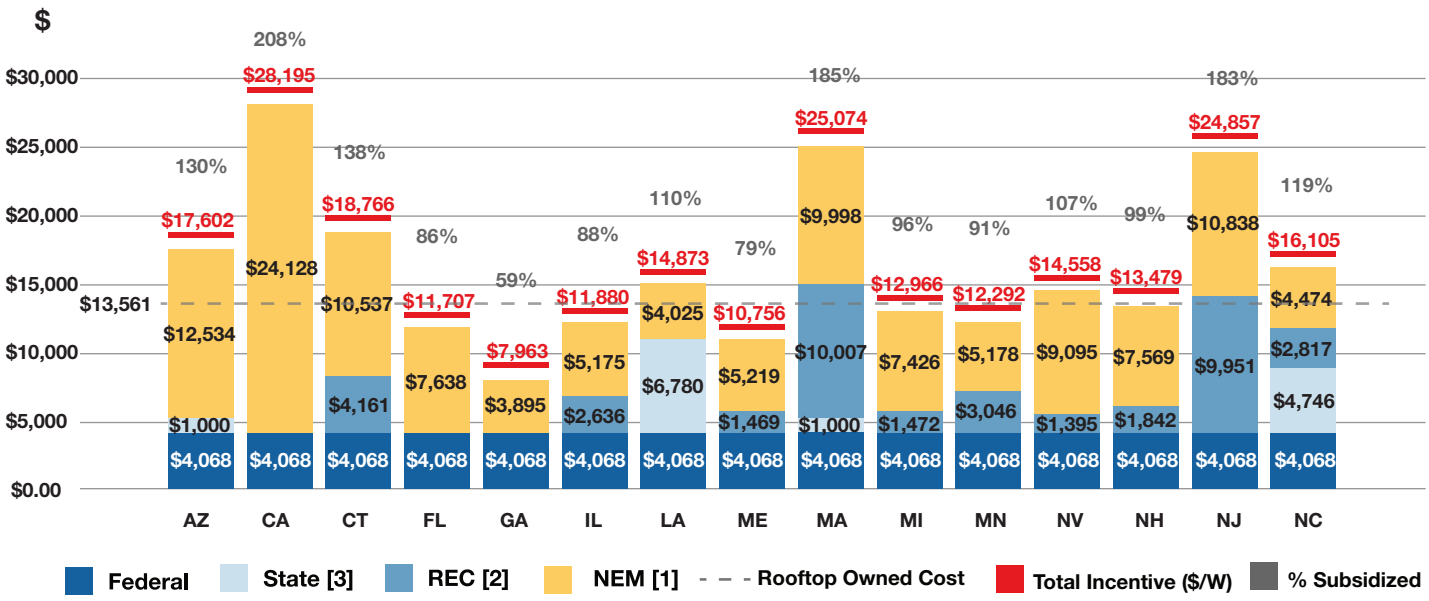


Figure 3A. Total Incentive ($) for Typical Rooftop Owned System (6kW)