WHAT'S BEHIND YOUR SREC?

As Solar Renewable Energy Certificate programs grow, from $100,000s to $100,000,000s, how can we as an industry provide confidence to utilities and their ratepayers in the generation behind SRECs?

Solar Renewable Energy Certificates (SRECs) provide solar industry stakeholders an essential source of financing. But as the impact to ratepayers grows, from $100,000s to $100,000,000s, how can we as industry provide confidence to utilities and their ratepayers in the generation behind SRECs? Program implementers may lack the resources needed to undertake an exhaustive evaluation; however, as the SREC market continues to grow ensuring confidence in the energy and environmental impacts is critical to continuing support.

As the designated **Independent Third Party Meter Reader** for Solar Renewable Energy Certificates (SRECs) generated under the Massachusetts Renewable Portfolio Standard, the **Massachusetts Clean Energy Center** (**MassCEC**) engages in quality assurance to ensure the accuracy of SRECs reported to the **New England Power Pool Generation Information System** (NEPOOL GIS).

Working together, MassCEC and **Cadmus** initiated a program to verify and evaluate SRECs through statistical analysis and on site audits of Solar Photovoltaic (PV) systems participating in **Massachusetts' Renewable Portfolio Standard Solar Carve-out Program**. The end goal of this project is to provide participants in the market for SRECs the information they need to have ***confidence in the value of SRECs.***

Massachusetts Renewable Portfolio Standard Solar Carve-out Program

A market-based incentive program to support residential, commercial, public, and nonprofit entities in developing 400 MW of solar PV across the Commonwealth. Participants must have a capacity of 6 MW DC or less; be located in the Commonwealth; use some generation on-site; and be operational as of January 1, 2008, or later.

Renewable Energy Production Tracking System (PTS)

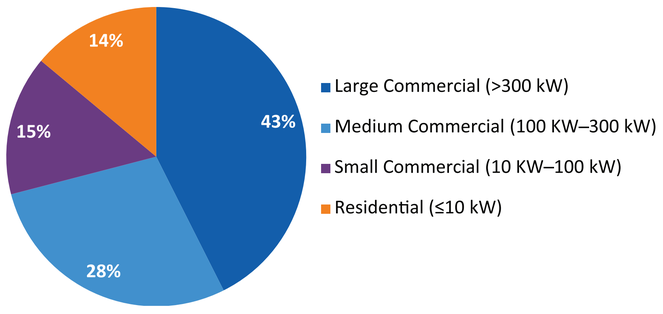
Used to track monthly reports of energy generation for participating systems, each quarter PTS data is reported to NEPOOL GIS and converted into SRECs. To confirm the accuracy of these production reports, MassCEC staff review the data and perform a statistical analysis to identify outliers. System representatives are also contacted to resolve discrepancies. Audits are conducted to confirm accuracy of reports, provide assistance, and verify the requirements of the Solar Carve-out Program are met.

METHODS

Energy generated by systems identified for audit should comprise a significant portion of the total energy reported to the PTS for the purpose of claiming SRECs.

We estimated nearly 50% of the energy used to claim SRECs originated at systems with an installed capacity greater than 300 kW, or 2% of all SREC-eligible systems as of June, 2012.

As additional systems have qualified for the Solar Carve-out Program, this trend has continued, with more than 60% of energy generation attributed to large-scale solar facilities in 2013.



The effort should be representative of all participating systems, including medium and small commercial and residential systems.

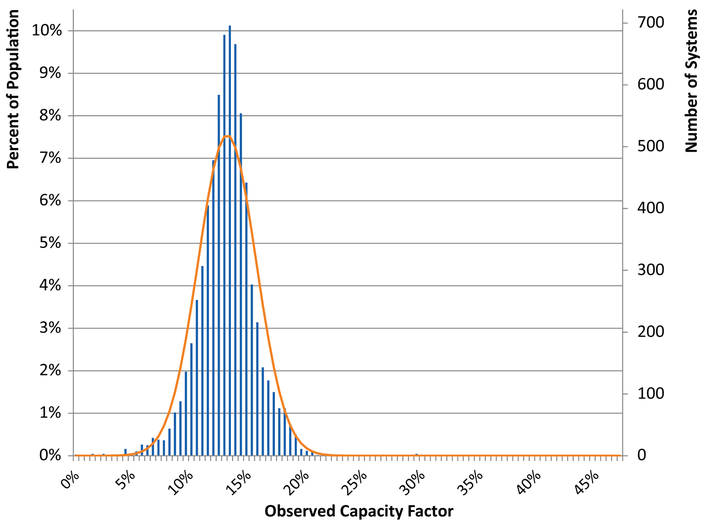
Using a stratified random sampling method, we identified **medium** (100 to 300 kW), **small** (10 to 100 kW), and **residential** (≤ 10 kW) systems, which represent 98% of all SREC-eligible systems, for audit. Analyzing PTS data, we derived a coefficient of variation (CV) for each category. Since the CVs were relatively low, we anticipated a high precision could be attained with a comparatively small number of audits.

	SREC Systems[1]	Audits	Estimated Confidence and Precision	Coefficient of Variance
Medium Commercial	104	21	90/10	16%
Small Commercial	311	12	90/10	11%
Residential	1,962	25	90/10	15%
Total	**2,377**	**58**		

[1] *As of June, 2012*

Audit should be conducted when energy reported to the PTS indicates obvious discrepancies.

Systems reporting unexpectedly high or low energy generation, intermittently or continuously, warranted an audit when MassCEC's monthly quality assurance review was unable to resolve the issue(s). An approach used to identify outliers was to calculate a mean and standard deviation for the **ratio of generation** (kWh to capacity (kW-DC). The results commonly followed a normal distribution pattern, and generation reports outside two standard deviations were identified for further review.



Verification Audits

During verification audits, we confirmed system components and configuration, and documented any inconsistency between installed systems and project specifications and data housed in the PTS. We also collected detailed solar resource information and reviewed the system for issues which could contribute to abnormal energy generation.

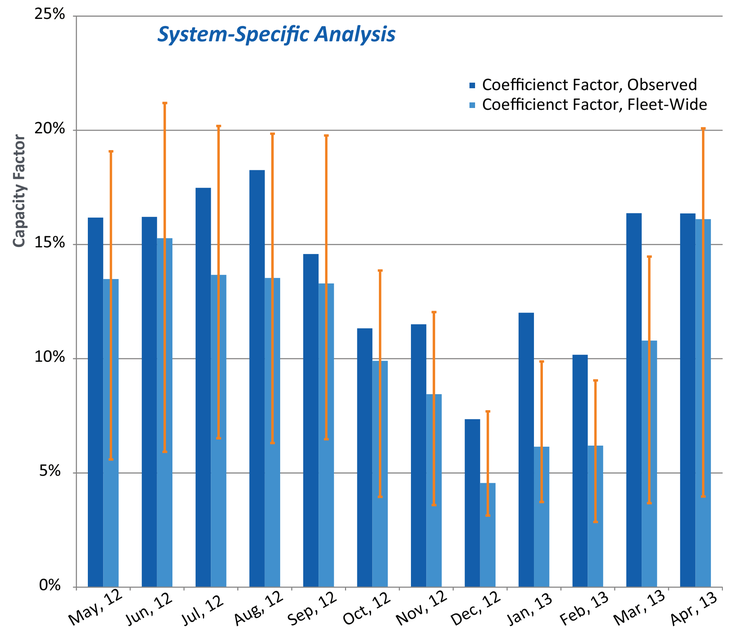
- Equipment installed and Total Solar Resource Factor.
- Development of an independent energy-generation production estimate.
- Reporting procedures and metering equipment compliance with NEPOOL Operating Procedure 18.
- Compliance with program requirements, including MassCEC and Solar Carve-out Program requirements.
- Review of system design and identification of potential production impacts.

RESULTS

System-Specific Analysis

We reviewed energy generation for each audited system in context with the performance of all SREC-eligible systems, comparing observed **Capacity Factor** (CF) to the average coefficient factor for all SREC-eligible systems. For systems which exhibited a high or low ***CF***, we investigated their claims of energy generation in depth, determining if the difference was reasonable.

For each system, we provided MassCEC a detailed report describing discrepancies, the system's compliance with NEPOOL GIS Operating Procedure 18, and an analysis of the system's production over the last year.



Report on Energy Generation

In the next year, Cadmus will provide MassCEC with a report detailing aggregated findings, evaluating the quantity of SRECs minted in comparison to energy generation reports and the detailed estimates developed by Cadmus. **Preliminary results indicate PTS reports used to claim SRECs are within 3% of Cadmus' independent estimates**, and only minor discrepancies have been identified to date.

LOOKING FORWARD

This winter, the **Massachusetts Department of Energy Resources** will release new regulations to create a second phase under the Solar Carve-out Program, intending to bring the **total installed capacity to 1,600 MW in the state**. With the increased scope of the Solar Carve-out Program, maintaining the quality of data collected in MassCEC's Renewable Energy Production Tracking System will be essential - as the low coefficient of variance, and the large population size, have enabled MassCEC and Cadmus to realize a high level of accuracy with relatively few audits.

Forward Minting

Part of the draft regulations, if implemented, may enable residential system owners to ***forward-mint*** SRECs during the first year of operation. This change will require additional review of production estimates to ensure the quantity of SRECs minted is supported by realized energy generation for each system.

Authors

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Elizabeth Kennedy, Massachusetts Clean Energy Center is the Program Director of Solar at the Massachusetts Clean Energy Center, which is dedicated to accelerating the success of clean energy technologies, companies and projects —while creating quality jobs and long-term economic growth in Massachusetts. She is responsible for launching the state solar rebate programs and the Solarize Massachusetts Program, as well as helping customers understand the RPS Solar Carve-Out Program.

Eric Ramras, Massachusetts Clean Energy Center is the Renewable Energy Production Manager at the Massachusetts Clean Energy Center. He is responsible for the management of Independent Third Party Meter Reading activity, and solar production reporting, for the purpose of providing verification of Solar Renewable Energy Certificates (SRECs) for qualified generators.

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