

Solar Market Barriers Analysis Overview

The Massachusetts solar market has grown rapidly over the last several years. In 2015, Massachusetts installed 340 MW of solar electric capacity, ranking it fourth nationally. Installed solar capacity in Massachusetts has grown by 10% over the last year, largely driven by state policies, including public awareness of renewable energy benefits and RPS-driven markets for solar renewable energy certificates (SRECs). Despite this level of overall growth, solar deployment within some sectors has not seen rapid adoption. The Massachusetts Clean Energy Center (MassCEC) enlisted ICF and its partner Sustainable Energy Advantage (the ICF Team) to help identify the key solar barriers existing within the residential new construction, residential rental, manufacturing, and small-medium commercial market sectors and help identify potential market options to overcome these barriers.

The objective of this study was to perform an analysis of solar market adoption barriers and help develop potential program design options to spur greater adoption within the following solar market sectors:

- 1-4 unit new construction properties
- 1-4 unit rental properties
- Small and medium commercial rooftop properties and parking canopies
- Manufacturing facilities

Overview of Methodology

The ICF Team's approach included a literature review, surveys and multiple stakeholder workshops. Each phase of the project further built upon the analysis to gain feedback on the challenges faced by each market sector and potential market activities that could be employed by MassCEC to overcome them.

Literature Review. The ICF team conducted a wide-ranging literature review of the market barriers existing within each of the market sectors under evaluation. Successful state and municipal programs from across the United States were reviewed to help inform potential solutions and options. Findings from this literature review helped inform survey development and workshop discussions. The findings are also summarized and included in Appendix A: Select Case Studies of Best Practices.

Survey Design and Implementation. Surveys were specifically designed to draw thoughtful responses from key stakeholders from each market sector under evaluation. Questions developed in this survey were informed by solar experts and received multiple iterations of review by MassCEC and the ICF team before being tested and sent out to target market participants.

Results from surveys were compiled and coded to help identify common themes within and across all market groups. Market barriers were identified and reviewed with MassCEC to help inform content for discussion during workshops. The survey was distributed to industry contacts provided by MassCEC and other industry representatives. Respondents received the survey link via an email. The survey collected responses over one month period from September 19, 2016 through October 20, 2016. Upon completion of the survey, the ICF team cross checked raw results to ensure that no survey was duplicated, and incomplete surveys were not incorporated into results. The survey received 138 valid unique responses. Survey respondents were further engaged to participate in a series of workshops to discuss the results and to formulate options.

Workshops. Three workshops were conducted, each focusing on a specific market sector to discuss insights drawn from survey results and to elicit stakeholder input on potential options by MassCEC that could help increase solar adoption in the state. At each workshop participants worked together to first confirm the barriers identified in the survey and then to expand and present options associated with the vetted barriers.

Market Barriers

Key market barriers identified in the literature review and verified by the survey responses served as a starting point for the workshop discussions. While some barriers such as lack of understanding of solar incentives cut across multiple market sectors and barrier types, barriers to solar adoption in the selected markets mainly fell into four general categories:

- Awareness;
- Economic;
- Policy¹; and,
- Site-related.

Barriers to Awareness

Lack of customer awareness around the generation and metering of electricity is a common and significant market barrier that was identified by stakeholders in all market sectors. Below are key barriers identified in the literature review and survey that were further confirmed by stakeholders during the workshops.

Barriers to stakeholders within the 1-4 unit new construction market

- Lack of technical information available to the builder community
- Building codes are too onerous or confusing to incorporate solar PV
- Homeowners lack an understanding about financing options and the relative benefits and costs of solar

Barriers to stakeholders within the 1-4 unit rental property market

- Lack information about rooftop solar installation and financing strategies for landlords
- Landlords are generally unaware or do not believe they are able to capture the benefits of solar PV for their rental property.
- Difficulty finding or knowing about lenders who finance solar projects

Barriers to stakeholders within the small and medium commercial rooftop properties and parking canopies market

- Lack of information among commercial company operations and management teams about integrating solar systems into commercial facilities.

Barriers to stakeholders within the manufacturing facility market

- Lack of or misinformation about the cost, performance and reliability of solar systems among industrial property owners

¹ While policy barriers were identified by stakeholders in response to the survey and during the workshop, MassCEC's focus is on potential market activities and thus policy barriers are not a focus of this assessment.

Economic barriers

The ICF team also investigated the economic barriers the solar markets face, of which confusion and skewed perceptions around incentives played a large theme again. Respondents across all market sectors reported their top barrier as the high perceived variability of revenue from state solar incentives. Below are key barriers by market segment.

Barriers to stakeholders within the 1-4 unit new construction market

- Solar market incentives are unclear, too low, or not available
- Lack of clarity among housing developers around SREC availability or value, and net metering credits

Barriers to stakeholders within the 1-4 unit rental property market

- “Split incentive” where the landlord finances the installation, but the renters may benefit from the electric savings.
- Perceived initial investment to install a solar electric system is too high

Barriers to stakeholders within the small and medium commercial rooftop properties and parking canopies market

- Lack of financing availability (equity, debt and tax equity)
- Leased facilities, which are common in this market, inhibit a long-term commitment to capital investments, including solar

Barriers to stakeholders within the manufacturing facility market

- Perception that the initial investment to install a solar electric system is too high.
- Lack of net metering availability

Policy barriers

While policy barriers were identified by stakeholders in response to the survey and during the workshop, MassCEC’s focus is on potential market activities and thus policy barriers are not a focus of this analysis. Stakeholders from all of the market groups noted that changing policy and incentive frameworks were a significant barrier. Specifically, all markets responded that there is uncertainty about electric rates that affect the payback, and that utility interconnection processes and requirements are confusing.

Residential rental property respondents specifically pointed to inconsistent or restrictive zoning and the lack of available access to electricity and associated financial benefits from remotely sited solar electric systems (e.g., ‘Community Shared Solar’) as a significant policy barriers.

Site-specific barriers

Site specific barriers were more diverse and particular to market sectors than other barriers, however, stakeholders from all sectors pointed out that the age of roofs and their potential to void a warranty is a market barrier. Below are key barriers by market segment.

Barriers to stakeholders within the 1-4 unit new construction market

- Site specific rules, such as those coming from homeowners associations or condominium rules.

- Appearance or perceived appearance of solar panels as one of the top site specific barriers

Barriers to stakeholders within the 1-4 unit rental property market

- Lack of ownership or control of shared rooftop space
- Inconsistent or restrictive local zoning (e.g., historic districts) or permitting requirements (or lack thereof - e.g., does not explicitly address solar PV in its by-laws).

Barriers to stakeholders within the small and medium commercial rooftop properties and parking canopies market

- Lack of space for a solar canopy or carport
- Concerns regarding snow, ice, rain shedding or snow plowing
- Permitting challenges, including inconsistencies with solar canopy permitting

Barriers to stakeholders within the manufacturing facility market

- Concerns regarding capacity of the electrical system to support solar interconnection
- Lack of rooftop ownership and control

Key Barriers and Priority Options

After evaluating input from the three market sector workshops, the ICF team identified the key barriers and market options for MassCEC to consider. The priority options are considered high impact based on the professional knowledge and judgement of ICF team experts combined with the plethora of industry stakeholder insights gained from the survey and workshops, and achievable by MassCEC in the near term. The discussion below presents the priority options identified during the stakeholder workshops. A full list of potential priority options and further details on their potential can be found in Section IV of the main report.

Key Barrier: The Massachusetts solar market is complicated and customers desire clear, unbiased information and examples of how to proceed.

Identify MassCEC as a Hub of Expertise

Relevant Market Sectors: All

By identifying MassCEC as a central, third-party hub of information, market participants could point to MassCEC as a reputable, un-biased source for information. This option would entail the creation of educational materials as well as website to host the content. Some potential content might include simple examples of savings/ returns, an online calculator to estimate savings.

Facilitate the Creation and Publication of Customer Testimonials

Relevant Market Sectors: All

MassCEC, as an unbiased, central hub of information should collect and publicize customer testimonials that can serve as best practices within each market sector. Customer testimonials can be particularly persuasive versus other types of outreach as they resonate well with potential customers. This option would entail outreach to existing customers within each market sector to identify best practices, documentation of those stories and then publication and publicity to ensure the examples reach the customer base.

Market Actors as Solar Ambassadors

Relevant Market Sectors: All

MassCEC could partner with builder associations and the banks that serve each market to develop and deliver a customized training program so that these market actors understand and can speak to the value of solar to homeowners and on the economic viability of manufacturing and small and medium commercial businesses.

Solar Coaches

Relevant Market Sectors: Manufacturing and Small and Medium Commercial

Similar to the Solar Coaches model in the residential market, MassCEC could identify several individuals within the manufacturing and commercial sectors who have adopted solar. MassCEC could train these individuals (and / or their representative organizations) and provide them a stipend to participate in outreach efforts across their market sector.

HERS raters as Solar Ambassadors

Relevant Market Sectors: Residential 1-4 Unit New Construction, Residential 1-4 Unit Rental Properties

MassCEC could prepare a customized training program targeting HERS raters so that they would be able to speak to home owners, potential home owners, builders and real estate professionals about the value solar on a home in terms of energy cost savings and how a solar installation positively affects a HERS score.

Rating System for Solar/Solar-ready Homes

Relevant Market Sectors: Residential 1-4 Unit New Construction, Residential 1-4 Unit Rental Properties

The HERS score has been vital to the market adoption and understanding of home energy efficiency. It provides a standard metric for current as well as potential home owners to value the energy efficiency of a home. It also provides a valuable data point for the real estate market when comparing homes. MassCEC could work with an organization like SolarNumber to develop a similar rating that would apply to solar.

Key Barrier: Legal costs associated with solar siting are expensive and confusing.

Relevant Market Sectors: All

Facilitate Creation of Standardized Documents and Loan Materials

Legal costs associated with solar siting are expensive and confusing. MassCEC facilitate the development of standardized language for documentation related to siting, lease agreements and net metering agreements that would provide a ready-access boilerplate for commercial entities, thereby reducing some of the legal and transaction costs associated with solar adoption. MassCEC could convene organizations such as DOER's Lead By Example program as well as the Massachusetts Association of Realtors, American Banker Association, National Bankers Association, Massachusetts Bankers Association, and Independent Community Bankers of America to facilitate the development of standardized documents and streamlined due diligence processes.

Key Barrier: The uncertainty around solar payback causes a high cost of capital.

Relevant Market Sectors: Manufacturing and Small and Medium Commercial

Interest Rate Buy-Down

MassCEC could create a financing program for the industrial and commercial sectors similar to the one they administer for the residential sector. The program would provide an interest rate buy-down or loan loss reserve so that banks are more comfortable offering a lower interest rate or more flexible credit terms. MassCEC should identify and reach out to local banks who might be interested in partnering and then collaboratively develop the terms of the program. Such an option also could have the additional benefit of promoting self vs. third-party ownership. MassCEC should be able to garner preferences of preferred structure (rate buy-down vs. loan loss reserve) and value from banks and credit unions that are participating (and declined to participate) in the residential [Mass Solar Loan](#) program and apply those findings to any new program.