

Compensation levels for the under 25kW sector in SMART are inadequate, inequitable and important for the solar market to flourish in Massachusetts.

Residential-scale SMART compensation is inadequate:

As a consumer product, Residential PV is sensitive to customer risk aversion. Homeowners will rarely if ever make a solar investment if their payback is 8-10 years, and adoption will decline precipitously at 10 years and beyond. A payback that exceeds the 10 year length of the SMART compensation term is a non-starter for middle-class homeowners. Most residential solar lending products are 10 years and SMART must provide value to service debt before it ends or it cannot be afforded by the typical homeowner.

The median Massachusetts residential homeowner-owned PV system is 8kW in size and costs \$4 per watt, as shown by Mass Solar Loan data. Under SMART, assuming *the highest possible initial procurement clearing price of \$.15/kWh*, that 8kW residential system participating in blocks one through three would expect a 9 year payback, with blocks four through eight being 10 years or longer.

Additionally, in almost every scenario other than maximum clearing price, paybacks reach 10 years well before SMART ends. If the initial procurement price is a more realistic \$.12/kWh, that median system projects a 10 year payback right from block one. Or, if that system has even a slightly below average site efficiency of 75% (a quality level still acceptable for Mass Solar Loan participation) payback is 9 years under block one and in excess of 10 years by block two. If that system is smaller than the 8kW average but still a common 5kW size, again payback is 9 years under block one and 10 thereafter.

As currently designed, SMART compensation levels are wholly inadequate to support a healthy and diverse residential solar market for the next 1600 MW of deployment.

Residential-scale SMART compensation is inequitable:

The DOER's "Developing a Post-1,600 MW Solar Incentive Program" study from October 2016 reported that typical system costs for under 25kW rooftop solar ranged from \$3.48 to \$4.66 per watt, an average of \$4.07 per watt, while the 1MW typical system cost ranged from \$1.99 to \$2.61, an average of \$2.30 per watt. On average, it costs nearly twice as much to deploy on the residential scale as it does on the megawatt scale.

The majority of cost in the residential sector is "soft": administration, permitting, engineering and labor. In Massachusetts, labor and permitting costs are increasing, not decreasing, offsetting the industry-wide decrease in "hard" costs for panels, inverters, and racking. A reduction in panel cost of 20 cents per watt on a MW project that costs \$2.00/watt to deploy represents a 10% cost decrease. That 20 cent decrease on a residential project that costs \$4.00/watt to deploy is just 5%. Meanwhile cost of living increases push the cost labor, the most impactful soft cost, upward.

Yet despite that the cost to deploy in the under 25 kW sector is more than 175% of the MW sector, both systems *receive the same base level compensation factor* under SMART. The 1 MW project developer receives 100% of base for 20 years for 200 total units of compensation. The homeowner with an 8 kW system gets 200% of base for 10 years for 200 total units of compensation. While there is relative benefit to receiving compensation in 10 rather than 20 years, that benefit is offset by other internal and external disparities, such as the residential sector being locked out of all location and off-taker based adders under SMART, and the commercial sector's ability to employ accelerated depreciation to speed return on investment.

As currently designed, SMART favors the large-scale photovoltaic projects of corporations and solar developers at the expense of homeowners.

Residential-scale SMART compensation is important:

Of all sectors defined under SMART, the under 25kW market is the most impactful. Forty-two percent of all capacity registered in the Mass CEC's Production Tracking System in 2015 & 2016 came from projects under 25kW in size, the largest percentage of any SMART sector.

The residential sector installs more projects than any other. Of all projects registered in the Production Tracking System in 2016, 99% - more than 23,000 individual projects - were under 25kW.

The residential sector employs significantly more workers than any other. The Solar Foundation's Jobs Census 2016 shows that in Massachusetts, 75% of solar worker's time is spent on residential, with 16% on commercial and 10% on utility-scale projects.

As currently designed, SMART injects widespread instability to the residential market, risking thousands of solar jobs across Massachusetts.

In order for the residential market to survive under SMART, program designers must make three key changes within the < 25kW sector.

1. The sector's current 200% base capacity factor needs to be revised to 300%.

A 300% capacity factor partially closes the gap between the homeowner's 8 kW investment return and that of the 1 MW project owner. Receiving 50% more than the 1-2 MW sector's base compensation helps recover the homeowner's 75% higher installation cost.

2. The under 25kW sector must be allowed to participate in adders, and a Small Scale System Owner adder of at least \$0.04/ for systems 10 kW AC or smaller should be created.

As designed, SMART creates an extremely fragile market for projects under 25kW. The sector's entire compensation is based on a one-time procurement event, with none of the stability provided by adders. A scenario in which a \$0.12/watt initial procurement price clears results in an all-in value for a homeowner of just \$0.24/watt, immediately pushing

residential paybacks under every reasonable scenario to 10 years or greater and making all current residential solar loan products cash flow negative from day one of SMART implementation.

Under 25kW must be allowed to participate in adders in order to stabilize the sector. A healthy \$.04 or greater per-watt adder must be applied to small system owners to help recover higher fixed deployment cost.

3. Adders should not decline for the under 25kW sector. In fact, a thoughtfully designed adder system should allow for fixed adders program-wide.

In the SMART program, adders address costs that are above the base case. In the residential sector the majority of those costs are not equipment but instead are “soft” deployment costs. The largest, labor, is increasing with the cost of living rather than decreasing like many hard costs. A healthy residential market requires stable compensation levels that reflect real-world cost projections over the years to come.