



COMMONWEALTH OF MASSACHUSETTS

*Charles D. Baker, Governor
Karyn Polito, Lt. Governor
Matthew A. Beaton, Secretary
Judith Judson, Commissioner*

Becket Energy Committee Informational Session September 9, 2017

*Jim Barry, Regional Coordinator
Mass DOER*

Today's Topics

How to Save Energy

No-Cost MassSave Program

How to Generate Energy

How does Solar PV work

How to finance it

SRECs being replaced by SMART

How Communities Can Work Together

Solarize and Solarize Plus

Heat Smart

EV anyone ?



Helping Massachusetts Municipalities Create A Cleaner Energy Future



MassSave.com

First Step: NO-COST Energy Assessment Too Good to be True? Nope! Big Comfort and Fast Savings!

- Trained Professional - Personalized Report
- Covers Insulation cost 75% up to \$2,000
- if income eligible: 90% up to \$3,000
- 0% Interest HEAT Loan
- Generous Rebates on hot water systems, refrigerators and more
- 8 Hours of Air Sealing – FREE!
- Free Energy Efficient Lights
- Water Conservation Devices

Heating System Combustion Safety Test



Helping Massachusetts Municipalities Create A Cleaner Energy Future

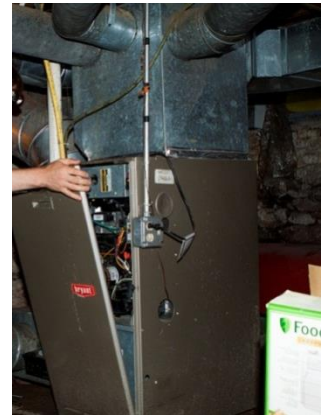


Personalized Recommendations

You may be offered contracts for Air Sealing, Insulation, Hot Water System and Heating System,

Upgrades, and rebates on refrigerators or more, all of which will translate into savings for you...

0% Interest Heat Loan available



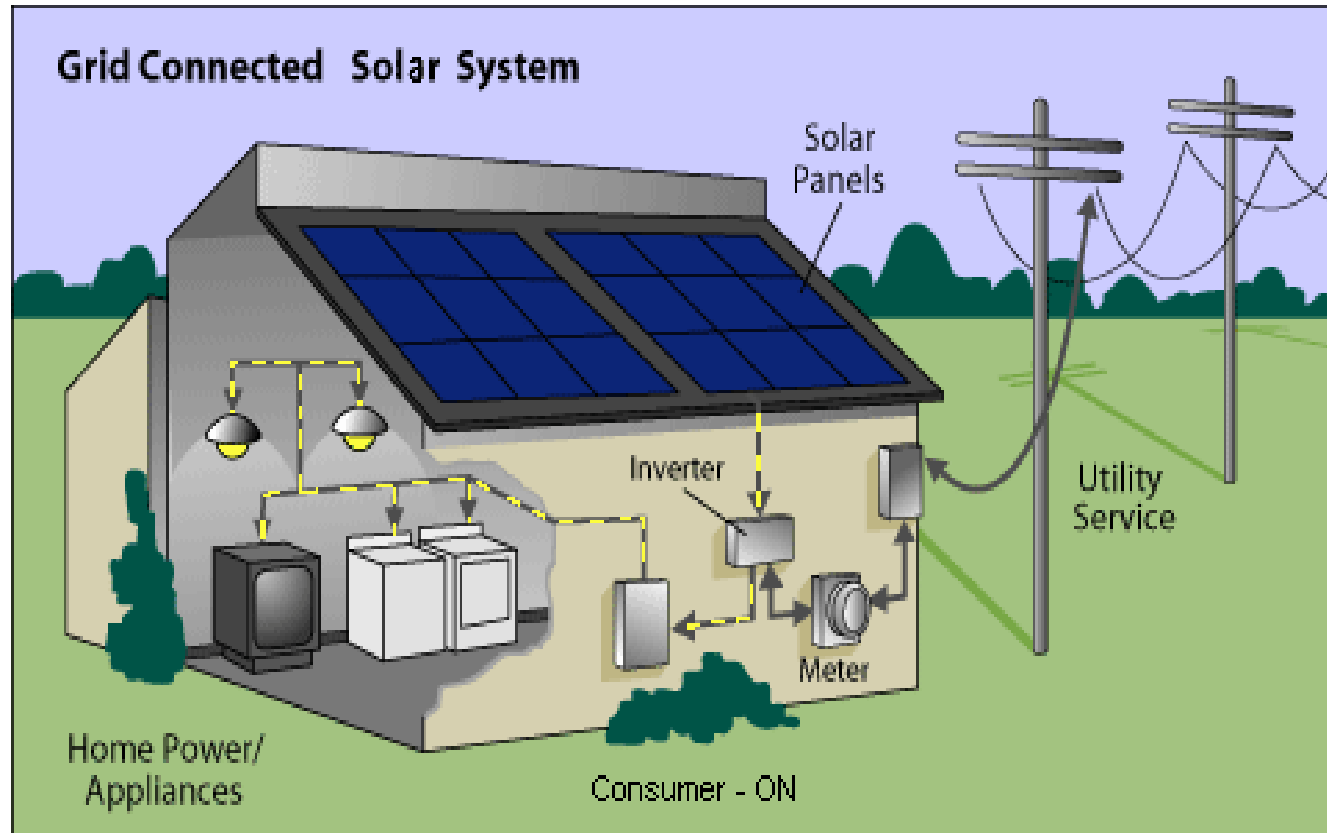
Helping Massachusetts Municipalities Create A Cleaner Energy Future



Solar PhotoVoltaic (PV) Basics



How Does a Solar PV System Work?



- Grid-connected projects can apply for Net Metering (utility meter spins backwards)
- **If Power outage: Inverter shuts down, unless a battery-back up system is installed**

Net Metering – Basics

- Energy produced by your system but not used by you go back onto the 'grid' & your meter spins backwards
- Energy you get from the 'grid' when the system is not producing makes the meter spin forward
- You pay the NET difference between what you send to the grid and what you take from the grid.
- If you produce more in a month that you use, you get a CREDIT with the utility to be used 'later'
- You are allowed to assign some of those credits to another customer

Solar Incentives in Massachusetts

**High electricity prices + Reduced Solar PV Costs +
Numerous Incentives = Economical solar projects**

Incentives
Tax Incentives: Federal (30%) State (15% up to \$1,000)
SREC Sales
Net Metering
Mass Solar Loan
Low/No money down options



www.house-power.com/blog/wp-content/uploads/2009/12/iStock_000009001180XSmall.jpg

Solar Renewable Energy Certificates (SRECs)

Electricity Pathway

- Electrons from all generation sources are physically the same
- Cannot be tracked independently on the grid

Electricity and SRECs can be, and often are, sold separately

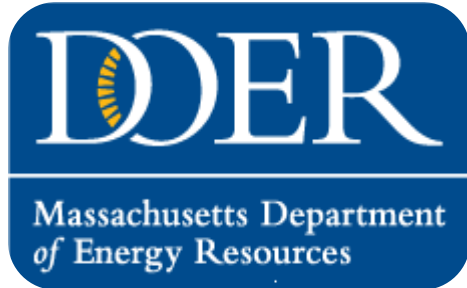


SRECs Pathway

- SRECs represent the “green” attributes of the renewable generation source
- Utilities are required to purchase SRECs every year
- 1 SREC = 1,000 kWh
- Verified SRECs ensure that only one buyer can claim each SREC

SRECs (cont.)

- Will be able to sell SRECs for 10 years
- Likely sell from \$189 - \$285 per SREC
- Work with aggregator or broker to help with the sale
- Monthly production reported to MassCEC's Production Tracking System (PTS)
- SREC II Program WILL be replaced ... Spring 2018



COMMONWEALTH OF MASSACHUSETTS

Charles D. Baker, Governor

Karyn E. Polito, Lt. Governor

Matthew A. Beaton, Secretary

Judith Judson, Commissioner

Boston, MA

**Solar Massachusetts Renewable Target
(SMART)
Final Program Design**

SMART vs. SREC II

SREC II

- Incentive is market based
- Value of incentive is added to any value received for energy (net metering...)

SMART

- All in compensation is established for qualified projects
- All in compensation is established for both energy + incentive values
- Incentive is paid directly to project owner
- Incentive is calculated as the all in compensation rate net of energy value

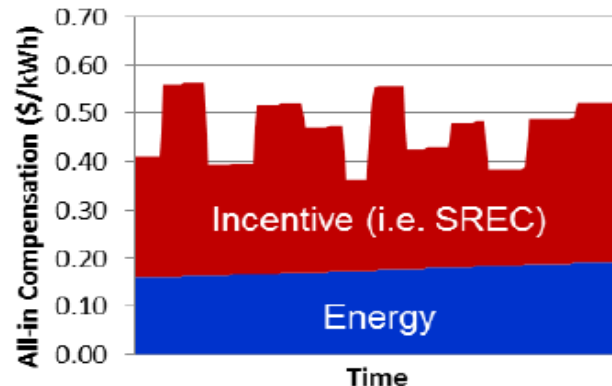
SRECs vs. SMART

SMART = Solar MAss Renewable target

SREC

- SRECs are a tradable commodity with a value that fluctuates based on market conditions:
 - Long-term revenue uncertainty leads to higher financing costs,
 - A large portion of the program costs are going to a 3rd party to pay for financing,
 - Total program costs and ratepayer impacts are difficult to predict.
- SRECs are an additional revenue stream independent of the value of the energy.

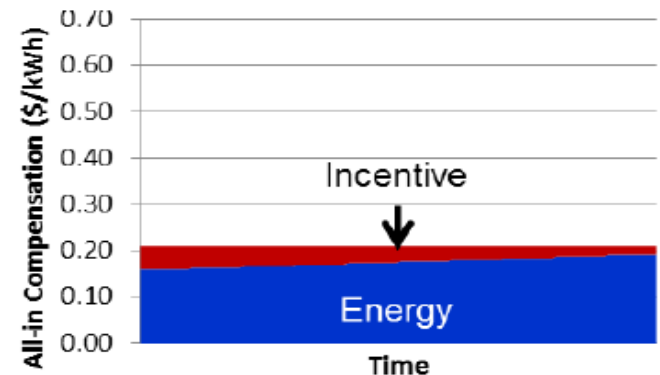
Example of the incentive level in a SREC program



Declining Block Program

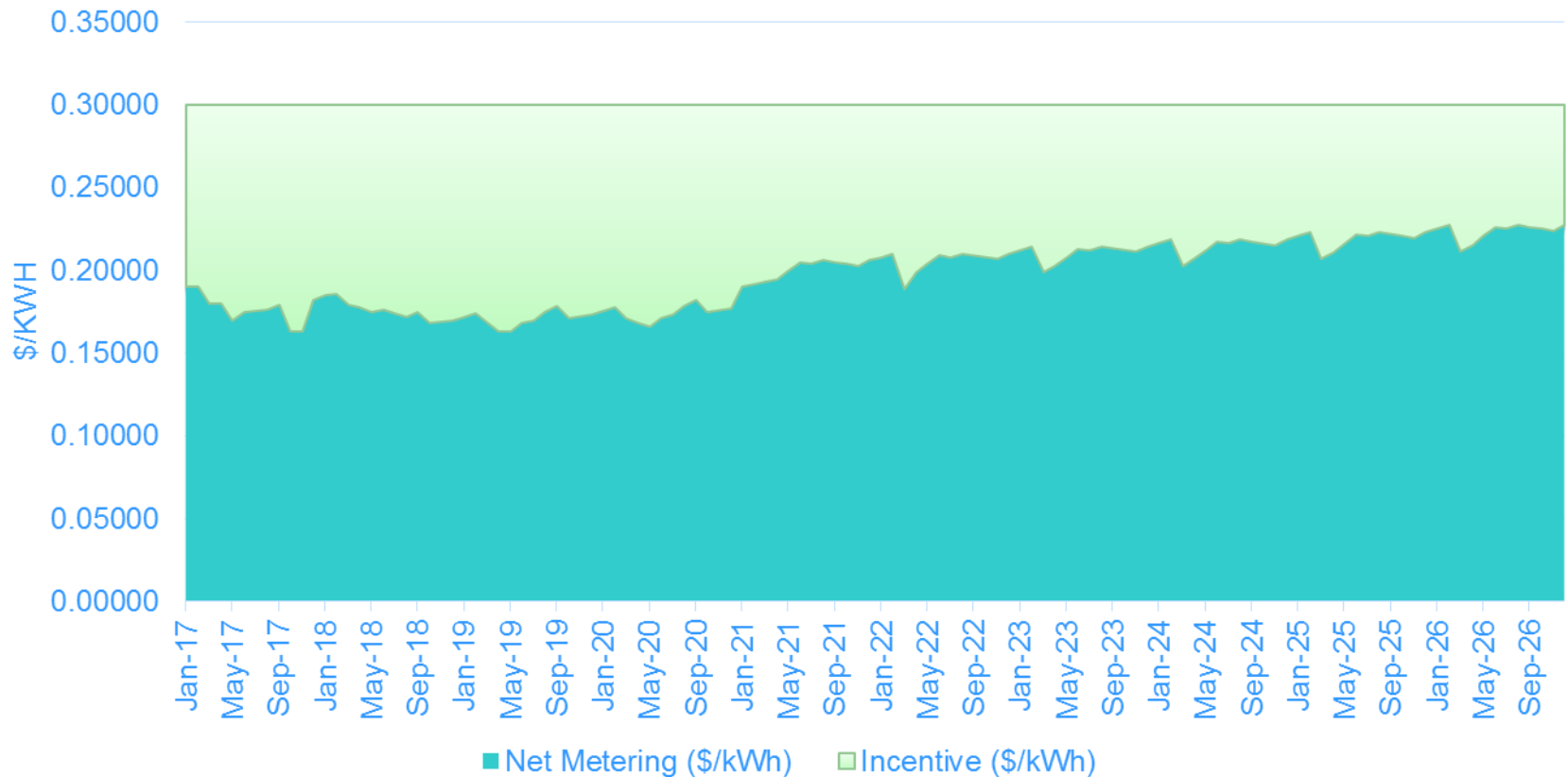
- This program provides long-term revenue certainty (10-20 years) which reduces financing risks and in turn, lowers soft costs
 - Total program costs can be predicted with certainty.
 - Incentive declines with the declining cost of solar.
- A solar facility receives a single compensation rate that accounts for both the energy and the incentive.
 - The resulting value of the incentive is the net difference between the all in rate and the value of the energy.

Example of the incentive level in the new program



Small System Tariff

10-year Small NEM System (1-25 kW) Tariff Payments
(National Grid)



Note: Graph is illustrative of how tariff payments would be determined and does not reflect projected values

Creating A Clean, Affordable, and Resilient Energy Future For the Commonwealth

Capacity Based Compensation Indices for Solar Generation Units equal to or less than 1 MW AC

Capacity Based Compensation Rates (kW AC)		
Generation Unit Capacity	Base Compensation Rate Factor (% of Block 1 Clearing Price)	Term Length
Low income less than or equal to 25 kW AC ¹	230%	10-year
Less than or equal to 25 kW AC	200%	10-year
Greater than 25 kW AC to 250 kW AC	150%	20-year
Greater than 250 kW AC to 500 kW AC	125%	20-year
Greater than 500 kW AC to 1,000 kW AC	110%	20-year
Greater than 1,000 kW AC to 5,000 kW AC	100%	20-year

1. Must be an R-2 customer to qualify

Example: How Indices will be Used to set Rates for Different Project Types

- If Block 1 Compensation Rate for National Grid is \$0.15/kWh the following will be the Capacity Based Compensation Rates for Block 1 National Grid territory

Capacity Based Compensation Rates (kW AC)			
Generation Unit Capacity	Capacity Based Rate Factor (% of Clearing Price)	Capacity Based Rate (\$/kWh)	Term Length
Low income less than or equal to 25 kW AC	230%	\$0.3450	10-year
Less than or equal to 25 kW AC	200%	\$0.3000	10-year
Greater than 25 kW AC to 250 kW AC	150%	\$0.2250	20-year
Greater than 250 kW AC to 500 kW AC	125%	\$0.1875	20-year
Greater than 500 kW AC to 1,000 kW AC	110%	\$0.1650	20-year
Greater than 1,000 kW AC to 5,000 kW AC	100%	\$0.1500	20-year

Adder Values

All adder values will decline by 4% every tranche. First tranche is 80MW.

Location Based Adders	
Type	Adder Value (\$/kWh)
Building Mounted	\$0.02
Brownfield	\$0.03
Floating Solar	\$0.03
Landfill	\$0.04
Solar Canopy	\$0.06

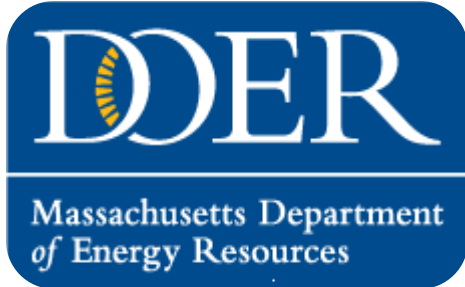
Off-taker Based Adders	
Type	Adder Value (\$/kWh)
Public Entity	\$0.02
Community Shared Solar (CSS)	\$0.05
Low Income Property Owner	\$0.03
Low Income CSS ¹	\$0.06

Other	
Type	Adder Value (\$/kWh)
Storage + PV	Variable
Solar Tracking Adder	\$0.01

1. Must be at least 50% R-2 customers

Status and Next Steps

- DOER regulations fully promulgated as 225 CMR 20.00
- EDCs to file a model tariff at the DPU shortly
- Tariff will cover both the SMART incentive and the Alternative On Bill Credit
- DPU will establish the proceeding schedule
- SMART program is effective upon approval by the DPU of the tariff
- SREC II extended until SMART program effective date, with current SREC Factors effective through 3/31/18



Massachusetts Residential Solar Loan Program

www.MassSolarLoan.com

JIM.BARRY@STATE.MA.US

SPRING 2016
UPDATED FALL 2017

Problem Statement and Opportunity

- MA residential solar market has boomed over past 4 years and continued SREC-II program support will maintain this growth.
- Solar financing is essential to maintain market progress.
 - PPA/ Leases are one means of financing which currently serves a majority of the MA residential solar market.
 - For a direct ownership alternative, loans are generally required.
- **Direct ownership of solar by MA homeowners provides substantially greater lifecycle benefits to homeowner and local economy.**
- Convenient access to loan products will further this economic opportunity for homeowners and local lenders.

Residential Solar Loan Program

- Banks can choose to participate or not
- State will buy down the interest rate regardless of your income
- State will also offer grants to buy down the principal based on income
- **Expectation is that the monthly payments are about what the borrower would pay for electricity ... thus it would be cash-flow neutral**

Borrower Eligibility Homeowner

- Only solar electric (photovoltaic) systems owned by the resident are eligible.
- Third-party lease or power purchase agreements for solar are NOT eligible.
- Loan recipients must meet lender-defined loan qualification standards.
- Solar electric systems must be connected to the electricity distribution grid.
- Solar electric systems may not have previously received incentives from the Massachusetts Clean Energy Center.
- Homes must have had a residential energy audit within the past five years or have one scheduled at the time of loan closing.

Borrower Eligibility

Community Shared Solar

- Minimum requirements to qualify for a Community Shared Solar project include:
 - Participants must demonstrate a direct ownership stake in a solar project as net metering off-taker of 25 kW or less
 - Participants must demonstrate a direct ownership stake in solar project through an LLC, cooperative, or condo association
 - Project must meet Mass Solar Loan program technical eligibility criteria

Mass Solar Loan Features

- **\$3,000 to \$35,000 loans, with some lenders offering loans up to \$60,000**
- **\$500 maximum closing costs**
- **Standard 10-year repayment term**
- **5.5% maximum interest rate**
- **Up to 12 months of interest-only payments during construction**
- **Secured or unsecured loans available depending on lender**
- **Ability to re-amortize within the first 18 months at no cost (thus Federal Investment Tax Credit can be used)**

Income-Based Loan Support

- Consumers with annual household incomes below certain thresholds may be eligible to have the Mass Solar Loan program pay a portion of their loan principal when the project is complete. An independent party will verify household income as part of the qualification process. Eligibility for Income-Based Loan Support is based on total household income (**Tax Return Form 1040 line 22**) as determined by the federal income tax filing for the most recent year available. Incentive rates are shown below. <http://www.masssolarloan.com/loan-support-incentives>

Household Size	<80 Median = 30%	<120 Median = 20%
1	\$45,335	\$68,002
2	\$59,284	\$88,926
3	\$73,233	\$109,850
4	\$87,183	\$130,774

Solar Financing Made Easy

1. Receive a solar price quote from a pre-qualified Mass Solar Loan installer by finding a list of eligible installers and resources to help you choose an installer at www.MassSolarLoan.com.
2. Select an installer and sign a solar installation contract.
3. Work with your installer to complete your Mass Solar Loan technical application online.
4. Provide your tax information online, if you are applying for income-based loan support.
5. Once you receive your technical confirmation document via email, work with a Mass Solar Loan lender to complete your loan application.
6. When your loan closes, your lender advances you 35% of the loan to cover initial construction costs.
7. After your solar system is connected by your utility, your installer files your project completion documents.
8. When the project receives completion approval, you receive the remainder of your loan from your lender.

Financial Example with Grant

- 6 kilowatt system – 23 panels at 260-watt per panel
- Initial price at \$4.00/watt = \$24,000
- Less Moderate Income grant (20% = \$4,800) => \$19,200
- Federal tax credit (30%) = \$5,760; state tax credit \$1,000, Net Cost = **\$12,440** to borrow at <4-5%
- System generates 6,000 kWhs per year for 6 SRECs each \$1,500 year (6 @ \$250 each = \$1,500) for 10 years
- Electricity savings/year = 6,000 x .18/kWh = \$1,080
- \$1,500 + \$1,080 = \$2,580 → 4.8 year payback
- \$2580 div by 12 months = \$215.00 month in benefit
- \$12,440 loan for 10 years at 5.5% is \$135.00 a month

LATEST UPDATE Fall 2017

Program is nearing its funding cap

They have received approval for additional funds

Revised program will focus on income eligible folks

There will be a specific 'date certain' for revision
with a 30 days 'notice'

You need to have the loan "closed" at the
participating lender to reserve your current
incentives.

Check their "program updates" page of their website



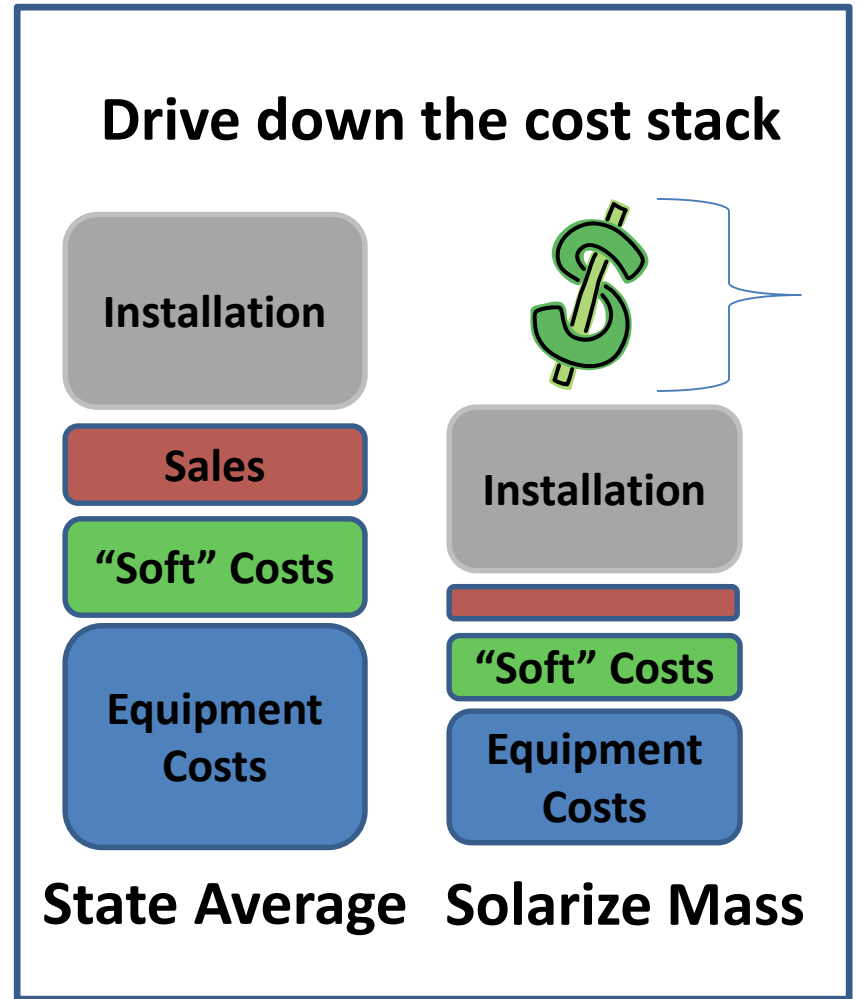
February 2016

What is Solarize?

Solarize is a community based and driven
Education, Outreach, and Group Purchasing program
aimed to increase the adoption of Small-Scale solar
electricity
through a competitive installer selection
and tiered pricing structure that increases savings as
more people sign contracts.

Goals of Solarize Mass

- Support Governor's goal of 1,600 MW by 2020
- Increase education and community outreach
- Model to simplify process
- Reduce installation costs
- Reduce time to contract
- Increase adoption



MassCEC/DOER

Town and Installer RFPs
Engage tech. consultants
Marketing/Education
SRECs

Installer

Free Site Assessments
Tiered Pricing and Ownership Options
Contracting
Installation

Homeowner

Sign up for a site assessment
Talk to neighbors!

Community

Installer Selection
Solar Coach
Volunteers
Outreach



2017 Solarize Mass

Up to 4 towns can partner

Can be Non-contiguous but same region

1,000 + owner occupied homes

\$2,500 grant per town;

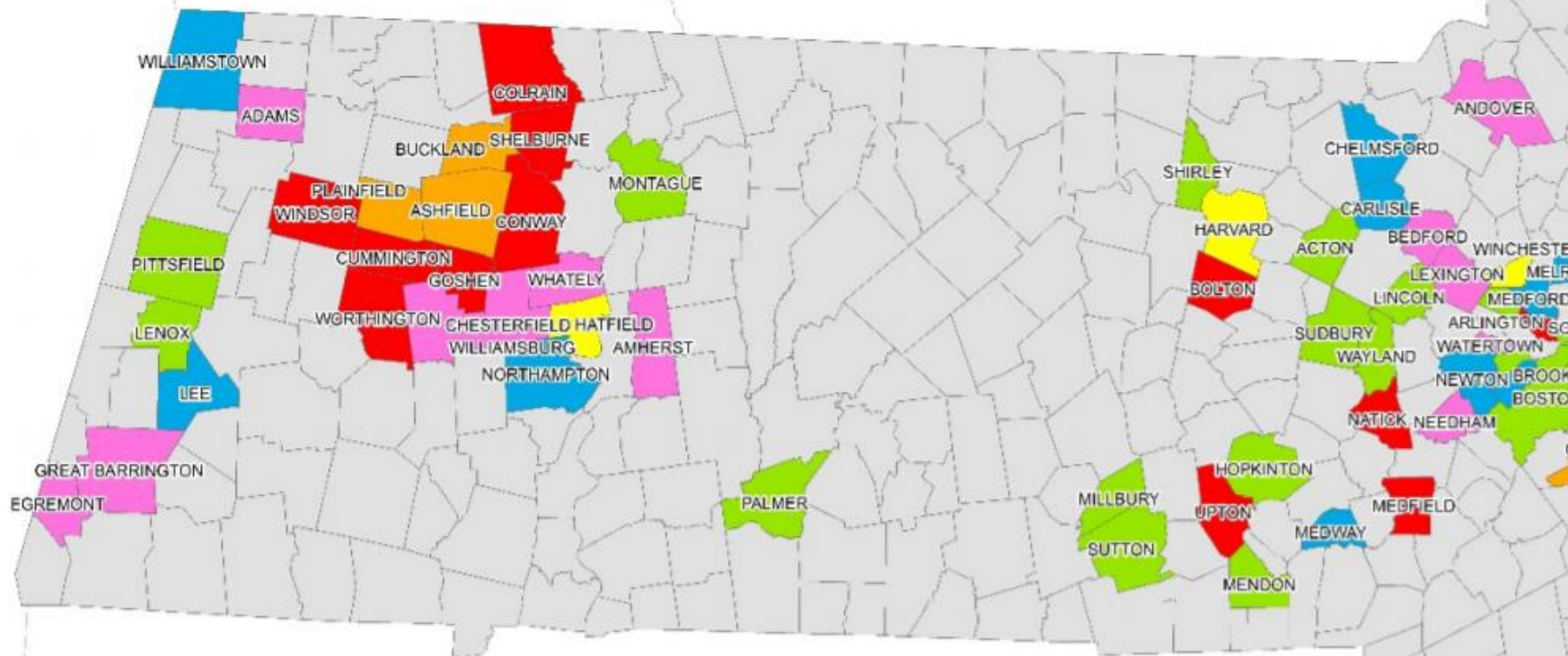
\$0 to \$1,000 per solar coach

Additional \$2,500 grant per town possible

Training; tech support; conference calls

Communities do Request For Proposals (RFP)

Application to Mass Clean Energy Center:



NEW 2017 Mass Solar Connect

MassCEC has partnered with [Mass Energy](#), and, [Self Reliance](#) and the [Marion Institute](#) to conduct an education and outreach campaign. MassCEC has also competitively procured vendors to host online installer bidding platforms. Members of the selected non-profit will have access to an online marketplace where they can learn about going solar, and request proposals from a pre-selected group of installers. As part of the 2017 program, Mass Energy has partnered with the online installer bidding platform [EnergySage](#), and Self Reliance and the Marion Institute have partnered with the online installer bidding platform [Pick My Solar](#).

my GUESS is that prices offered will be comparable to Solarize Pgm)

Summary

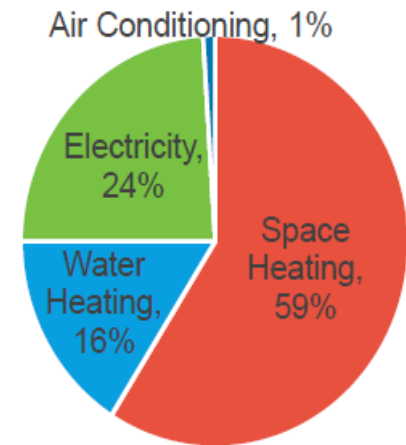
- A group purchasing and community education program for renewable heating and cooling technologies
- Targets residential and small-commercial installations
- Relies on community volunteer leadership
- Based on Solarize Mass model



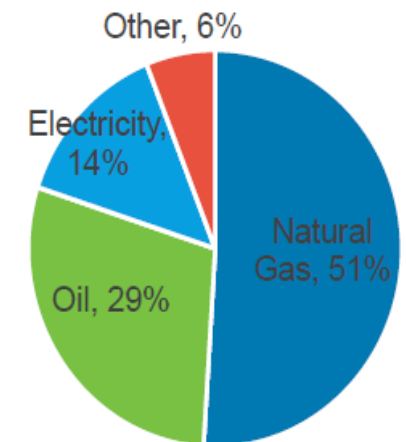
Why target heating?

- Heating represents about a third of Massachusetts' energy use and GHG emissions
- For homes, heating is an even larger portion of energy use.
- In 2015, MassCEC made a \$30 million, 5-year commitment to support clean heating and cooling technologies.
- Heating comprises largest household energy cost
 - Especially burdensome for households that heat with high cost heating fuels (oil, electric resistance, propane)

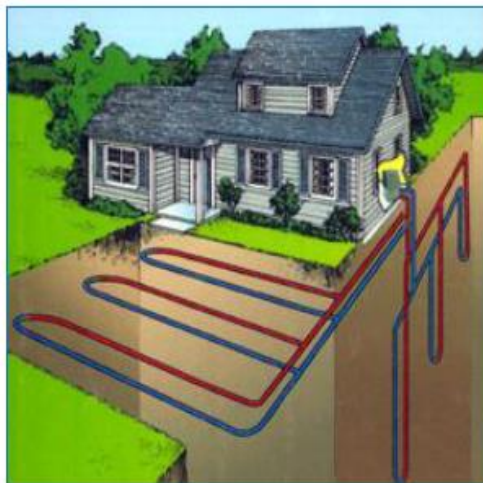
MA Household Energy Use



MA Residential Heating Fuel



- Modern Wood Heat
- Cold-Climate Air-Source Heat Pumps
- Ground-Source Heat Pumps
- Solar Hot Water



NEW 2017 Solarize PLUS

MassCEC has enhanced and combined the Mass Solarize Program with the Heat Smart Program to create a new Solarize PLUS Program.

Works like Solarize but a municipality would pick Solar PV as well as one of the Renewable Heating systems.

Some towns have chosen Solar Electric PLUS Solar Hot Water. Other towns have chosen Solar Electric PLUS Air Source Heat Pumps. The idea is that you can help educate the residents on more than one technology and also offer the benefit of 'group discount' on more than one technology.

A resident can choose one or the other or both .

EV Anyone ??

The **Massachusetts Offers Rebates for Electric Vehicles (MOR-EV)** program provides incentives to Massachusetts drivers who purchase or lease for 36 months a new qualified electric vehicle. For a complete list of eligible vehicles and information about the MOR-EV program, learn more at www.mor-ev.org

Rebates of up to \$2,500 are available to Massachusetts residents who purchase or lease a qualified vehicle.

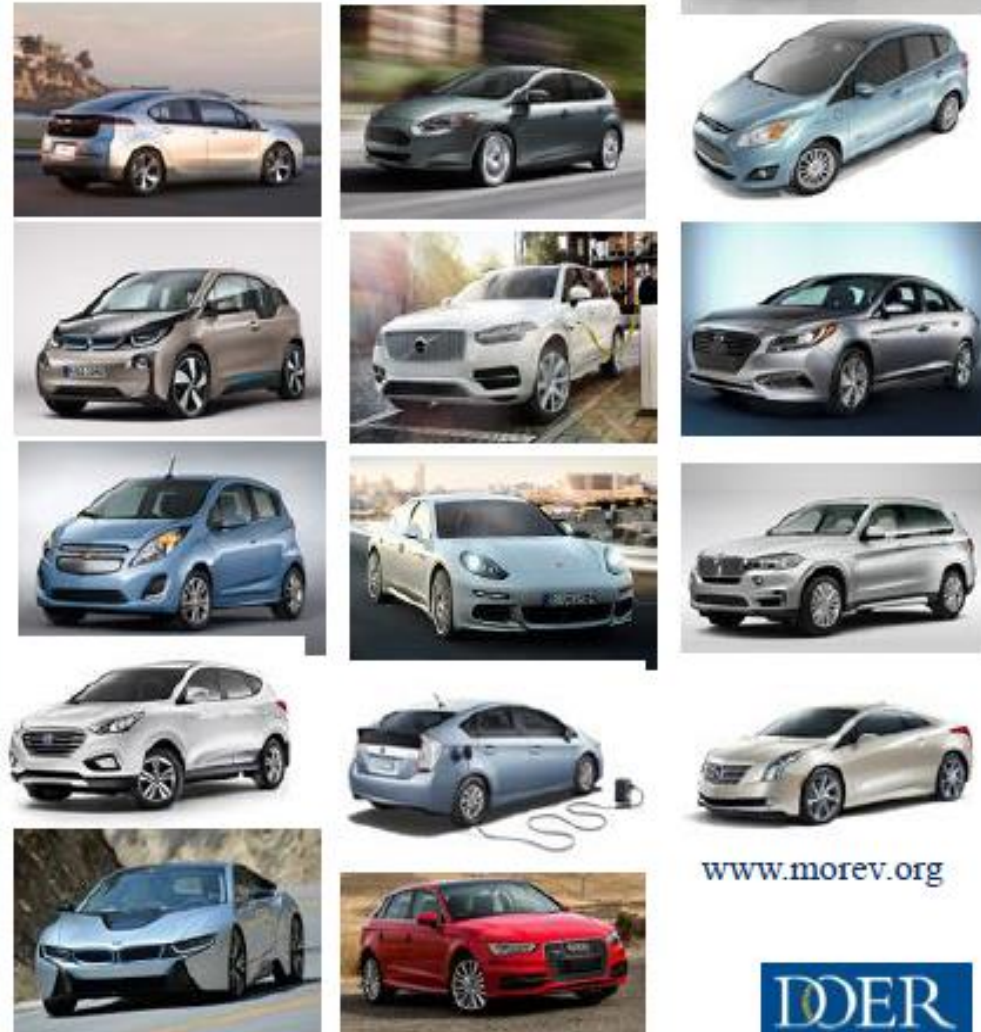
mor-ev.org/eligible-vehicles

These are the MOR-EV consumer rebate eligible vehicles:

BEVs



Plug in Hybrids



www.morev.org

DOER

Jim.Barry@State.Ma.Us (413) 755-2232

