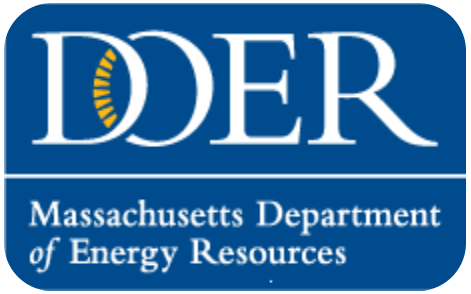
*Creating A Cleaner Energy Future For the Commonwealth*




**COMMONWEALTH OF MASSACHUSETTS**

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**Energy Manager Boot Camp**

**Boston, MA**

**September 4, 2014**

# Solar Incentive Programs in Massachusetts

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# What is a Renewable Portfolio Standard?

- State program requiring a certain percentage of the in-state load served by Load Serving Entities (LSEs) come from renewable energy
- LSEs meet their yearly obligations by procuring Renewable Energy Certificates (RECs)
- One REC = 1 MWh
- Obligation typically expressed as percent of total electric load

Example:

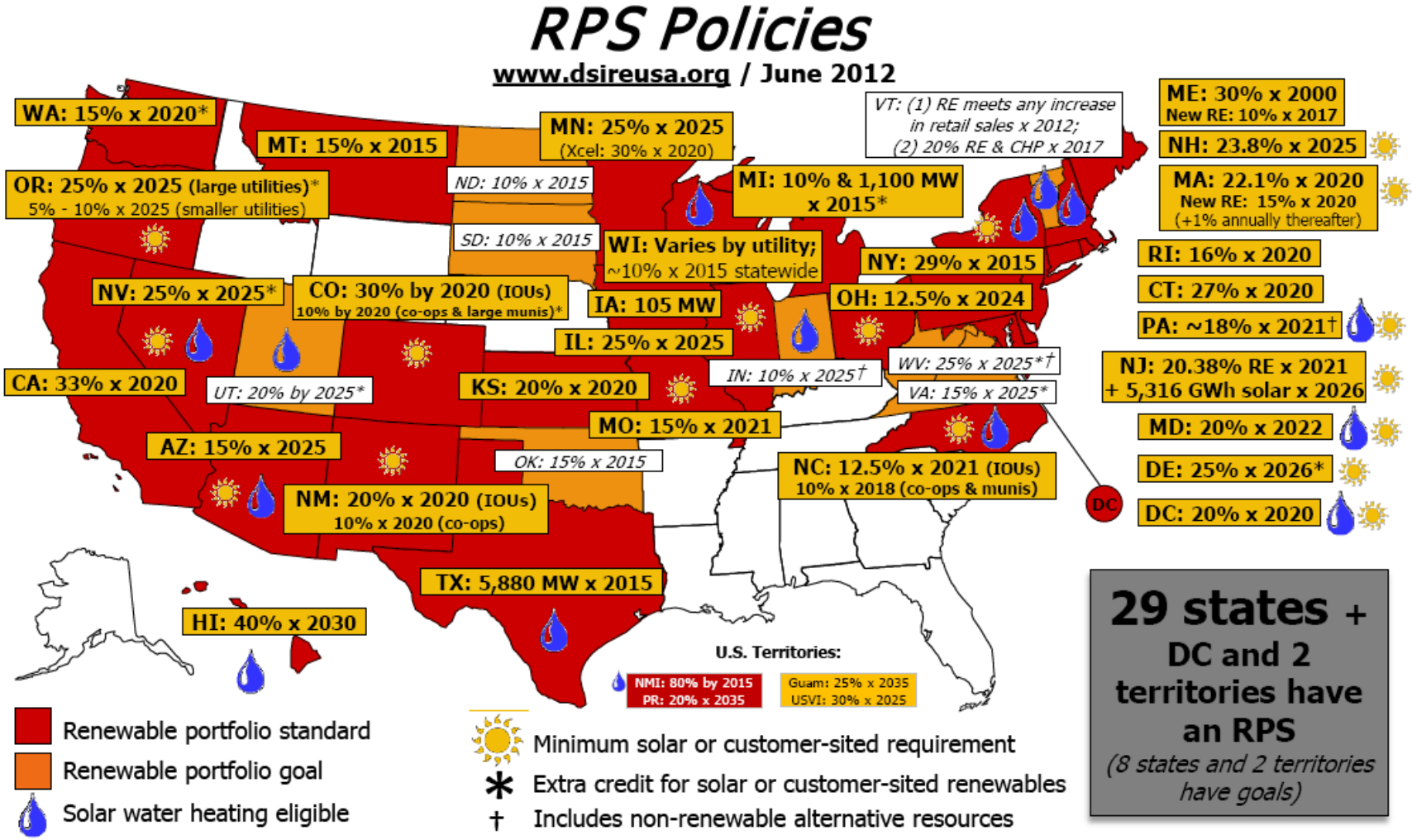
Utility serves 1,000,000 MWh of load in 2014 and has an obligation to procure 9% of that through the purchase of RECs

1,000,000 MWh x 0.09 = 90,000 MWh (number of RECs they must procure)

# REC Pricing

- Market driven
- State usually sets two variables:
  - Minimum Standard
  - Alternative Compliance Payment (ACP) Rate
- Minimum Standard refers to yearly percentage obligations placed upon compliance entities
- ACP rate is the price LSEs must pay for every MWh they are short of meeting their obligation

# RPS Programs Nationally



# MA RPS Class I Program

- Established in 1997, first year of compliance in 2003
- Eligible technologies include solar PV, solar thermal electric, wind, ocean thermal, wave or tidal energy, fuel cells, landfill methane gas, small hydro, low-emission biomass, marine or hydrokinetic energy, and geothermal electric
- Generation Units from New England and adjacent control areas (i.e. New York, Quebec, and New Brunswick) may qualify
- Minimum Standard of 9% in 2014
- Set to increase by 1% each year going forward

# MA RPS/APS Programs

- In 2008, 3 new classes were added to the RPS
  - Class II Renewable Energy for facilities in operation prior to 1998 (mostly small hydro, LFG, and wind)
  - Class II Waste-to-Energy for waste-to-energy facilities located in MA
  - Alternative Portfolio Standard (primarily CHP projects)
- In 2010, a Solar Carve-Out was added to Class I
- Obligation is part of the Class I total, but has different market parameters and qualification process

# Summary of MA Portfolio Standard Programs

| RPS Class | Sub Class | Technology | Minimum Standard | 2014 ACP Rate, $/MWh |
|---|---|---|---|---|
| **Class I** | | Wind, LFG, Biomass, Solar PV, Small Hydro, AD, etc. | 9% in 2014; increases by 1% each year | $66.16; increases with CPI |
| | Solar Carve-Out | Solar PV; 6 MW or less, in MA | 0.9481% in 2014; set by formula annually | $523; reduced annually per 10-year schedule |
| | Solar Carve-Out II | Solar PV; 6 MW or less, in MA | 0.0843% in 2014; set by formula annually | $375; reduced annually per 10-year schedule |
| **Class II** | Renewable | same as Class I | 1.5%; increases per schedule in regulation | $27.16; increases with CPI |
| | Waste Energy | Waste to Energy Plants, in MA | 3.5%; stays constant | $10.86; increases with CPI |
| **APS** | | CHP in MA, flywheels, storage, etc. | 3.5% in 2014; increases to 5% in 2020 | $21.72; increases with CPI |

# SREC I Program

- Launched in January 2010
- Designed to support 400 MW of new PV installations
- Unique design features designed to maintain supply/demand balance and support pricing (e.g. adjustable minimum standard, auction account, program cap, etc.)
- Program oversubscribed in May/June 2013
- Emergency Regulation filed on June 28, 2013
- Extended eligibility to projects that had met certain project development milestones
- Currently 659 MW qualified under SREC I
- About 90 MW not yet operational
- No new projects qualified under SREC I after April 25, 2014
- Larger size of SREC I program reduced the amount of capacity available under SREC II

# SREC-II Policy Objectives

- Provide economic support and market conditions to maintain and expand PV installations in MA
- Control ratepayer costs
- Maintain robust, progressive growth across installation sectors and manage growth to reach 1,600 MW by 2020
- Maintain competitive market of diverse PV developers, without undue burdens of entry
- Address financing barriers limiting residential and non-profit direct ownership, without compromising third-party ownership model
- Minimize regulatory complexity and maintain flexibilities to respond to changing conditions

# Key Differences Between SREC I & SREC II

- Larger program capacity cap (1,600 MW – Final SREC I Cap).
- Qualified projects generate SREC IIs for 40 quarters (10 years) from quarter in which they qualify.
- Both ACP Rate and Auction Price decline over time.
- SREC Factors differentiate market sectors and provide different incentive levels to different types of projects.
- Managed Growth sector helps control market growth. Qualification under this sector will be limited by Annual Capacity Blocks made available on a two year forward schedule by DOER.
- Compliance Obligation and Minimum Standard set in regulation for 2014 and 2015. Annual calculations thereafter based on actual and projected supply, constrained by Yearly Installed Capacity Targets, which help determine Annual Capacity Blocks for Managed Growth sector.

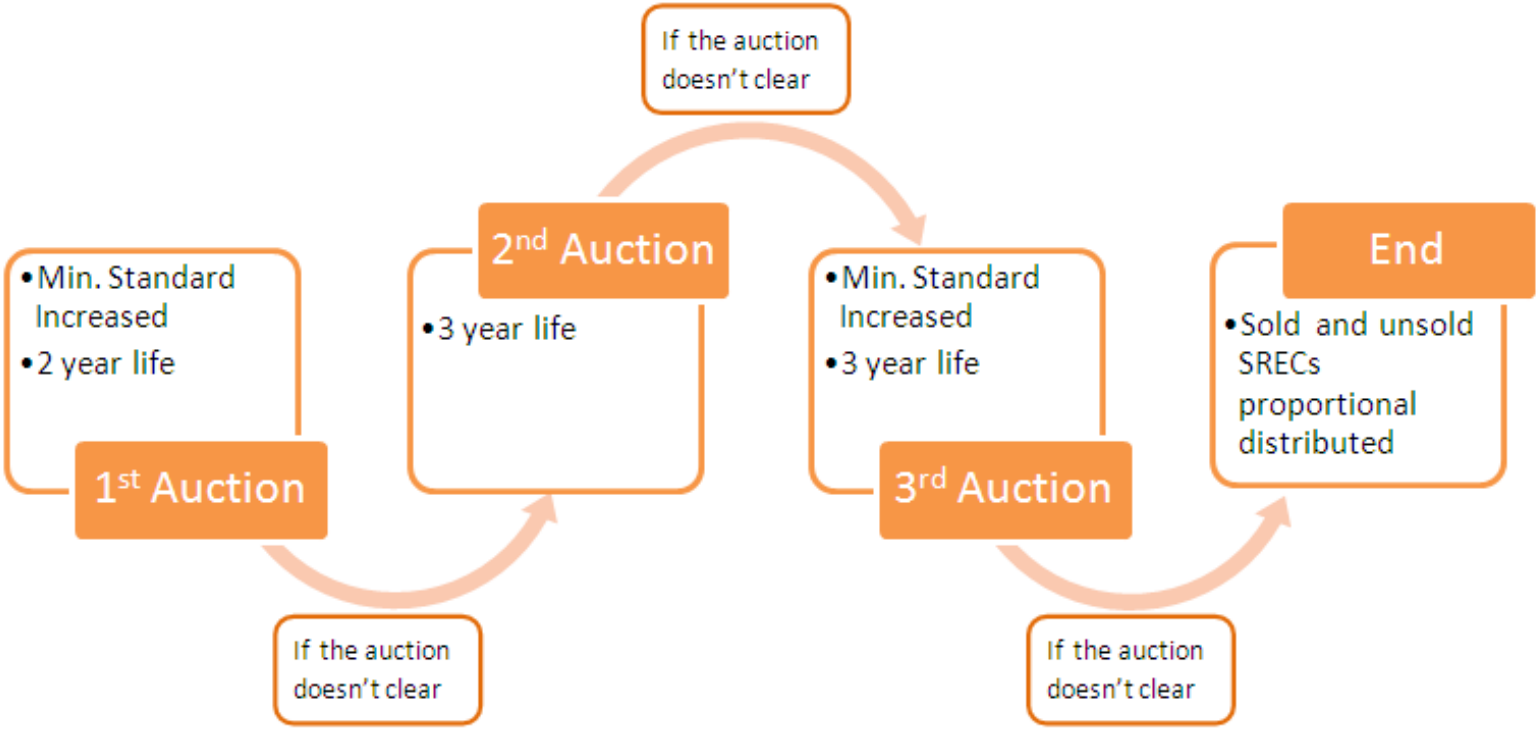
# Auction and ACP Rate Schedules

| Year | $/MWh | | |
|---|---|---|---|
| | Auction Price Bid | Auction Price After 5% Fee | ACP Rate |
| 2014 | 300 | 285 | 375 |
| 2015 | 300 | 285 | 375 |
| 2016 | 300 | 285 | 350 |
| 2017 | 285 | 271 | 350 |
| 2018 | 271 | 257 | 350 |
| 2019 | 257 | 244 | 333 |
| 2020 | 244 | 232 | 316 |
| 2021 | 232 | 221 | 300 |
| 2022 | 221 | 210 | 285 |
| 2023 | 210 | 199 | 271 |
| 2024 | 199 | 189 | 257 |
| 2025 | Values announced by DOER each year to maintain 10-year forward schedule. | | |
| 2026 | | | |
| 2027 | | | |
| 2028 | | | |
| 2029 | | | |
| 2030 | | | |

# Price Support – Auction Mechanism

- Solar Credit Clearinghouse Auction Account
  - Open every year from May 16th – June 15th
  - Any unsold SRECs may be deposited into the Account
- Auction held no later than July 31st, but after the Minimum Standard adjustment is announced
- Deposited SRECs are re-minted as "extended life" SRECs (good for compliance in either of the following two Compliance Years)
- SRECs are offered to bidders for a fixed price of $300/MWh before being assessed a $15/MWh auction fee by DOER. Bidders bid on volume willing to buy at the fixed price
- SREC owners will be paid $285/MWh for each SREC sold through the Auction

# Price Support – Auction Mechanism



# Market Sectors and SREC Factors

| Market Sector | | SREC Factor |
|---|---|---|
| A | 1. Generation Units with a capacity <=25 kW<br>2. Solar Canopies<br>3. Emergency Power Generation Units<br>4. Community Shared Solar Generation Units<br>5. Low or moderate income housing units | 1.0 |
| B | 1. Building Mounted Generation Units<br>2. Ground mounted Generation Units with a capacity >25 kW where 67% or more of the electric output on an annual basis used by an on-site load. | 0.9 |
| C | 1. Generation Units on Landfills<br>2. Generation Units on Brownfields<br>3. Generation Units with a capacity of <= 650 kW where less than 67% of the electrical output on an annual basis used by an on-site load. | 0.8 |
| Managed Growth | Unit that does not meet the criteria of Market Sector A, B, or C. | 0.7 |

# Net Metering

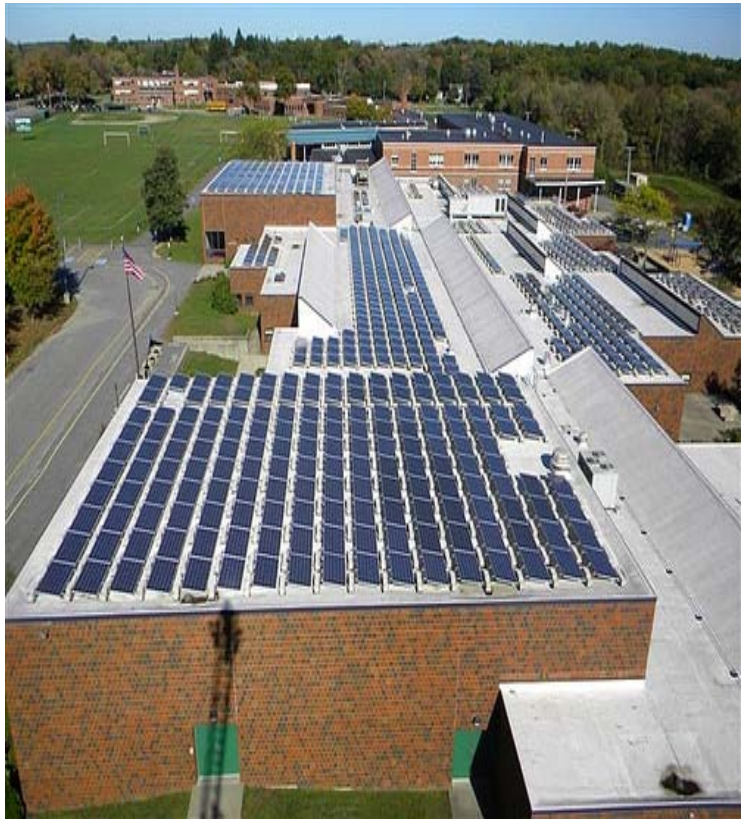
- Net metering is an incentive program designed to encourage customers to install distributed generation
  - Customers offset own electricity usage
  - Customers are compensated for electricity they generate and don't use
- If consumption exceeds generation, customer pays for net kWh consumed
- If generation exceeds consumption, customer receives credit on bill for net excess generation
- Many non-residential and most municipal solar projects depend on the net metering credit incentive, along with SREC revenue
- MA market is non-uniform in the availability and value of Net Metering credits by utility territory
- Legislature raised net metering caps this summer
- Current net metering caps are set at 5% for public projects and 4% for private projects

# History of Net Metering in MA

- Created in 1982
  - Originally only for systems ≤ 30 kW
- Expanded in 1997
  - Allowed for systems ≤ 60 kW
- Significant revisions made by Green Communities Act of 2008
  - Allowed for systems ≤ 2 MW, increased value of net metering credits
- Further amended in 2010
  - Expanded program caps and clarified rules
- Amended again in 2012
  - Expanded program caps, clarified rules, expanded eligibility to anaerobic digesters
- Recently amended in 2014
  - Expanded program caps, established task force to study long-term solutions

# Example: PV Facility on School

- PV system generates 60,000 kWh/month
- School months
  - Electricity usage = 80,000 kWh
  - School is charged for 20,000 kWh
- Summer months
  - Electricity usage = 10,000 kWh
  - School is credited for 50,000 kWh
- 50,000 kWh represents excess generation and can be applied to the bill during the school year.



202 kW installation in Sutton, MA

# Eligibility Criteria & Facility Classes

- In order to be eligible for net metering in MA, facilities must meet four criteria
  - Use some on-site load (can be parasitic)
  - Be located in investor owned utility (IOU) service territory
  - Have a capacity of less than 2 MW AC (10 MW for public facilities)
  - Be a PV, Wind, Anaerobic Digestion, or Agricultural Generation Unit
- There are three classes of net metering facilities in MA
  - Class I (≤ 60 kW)
  - Class II (60 kW – 1 MW)
  - Class III (1 MW – 2 MW)

# Private Entities

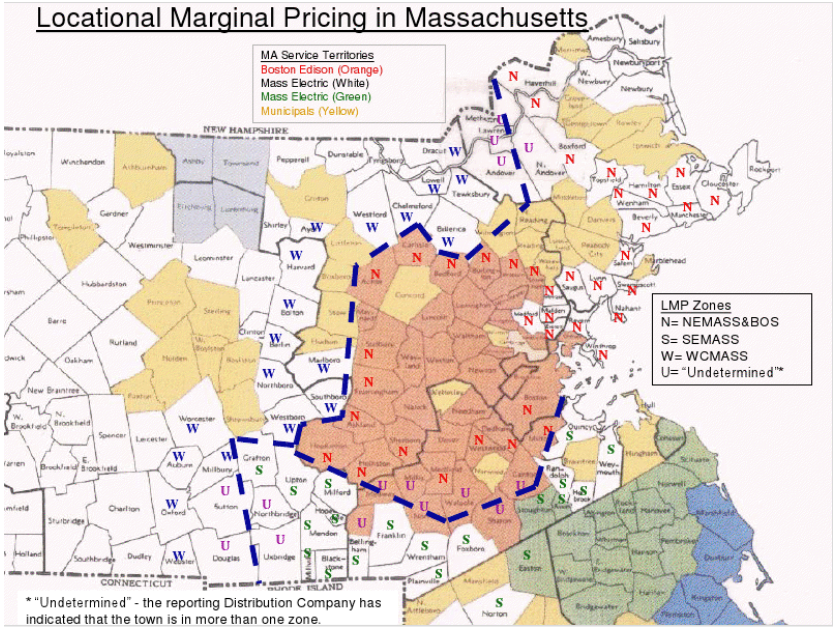
- All generation units are classified as either public or private.
- 2 MW **per facility** for private entities
- Facility =
  - Single parcel of land
  - One interconnection point
  - One utility meter
- ***Cannot*** have multiple "facilities" on one parcel of land
- Class III private facilities receive lower value net metering credits than Class III public facilities.

# Public Entities

- In order to be classified as public, a facility must:
  - Have a public entity listed as the host customer on its interconnection application
  - Provide 100% of the net metering credits it generates to a public entity
- Public entities can develop up to 10 MW per facility
- 2 MW **per unit**
- Unit =
  - For wind – a turbine
  - For PV – an inverter
  - For AD or agricultural – an engine or combustion turbine

# Net Metering Credits

- Generation is tracked on a meter in kWh, but credits are expressed as a monetary value
  - Excess generation (kWh) results in net metering credits
  - Net metering credit = $ credit
- Credits offset charges on electricity bills
- Credits never expire
- Credits can be “cashed-out” at the discretion of the Distribution Company, but rarely are




Map of ISO-NE Load Zones

# Net Metering Credits (cont.)

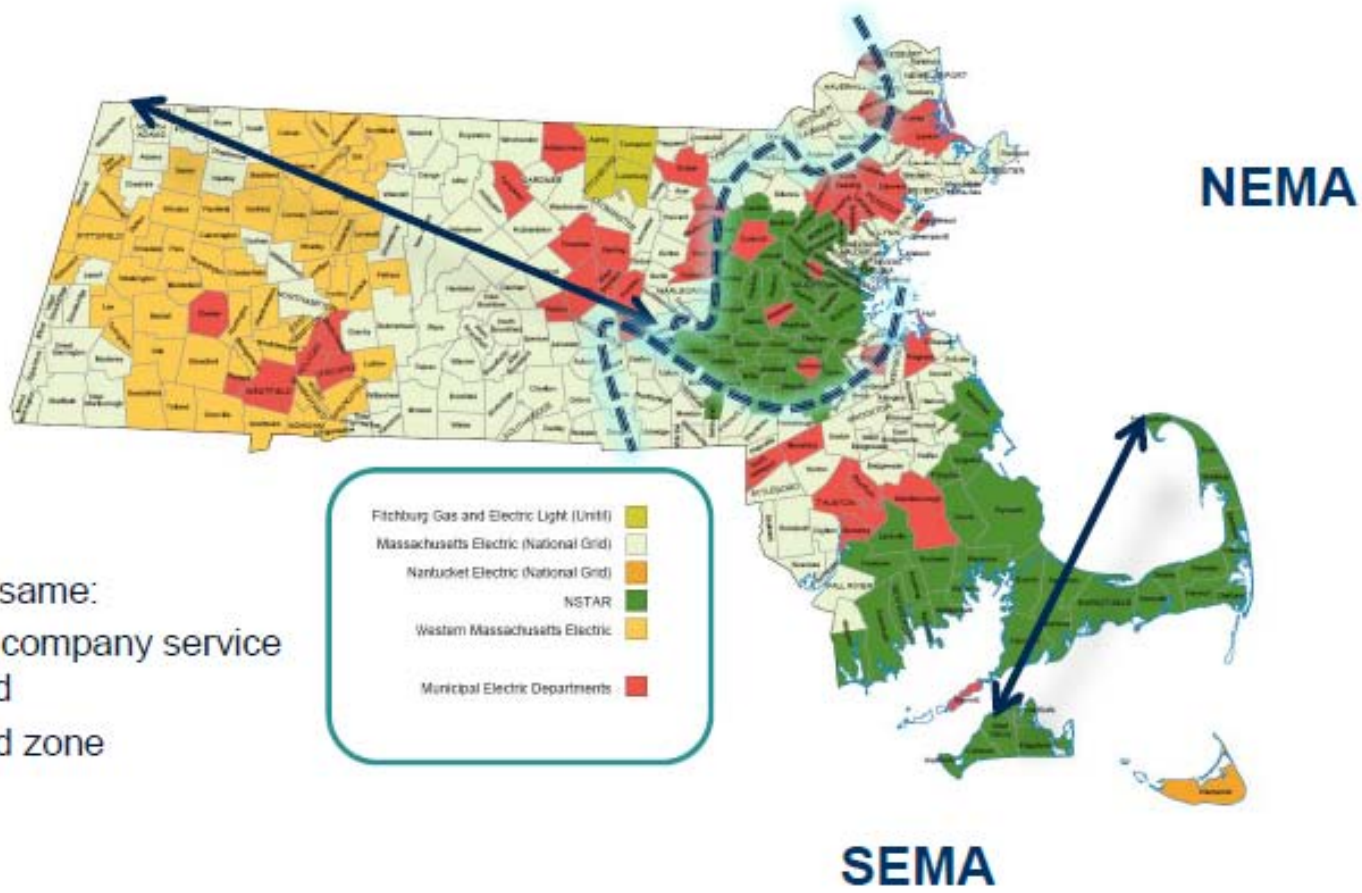
| Credit Calculation | | Units | Class I | Class I- Wind, PV, Ag. | Class II | Class III | Neighborhood Net Metering |
|---|---|---|---|---|---|---|---|
| | Customer Charge | $/month | | | | | |
| Delivery | Distribution Charge | ¢/kWh | | ✓ | ✓ | * | |
| | Transmission Charge | ¢/kWh | | ✓ | ✓ | ✓ | ✓ |
| | Transition Charge | ¢/kWh | | ✓ | ✓ | ✓ | ✓ |
| | System Benefit Charge | | | | | | |
| | Efficiency Charge | ¢/kWh | | | | | |
| | Renewables Charge | ¢/kWh | | | | | |
| Supply | Basic Service | ¢/kWh | | ✓ | ✓ | ✓ | ✓ |
| Generation | Average Monthly Clearing Price at the ISO-NE | ¢/kWh | ✓ | | | | |

* Only applies to class III municipalities and governmental entities

# Credit Allocation

- Credits may be allocated to accounts located in same utility service territory and ISO-NE load zone
- Credits are allocated on a percentage basis
- Can be allocated to as many accounts as the customer wishes
- Allocation is done via Schedule Z form
- Can be changed twice annually
- Payment for the credits is negotiated between the credit owner and credit off taker via a Net Metering Credit Purchase Agreement

# Credit Allocation (cont.)




Allocation only in same:

(1) Distribution company service territory; and

(2) ISO-NE load zone

# Example: Credit Allocation

- 2 MW project located on landfill in Easthampton, MA
- Very little on-site load
- Developer allocates net metering credits to Town of Easthampton's municipal electric account(s)
- Town of Easthampton enters into sale of net metering credits agreement with project owner/developer
- Easthampton receives $ credits, but only pays a fraction of a dollar for the credit
- Developer compensated at a rate higher than the wholesale clearing price for electricity, but slightly less than the retail rate

Easthampton Landfill 2 MW Array (photo by Borrego Solar Systems, Inc.)

# Residential Direct Ownership

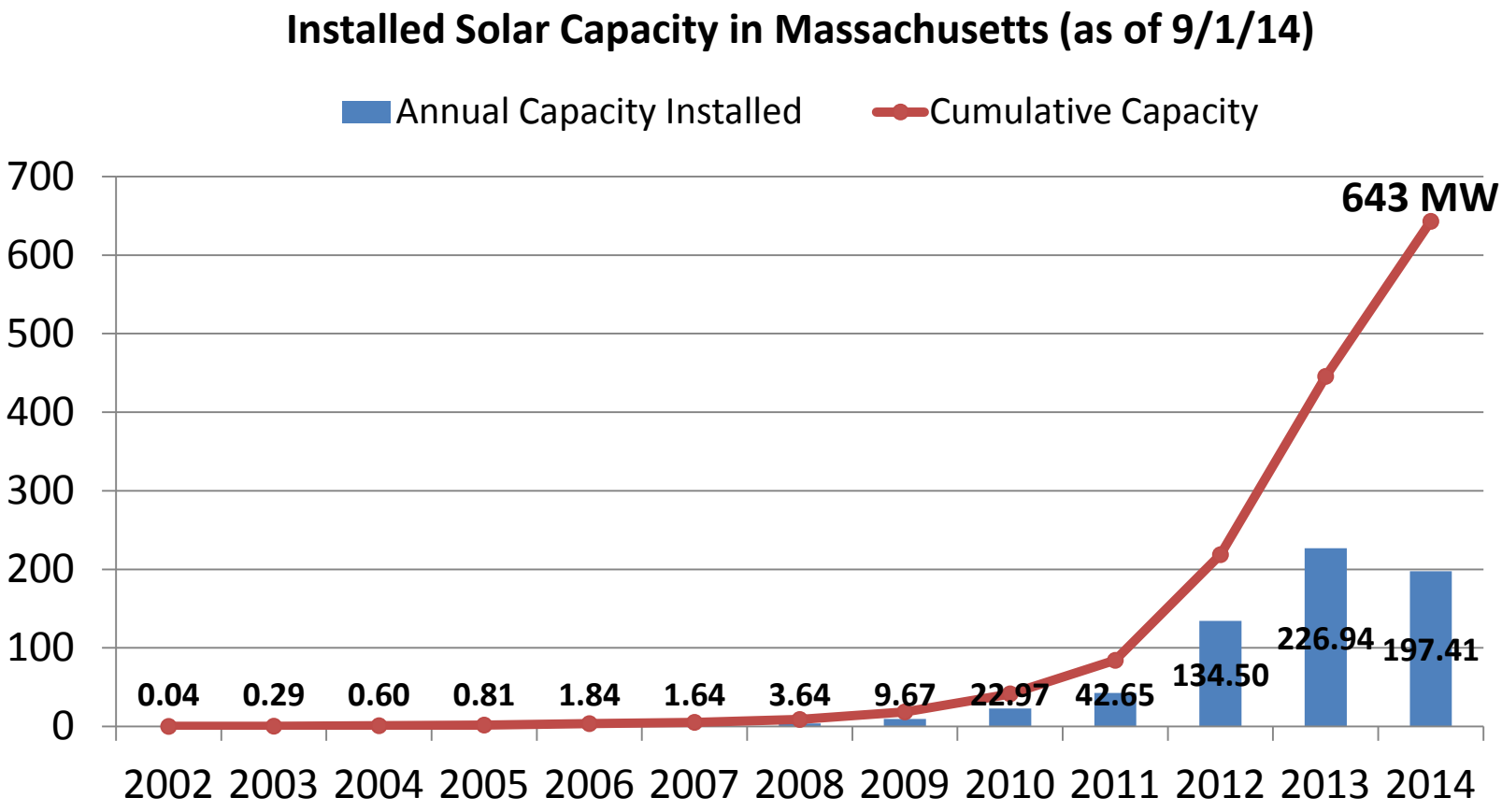
## ACP-funded Support Program

- DOER estimates that a robust residential direct ownership market would need to be supported by $20-50 million in loans at the start of SREC II, and $300-600 million cumulatively through 2020. This represents a significant opportunity for the financing/banking industry.
- DOER announced, in parallel with the SREC-II rulemaking, a financing support program using ACP funds. Final development of the program will be done in coordination with stakeholder input, including direct discussions with the banking industry.
- DOER anticipates using approximately $30 million of ACP funds for this purpose. Leveraging funds will be important, along with strategies to enable banking sector to sustain lending as ACP support is diminished.
- MassCEC will maintain CommSolar II rebate program through the development of the financing program.
- Program expected to be launched by the end of 2014

# MA Ranks High Among States Supporting Solar

- Governor's goal of installing 250 MW by 2017 met four years early; new goal of 1,600 MW by 2020.
- 350 of 351 MA cities and towns have a solar installation. Over 150 municipalities are hosting solar projects on town facilities.
- More solar was installed in 2013 than in all prior years combined
- Massachusetts is well ranked nationally (SEIA and Solar Foundation 2014)
  - 4th in solar capacity installed in 2013
  - 5th in cumulative installed capacity
  - 2nd in commercial installations; 6th in residential installations
  - 4th in total solar jobs; 6th in per capita solar jobs
- Over 1,800 firms in MA work primarily in the renewable energy sector, employing over 21,000 workers. Nearly 60% of renewable energy workers support the solar sector *(2013 MassCEC Jobs Report).*

# Remarkable Solar Growth in Massachusetts






*Creating A Greener Energy Future For the Commonwealth*

DOER
Massachusetts Department of Energy Resources

# Thank You

**DOER RPS Website:** www.mass.gov/energy/rps

**RPS Contact:** DOER.RPS@state.ma.us

**DOER Solar Website:** www.mass.gov/energy/solar

**SREC Contact:** DOER.SREC@state.ma.us