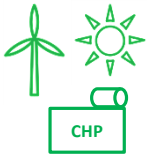
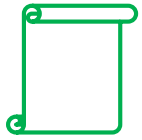
MA Leading by Example Council Meeting

DOER Massachusetts Department of Energy Resources

January 17, 2019

MASSACHUSETTS LEADING BY EXAMPLE PROGRAM
PUBLIC LEADERSHIP. STEWARDSHIP. COMMITMENT

State Government Progress – as of Jan. 2019

Greenhouse Gas (GHG) Emissions  **↓ 28%** 2004 -2017	**Energy Use Intensity per Square Foot**  **↓ 15%** 2004-2017	**Electricity via Renewable or Onsite Generation**  **20%** In 2017	**Heating Oil Consumption at State Facilities**  **↓ 84%** 2006-2017
24.1 MW Installed Solar PV at State Sites  **15.9 MW** Since 2015	**82 LEED Certified State Buildings**  **45** Since 2015	**125 Electric Vehicle Charging Stations at State Sites**  **55** Since 2015	**Leading by Example Grants Awarded**  **$10.7 M** Since 2015

News From Around the World

Fourth National Climate Assessment

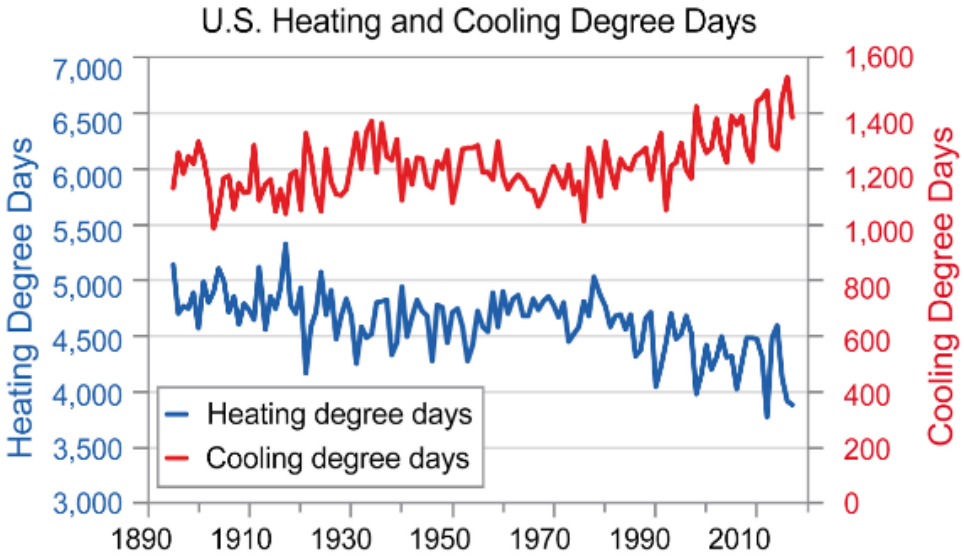
NCA, 2018

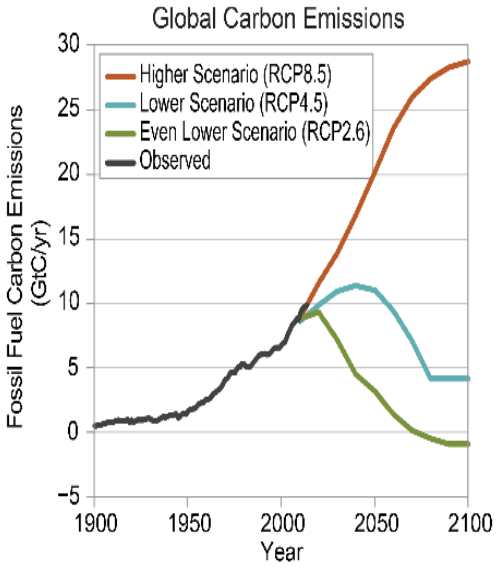
Report from 13 Federal Agencies

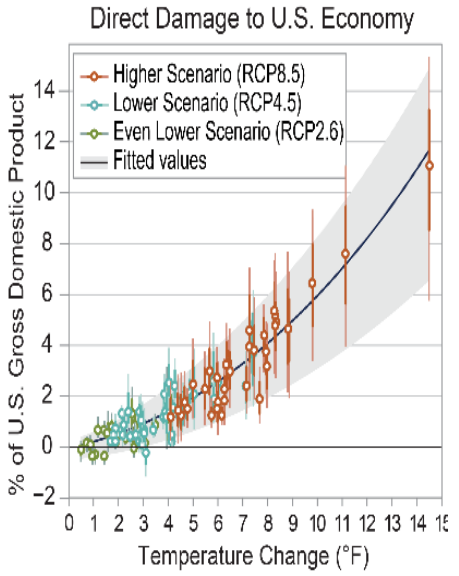
Actions to Reduce Risks:

- "While mitigation and adaptation efforts have expanded substantially in the last four years, **they do not yet approach the scale considered necessary to avoid substantial damages** to the economy, environment, and human health over the coming decades."

- "Because society is already committed to a certain amount of future climate change due to past and present emissions and because mitigation activities cannot avoid all climate-related risks, **mitigation and adaptation activities can be considered complementary strategies."**







Climate Takeaways

1. Climate Change is accelerating
2. Nothing can be done to completely stop future impacts
3. Adaptation strategies are and will be required
4. Mitigation is still critically important to avoid catastrophic environmental and economic damage

Climate Change Headlines: 2018 in Review
The Bad

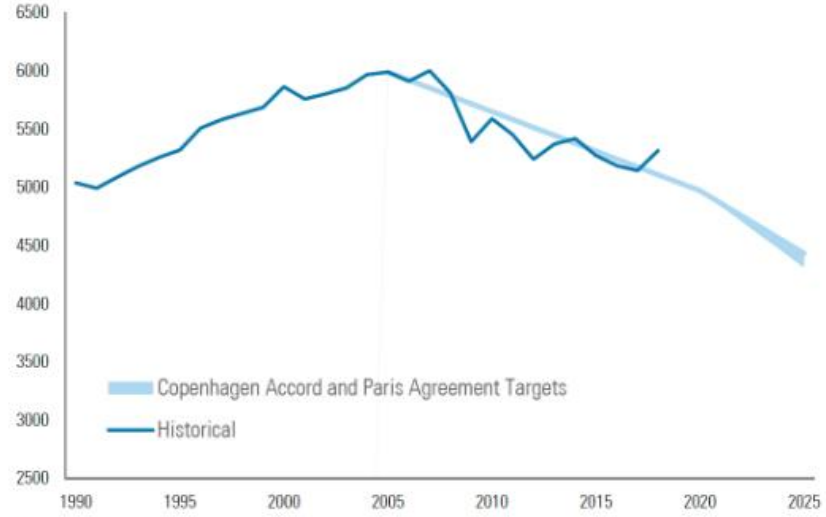
US CO_2 Emissions Increased in 2018

Rhodium Group, 2018

- Increased estimated 3.8% from 2017 to 2018
- Largest emissions growth occurred in two sectors: buildings and industry

Figure 6: US energy-related CO_2 emissions

Million metric tons. Copenhagen Accord and Paris Agreement Targets assume reductions in energy-related CO_2 emissions proportional to the economy-wide GHG total



Source: Rhodium US Climate Service

Warming in Arctic Raises Fears of a 'Rapid Unraveling' of the Region

NYT, 2018

- The Arctic has been warmer over the last 5 years than at any time since records began in 1900, and the region is warming at 2x the rate as the rest of the planet

Oceans are warming even faster than previously thought

UC Berkley, 2019

- 2018: Warmest year on record in the oceans
- If no GHG reduction by 2100: estimated 1 foot of sea level rise

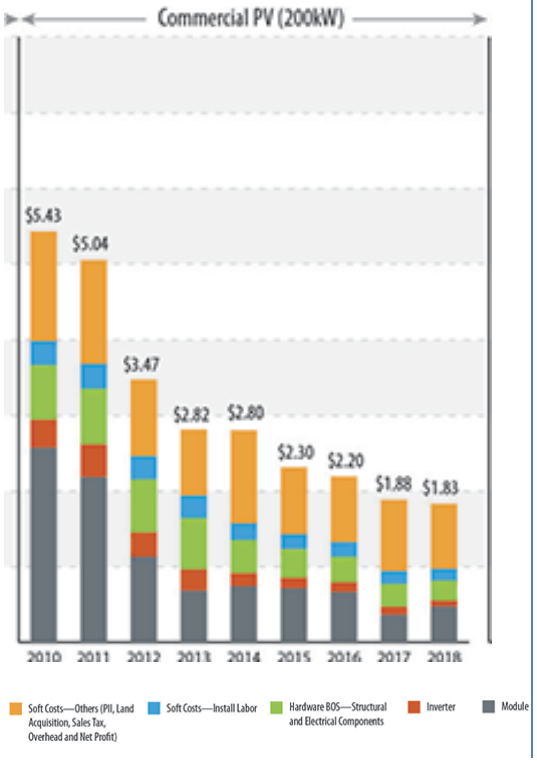
Climate Change Headlines: 2018 in Review

The Good

Costs Continue to Decline for Residential and Commercial Photovoltaics in 2018

NREL, 2018

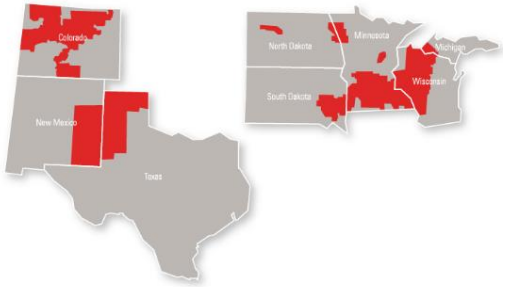
- **Solar costs down 66% since 2010**



Xcel Energy Commits to 100% Carbon-Free Electricity by 2050

GTM, 2018

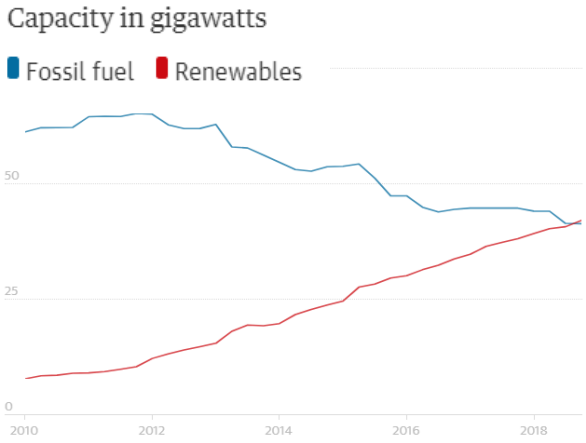
- **First power company to commit to 100% carbon-free electricity by 2050 across 8 Western and Midwestern states**
- **80% by 2030 goal can be met through affordable and currently available technologies but 100% clean energy will require technologies that are not currently cost-effective or commercially available**



UK renewable energy capacity surpasses fossil fuels for first time

The Guardian, 2018

- **In past 5 years, renewable capacity has tripled while fossil fuels' has fallen by one-third, as power stations at end of life or became uneconomic**
- **Between July and September, UK capacity of wind, solar, biomass and hydro reached 41.9 GW, exceeding the 41.2GW capacity of coal, gas and oil-fired power plants**



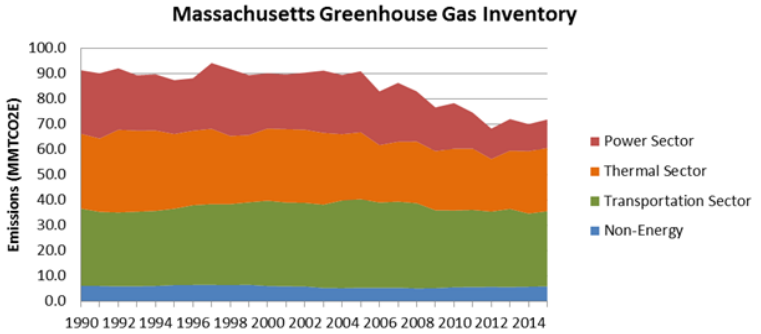
Massachusetts Updates

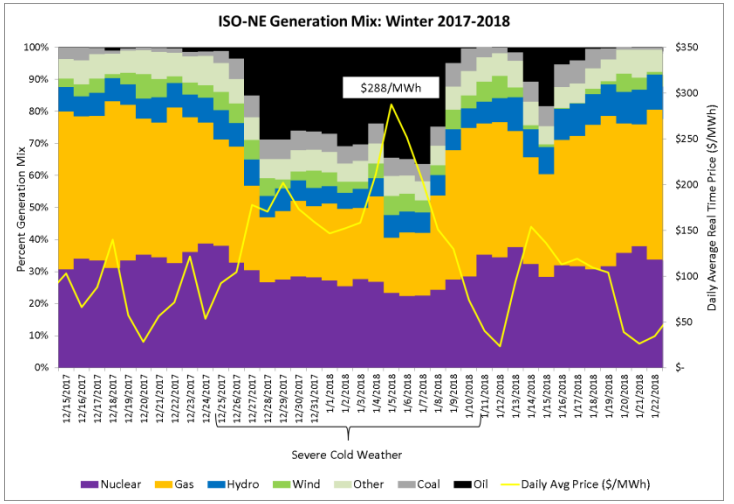
MA Comprehensive Energy Plan

Press Release, 2018

Some Key Findings:

- Electric generation contributes the fewest GHG emissions in MA and is also where we have made the greatest progress in reducing emissions
- NE states have some of the highest electric rates in the nation, however MA on path to become more competitive
- Region remains at risk for price spikes and emission increases during extended cold periods





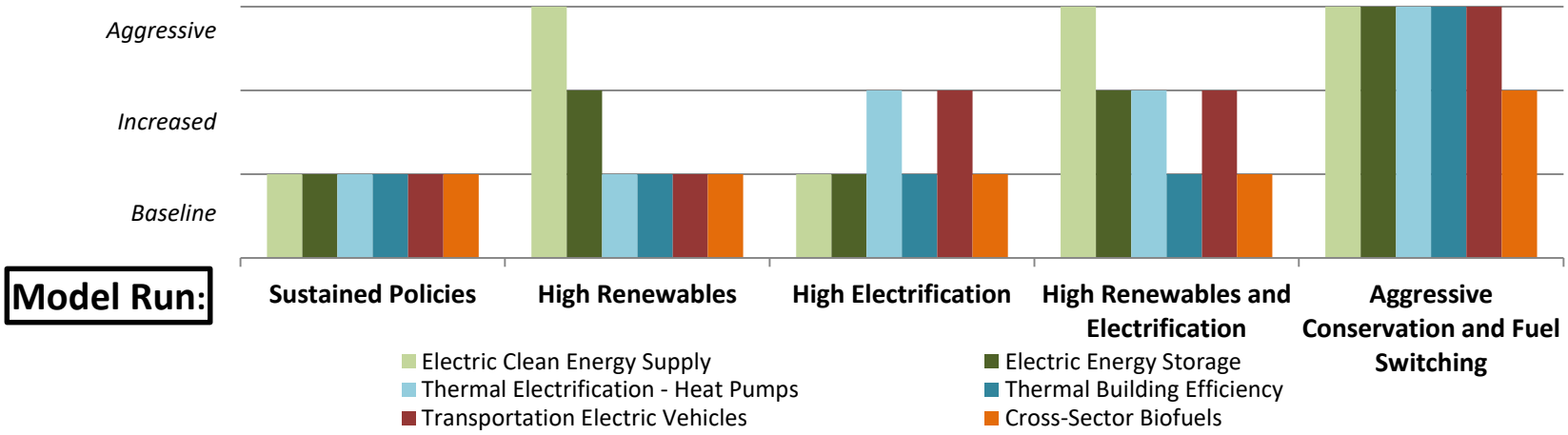
Creating A Clean, Affordable and Resilient Energy Future For the Commonwealth

Massachusetts Department of Energy Resources

Scenario Modeling Analysis

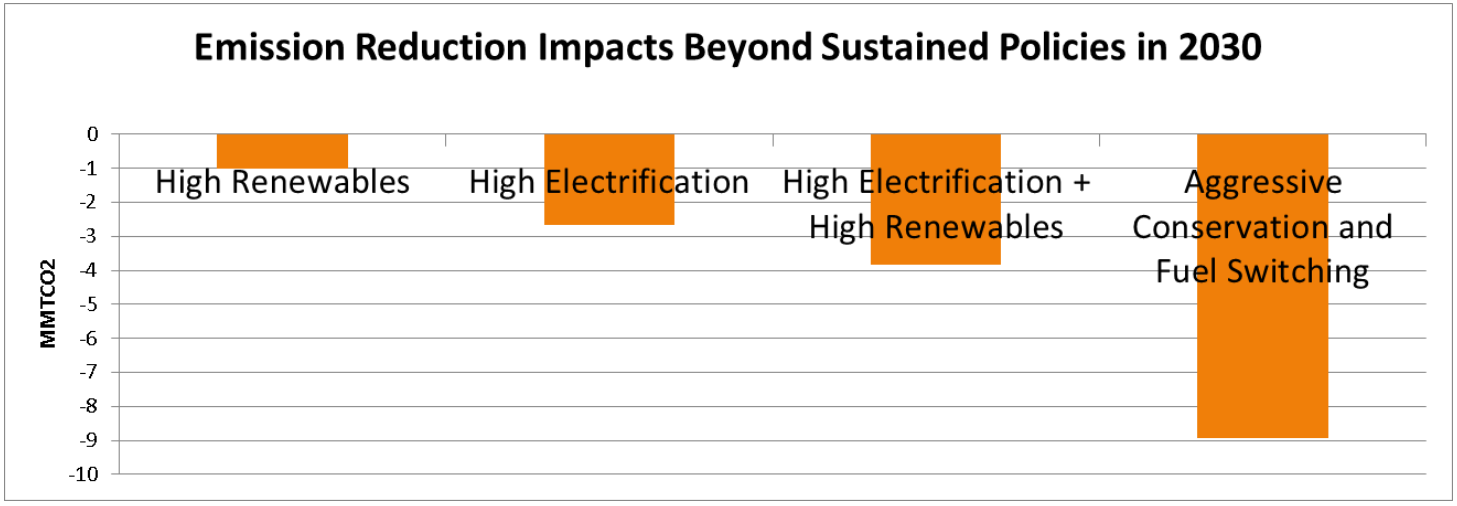
Modeled various hypothetical amounts of clean energy and demand between now and 2030 to see impact on cost, emissions and reliability:

Scenarios	Modeling Assumptions by 2030
Sustained Policies	*Assumption of what outcomes will be achieved by 2030 as a result of current policies (Pre-2018 Legislation)* 45% clean retail electricity; 500 MWh storage; 1.2 million EVs
High Renewables	*Sustained Policies with additional clean electricity:* + 16 TWh of Clean Electricity (4,000 – 7,000 MW), 65% clean retail electricity + 3x amount of energy storage (1800 MWh)
High Electrification	*Sustained Policies with increased electrification of Thermal and Transportation Sectors* + Accelerated growth in EVs (1.7 million LDV (36%) - by 2030) + 25% of oil-heated and 10% of gas-heated buildings switch to ASHP
High Renewables + Electrification	*Combine the High Renewables and High Electrification assumptions*
Aggressive Conservation + Fuel Switching	*High Renewables + Electrification scenario with:* + More aggressive fuel switching in the Thermal and Transportation sectors + 3x increase in pace of weatherization and building efficiency + 2 GW peak demand reduction



Findings: Impact on Emissions

- With sustained policies, Massachusetts estimated to achieve 35% emission reduction from 1990 levels by 2030 (~61 $MMTCO_2$); key findings for additional reductions:
  - Focusing policies primarily on the electric sector has diminishing returns, increasing rates with while realizing only modest decreases in GHG emissions
  - Electrifying the thermal and transportation sector leverages investments made in a cleaner electric grid
  - Conservation and peak demand reduction important as use of electricity for heating and transportation grows
  - Improving building efficiency is important to achieving reduced emissions in thermal sector
  - Alternative fuels, such as biofuels, can assist in transition to cleaner heating and transportation



Greatest amount of emissions reductions are achieved by combining increased use of clean energy in all sectors while simultaneously decreasing overall energy consumption

MA Comprehensive Energy Plan

Policy Priorities & Strategies

Thermal Sector

- **Target electrification** of heating and cooling
- **Promote fuel switching** to lower cost, lower carbon fuels such as electric air source heat pumps and biofuels
- Reduce consumption
- **Drive demand** for energy efficiency and fuel switching
- **Invest in R&D** for clean heating fuels, such as renewable gas and biofuels

Electric Sector

- Prioritize electric energy efficiency and peak demand reductions
  - **Utilize our successful Green Communities and Leading By Example programs to continue to make state and municipal infrastructure clean and efficient**
- Continue to increase cost-effective renewable energy supply
- Support grid modernization and advanced technologies
- Examine strategies to lower natural **gas price and mitigate natural gas constraints**

Transportation Sector

- Increase the **deployment of EVs** and charging infrastructure
- Support development of **liquid renewable fuels** to provide alternative transportation fuels

3 Year Energy Efficiency Plan

2019-2021 Three Year Planning Process

6 EEAC workshops to establish Council priorities for Plan	Fall 2017/Winter 2018
EEAC votes on its 2019-2021 priorities	February 2018
8 Public listening sessions	Winter/Spring 2018

April 30, 2018
DRAFT Plan

May – July 2018
Review and Comment on Draft Plan

July 31, 2018
Council Vote on Draft Plan Resolution

Throughout Summer 2018
Analysis, goal setting, and program design discussions continue

September 14, 2018
PAs Submit 2nd Draft of Plan

October 23, 2018
PAs submit updates to Plan and data tables to the EEAC

October 30th, 2018
Council unanimously approved Updated Plan

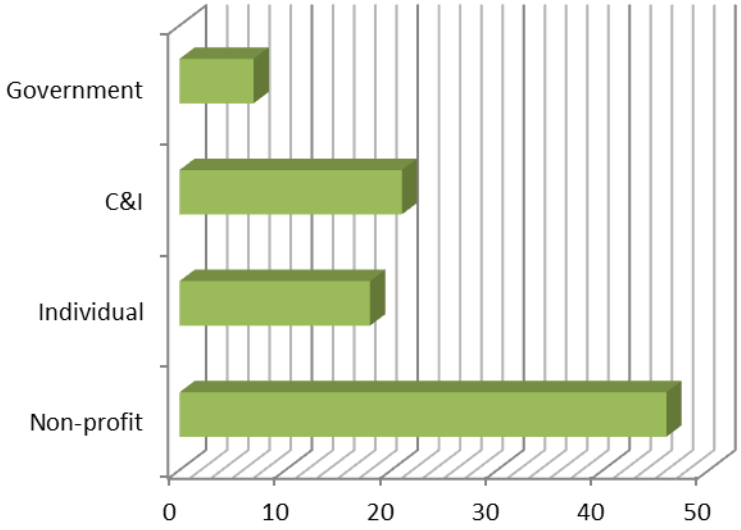
October 31, 2018
PAs submit Final Plan to DPU

2019-2021 Public Comment Summary – THANK YOU

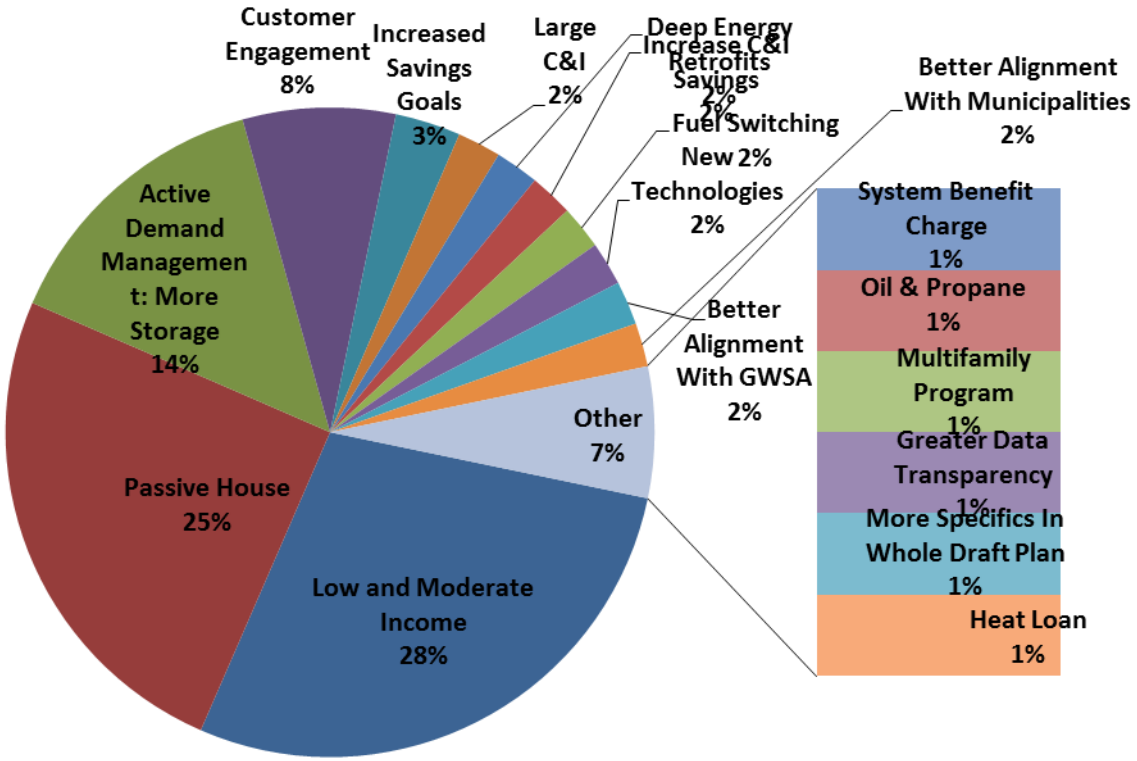
Total number of written comments

93

Affiliation of Commenter



3-Year Plan Written Public Comment Themes



Summary 2019-2021 Plan as Filed

Statewide Goals	2019-2021
Net Lifetime MMBtu Savings	261,931,735
CO2e Reductions (tons)	2.7 million
Total Budget	$2.7 billion
Total Benefits	$8.5 billion
Electric Savings as % of Sales	2.7 %
Gas Savings as % of Sales	1.25%

2019-2021 EE Plan Themes

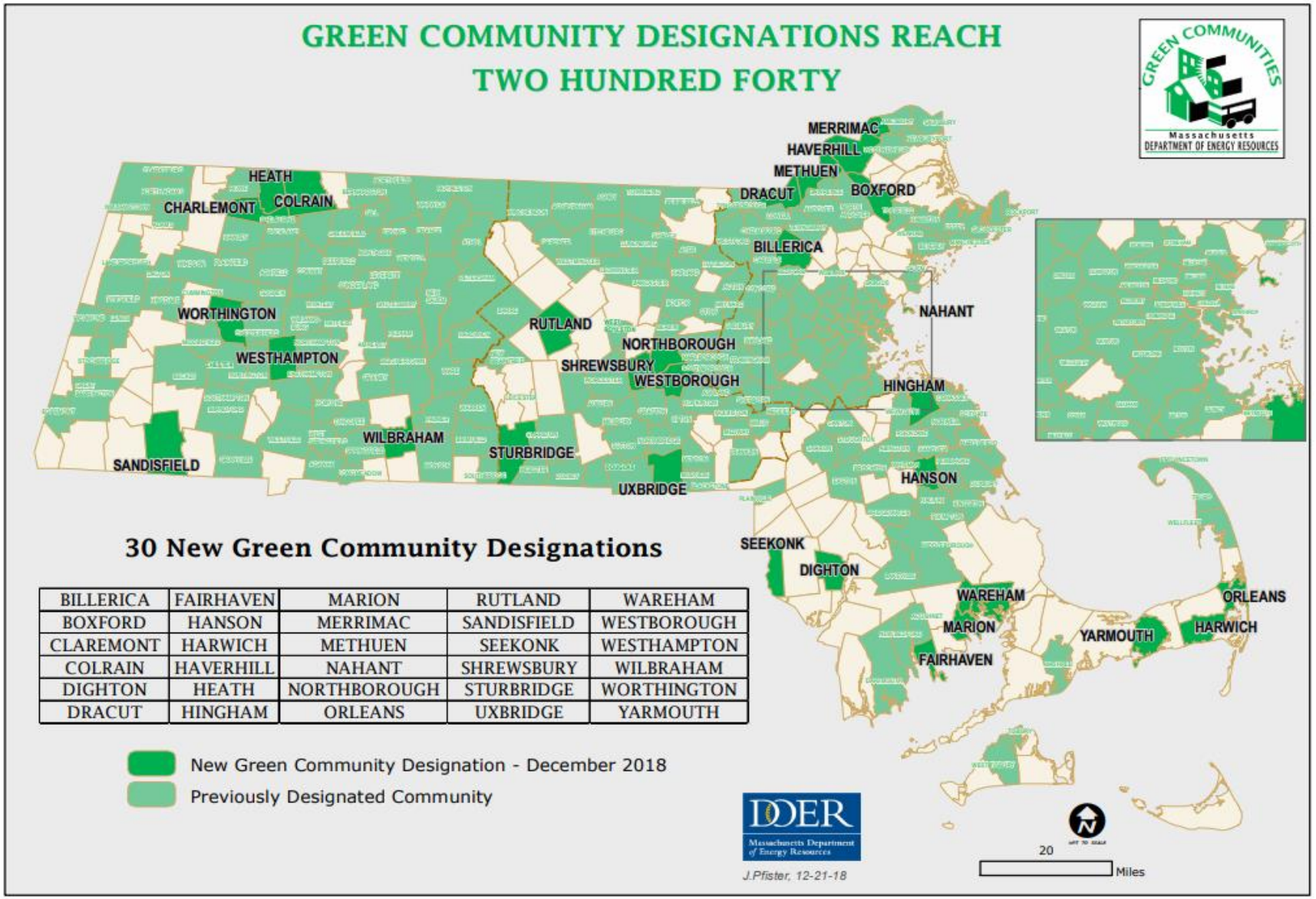
- Also focus on reducing energy use during times when demand and costs are highest
- Winter reliability focus on natural gas savings through active demand technologies (including storage) and LED conversions
- Residential enhancements through expanding participation and energy justice, Pre-weatherization barrier financing and Home Energy Scorecards as part of in-home assessment
- Energy Optimization and Fuel Switching through fuel-neutral heating and hot water recommendations and increased incentives for cold climate air-source heat pumps
- Expanded efforts on zero energy and Passive House strategies

Next Steps

- DPU Decision on the 2019-2021 Three Year Plan by January 31, 2019
- More details at March Council meeting

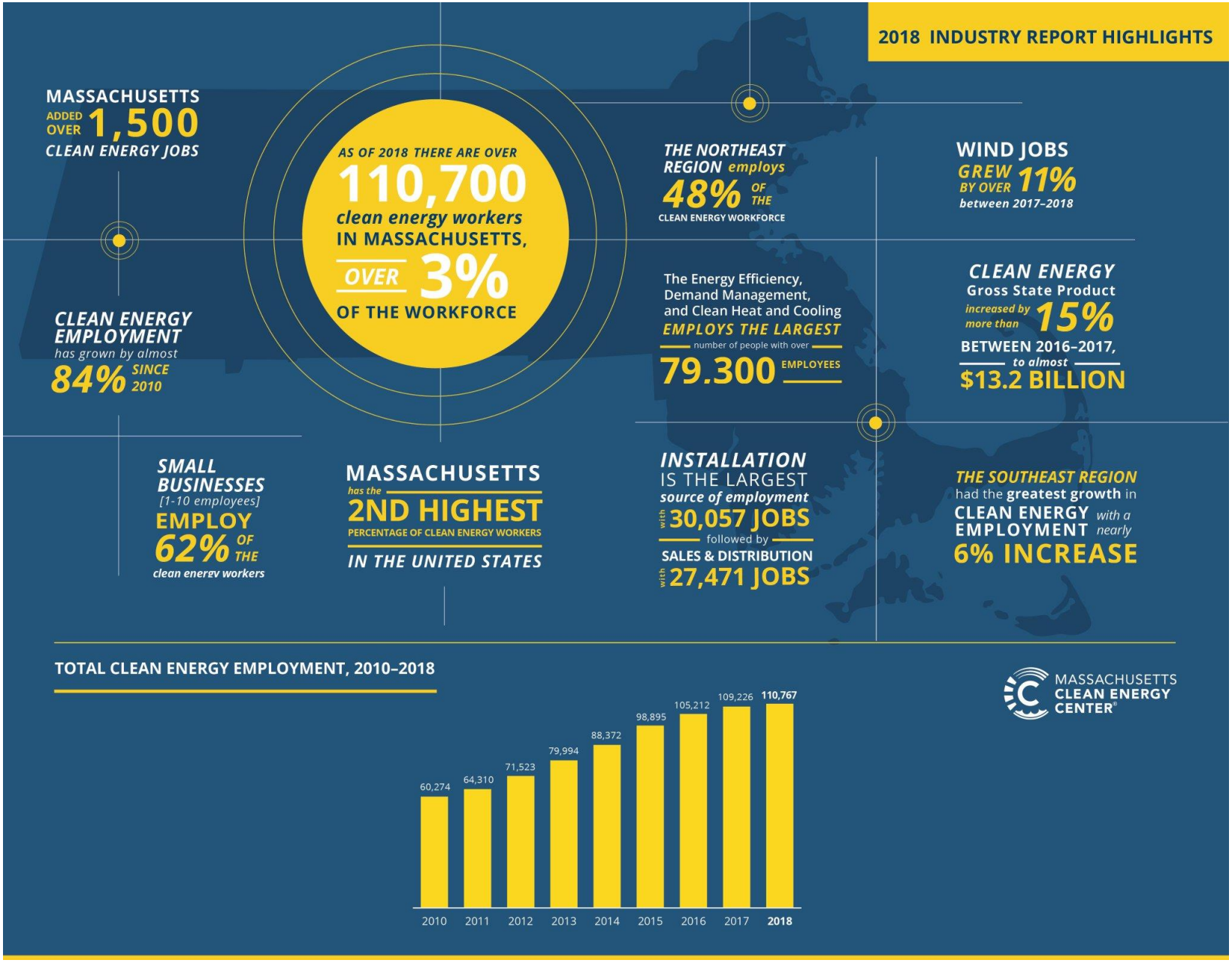
- **Interested in learning more?**
  - Plan documents posted to the EEAC website
  - http://ma-eeac.org/plans-updates/

New Green Communities Designations



- **30 new designations**
- **68% of MA residents live in a Green Community**

MassCEC Clean Energy Industry Report



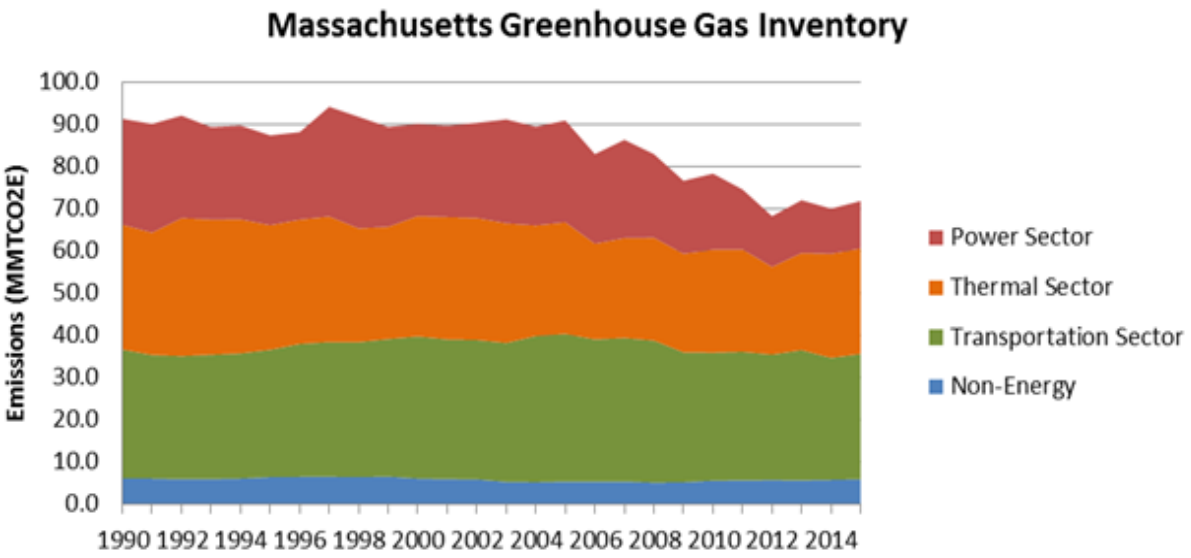
Watertown Rooftop Solar Requirement

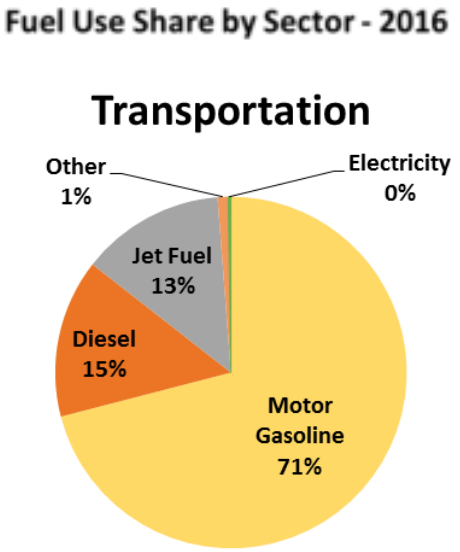
- **1st Town In New England To Require Solar Panels On New Commercial Construction**
- New ordinance applies to commercial new construction and renovation projects including:
  - ≥ 10,000 square feet
  - 10 or more residential units
  - Parking garages
- Exemptions: single-family homes, duplexes and buildings lacking feasible solar-zones

WBUR, 2018

Clean Transportation: Fleets & Infrastructure

Setting the Stage





★ COMMISSION ON THE FUTURE OF TRANSPORTATION IN THE COMMONWEALTH

Press Release December, 2018

Established in Jan. 2018 by EO569 to provide recommendations on transportation needs and challenges facing the Commonwealth between 2020 and 2040

Recommendations by the Commission to the Governor:

I. **Modernize** existing state and municipal transit and **transportation assets** to more effectively and sustainably move more people throughout a growing Commonwealth

II. Create a 21st century "mobility infrastructure…" to capitalize on **emerging changes** in transportation technology and behavior

III. **Substantially reduce GHG emissions** from transportation sector in order to meet Commonwealth's GWSA commitments, while also accelerating efforts to make transportation infrastructure resilient to a changing climate

IV. Coordinate and modernize land use, economic development, housing, and transportation policies and investment in order to support resilient and dynamic regions and communities throughout Commonwealth

V. Make changes to current transportation governance and financial structures in order to better position MA for the transportation system that it needs in the next years and decades

Recommendations of note for LBE:

- **Enable and promote a ubiquitous electric charging (and/or alternative fuel) infrastructure**
- **Establish a goal that all new cars, light duty trucks, and buses sold in MA will be electric by 2040**
  - **Public Fleets: Establish a goal for purchase of ZEVs-only by 2030**
- **Establish a regional, market-based program to reduce transportation sector greenhouse gas (GHG) emissions**
- **Prepare MassDOT and other transportation-related entities to effectively oversee a changing transportation system**

MA Joins Regional State Partnership to Reduce Transportation Emissions

- Through the Transportation and Climate Initiative (TCI), a program of the Georgetown Climate Center
- MA reached an agreement with 8 states and Washington DC to work together over the next year to develop the framework for a regional program to address greenhouse gas emissions in the transportation sector
- At the conclusion of the policy development process, member states will decide whether to adopt and implement the policy

Press Release, 2018

Partners:

- Connecticut
- Delaware
- Maryland
- New Jersey
- Pennsylvania
- Rhode Island
- Vermont
- Virginia
- + Washington DC

"As the transportation sector is the largest contributor to carbon emissions in the Commonwealth, reducing transportation emissions is imperative to combating the causes of climate change and meeting Massachusetts' aggressive greenhouse gas reduction targets,"

- Governor Charlie Baker.

VW Emissions Settlement Funding Plan

- Commonwealth has been allocated $75,064,424.40 in funding from the VW Settlement
- Massachusetts has up to 10 years to spend 80% of its allocation and an additional five years to spend the remaining 20%.
- Plan recommends funding for 10 categories:
  1. *Class 8 Local Freight Trucks & Port Drayage Trucks (Large Trucks)*
  2. *School, Shuttle or Transit Buses*
  3. *Freight Switchers*
  4. *Ferries and Tugs*
  5. *Shore Power for Ocean Going Vessels (OGV)*
  6. *Class 4 through 7 Local Freight Trucks (Medium Trucks)*
  7. *Airport Ground Support Equipment (GSE)*
  8. *Forklifts and Port Cargo Handling Equipment (CHE)*
  9. ***Light Duty Zero Emission Vehicle Supply Equipment (EVSE)***
  10. *Diesel Emissions Reduction Act (DERA) Option*

MassDEP Press Release, 2018

Final MA VW Settlement Beneficiary Mitigation Plan

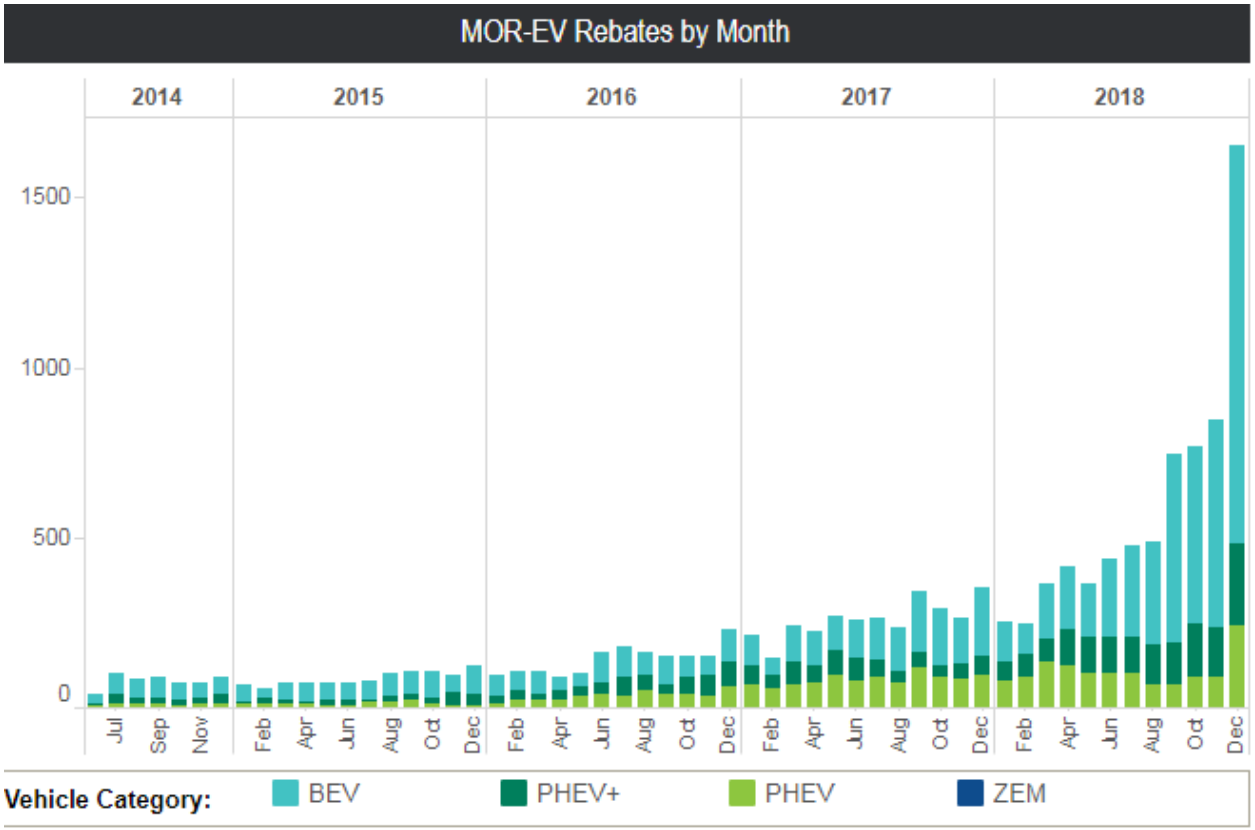
VW Emissions Settlement Funding Plan

- First year spending: $23.5M:
  - *$11M for replacement of diesel transit buses with electric buses at Pioneer Valley Transit Authority and Martha's Vineyard Transit Authority*
  - ***$5M for network of existing EVSE, with focus on funding charging stations at workplaces, multi-unit dwellings, and publicly accessible sites***
  - *$7.5M for proposals submitted to a VW Open Solicitation for eligible projects that reduce emissions from certain types of diesel vehicles, non-road equipment, and marine vessels*
- Up to 15% of the Trust funding can be used for the acquisition, installation and maintenance of equipment for both electric and hydrogen fuel cell options

Funding Categories for Light Duty Zero Emission EVSE	Maximum Allowable Funding %
Open to public at government-owned property	100%
Open to public at non-government owned property	80%
At workplace not open to general public	60%
At multi-unit dwelling not open to general public	60%

MOR-EV Program Update

MOR-EV
Massachusetts Offers Rebates for Electric Vehicles



Rebates Reserved & Issued	
BEV	7,732
PHEV+	2,812
PHEV	2,859
ZEM	24
Grand Total	**13,427**

Rebate Dollars Reserved & Issued	
BEV	$16,774,500
PHEV+	$7,022,500
PHEV	$4,143,500
ZEM	$18,000
Grand Total	**$27,958,500**

As of January 1, 2019:

- MOR-EV extended through at least June 30, 2019
- Now only supporting qualifying battery electric vehicles up to a $50,000 sales price with a $1,500 rebate

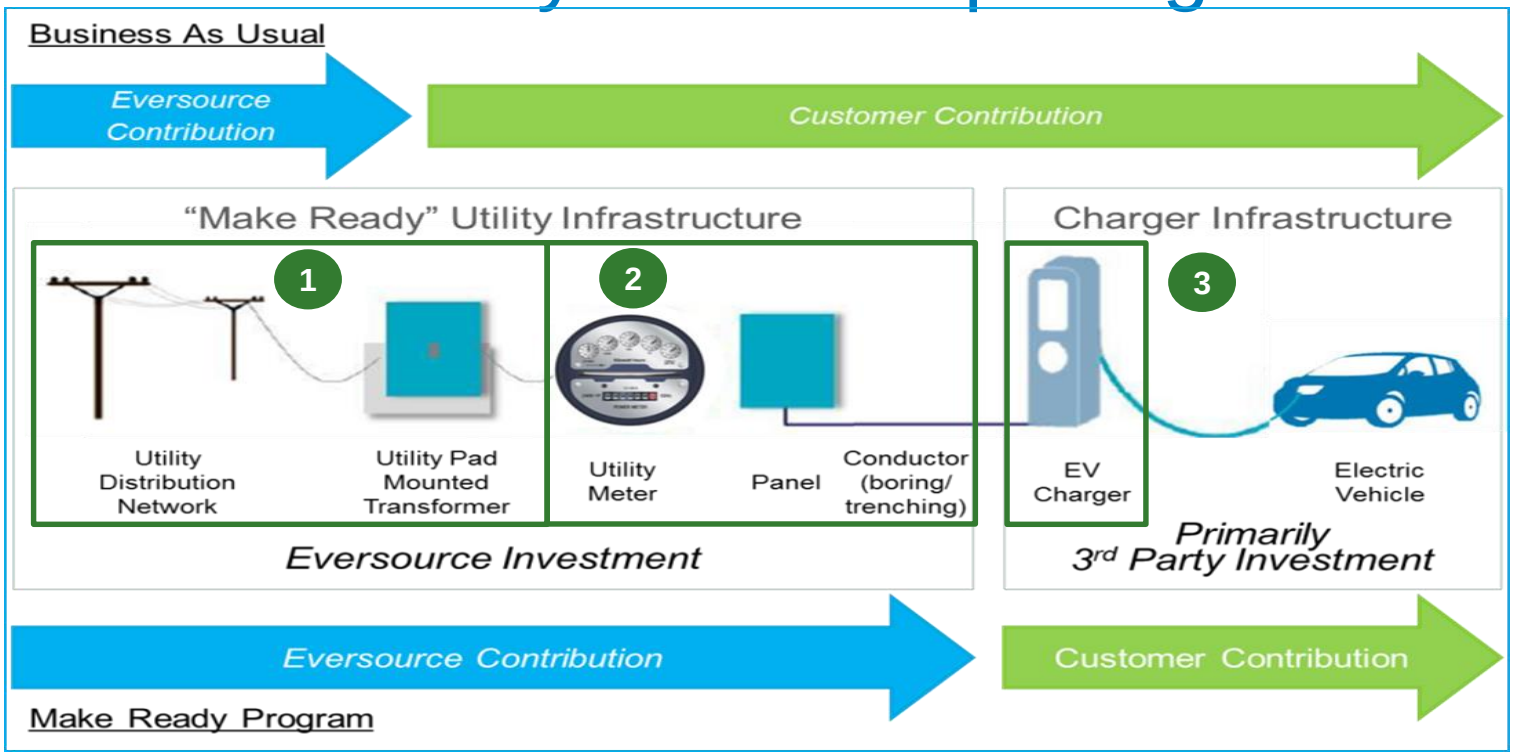
EVERSOURCE

Mass EV Make Ready Program Overview

EV Make-Ready Program Overview

- $45 million program for the deployment of Electric Vehicle Infrastructure in Eversource service territory.
- Deployment of up to 3,500 Level 2 and DC Fast charging stations throughout Eversource electric service territory.
- “Make-Ready” program shifts cost of “behind the meter” charging infrastructure from the site host to Eversource

EV Make Ready Ownership Diagram

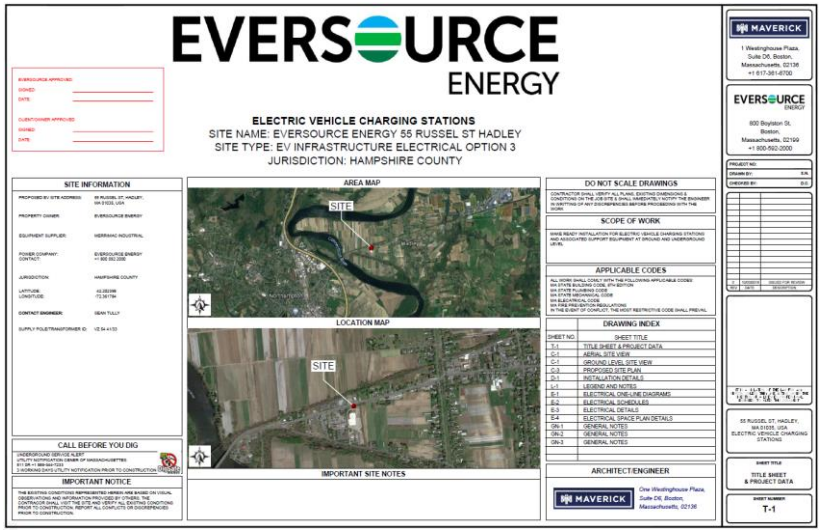


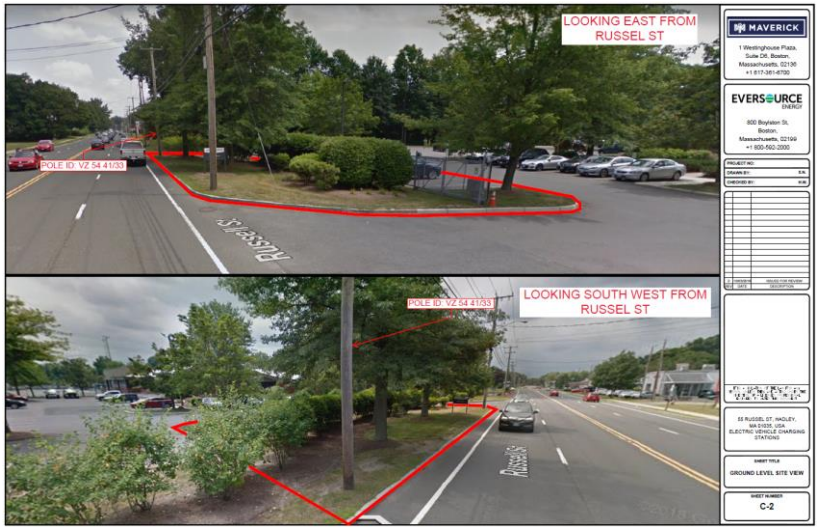
	1	2	3
Ownership	Eversource	Eversource	Site Host/ 3rd Party Operator
Construction	Eversource	Electrical Contractor	Site Host/ 3rd Party Operator
O&M	Eversource	Electrical Contractor	Site Host/ 3rd Party Operator

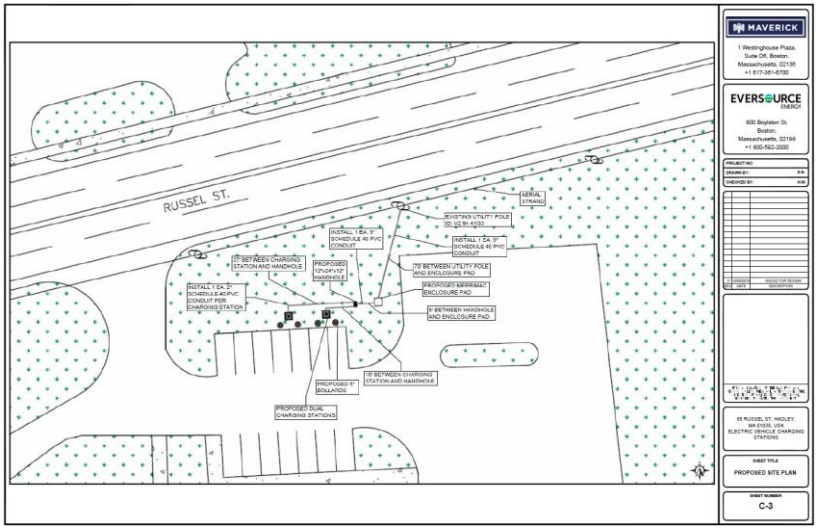
Site Deployment Example

Finished Site

Site Development Plans







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nationalgrid

HERE WITH YOU. HERE FOR YOU.

National Grid's Massachusetts Electric Transportation Program

Agenda

nationalgrid

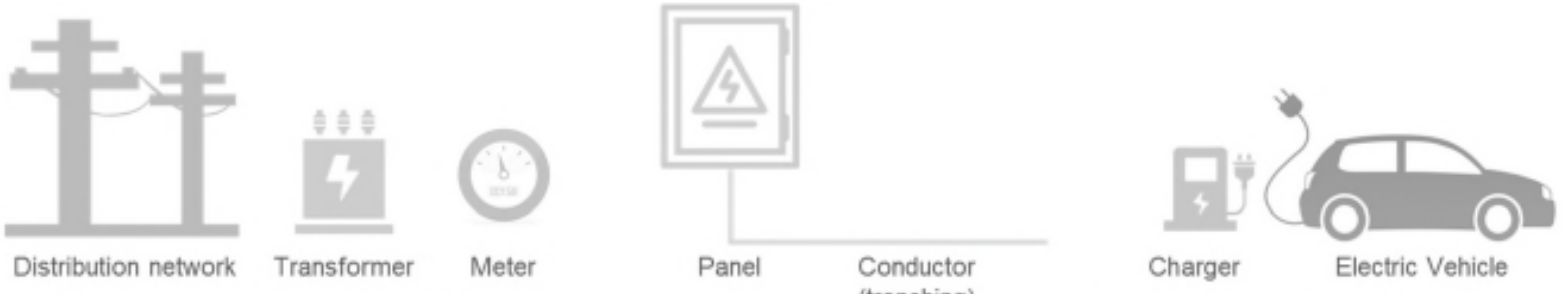
- EV Charging Infrastructure Program
  - Overview
  - Targeted Segments, Sites and Charging Ports
  - EVSE Rebate Levels
  - Qualified EVSE Equipment Lists (Level 2 and DCFC)
- Available Resources

Massachusetts EV Charging Infrastructure Program

- EV Program recently approved in September 2018

- For **approved** projects, National Grid:
  - Funds 100% of the electric service to the charging stations ("EVSE")
  - Provides a rebate for the charging stations

- Site Host:
  - Selects charging stations from Qualified EVSE List
  - Installs, owns and maintains charging stations, pays energy costs and station network and service fees for a minimum of 5 years
  - Owns and maintains the Customer Equipment electrical infrastructure
  - Shares station usage data with National Grid



Massachusetts: Sites and Ports

nationalgrid

Type of Charging Station	Total Sites	Ports Per Site
Level 2	120	10
DCFC	20	4

Level 2: Give priority to site hosts who serve the public at large. Prioritize in the following order:

(1) Public parking areas such as garages, parks, stadiums, beaches, airports, train stations, hotels, hospitals, clinics, dining, entertainment and shopping venues;

(2) Workplaces and multi-unit dwelling parking areas that the public can access, including offices, colleges, universities, and government properties; and

(3) Parking areas at workplaces and multi-unit dwellings

DCFC: High-traffic locations, such as close to highway corridors and retail locations, given the fit between drivers' behavior in those locations (e.g., parking for less than one hour) and the DCFC's rate of charge (e.g., 100 miles of range in 30 minutes)

"Ports Per Site" may differ (+/-) from above and will be evaluated by National Grid based on the project.

Massachusetts: EVSE Rebates

nationalgrid

Targeted Charging Segment	Rebate Level(1)
Level 2	
Workplaces, Fleets, Private Businesses	Up to 50%
Multi-Unit Dwellings, Public Sites	Up to 75%
Disadvantaged Community Sites	Up to 100%

(1) EVSE rebates are for station hardware only, not network service fees, maintenance fees or installation costs. Rebate levels may be a fixed amount based on the average for all qualified EVSE and not the actual cost to the site host.

Level 2 Qualified EVSE Equipment List

nationalgrid

Station Type	EV Program Vendor	Qualified Package Overview	Electric Vehicle Supply Equipment (EVSE) Manufacturer	Qualified EVSE Models	EV Charging Network Backend Provider
LEVEL 2					
Level 2	ChargePoint	Includes gateway and non-gateway EVSEs with a single gateway station providing communications for up to 9 non-gateway stations.	ChargePoint	CT4000 CPF25	ChargePoint
Level 2	EV Connect, Inc.	EV Connect turn-key EVSE solution which includes both EV Connect's EV Cloud™ Charge Point Management System and BTC Power's L2 EVSE.	BTCPower, Inc.	EVP-2002-30 EVP-2002-40	EV Connect, Inc.
Level 2	EV Connect, Inc.	EV Connect turn-key EVSE solution which includes both EV Connect's EV Cloud™ Charge Point Management System and EV-Box L2 EVSE.	EV-Box, Inc.	BL-1	EV Connect, Inc.
Level 2	EV-Box, Inc.	Charging stations use OCPP (Open Charge Point Protocol) and can communicate with OCPP network providers. BusinessLine charging stations are equipped with Smart Charging, Load Balancing and Peak Shaving features.	EV-Box, Inc.	Business Line B2320-45063|65063 B2323-45063|65063	EV Connect, Inc or Greenlots
Level 2	EVSE LLC	Charging stations use OCPP (Open Charge Point Protocol) and can communicate with OCPP network providers. Single port station offered in wall or pole mounted configurations with either wrap around cable (3703) or autocoil configurations (3704) or a ceiling-mounted station designed for parking garages (3722).	EVSE LLC	3703 3704 3722	Greenlots
Level 2	Greenlots	Charging stations use OCPP (Open Charge Point Protocol)	Efacec Electric Mobility, S.A.	EV-CP G2	Greenlots
Level 2	Greenlots	Charging stations use OCPP (Open Charge Point Protocol) and can communicate with OCPP network providers. BusinessLine charging stations are equipped with Smart Charging, Load Balancing and Peak Shaving features.	EV-Box, Inc.	Business Line B2320-45063|65063 B2323-45063|65063	Greenlots
Level 2	Greenlots	Charging stations use OCPP (Open Charge Point Protocol) and can communicate with OCPP network providers.	EVSE LLC	3703 3704	Greenlots

DCFC Qualified EVSE Equipment List

nationalgrid

Station Type	EV Program Vendor	Qualified Package Overview	Electric Vehicle Supply Equipment (EVSE) Manufacturer	Qualified EVSE Models	EV Charging Network Backend Provider
DC FAST CHARGING ("DCFC")					
DCFC	ChargePoint	Each CPE250 station is equipped with two Power Modules that can deliver up to 62.5 kW to a vehicle. Express Plus employs a scalable architecture with every station in the Express Plus system capable of charging from 50 kW to 400 kW.	ChargePoint	CPE250 Express Plus	ChargePoint
DCFC	EV Connect, Inc.	EV Connect EVSE solution includes both EV Connect's EV Cloud™ Charge Point Management System and ABB's DCFC offering (50 kW minimum with ability to scale to 350 kW).	ABB, Inc.	Terra 53 CJ	EV Connect, Inc.
DCFC	EV Connect, Inc.	EV Connect EVSE solution includes both EV Connect's EV Cloud™ Charge Point Management System and BTC Power's offering (50 kW minimum with ability to scale to 350 kW)	BTCPower, Inc.	L3-50-CS	EV Connect, Inc.
DCFC	EVgo Services LLC	50 kW fast charging station	ABB, Inc.	Terra 53 CJ	EVgo Services LLC
DCFC	EVgo Services LLC	50 kW fast charging station	BTCPower, Inc.	EVP-FC-50-001	EVgo Services LLC
DCFC	Greenlots	50 kW fast charging station	BTCPower, Inc.	EVP-FC-50-001	Greenlots
DCFC	Greenlots	50 kW fast charging station	Efacec Electric Mobility, S.A.	QC45	Greenlots

Available Resources

nationalgrid

Program Materials

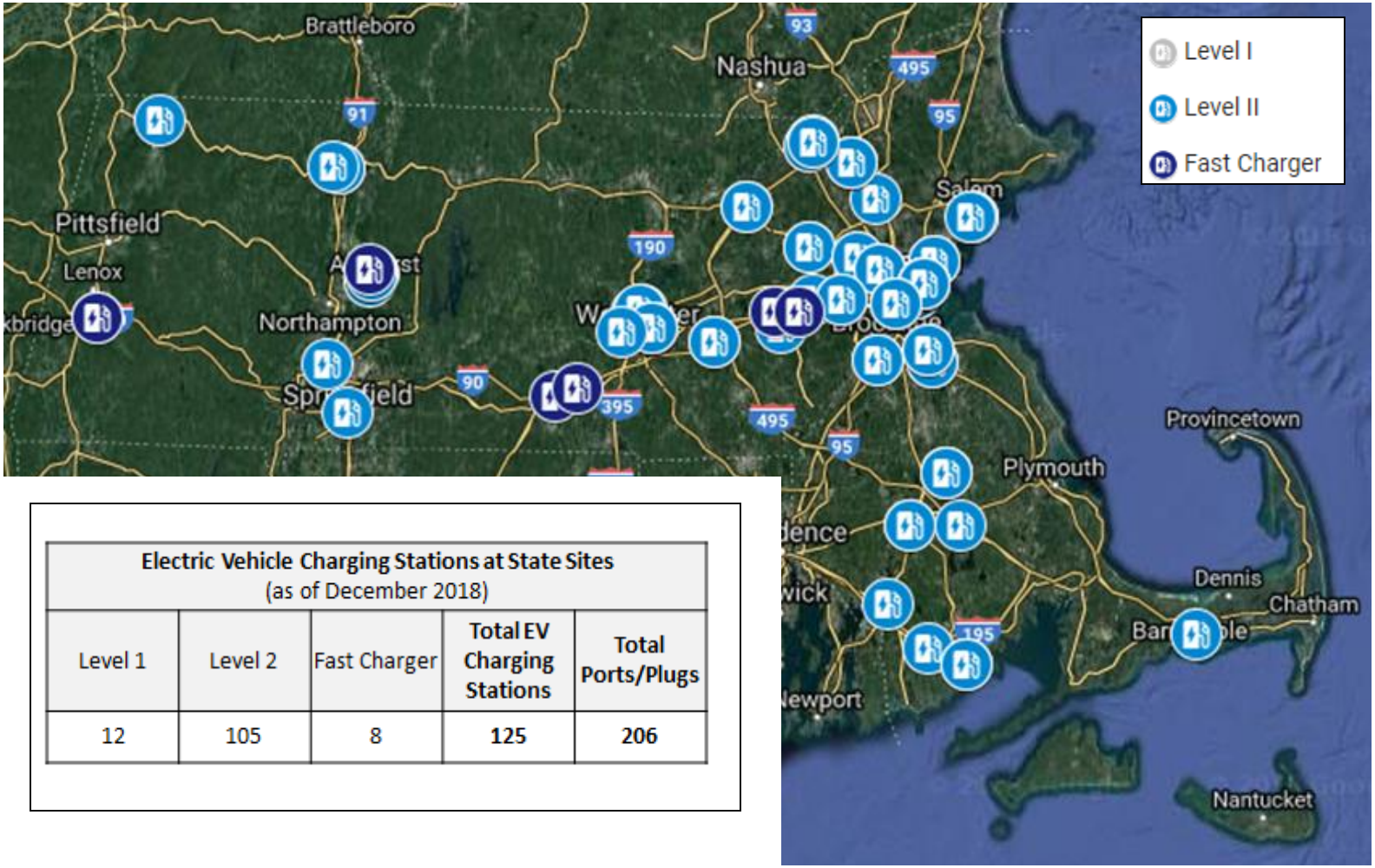
- EV Charging Infrastructure Program Overview/Brochure
- Qualified Level 2 and DCFC EVSE Lists
- Application Form

National Grid Contacts

- EV Mailbox: EVNationalGrid@nationalgrid.com
- EV Program Manager (In progress)
- National Grid Account Manager

Website: www.ngrid.com/ma-evcharging

State Government EV Charging Infrastructure



Electric Vehicle Charging Stations at State Sites (as of December 2018)				
Level 1	Level 2	Fast Charger	**Total EV Charging Stations**	**Total Ports/Plugs**
12	105	8	**125**	**206**

Approx. 20-30 additional stations planned or in discussion

LBE EVSE Guidance Document

- In final stages of development
- Designed to support agency efforts to install EV charging stations

- *What information would be useful to you and your agency/campus?*

Innovation & Future Tech: EV Charging Stations

News from Around the World

Massachusetts Updates

Clean Transportation

Solar Updates

LBE Updates

Volta Charging

Free EV charging supported by advertising

- Example : University of California SF

Envision Solar

Portable solar canopy (w/ storage) & EV charger

Powers up to 150 miles of EV driving each day

- Example: CA Natural Bridges State Park

Paired Power

Solar canopy + 6 EV charging stations, can be independent of or tied to grid

Innovation & Future Tech: BEVs on the Market Today

2019 Hyundai Ioniq Electric Automatic (A1), Electricity

136 MPGe (150 city / 122 hwy combined) — 25 kWh/100 mi

2018 Hyundai Ioniq Electric Automatic (A1), Electricity

136 MPGe (150 city / 122 hwy combined) — 25 kWh/100 mi

2018 Tesla Model 3 Long Range Automatic (A1), Electricity

130 MPGe (136 city / 123 hwy combined) — 26 kWh/100 mi

2018 Tesla Model 3 Mid Range Automatic (A1), Electricity

123 MPGe (128 city / 117 hwy combined) — 27 kWh/100 mi

2019 Hyundai Kona Electric Automatic (A1), Electricity

120 MPGe (132 city / 108 hwy combined) — 28 kWh/100 mi

2019 Chevrolet Bolt EV Automatic (A1), Electricity

119 MPGe (128 city / 110 hwy combined) — 28 kWh/100 mi

2018 Chevrolet Bolt EV Automatic (A1), Electricity

119 MPGe (128 city / 110 hwy combined) — 28 kWh/100 mi

2019 Volkswagen e-Golf Automatic (A1), Electricity

119 MPGe (126 city / 111 hwy combined) — 28 kWh/100 mi

2018 Volkswagen e-Golf Automatic (A1), Electricity

119 MPGe (126 city / 111 hwy combined) — 28 kWh/100 mi

2018 BMW i3 (94Ah) Automatic (A1), Electricity

118 MPGe (129 city / 106 hwy combined) — 29 kWh/100 mi

2018 Tesla Model 3 Long Range AWD Automatic (A1), Electricity

116 MPGe (120 city / 112 hwy combined) — 29 kWh/100 mi

2018 Tesla Model 3 Long Range AWD Performance Automatic (A1),

116 MPGe (120 city / 112 hwy combined) — 29 kWh/100 mi

2018 Honda Clarity EV Automatic (A1), Electricity

114 MPGe (126 city / 103 hwy combined) — 30 kWh/100 mi

2019 BMW i3 Automatic (A1), Electricity

113 MPGe (124 city / 102 hwy combined) — 30 kWh/100 mi

2019 BMW i3s Automatic (A1), Electricity

113 MPGe (124 city / 102 hwy combined) — 30 kWh/100 mi

2018 BMW i3s (94Ah) Automatic (A1), Electricity

112 MPGe (126 city / 99 hwy combined) — 30 kWh/100 mi

2018 Nissan Leaf Automatic (A1), Electricity

112 MPGe (125 city / 100 hwy combined) — 30 kWh/100 mi

2019 Nissan Leaf Automatic (A1), Electricity

112 MPGe (124 city / 99 hwy combined) — 30 kWh/100 mi

2019 Kia Niro Electric Automatic (A1), Electricity

112 MPGe (123 city / 102 hwy combined) — 30 kWh/100 mi

2019 Fiat 500e Automatic (A1), Electricity

112 MPGe (121 city / 103 hwy combined) — 30 kWh/100 mi

2018 Fiat 500e Automatic (A1), Electricity

112 MPGe (121 city / 103 hwy combined) — 30 kWh/100 mi

2018 smart fortwo electric drive coupe Automatic (A1), Electricity

108 MPGe (124 city / 94 hwy combined) — 31 kWh/100 mi

2019 Kia Soul Electric Automatic (A1), Electricity

108 MPGe (124 city / 93 hwy combined) — 31 kWh/100 mi

2018 Kia Soul Electric Automatic (A1), Electricity

108 MPGe (124 city / 93 hwy combined) — 31 kWh/100 mi

2018 Ford Focus Electric Automatic (A1), Electricity

107 MPGe (118 city / 96 hwy combined) — 31 kWh/100 mi

2018 Tesla Model S 75D Automatic (A1), Electricity

103 MPGe (102 city / 105 hwy combined) — 33 kWh/100 mi

2018 smart fortwo electric drive convertible Automatic (A1), Elec

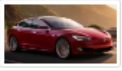
102 MPGe (112 city / 91 hwy combined) — 33 kWh/100 mi

2018 Tesla Model S 100D Automatic (A1), Electricity

102 MPGe (101 city / 102 hwy combined) — 33 kWh/100 mi

2018 Tesla Model S 75kWh Automatic (A1), Electricity

98 MPGe (97 city / 100 hwy combined) — 34 kWh/100 mi

2018 Tesla Model S P100D Automatic (A1), Electricity

98 MPGe (92 city / 105 hwy combined) — 35 kWh/100 mi

2018 Tesla Model X 75D Automatic (A1), Electricity

93 MPGe (91 city / 95 hwy combined) — 36 kWh/100 mi

2018 Tesla Model X 100D Automatic (A1), Electricity

87 MPGe (86 city / 89 hwy combined) — 39 kWh/100 mi

2018 Tesla Model X P100D Automatic (A1), Electricity

85 MPGe (83 city / 89 hwy combined) — 40 kWh/100 mi

2019 Jaguar I-Pace Automatic (A1), Electricity

76 MPGe (80 city / 72 hwy combined) — 44 kWh/100 mi

2018 BYD e6 Automatic (A1), Electricity

72 MPGe (73 city / 71 hwy combined) — 47 kWh/100 mi

22 vehicle models

(35 options)

For model years '18 or '19

FuelEconomy.Gov

Innovation & Future Tech: EVs on the Market *Tomorrow*

Compact Car

Nissan Leaf Plus:

- Expected 226 mile range
- Expected in spring 2019

Green Car Reports, 2019

Pickup Truck

Rivian:

- *Expected 400 mile range*
- *Expected in 2020*

Inc., 2018

Nearly 100 electrified models expected to debut through 2022, including:

- *Ford: 40 EVs and hybrids expected by 2022*
- *GM: 20 EVs expected by 2023*
- *Nissan: 8 new EVs expected by 2023*

Auto News, 2018

EV Rebates Current and Upcoming

Funding	Private	Fleets
$7,500 Federal Tax Credit (diminishing for some models)	Yes	Maybe
$1,500 state Mor-EV incentive (Battery Electric Only)	Yes	No
$5,000 Nissan Leaf manufacturer rebate	Yes	Yes
Mass EVIP incentives / DEP ($ levels TBD soon)	No	Yes

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the Commonwealth or DOER.

Solar Updates

SMART
MASSACHUSETTS SOLAR PROGRAM

SMART Solar Block Status Update Last Update: 1/14/2019 9:00 AM						
Electric Distribution Company (EDC)	Size Group	Current Block	Block/Size Group (MW)[1]	Allocated Capacity (MW)[2]	Pending Capacity (MW)[3]	Accepting Applications for Block[4]:
Eversource MA East	Small	1 of 8	18.303	2.019	6.790	1
Eversource MA East	Large	1 of 8	73.211	10.071	34.948	1
Eversource MA West	Small	2 of 8	3.147	0.580	2.830	2
Eversource MA West	Large	Waitlist	TBD	10.700	105.379	Waitlist
National Grid (Massachusetts Electric)	Small	1 of 8	18.004	1.159	9.788	1
National Grid (Massachusetts Electric)	Large	7 of 8	72.018	43.573	424.600	7
National Grid (Nantucket)	Small	1 of 2	0.604	0.000	0.039	1
National Grid (Nantucket)	Large	1 of 2	2.417	0.000	1.000	1
Unitil	Small	1 of 4	0.789	0.000	0.403	1
Unitil	Large	Waitlist	TBD	0.000	17.884	Waitlist

- SMART applications opened in November:
  - 2,500 applications for approx. 629 MW of total capacity in first week
- **Eversource West & Unitil on waitlist**
- **National Grid in Block 7 (of 8)**
- **Eversource East still in Block 1**
- **400 MW program review soon**
- **Adder tranche levels established (60 MW for community solar, 80 MW for all others**

LBE Solar Grant Program

Applications – in order of submittal

1. **(DCAMM) MEMA Bunker – Framingham**
   - *275 kW Solar Canopy - $453,750 requested*
2. **Salem State University – Salem**
   - **387 kW Rooftop - $193,500 awarded**
   - **Installation complete by June**
3. **MassDOT District 3 HQ - Worcester**
   - *934 kW Solar Canopy & Roof - $1,000,000 requested*
4. **Cape Cod Regional Transit Authority - Hyannis**
   - *360 kW Solar Canopy - $396,000 requested*
5. **Quinsigamond Community College - Worcester**
   - *4.4 MW Solar Canopy w/ storage - $875,000 requested*
6. **Massasoit Community College – Brockton**
   - *3.1 MW Solar Canopy w/ storage - $820,500 requested*
7. **Massasoit Community College – Canton**
   - *830 kW Solar Canopy w/ storage - $239,056 requested*
8. **Plymouth Trial Court – Plymouth**
   - *918 kW Solar Canopy w/ Storage*
   - *1.2 MW Solar Canopy - $858,200 requested (for both)*
9. **Greenfield Community College – Greenfield**
   - *2.8 MW Solar Canopy - $750,000 requested*

$5 million LBE Solar Grant Program

Total Awarded:
- **387 kW**
- **$193,500**

Active Applications Totals:
- 15 MW
- $5.3 million

Awarded & Active Totals
- 15.5 MW
- $5.5 million

Current grant requests go beyond LBE Solar Grant Program budget – however:
- Details and grant requests for active applications subject to change
- Applications still being accepted (for review if funding becomes available)

LBE Updates

FY18 LBE Tracking Form

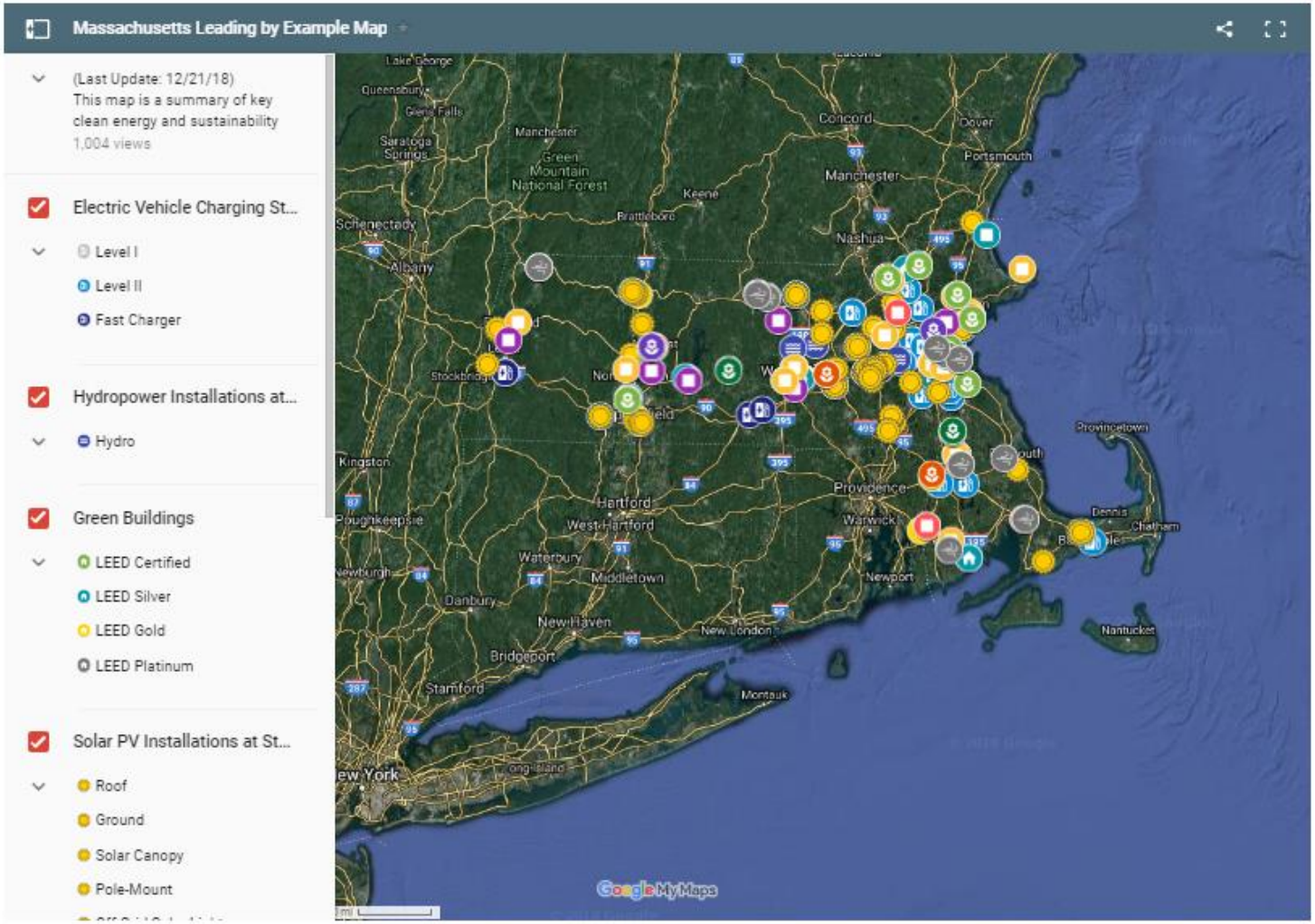
Thanks to those who have already submitted their FY18 Tracking Form!

Bridgewater State University	**MassBay Community College**	**UMass Amherst**
Bristol Community College	**Mass. College of Liberal Arts**	**UMass Boston**
Fitchburg State University	**North Shore Community College**	**UMass Lowell**
Greenfield Community College	**Quinsigamond Community College**	**UMass Medical School**
Holyoke Community College	**Roxbury Community College**	**Westfield State University**
Mass College of Art and Design	**Salem State University**	**Worcester State University**
Massasoit Community College	**Springfield Tech. Community College**	

LBE staff will be reaching out to help finalize submissions

MA required to submit data to the Better Buildings Challenge *by March 31, 2019*

Interactive LBE Website Map



[Interactive LBE Map link]

LBE Award Recipients

State

- Franklin County Sheriff's Office: *solar canopy, EV charging, energy efficiency, EPPs*
- Metropolitan Area Planning Council: *demand response program, hybrid upfits, educ. programming*

Higher Education

- Salem SU: *energy efficiency, fleet gas reduction, food waste composting*
- UMass Amherst Landscaping Services: *pollinator habitats, battery-equipment, use of UMA compost*

Municipal

- City of Salem: *solar, bike-share program, innovative recycling*
- Town of Wellesley: *LED streetlights, surplus food recovery, solar*

Individual

- (Municipal): Thomas Philbin, Town of Westwood: *solar, energy efficiency, GC designation, stakeholder collaboration*
- (State): James Latini: DCAMM Capitol Complex Operations: *operational energy efficiency (night & weekend baseloads), stakeholder collaboration*

State Recipients w/ State Officials:

Franklin County Sheriff's Office (w/ DCAMM)

MAPC

SSU

UMA Landscaping Services

James Latini, DCAMM