

Hot, Cool, Clean

Clean Heating and Cooling Opportunities for Massachusetts Municipalities

Wednesday, September 11, 2019

MAPC
METROPOLITAN AREA PLANNING COUNCIL

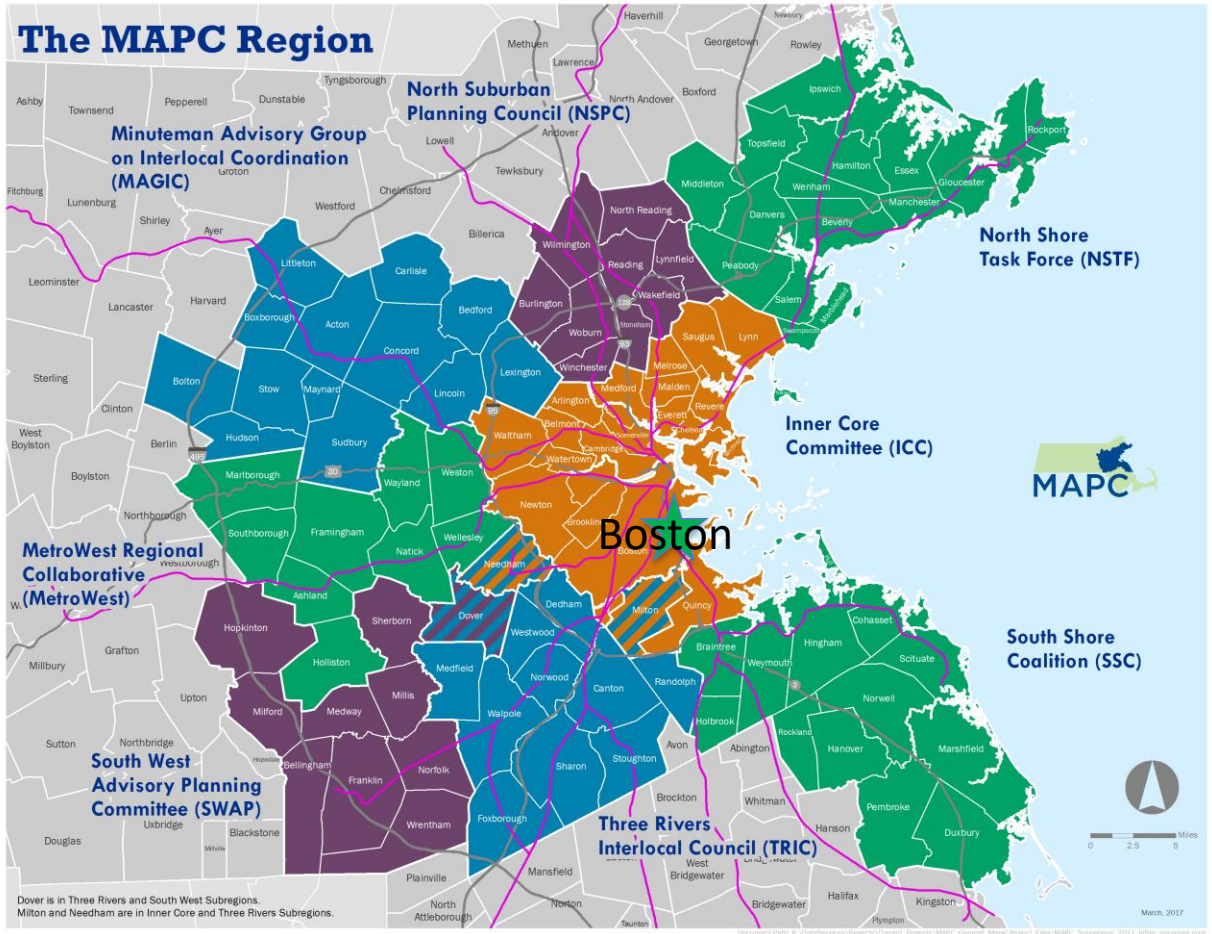
Agenda

1. Highlights from the *Hot, Cool, Clean: Clean Heating and Cooling Opportunities for Massachusetts Municipalities* white paper
2. Air-Source Heat Pump Case Study – Bruce Ledgerwood, ABCD
3. Mass Save C&I HVAC and Heat Pump Initiative - Shonté Davidson, Eversource
4. Alternative Portfolio Standard Overview for Municipalities – Paul Ormond, DOER
5. MassCEC's Solar Hot Water Program – Meg Howard, MassCEC
6. Discussion and Q&A

About MAPC

Regional Planning Agency for Greater Boston:

- 101 cities and towns
- 1,440 square miles
- Nearly 3.2 million residents



Clean Energy Expertise

1 Regional Energy Projects

- **ESCO Procurement**
- **Regional Solar Initiative**
- **LED Streetlight Purchasing Program**
- **Community Electricity Aggregation**
- **Green Mobility Program**
- **Energy Resiliency**

2 Climate and Energy Planning

- **Connecting municipalities with incentives + plug-and-play programs**
- **Community energy and climate baselining, planning, and strategizing**
- **Outreach programming and education**
- **Net Zero Planning**

3 Energy Technical Assistance

- **Grant Writing**
- **Green Communities Designation**
- **Methane Leaks**
- **Solar Permitting and Zoning**
- **State and Local Policy**
- **Net Zero Guidance & Education**

Urgency of Now

National Oceanic and Atmospheric Administration
U.S. Department of Commerce

2018 was 4th hottest year on record for the globe

The U.S. experienced 14 billion-dollar weather and climate disasters

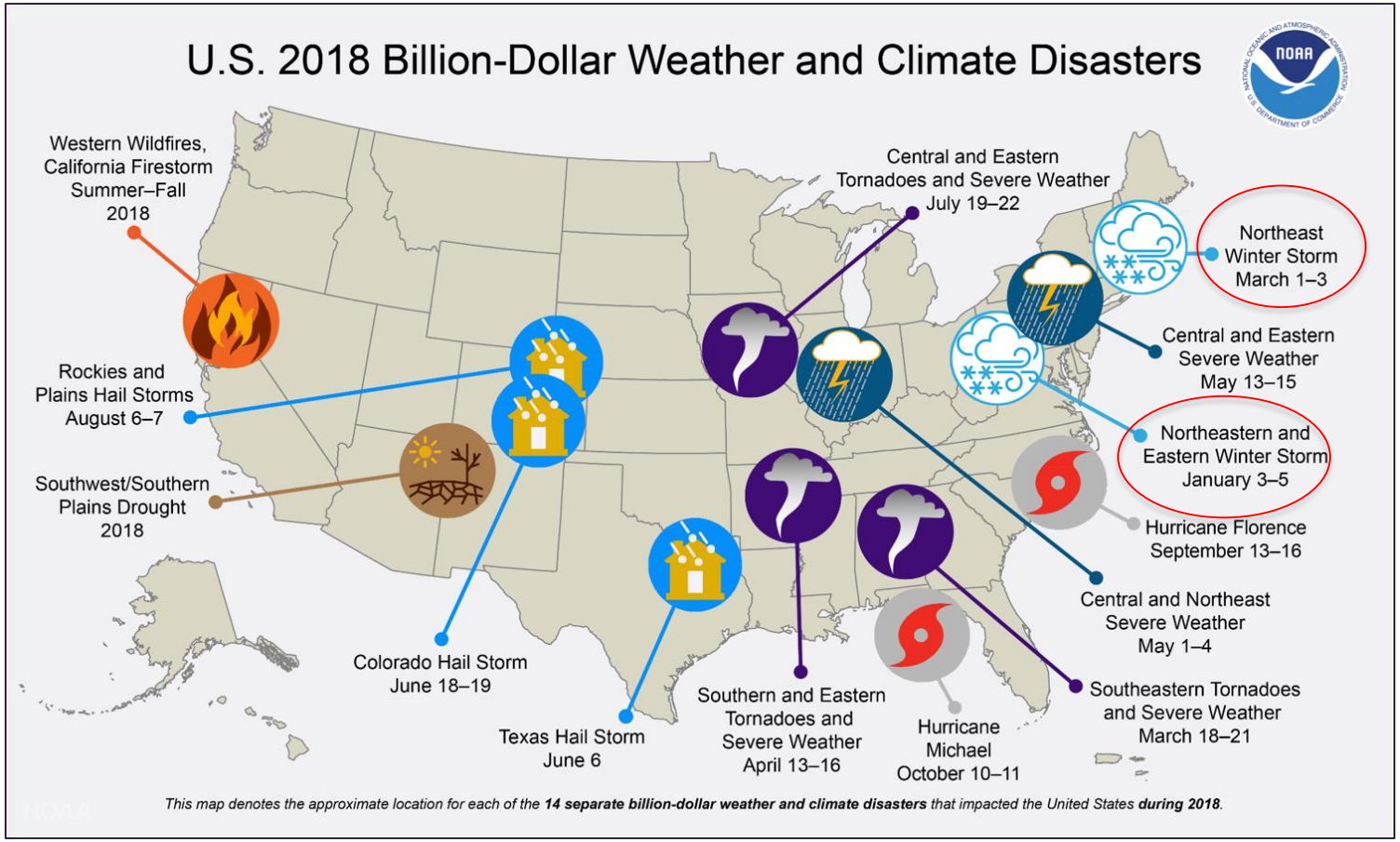
Climate Satellites | climate analyses and statistics global average temperatures SHARE

February 6, 2019 —

July was the hottest month ever recorded on Earth

CBS NEWS

BY SOPHIE LEWIS
UPDATED ON: AUGUST 15, 2019 / 3:45 PM / CBS NEWS



Cities and Towns as Climate Leaders

SANTA BARBARA BECOMES 30TH U.S. CITY TO COMMIT TO 100% RENEWABLE ENERGY

First City On California's Central Coast To Commit To 100% Clean Energy

Tuesday, June 6, 2017

Abita Springs aims to run on 100% renewable energy by 2030

BY SARA PAGONES | SPAGONES@THEADVOCATE.COM MAY 6, 2017 - 4:00 PM (1)

THE NEW ORLEANS ADVOCATE

Orlando Becomes 40th City to Commit to 100% Renewable Energy

By Sierra Club
Aug. 09, 2017 08:39AM EST

Boston Aims To Be Carbon Free By 2050. Here Are 5 Takeaways From A New Report

January 29, 2019 | By Miriam Wasser

90.9 wbur

Madison approves 100 percent clean energy goals, up to $250,000 for consultant

ABIGAIL BECKER | The Capital Times | abecker@madison.com | @abecker_4 Mar 22, 2017

Getting to Net Zero: Cambridge, MA

Thursday Mar 26, 2015 · 4:20 PM EDT

DAILY KOS

Lexington Town Meeting votes to adopt a net zero carbon emissions policy

Posted Apr 21, 2016 at 8:48 PM

WICKED LOCAL LEXINGTON
Includes content from the Lexington Minuteman

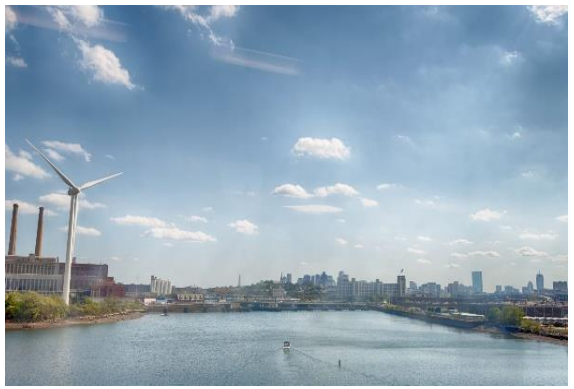
MAPC
METROPOLITAN AREA PLANNING COUNCIL

Supporting Clean Energy Transitions

- **P**lanning - Clean Energy and Climate Action Planning
- **P**rocurement – Collective purchasing of clean energy technologies and services
- **P**olicy – Advancing legislation, regulation, incentives that support climate mitigation and adaptation

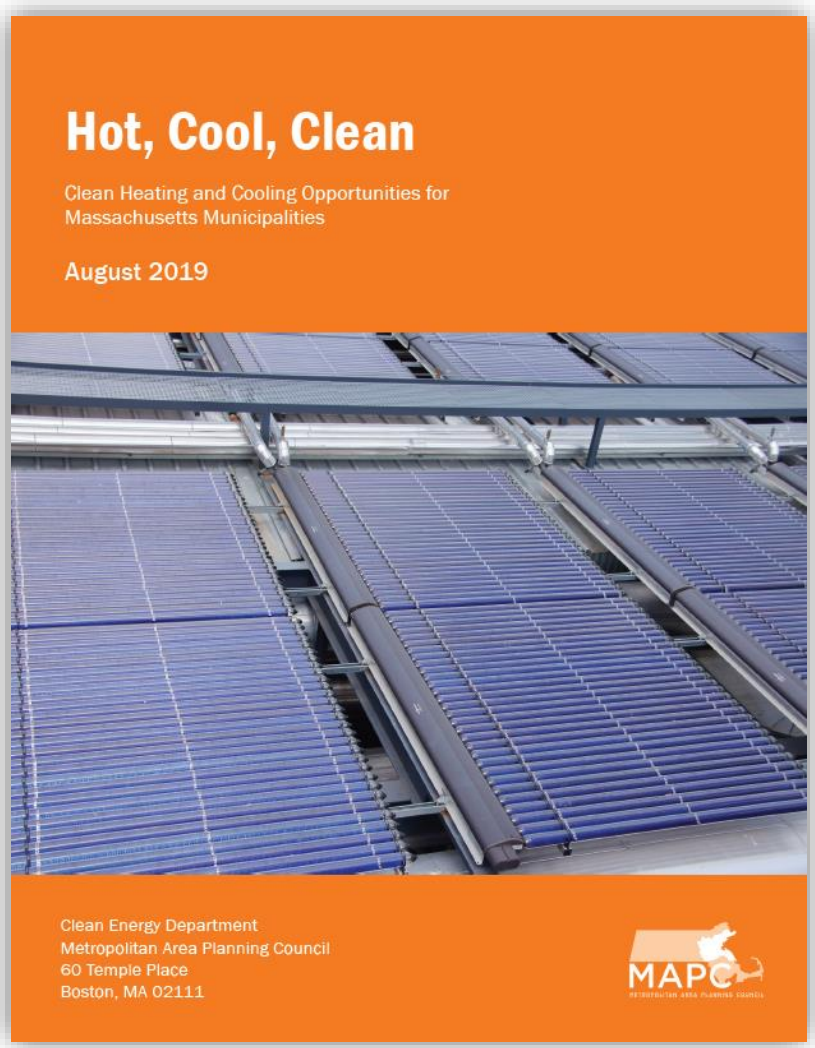
ZERO to 101






MAPC
METROPOLITAN AREA PLANNING COUNCIL

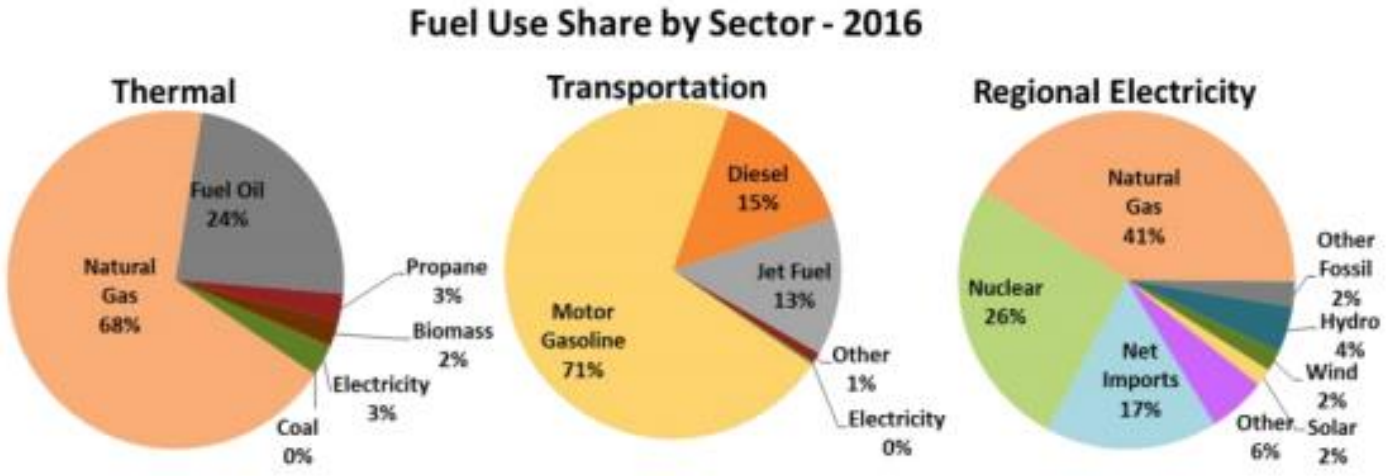
Download the white paper

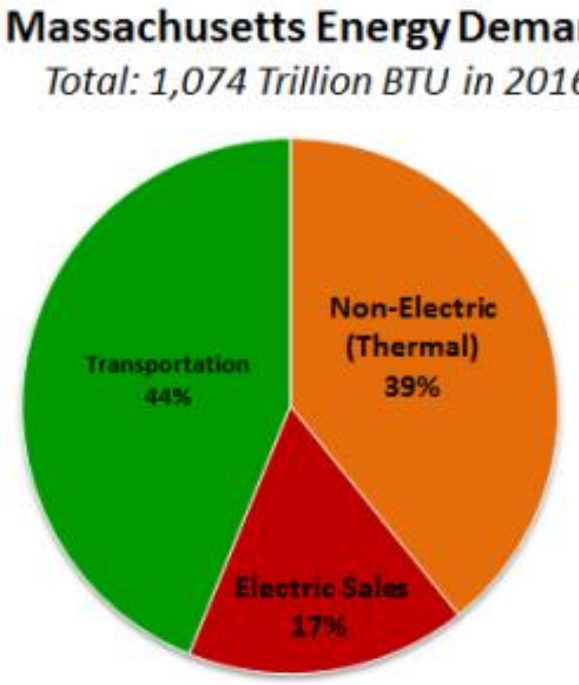


Available at
http://www.mapc.org/wp-content/uploads/2019/08/8.13.19-Clean-Heating-and-Cooling-White-Paper.pdf

Why Clean Heating & Cooling?

- Thermal energy = 39% of MA total energy consumption
- 30% of statewide emissions
- 92% of fuel use in thermal sector is fossil fuels (natural gas, fuel oil)





Source: MA DOER, [Massachusetts Comprehensive Energy Plan]

Clean Heating & Cooling Technologies

Technology	Description	Massachusetts Opportunities
Air-Source Heat Pumps (ASHPs) Types include ductless mini-splits or variable refrigerant flow (VRF) for larger buildings 	ASHPs use a vapor compression cycle to move heat energy from the outside air to inside (or vice versa). The single system can provide both space heating and cooling to buildings depending on the season. ASHPs require electricity to operate, but much less than electric resistance heating, and operates at a lower cost than electric resistance, oil, or propane (Northeast Energy Efficiency Partnerships [NEEP], 2017).	The recent technology improvements of ASHPs have demonstrated better heating performance in low-temperature conditions (5˚F or less), which has significantly expanded the MA market.
Ground-Source Heat Pumps (GSHPs) Also called geothermal 	Similar to ASHPs, GSHPs use energy from the earth to efficiently heat or cool a building. GSHPs use the temperature difference between the earth's ground temperature and a building's indoor air to provide space heating or cooling, depending on the season. GSHPs use electricity to move the heat, not to generate it, ultimately providing the same amount of heat much more efficiently than traditional electric heating would. Although installation can be expensive upfront, the savings and other benefits can be commercially attractive (MassCEC, 2017a).	MA bedrock has a higher capacity to provide heating and cooling than do other soil types in many other parts of the country. GSHP systems require trenches or wells to operate, so certain sites may not have sufficient space or geological conditions to support them.

Technologies: Air-Source Heat Pumps

Description

- Types: ductless mini-split (pictured), ducted, variable refrigerant flow (VRF)
- Provide heating, cooling, and/or hot water
- Efficiently move heat energy from outside to inside (or vice versa)
- Use electricity, but 3-4x more efficient than resistance heat

Opportunities

- Cold climate technology improvements
- Cost-effective, particularly when replacing fuel oil

Credit: NREL.

Air-source heat pumps at a public housing facility.
Credit: Action for Boston Community Development

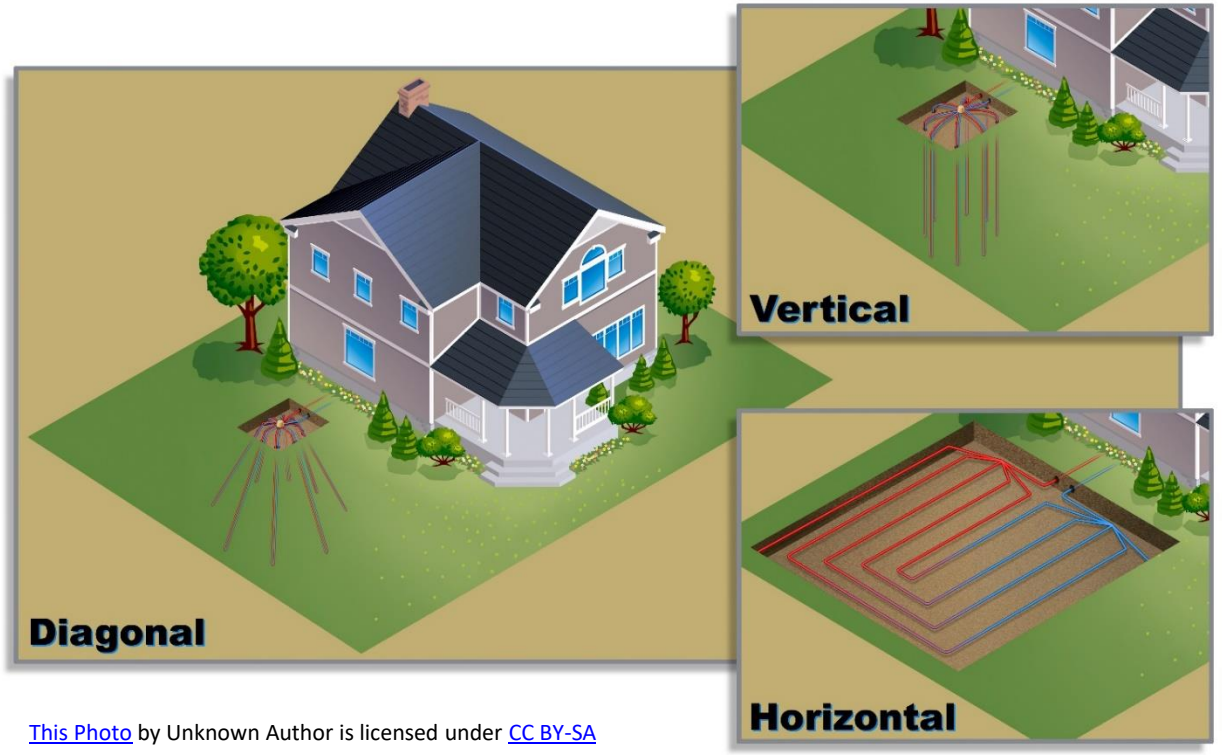
Technologies: Ground-Source Heat Pumps (geothermal)

Description

- Provide heating, cooling, and/or hot water
- Use energy from earth to heat/cool
- High upfront cost, low operating cost

Opportunities

- New construction
- Favorable geology in many parts of MA



Technologies: Solar Hot Water

Description

- Provides heating, and/or hot water
- Uses thermal energy from sun to heat water

Opportunities

- Can provide up to 80% of building hot water needs
- Rebates available through MassCEC

Solar thermal array. Credit: NREL.

Biomass Thermal

Description

- Provides heating, and/or hot water
- Uses wood or other biomass to heat water or air
- Concern: Still combustion (not carbon neutral)

Opportunities

- Pellet delivery available in most of MA, may be locally produced

Pellet boiler system at Northfield Town Hall. Credit: Town of Northfield.

Opportunities for Municipalities

- Reduce energy use
- Reduce energy costs
- Increase comfort
- Foster long-term thinking
- Lead by example
- Generate economic growth
- Increase climate preparedness

Challenges and (potential) solutions

Challenge: High upfront costs can be limiting for municipal budgets

Potential Solutions:

- Work CH&C upgrades into building renovation or recapitalization plans
- Finance CHC&C systems through an ESCO
- Third-party ownership – Heat/cooling as a service, similar to a Power Purchase Agreement

Challenge: Limited staff capacity or expertise to evaluate CH&C options

Potential Solutions:

- Work CH&C upgrades into building renovation or recapitalization plans
- Finance CHC&C systems through an ESCO
- Third-party ownership – Heat/cooling as a service, similar to a Power Purchase Agreement

Sample Procurement Process

Process and Key Steps:

Invitation to bid with key descriptors of project; bid and work schedule

Final specs

Contractor Award

Installations begin

Inspections in process

Final electrical inspection

Final ABCD inspection

Final Payment

Checklist for Municipalities Considering Clean Heating & Cooling Systems

- ❑ Plan ahead
- ❑ Consider the building
- ❑ Visit MassCEC & Mass Save websites
- ❑ Explore AEC opportunities
- ❑ Optimize implementation

Case Studies

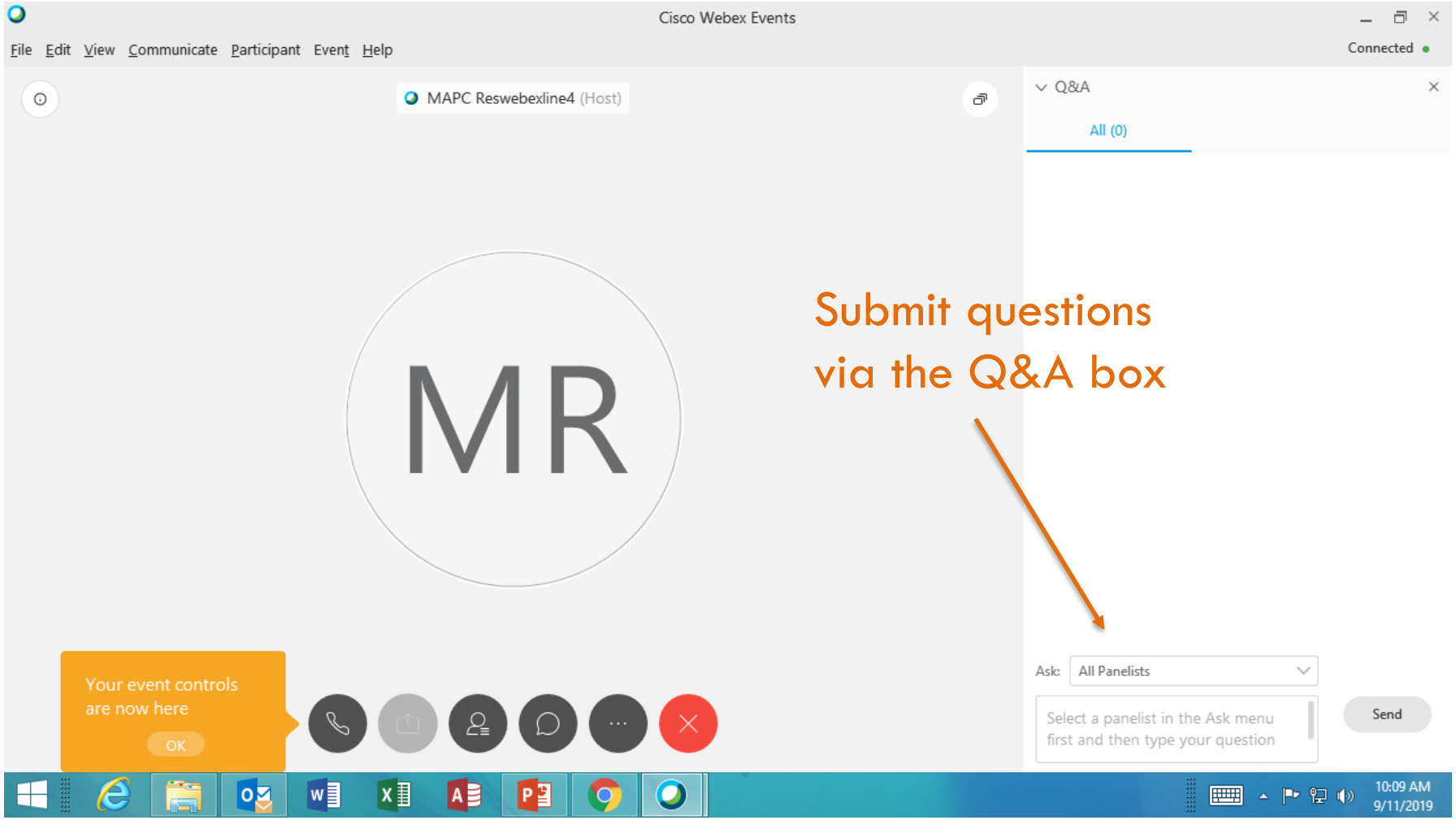
Air-Source Heat Pumps at Public Housing

Geothermal at Walpole Public Library

Solar Thermal at Worcester State

Biomass at Northfield Town Hall

Questions?


Cisco Webex Events
File Edit View Communicate Participant Event Help
Connected
MAPC Reswebexline4 (Host)
Q&A
All (0)
MR
Submit questions
via the Q&A box
Your event controls
are now here
OK
Ask: All Panelists
Select a panelist in the Ask menu
first and then type your question
Send
10:09 AM
9/11/2019

Air Source Heat Pumps in Multi Family Buildings

Bruce Ledgerwood
Action for Boston Community Development (ABCD)

- ABCD is one of 23 agencies that deliver the energy efficiency and fuel assistance programs to Massachusetts low income households.
- Ratepayers have provided ABCD funding to install ASHPs in low income homes 2013-2019. Clean Energy Center and Eversource administered.
- Installed 900+ ASHPs at 22 different sites - mostly low rise, garden style apartments.
- Most were mini-splits in one bedroom apartments, serving elderly.
- A few family homes also served with larger, multi-zone equipment.
- One Variable Refrigerant Flow (large central system, 23 apts.) project in Cambridge.
- All electric baseboard or storage heat removed except in bathrooms and hallways.


5678


Construction Equipment
Rentals, Inc.
855-704-5170


BOSTON
AIR
MECHANICAL SYSTEMS


MITSUBISHI
ELECTRIC

Savings?

wegowise

68 Windsor Avenue - 4 « ACT - Windsor Green

Total energy use in kWh

Name	Full-Year Sum	
Electric #256796410..	55.2k	✓

Detailed data per month

wegowise

Tonset Woods - Pines « ORL - Tonset Woods

Total energy use in kWh

Name	Full-Year Sum	
Electric #137669700..	71.4k	✓

Detailed data per month

wegowise

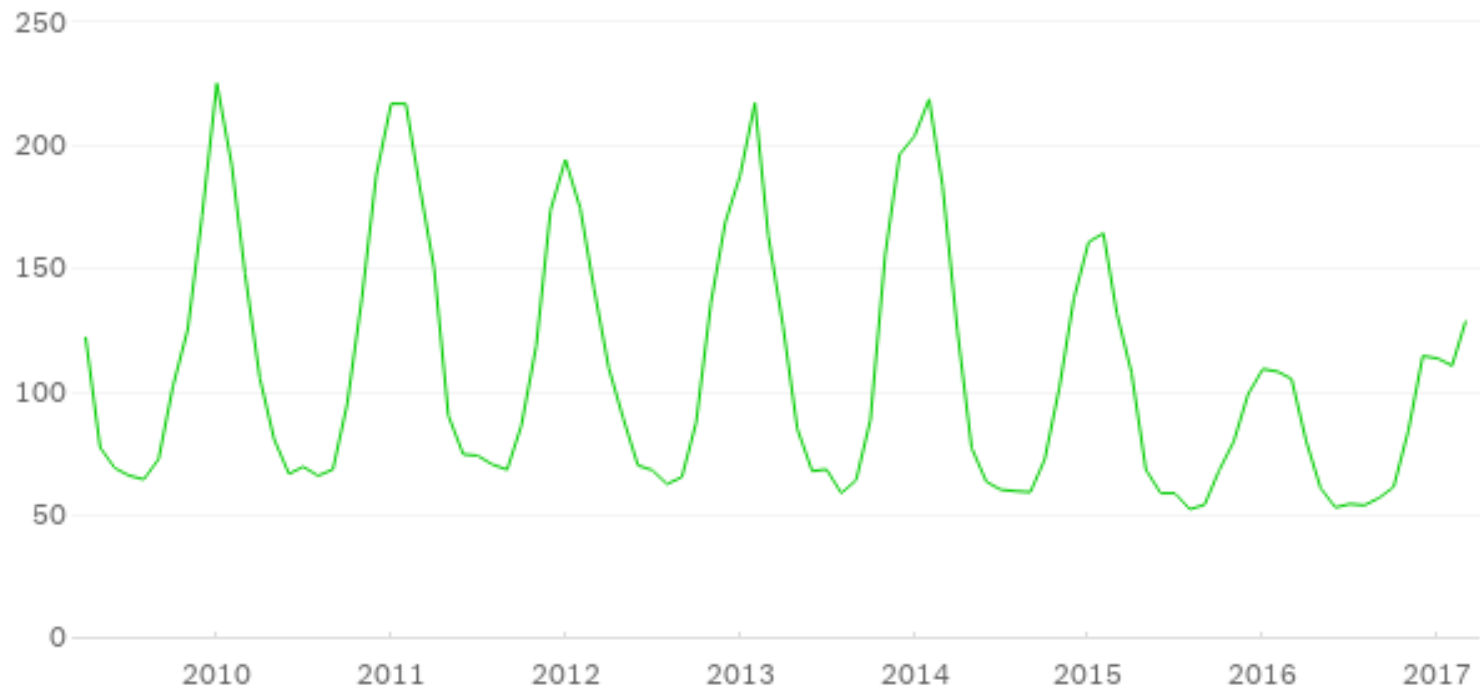
397 Bolton St. #4 « MRL - Bolton Hill Apartments

Total energy use in kWh

Name	Full-Year Sum	
• Electric #40486140..	29.4k	✓
• Water #1111111	Not included in total reports	

• Properties owned by other users

Detailed data per month



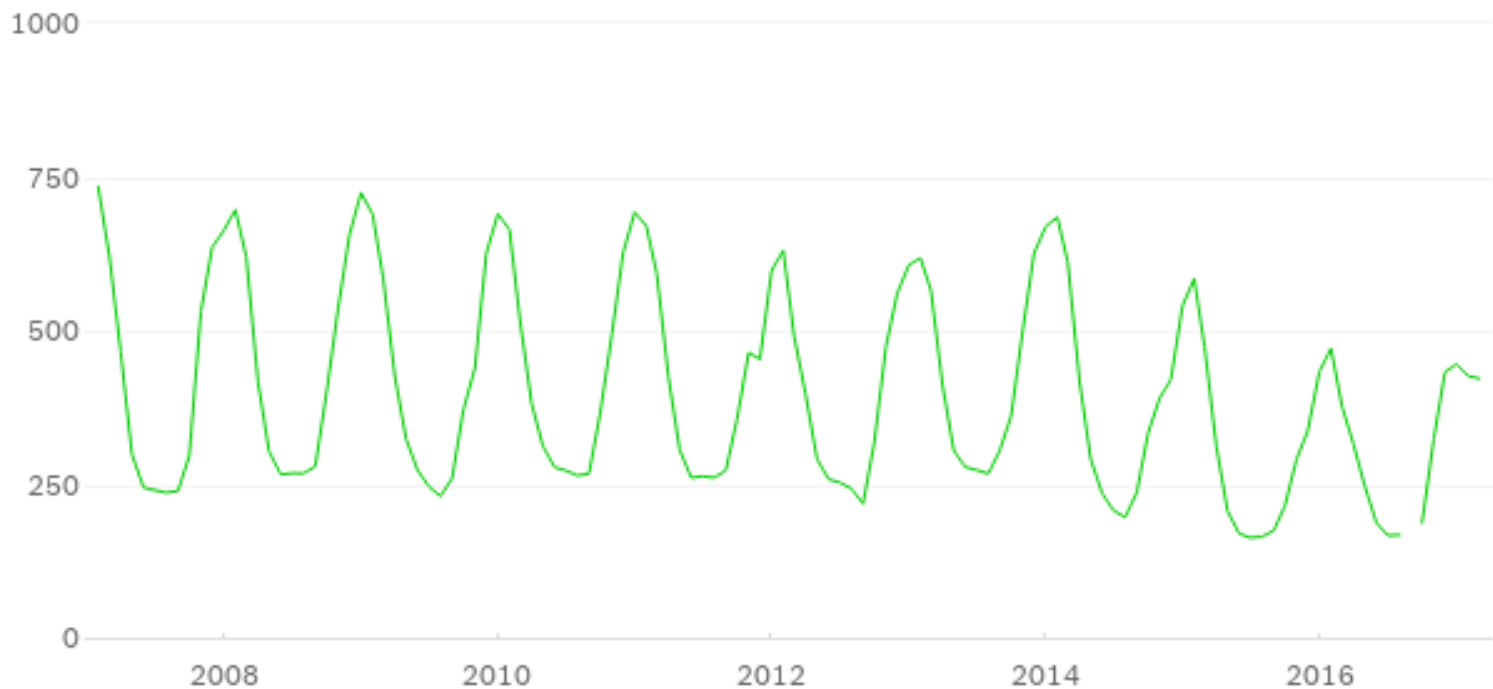
wegowise

425 East St - Annex « PIT - Providence Court

Total energy use in kWh

Name	Full-Year Sum	
Electric #546576710..	103k	✓

Detailed data per month



wegowise

312 - R.C. Weaver Apartment

Total energy use in kWh showing all available data

Name	Full-Year Sum	
• 81 Clifton St	174k	✓

• Properties owned by other users

Detailed data per month

Project	one bed apts.	Overall Savings	HVAC Savings	Summer KW Impact	Winter KW Impact
Acton	68	24%	45%	1 (0%)	440 (-37%)
Orleans	100	24%	51%	75 (-16%)	2508 (-59%)
Marlborough	62	32%	52%	57 (-18%)	487 (-38%)
Pittsfield	13	31%	49%	88 (-59%)	351 (-60%)
Cambridge	23	23%	53%	3 (+3%)	99 (+61%)
Weighted Average		**26%**	**50%**	somewhat reduced	significantly reduced, except Cambridge

Costs?

Cost of Installations				
type	BTU size	heads	air transfer fans	average
mini split	9,000	1	0	$ 4,000
mini split	12,000	1	1	$ 5,000
mini split	15,000	1	1	$ 6,000
multi zone	18,000	2	0	$ 7,000
multi zone	24,000	3	0	$ 10,000
multi zone	36,000	4	0	$ 18, 000
Variable Refrigerant Flow	186,000	23	6	$ 208,250

Benefits vs. Costs

(not including Demand savings)

Pittsfield Cost Effectiveness:		
KWHr saved annually		47,035
Electric expense avoided annually	@ $ 0.18/Kwhr	$ 8,466
Electric expense avoided over lifetime	18 years	$ 152,394
Cost of ASHPs		$79,500
Simple payback		9.4 years
Additional Demand savings		
Some maintenance and repair costs		

Orleans Cost Effectiveness:		
KWHr saved annually		215,357
Electric expense avoided annually	@ $0.18/Kwhr	$ 38,764
Electric expense avoided over lifetime	18	$ 697,755
Cost of ASHPs	$ 465,500	
Simple payback		12.0 years
Additional Demand savings		
Some maintenance and repair costs		

Thank You

Bruce Ledgerwood, Consultant Alternative Energy Program, ABCD, Inc.

John Wells, VP Property & Energy Services, ABCD, Inc

bruceledgerwood@comcast.net
617.780.6759

C&I HVAC & Heat Pump Initiative

Shonte Davidson, Energy Efficiency Consultant

Eversource Energy

September 11, 2019

Initiative Sponsors

Mass Save® is a collaboration of Massachusetts' natural gas and electric utilities and energy efficiency service providers. Mass Save empowers residents, businesses, and communities to make energy efficient upgrades by offering a wide range of services, rebates, incentives, trainings, and information. In Massachusetts, the C&I HVAC and Heat Pump Initiative is sponsored by Cape Light Compact, Eversource, National Grid, and Unitil.

National Grid offers many energy efficiency rebates, incentives, and services to help Rhode Island residents, businesses, and institutions manage their energy usage. These programs are funded by an energy efficiency charge on all customers' natural gas and electric bills, in accordance with Rhode Island law.

Initiative Funding

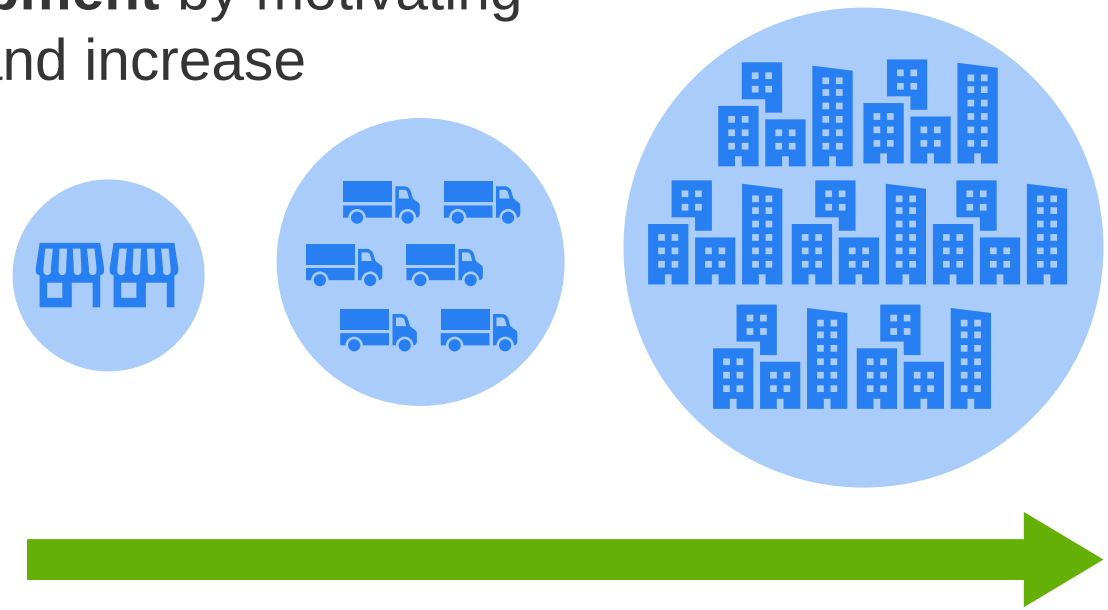
Where does funding for C&I Initiative incentives come from?

The primary funding for energy-efficiency programs in Massachusetts, New Hampshire, and Rhode Island is supported from a charge on customers' natural gas and electricity bills.

Initiative Goal

The C&I HVAC & Heat Pump Initiative partners with distributors to offer **monetary incentives on high-efficiency equipment to commercial and industrial customers.**

The goal of the Initiatives is to **increase customer adoption and access to high-efficiency equipment** by motivating distributors to upsell and increase high-efficiency stock.



Process

1. **Wholesaler explains benefits of high-efficiency and incentive opportunity**
2. **Wholesaler applies incentive to the price**
3. Contractor passes incentive along in pricing to customer
4. Customer receives high-efficiency equipment at a reduced price without having to complete any paperwork
5. **Wholesaler receives remaining portion of the incentive for their effort and to fund high-efficiency stocking and training**

C&I HVAC & Heat Pump Initiative Eligible Customers

Which customers are eligible for C&I Initiative Incentives?

- HVAC Initiative: Customers with a **commercial or industrial electric account** with one of the program Sponsors

Customers **already receiving an incentive** for eligible equipment **through another program** from the Sponsors of Mass Save® or National Grid in Rhode Island, **are NOT eligible**.

- *IE: Commercial Whole Building Performance or Low Income*

Qualifying HVAC Equipment and Heat Pumps

- ✓ Air-Cooled Air Conditioning and Heat Pump Systems
- ✓ Water-Cooled Air Conditioning and Heat Pump Systems
- ✓ Ductless Mini and Multi Split Systems
- ✓ VRF Systems
- ✓ Dual Enthalpy Economizer Controls (when installed with new qualifying equipment)
- ✓ ECM Circulator Pumps for hydronic heating or service hot water installations

Qualifying HVAC Equipment and Heat Pumps

Air-Cooled Air Conditioning and Heat Pump Systems											
Equipment Type	Unit Type	Tier	Size Category[1]	Sub Category	Full Load Cooling Efficiency		Seasonal/ Part Load Cooling Efficiency		Heating Efficiency[2]	Minimum Sales Price Discount ($/Ton)*	Total Distributor Incentive ($/Ton)**
Air-Cooled	AC or HP	1	< 65 kBtuh (<5.4 Tons)	Split or Package System	12.0 EER	and	15.0 SEER	and	9.0 HSPF	$30.00	$60.00
		2			12.0 EER	and	16.0 SEER	and	9.0 HSPF	$50.00	$100.00
		3			12.0 EER	and	17.0 SEER	and	9.0 HSPF	$90.00	$180.00
Air-Cooled	AC or HP	1	≥ 65 kBtuh and < 135 kBtuh (≥ 5.4 Tons and < 11.3 Tons)	Split System and Single Package	12.0 EER	and	13.1 IEER	and	3.4 COP	$30.00	$60.00
		2			12.0 EER	and	14.5 IEER	and	3.4 COP	$45.00	$90.00
		3			12.0 EER	and	18.0 IEER	and	3.4 COP	$100.00	$200.00
Air-Cooled	AC or HP	1	≥ 135 kBtuh and < 240 kBtuh (≥ 11.3 Tons and < 20 Tons)	Split System and Single Package	11.5 EER	and	13.0 IEER	and	3.2 COP	$25.00	$50.00
		2			11.5 EER	and	14.0 IEER	and	3.2 COP	$37.50	$75.00
		3			11.5 EER	and	17.5 IEER	and	3.2 COP	$62.50	$125.00
Air-Cooled	AC or HP	1	≥ 240 kBtuh and <760 kBtuh (≥ 20 Tons and < 63.3 Tons)	Split System and Single Package	10.1 EER	and	12.0 IEER	and	3.2 COP	$25.00	$50.00
		2			10.1 EER	and	13.0 IEER	and	3.2 COP	$37.50	$75.00
		3			10.1 EER	and	14.0 IEER	and	3.2 COP	$62.50	$125.00
Air-Cooled	AC or HP	1	≥ 760 kBtuh (≥ 63.3 Tons)	Split System and Single Package	9.7 EER	and	13.0 IEER	and	3.2 COP	$25.00	$50.00
		2			9.7 EER	and	14.0 IEER	and	3.2 COP	$37.50	$75.00
		3			9.7 EER	and	16.0 IEER	and	3.2 COP	$62.50	$125.00

*This is the minimum incentive amount that must be reflected in a price reduction for each eligible sale. **This amount includes the sale price discount

1 Equipment capacity is AHRI rated capacity or capacity at AHRI rating conditions for units without an AHRI rating 2 Heating efficiency applies only to heat pumps

Qualifying HVAC Equipment and Heat Pumps

Water-Cooled Air Conditioning and Heat Pump Systems											
Equipment Type	Unit Type	Tier	Size Category[1]	Sub Category	Full Load Cooling Efficiency		Seasonal/ Part Load Cooling Efficiency		Heating Efficiency[2]	Minimum Sales Price Discount ($/Ton)*	Total Distributor Incentive ($/Ton)**
Water-Cooled	Water Source HP	1	Any Size	Split System and Single Package	14.0 EER		-	and	4.6 COP	$25.00	$50.00
		2			15.0 EER		-	and	4.6 COP	$40.00	$80.00
		3			16.0 EER		-	and	4.6 COP	$75.00	$150.00
Water-Cooled	Ground Source Closed Loop HP	1	Any Size	Split System and Single Package	15.0 EER		-	and	3.5 COP	$75.00	$150.00
Water-Cooled	Ground Source Open Loop HP	1	Any Size	Split System and Single Package	19.0 EER		-	and	4.0 COP	$75.00	$150.00
Water-Cooled or Evaporatively-Cooled	AC	1	< 65 kBtuh (< 5.4 Tons)	Split System and Single Package	13.5 EER	and	14.0 IEER		-	$25.00	$50.00
Water-Cooled or Evaporatively-Cooled	AC	1	≥ 65 kBtuh and < 240 kBtuh (≥ 5.4 Tons and < 20 Tons)	Split System and Single Package	13.0 EER	and	15.5 IEER		-	$25.00	$50.00
Water-Cooled or Evaporatively-Cooled	AC	1	≥ 240 kBtuh (≥ 20 Tons)	Split System and Single Package	12.5 EER	and	14.5 IEER		-	$20.00	$40.00

*This is the minimum incentive amount that must be reflected in a price reduction for each eligible sale. **This amount includes the sale price discount
1 Equipment capacity is AHRI rated capacity or capacity at AHRI rating conditions for units without an AHRI rating 2 Heating efficiency applies only to heat pumps

Qualifying HVAC Equipment and Heat Pumps

Ductless Mini and Multi Split Systems											
Equipment Type	Unit Type	Tier	Size Category[1]	Sub Category	Full Load Cooling Efficiency		Seasonal/ Part Load Cooling Efficiency		Heating Efficiency[2]	Minimum Sales Price Discount ($/Ton)*	Total Distributor Incentive ($/Ton)**
Air-Cooled	AC or HP	1	< 65 kBtuh (<5.4 Tons)	Ductless Mini and Multi Splits	12.0 EER	and	20 SEER	and	9.0 HSPF	$75.00	$150.00
		2			12.0 EER	and	23 SEER	and	11.5 HSPF	$150.00	$300.00

VRF Systems											
Equipment Type	Unit Type	Tier	Size Category	Sub Category	Full Load Cooling Efficiency		Seasonal/Part Load Cooling Efficiency		Heating Efficiency	Minimum Sales Price Discount ($/Ton)*	Total Distributor Incentive ($/Ton)**
Air-Cooled	HP	1	≥ 65 kBtuh (≥5.4 Tons)	VRF	11.0 EER	and	18 IEER	and	3.4 COP	$125.00	$250.00
Water-Cooled	HP	1	≥ 65 kBtuh (≥5.4 Tons)	VRF	12.0 EER	and	20 IEER	and	4.3 COP	$125.00	$250.00

*This is the minimum incentive amount that must be reflected in a price reduction for each eligible sale. **This amount includes the sale price discount

1 Equipment capacity is AHRI rated capacity or capacity at AHRI rating conditions for units without an AHRI rating 2 Heating efficiency applies only to heat pumps

Qualifying HVAC and Heat Pumps

Dual Enthalpy Economizer Controls (when installed with new qualifying equipment)		
Equipment	Minimum Sales Price Discount ($/Unit)*	Total Distributor Incentive ($/Unit)**
Outside Air Economizer utilizing 2 enthalpy sensors	$125.00	$250.00

Electronically Commutated Motor (ECM) Circulator Pumps for hydronic heating or service hot water installations		
Commercial Pump Size	Minimum Sales Price Discount ($/Unit)*	Total Distributor Incentive ($/Unit)**
≤ 1/6 HP	$100.00	$110.00
> 1/6 HP and ≤ 3/4 HP	$100.00	$200.00
> 3/4 HP and ≤ 3 HP	$200.00	$400.00

*This is the minimum incentive amount that must be reflected in a price reduction for each eligible sale. Distributors are encouraged to use the remaining balance of the incentive to provide further price reduction at any time.

Reminder One

Pre-Approval of Large Sales

To guarantee the incentive, sales that total **5 or more units** **OR $8,000 or more** in total Initiative incentives MUST receive pre-approval.

To obtain pre-approval, please contact Energy Solutions with the following information:

- Business Name & Installation Address
- Equipment Make and Model
- Number of Units

Reminder 2

All applications are subject to verification. You can help facilitate accurate verification results for your projects and protect incentives by providing:

- Accurate and precise equipment **installation address**
- **A customer contact**
- Accurate estimated **installation date**

Last Reminders

Sales of qualifying equipment are eligible for an incentive if:

1. Equipment will be installed for commercial use at a site that has a commercial electric account;
2. At least 50% of the incentive is used towards a point-of-sale price discount; and
3. The sale is not already receiving an incentive through another program.

Sales to commercial electric customers in Massachusetts & Rhode Island are eligible

Contact Energy Solutions with questions or comments at:

HVAC & Heat Pump Support:
617-440-5467
HVAC-NE@energy-solution.com

Paul Ormond, MA DOER

MassCEC's Solar Hot Water Program

Meg Howard
Program Manager
mhoward@masscec.com
September 11, 2019

MASSACHUSETTS CLEAN ENERGY CENTER®

MassCEC's Support of CH&C

- Starting in 2011 for solar hot water and 2013 for other CH&C technologies, MassCEC has been working to develop a market and industry for low carbon heating
  - Invested over $60 million
  - Supported over 20,000 projects
  - Worked with over 700 businesses
- Programs targeted fuel switching customers and provided financial incentives to residential and commercial consumers
- Began phase-out of rebate programs in 2019 due to funding constraints
  - ➢ Transitioning to programs that target specific challenges, focus on consumer education (e.g., HeatSmart), and addressing industry barriers
  - ➢ Reach out to us for information including participating installers and cost data
  - ➢ Solar hot water incentives will continue through 2020

Potential Solar Hot Water Project Sites

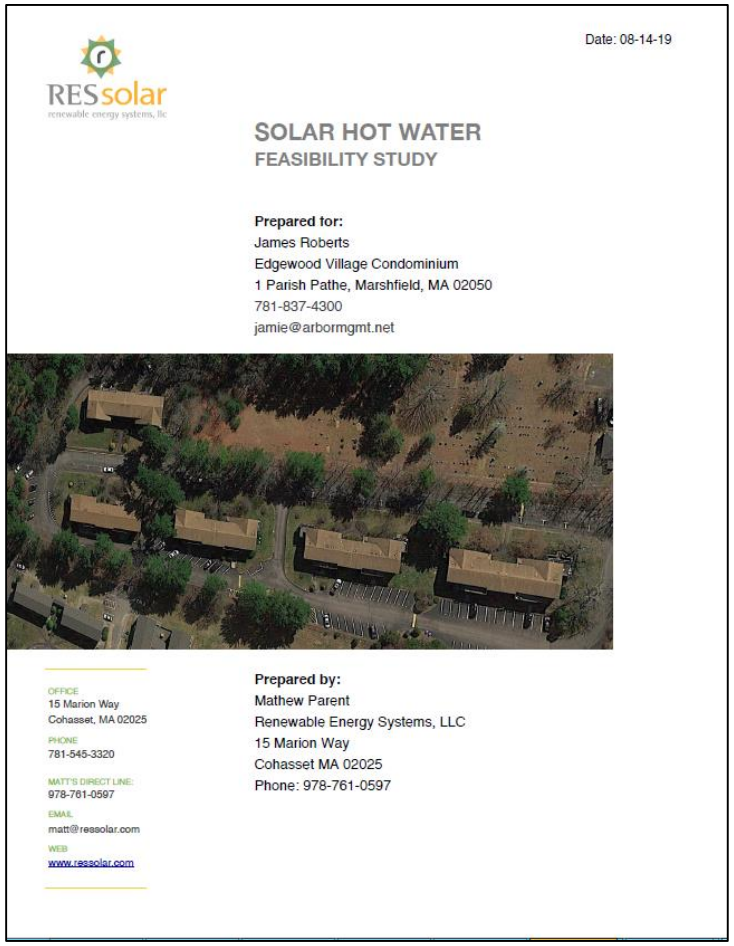
- Target: High hot water usage throughout the year (i.e., hot water is a large expense)
- Especially good payback against oil, propane, and electric water heating
- Screening questions:
  - State of roof or ground (size, age, condition, orientation/shading)
  - Do you have the space to fit the storage tanks?
- Examples of high hot water usage:
  - Community centers, especially with pools
  - Multi-family housing
  - Fire stations
  - Facilities with a kitchen
  - Non-municipal examples: hotels, laundries, breweries, hospitals, nursing homes, dairy farms, and colleges and universities.

Millbury Housing Authority apartments

Franklin County Community Development Corporation (FCCDC) including the Western Massachusetts Food Processing Center

MassCEC-funded Feasibility Studies

- Typically cost $5,000-6,000.
- Eligible for up to $5,000 rebate with minimum cost share of 5% from system owner.
- NOTE: Only project sites with government, non-profit, agricultural, and affordable housing uses are eligible for feasibility study rebates.
- Natural gas customers will only qualify for MassCEC feasibility study incentives if they can demonstrate a willingness to accept longer payback times based on other institutional goals, like greenhouse gas reductions.



RESsolar
renewable energy systems, llc

Date: 08-14-19

SOLAR HOT WATER
FEASIBILITY STUDY

Prepared for:
James Roberts
Edgewood Village Condominium
1 Parish Pathe, Marshfield, MA 02050
781-837-4300
jamie@arbormgmt.net

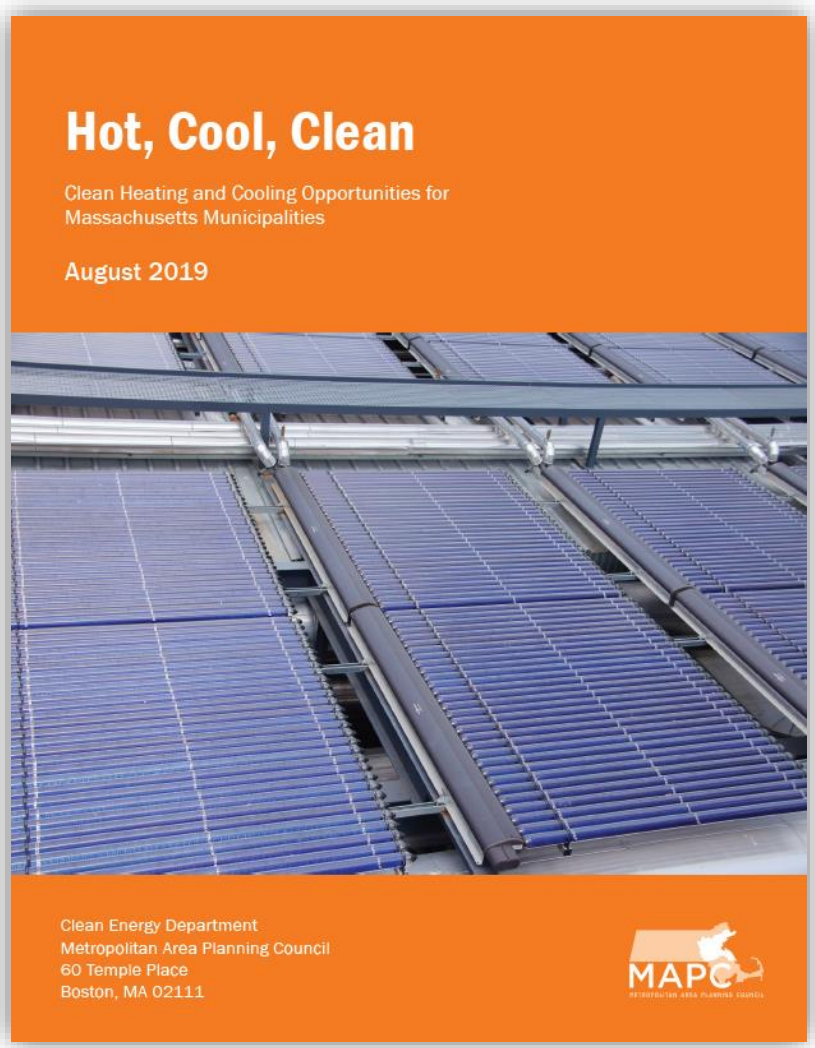
OFFICE
15 Marion Way
Cohasset, MA 02025
PHONE
781-545-3320
MATT'S DIRECT LINE:
978-761-0597
EMAIL
matt@ressolar.com
WEB
www.ressolar.com

Prepared by:
Mathew Parent
Renewable Energy Systems, LLC
15 Marion Way
Cohasset MA 02025
Phone: 978-761-0597

MassCEC Incentive Structure

- Incentive based on number and efficiency of collectors
- Rebate is up to 50% of project costs for public entities and non-profits (30% for for-profit entities and 75% for affordable housing)
- Total incentive up to $100,000
- Feasibility study required for systems greater than 8 panels
- Rolling deadline through the end of 2020.
- Next step: Contact a participating installer (or MassCEC or MAPC)

Download the white paper



Available at
http://www.mapc.org/wp-content/uploads/2019/08/8.13.19-Clean-Heating-and-Cooling-White-Paper.pdf