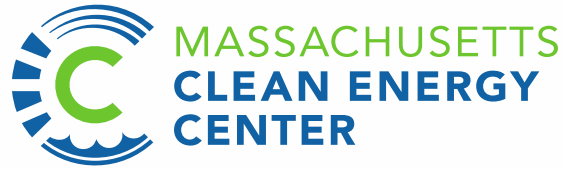


Clean Heating & Cooling for Multi-Family Buildings

Peter McPhee

April 25, 2017

Energy Efficiency in Multi-Family Buildings Workshop
Cambridge, MA



OUR MISSION

Grow the state's clean energy industry while helping to meet the Commonwealth's clean energy and climate goals.

ADOPT

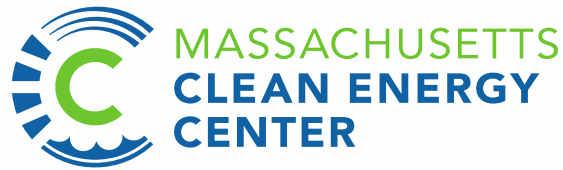
Increase renewable energy adoption by residents, businesses and communities.

CONNECT

Connect employers, job seekers, students, communities and investors to the clean energy industry.

INNOVATE

Help to spur innovation through infrastructure, funding and technology development support.



Motivation for Clean Heating & Cooling

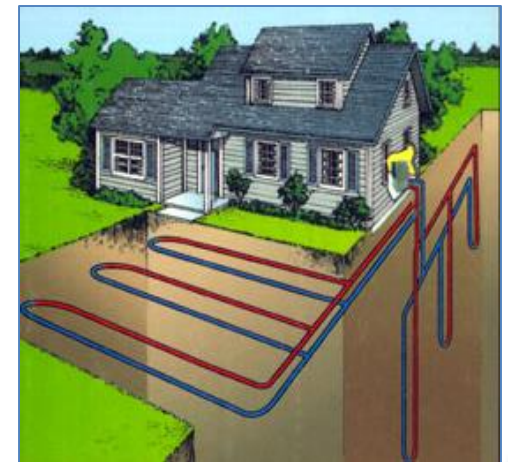
MA Background

- Heating is 30% of MA overall energy use
 - Also 30% of MA GHG emissions
- MA GHG reduction reqs
 - 25% by 2020, 80% by 2050
- August 2015: 5-year, \$30 Million commitment
 - Incentives for residential and commercial-scale clean heating
 - Additional incentives for low- and moderate-income

CH&C Technologies

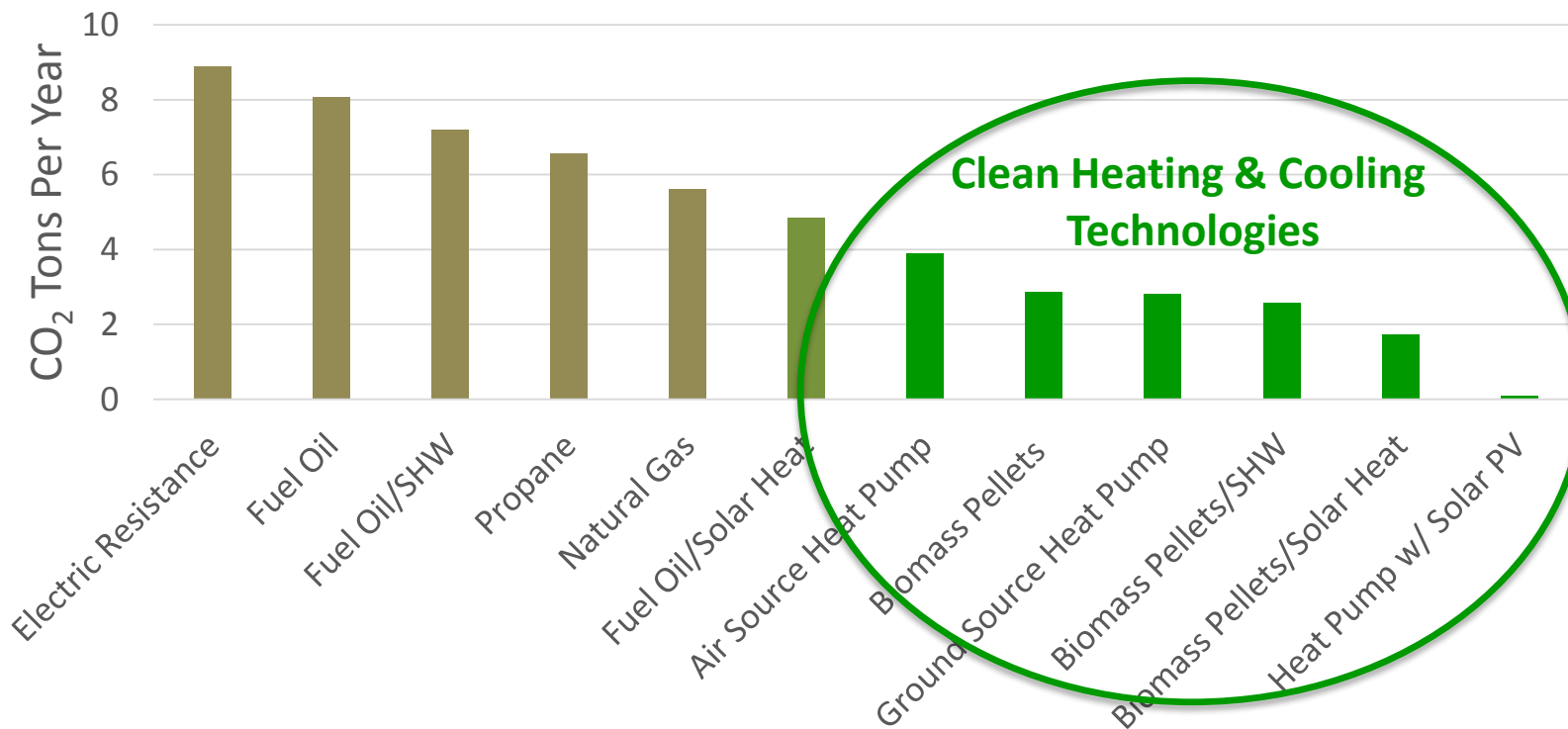
Technologies

- Solar Thermal
- Biomass Heating
- Cold-Climate Air-Source Heat Pumps
- Ground-Source Heat Pumps



Renewable Heating & GHG

Estimated Annual GHG Emissions – Example Residence



Mini-Split ASHPs

- High efficiency, cold-climate heat pump
- Versatile, often supplemental
- Provide heating & cooling
- Uses wall-mounted units, ceiling cassettes, floor units



Sector	\$ per unit or per 12 kBTU/hr	Max. Grant
Business	\$625	\$93,750
Public/Non-Profit	\$800	\$120,000
Affordable Housing	\$1,500	\$225,000



VRF ASHPs

- Whole-building, stand-alone heating & cooling
- Primarily for larger facilities
- Heat recovery/simultaneous heating and cooling
- Indoor distribution uses wall units, ceiling cassettes

DRAFT VRF Grant Amount

(\$ per 12 kBTU/hr of heating capacity @ 17°F)



Sector	VRF without Heat Recovery	VRF with Heat Recovery	Max. Grant
Business	\$800	\$1,200	\$180,000*
Public/Non-Profit	\$1,000	\$1,400	\$210,000*
Affordable Housing	\$1,600	\$2,000	\$250,000*

***Maximum Grant:** Up to 1,800 kBTU/hr of capacity, or \$250K

Solar Hot Water & Solar Heating

- Primary end use is domestic hot water
- Supplements existing hot water system
- Roof or ground space needed

Award Component	Standard Rebate	Non-Profit/ Public Rebate	Affordable Housing Rebate
Base Rebate = Rating * # of collectors * constant	Constant = \$100	Constant = \$150	Constant = \$200
PV Co-Location Adder	\$500		
Max. Rebate before Metering	40% of cost, up to \$100,000	65% of cost, up to \$100,000	80% of cost, up to \$100,000
Metering Adder	100% of metering equipment cost, up to \$1,500		
Maximum Total Rebate	\$101,500		



Massachusetts Clean Energy Center *Clean Heating & Cooling Programs*

www.masscec.com/programs/clean-heating-and-cooling

- Air-Source Heat Pumps: ASHP@masscec.com
- Central Biomass Heating: biomassthermal@masscec.com
- Ground-Source Heat Pumps: GSHP@masscec.com
- Solar Heating and Hot Water: solarhotwater@masscec.com

CH&C Hotline: [617-315-9357](tel:617-315-9357)

Sign up for updates at masscec.com

Array of Incentives

Rebates

MassCEC

Mass Save

Production Incentives

Alternative
Energy
Credits

Financing

Mass Save

PACE

Tax Incentives

Accelerated
Depreciation

Investment
Tax Credits
(Federal &
MA)

Other Incentives

Incentive Summary Table						
Program	Amount	Maximum Amount	ASHP	GSHP	Biomass	Solar Hot Water
All Sectors						
MassCEC Rebates	Varies	Varies	x	x	x	x
Alternative Energy Credits	TBD	None	x	x	x	x
Sales Tax Exemption	6.25%	None		x		x
For Businesses						
Accelerated Depreciation	5 years; typically 35% of costs + bonus depr.	None		x		x
Mass Save Financing for Business	0% for 7 years	\$500,000	x	x	x	x
Mass Save Custom Retrofit	Up to 75% of incremental cost	None	x	x	x	x
Federal Tax Credit	30% of costs	None				x
For Residents						
Mass Save HEAT Loan	0% for 7 years	\$25,000	x	x	x	x
Mini-Split Rebate	\$100 or \$300 per unit	None	x			
Federal Tax Credit	30% of costs	None				x
MA Income Tax Credit	15% of costs	\$1,000				x