

Renewable*Thermal*

Overview of Renewable Heating and Cooling Policy Drivers in the U.S.

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Clean Energy States Alliance

Clean Energy States Alliance (CESA) is a national non-profit organization dedicated to advancing state and local efforts to implement smart clean energy policies, programs, technology innovation, and financing tools to drive increased investment and market-making for clean energy technologies.

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Federal Policy

	Solar Thermal	Geothermal	ASHP	Biomass Thermal
Renewable Energy Tax Credit (residential)	30% until 2019, then ratchets down to 22% by 2020	30% expired 31/12/3016		
Energy Efficiency Tax Credit (residential)*			Expired 12/31/2016 2009-2010 max amount: \$1500 2010-2016 max amount: \$300	Expired 12/31/2016 2009-2010 max amount: \$1500 2010-2016 max amount: \$300
Corporate Tax Credit (30% ITC)	30%, ratcheting down btw '19-'22	10%, ratcheting down btw '19-'22		

* Aggregate cap of \$500 per household for tax credit term

RT Provisions in State Renewable Portfolio Standards

Twelve States have renewable thermal provisions in their Renewable Portfolio Standards: AZ, DC, IN, MA, MD, NH, NC, NV, PA, TX, VT, WI

RECs awarded based on energy generated. 1 REC=3, 412, 000 BTUs= 1MWh ³	RECs awarded based on electricity displaced. 1 REC = 1 MWh displaced
AZ, DC (metered output), IN, MA, MD, NV (solar thermal), NH, NC, TX (landfill gas)	DC (estimated output), PA, TX (solar therm and geotherm), UT, WI

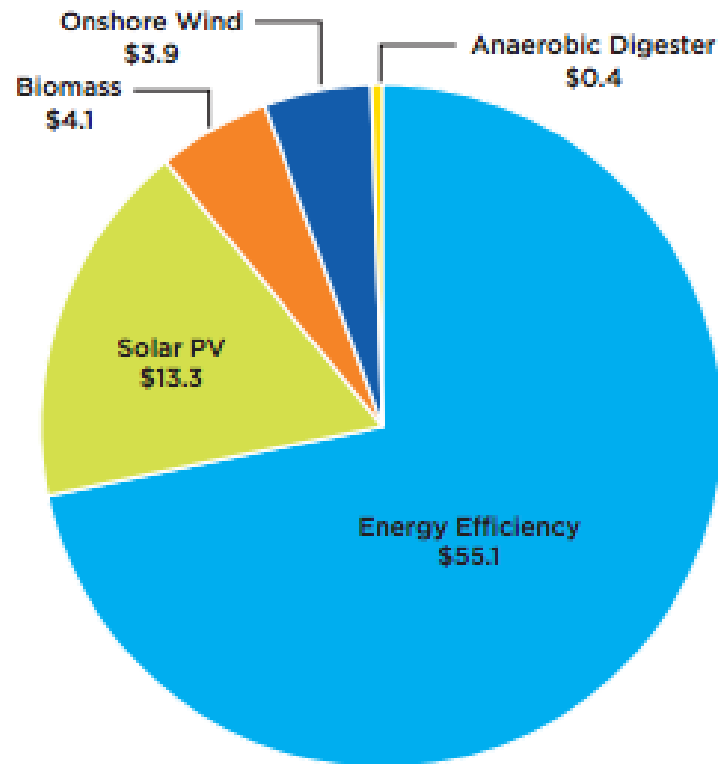
NH was the first state to include a thermal provision: 2% by 2023 beginning in 2014. **Thermal RECs are calculated based on measured thermal output and converted to electric equivalency.** Systems smaller than 150,000 BTUs/hr can calculate thermal output based on operating hours or fuel input.

Renewable thermal technologies by state

State Policy or Program	ASHP	GSHP	Biomass Pellet	Solar Thermal
MA Clean Heating and Cooling Program	✓	✓	✓	✓
RHNY	✓	✓	✓	✓
VT CEDF (incentive program)			✓	✓
VT CES	✓	✓	✓	
NH Renewable Energy Fund		✓	✓	✓

Green Bank Finance Opportunities in RT

FIGURE 1. New York Green Bank 10-Year Investment Potential (Billions of Dollars)



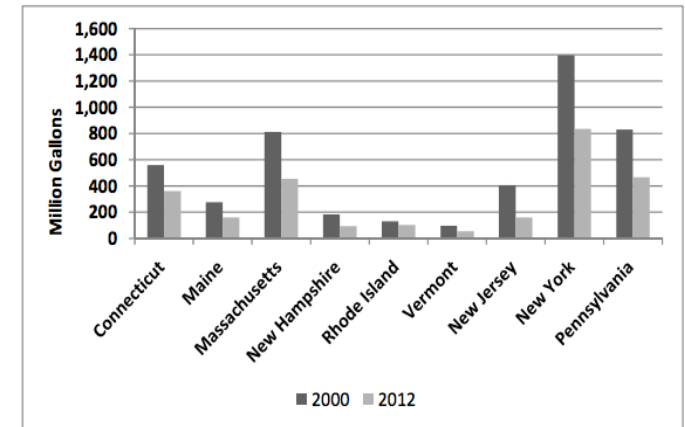
Source: *Financing Clean Energy*, July 2015. Union of Concerned Scientists.

<http://www.ucsusa.org/sites/default/files/attach/2015/07/financing-clean-energy.pdf>

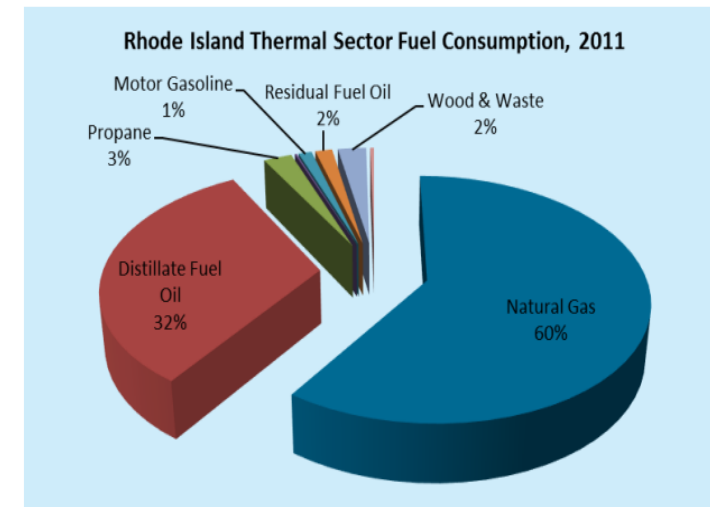
Renewable Thermal (RT)—Regional Context

- MA: Global Warming Solutions Act and Commonwealth Accelerated Renewable Thermal Strategy (2014). \$30m clean heating and cooling program.
- RI: Renewable heating and cooling task force. RHC roadmap soon to be released.
- NH: First thermal provision in RPS. T-RECS.
- VT: Clean Energy Standard has 'Energy Transformation' Tier.
- NY: State Energy Plan (2015). Renewable Heat New York has \$28m budget.
- CT: Comprehensive Energy Strategy calls for reduced reliance on oil heat through EE and RT. Currently updating its Energy Pan.

Figure 4. Northeast State Comparison of Heating Oil Demand



Source: U.S. Energy Information Administration, Adjusted Distillate Fuel Oil Sales for Residential Use, http://www.eia.gov/dnav/pet/pet_cons_821usea_a_epd0_var_mgal_a.htm.



Rhode Island Thermal Working Group Report, 7/15

MA Renewable Thermal Strategy

Table ES-1: Top Priority Strategies

Topic Area	Strategy
Governance	Develop statewide renewable thermal goals for each technology
Governance	Leverage, coordinate, and expand efforts across state agencies to meet short-term goals
Marketing	Launch comprehensive RT technology information campaign with MassSave
Governance	Support implementation of long-term, stable performance-based RT incentives
Governance	Integrate RT in state and public buildings via “Leading by Example” and/or other state energy programs
Governance	Integrate RT into the Stretch Energy Code and other building energy codes
Finance	Develop low-cost financing for renewable thermal through the MassSave HEAT loan program

Source: *Commonwealth Accelerated Renewable Energy Strategy*, 2014. Massachusetts DOER.

MA strategies continued...

Topic Area	Strategy
Marketing	Develop "Thermalize" program, modeled after the successful Massachusetts Solarize program
Marketing	Develop comprehensive, online database with case studies and technology performance metrics
Marketing	Provide data to assist developers and installers to identify "high value" renewable thermal customers
Marketing	Create tool that helps customers self-screen for suitability of RT technologies
Innovation	Support technology exchanges with "state-of-the-art" manufacturers
Resource and Logistics	Create Renewable Thermal Industry Advisory Forum
Governance	Review market enabling guidance regarding fuel choices and associated GHG emissions

Market Barriers

- High capital costs
- Renewable Thermal technologies receive far less public program support than renewable energy technologies, especially solar.
- Limited consumer awareness
- Lacking technology standards and regulatory standards
- Limited trained workforce
- US homes are mostly high temp, single zone
- Decrease in home heating oil and cheap natural gas
- RT technologies are not whole-house solutions
- ASHP performance decreases in cold-temperatures
- Lack of sophisticated control systems that allow automated coordination among multiple heating systems

Improving Emissions, Efficiency & Performance

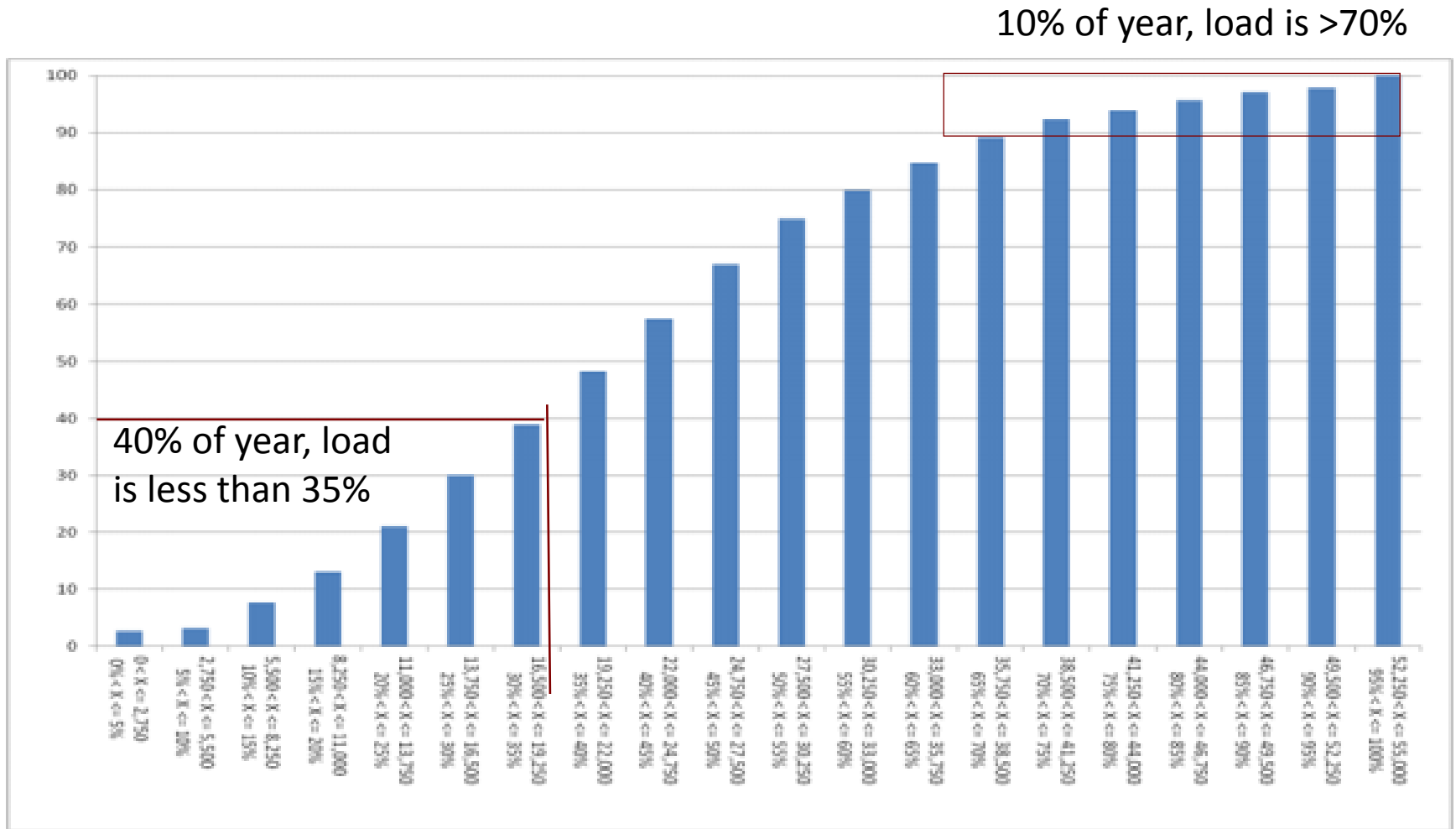
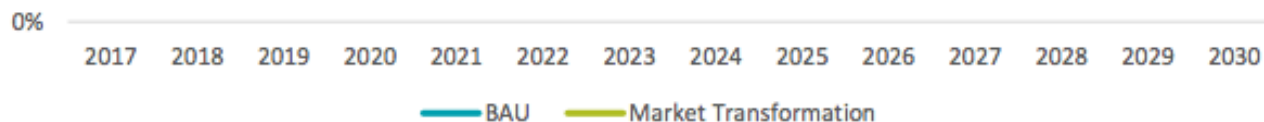


Image: NY State Wood Heat Report, 4/2016

Projected Growth & Opportunities

Source: HVAC Contractor Surveys (Vars: Type, HP1_3_Total thru HP1_3_t2) and D&R HARDI Data

Data Source	Total Sales Reported	Not High Efficiency: Less than 14 SEER/ 11 EER/8 HSPF	Tier 1:14 SEER/ 11 EER/8 HSPF	Tier 2: Above 14 SEER/11 EER/8 HSPF
Large Contractors (n=11)	10	50%	50%	0%
Small Contractors (n=14)	7	86%	14%	0%
Statewide, D&R HARDI Data on Sales of Ductless Heat Pumps	20,618	0.5%	14-14.99 SEER: 2.0%	15 SEER and Above: 97.5%



Source: Northeast/Mid-Atlantic ASHP Market Strategies Report 2016 Update, January 2017.
Northeast Energy Efficiency Partnership.

Contact Information

THANK YOU!

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