



NYSERDA

Clean Heating & Cooling In Rural NY

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Scott Smith

New York State Energy Plan

Reforming the Energy Vision (REV)

40%

Reduction
in GHG emissions
from 1990 levels

Reducing greenhouse gas (GHG) emissions from the energy sector—power generation, industry, buildings, and transportation—is critical to protecting the health and welfare of New Yorkers and reaching the longer term goal of decreasing total carbon emissions 80% by 2050.

50%

Generation
of electricity from
renewable energy sources

Renewable resources, including solar, wind, hydropower, and biomass, will play a vital role in reducing electricity price volatility and curbing carbon emissions.

600

 TBTU

Increase
in statewide energy
efficiency

Energy efficiency results in lower energy bills and is the single most cost effective tool in achieving clean energy objectives. 600 trillion British thermal units in energy efficiency gains equates to a 23% reduction from 2012 in energy consumption in buildings.

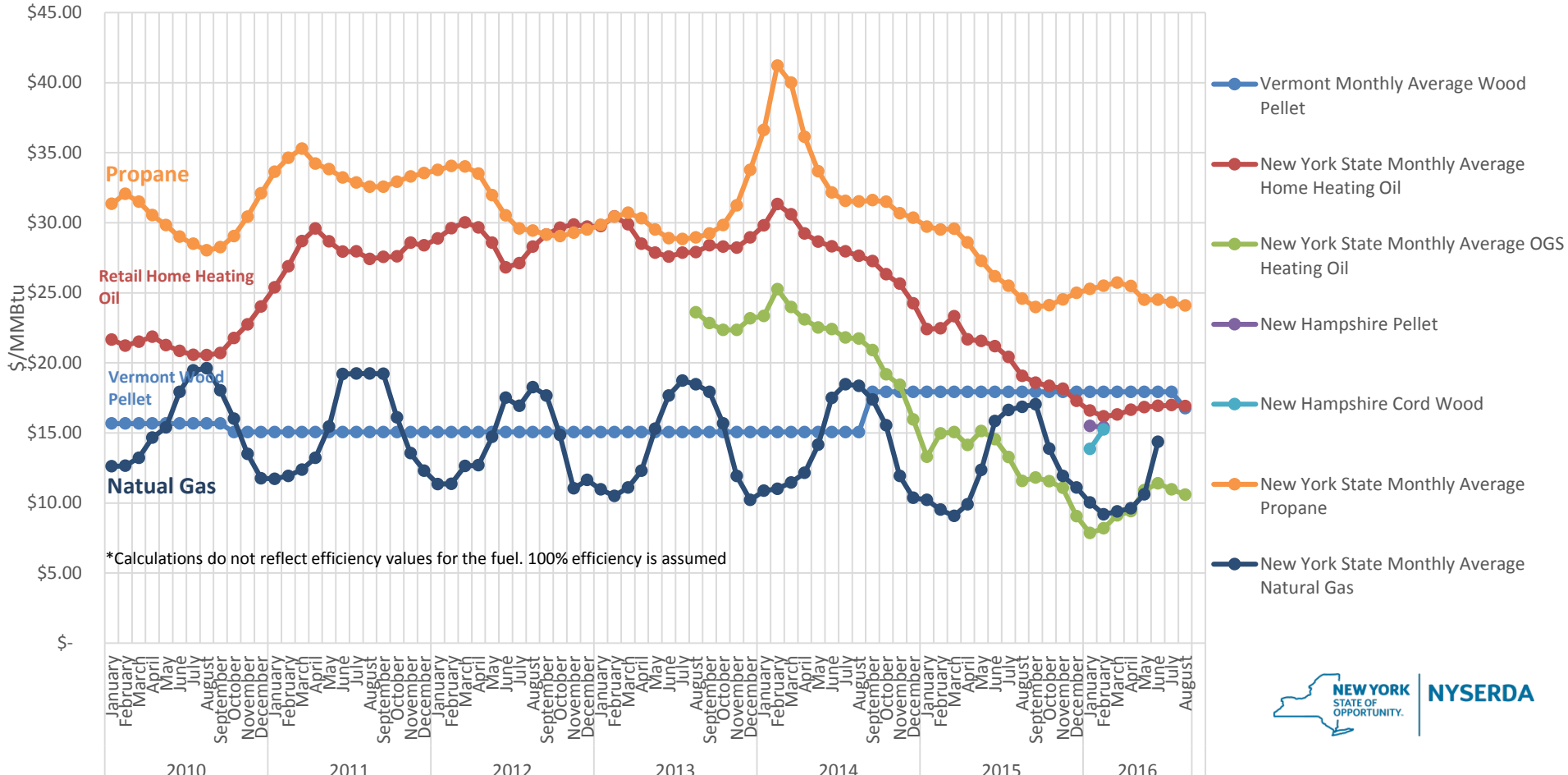
Earth Day Announcement

- New Energy Efficiency 2025 Target is Equivalent to Energy Used by 1.8 Million Homes
- Energy Efficiency Strategies Will Deliver Nearly One Third of State's 2030 Greenhouse Gas Reduction Goal
- \$36.5 Million in Investments Will Prepare up to 19,500 New Yorkers for New Jobs
- New Strategies Will Increase Annual Electricity Savings to Over 3% by 2025 Positioning New York as a National Leader in Energy Efficiency
- Heat pumps and beneficial electrification are included

Barriers to Clean Heating and Cooling Adoption

- **High first costs and insufficient return on the additional investment above the cost of a regular heating & cooling system**
- **Low fossil fuel costs**
- **Limited training available for installers, designers, architects, and engineers**
- **Lack of consumer knowledge and awareness**
- **Lack of affordable financing solutions**

Heating Oil Prices vs. Other Fuels (\$/MMBtu) 2010-2015



RH&C Policy Framework & Investment Plan

(Options to Advance Industry Growth and Markets in New York)

- **RH&C Policy Framework Published February 7, 2017**
 - Constitutes the first step in a longer-term effort to stimulate the RH&C market in New York State
 - It sets out options for policies and market-based strategies for the next few years and concepts for longer-term action
- **Policy Framework's Three Pillars**
 - Reducing Technology Costs and Lowering Barriers
 - Renewable Heating & Cooling Mandates
 - Incentives
- **Clean Energy Fund (CEF) Investment Plan, RH&C Chapter Approved May 8, 2017**
 - This first phase of RH&C initiatives under the CEF will advance timely interventions focusing on reducing soft costs
 - Over \$30 million being invested in this first phase to support ground source heat pump installations



Renewable Heat New York



John Rhodes, President and CEO, NYSERDA announcing Renewable Heat NY July 29th, 2014. Photo credit: Pyramid Energy EES.

Announced in Governor Cuomo's 2014 State of the State Address

Built upon NYSEDA's biomass heating R&D program to bring advanced technologies into the NYS heating market

Retirement of outdoor wood boilers, indoor wood boilers and wood stoves

Commercial pellet boiler heating systems

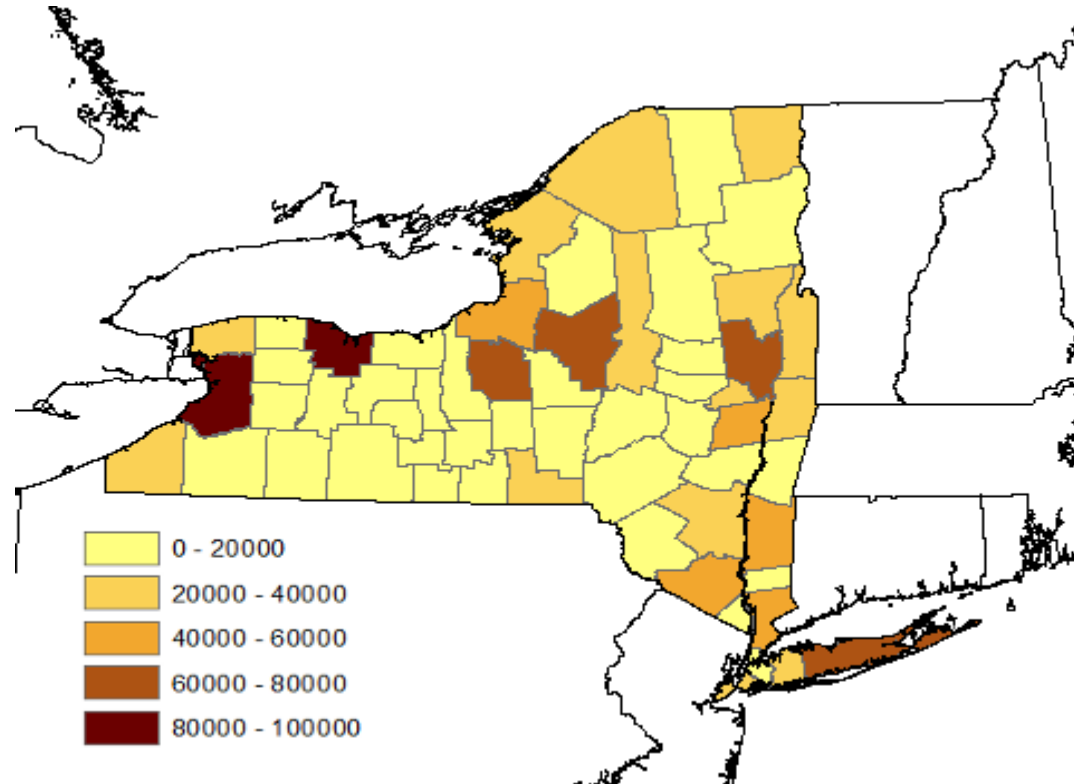
Residential pellet boiler heating systems and stoves

Residential/small commercial advanced cordwood boilers with full thermal storage

Continued R&D

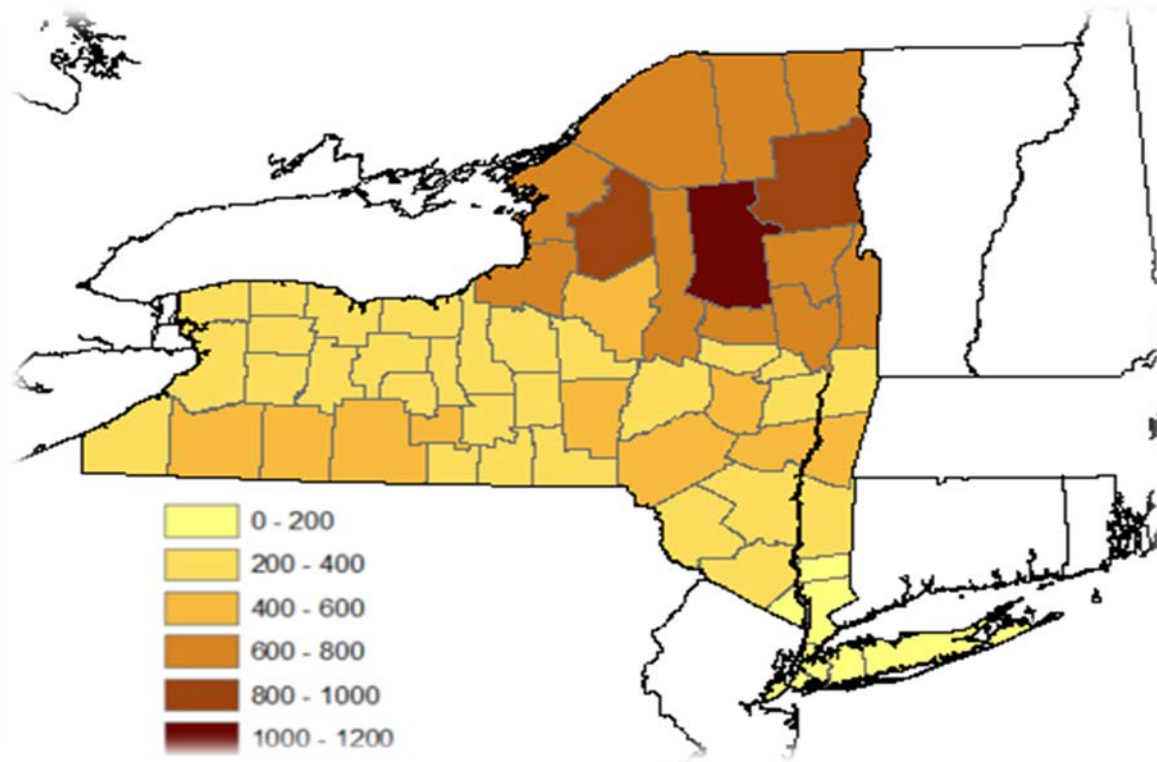
Workforce development for proper system design, sizing and quality installations

Residential Wood Combustion by County (tons) in 2011



Source: Wood Heat Report

Per Capita Residential Wood Combustion (pounds) by County in 2011



Source: Wood Heat Report

Qualified Advanced Cordwood Boiler Technologies



Must be $\geq 60\%$ annual efficiency by BNL PTS and be accepted by NYSDEC.
PM ≤ 0.32 lb/MMBtu, report CO

Advanced cordwood boiler in outbuilding



Advanced cordwood boiler

Seasoned wood is kept dry

Thermal storage tank in basement of farmhouse

Qualified Pellet Boiler Technologies



Must be $\geq 85\%$ thermal efficiency, $PM_{2.5} \leq 0.080$ lb/MMBtu, and $CO < 270$ ppm at 7% O_2

Bulk Pellet Storage



Maximizing performance with thermal storage



1250 Gallons
Unpressurized



528 Gallons
Pressurized

Residential / Small Commercial Boilers

System Type / Technology	Incentive amount
Advanced Cordwood Boiler with Full Thermal Storage	25% of installed cost up to \$5,000
Small Pellet Boiler with Thermal Storage	45% of installed costs up to \$36,000

An additional \$5,000 for the recycling of old outdoor/indoor wood boiler or \$2,500 for recycling a whole house wood furnace



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Large Commercial Boilers (>300,000 Btu/h)

System Type / Technology	Incentive amount
Large Pellet Boiler with Thermal Storage	40% of total installed cost up to \$200,000
Tandem Pellet Boiler with Thermal Storage	45% of total installed cost up to \$270,000

Sizing \leq 60% design day load, thermal storage, careful system integration with existing heating system and heat distribution system and controls.

Technical assistance for energy study, and review of commissioning and first year of Measurement and Verification.



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Qualified Pellet Stove Technologies



At or below 2.0 grams per hour particulate matter emissions on the 'EPA List of Certified Wood Heaters'

Residential Pellet Stoves

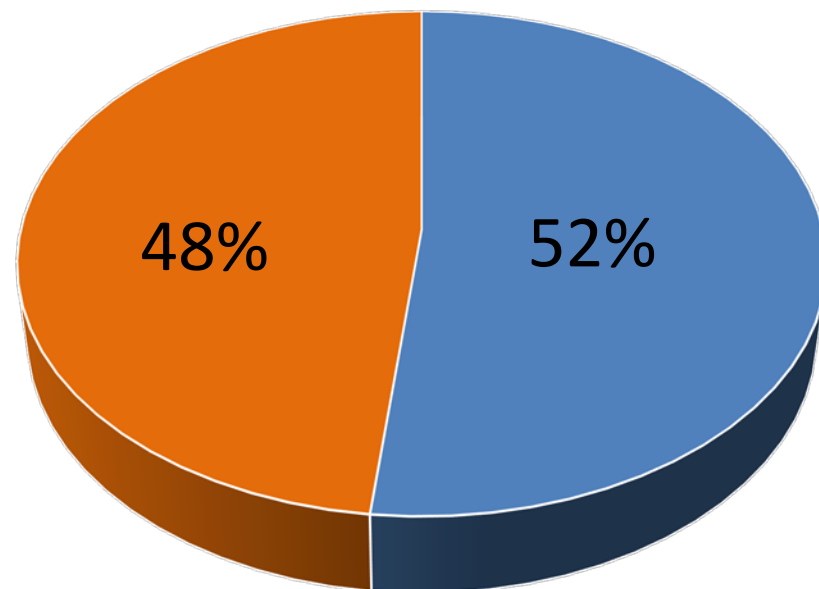
The following incentives are available toward the purchase of a new pellet stove for use in a primary residence, without natural gas service:

Qualification	Incentive Amount
Market Rate with Recycling	\$1,500
Income Qualified (No Recycling)	\$2,000
Income Qualified, add optional Recycling	\$2,500

The new stove can provide either primary or supplemental heating and must be at or below 2.0 grams per hour particulate matter emissions on the 'EPA List of Certified Wood Heaters'

Residential Pellet Stove Program Participation

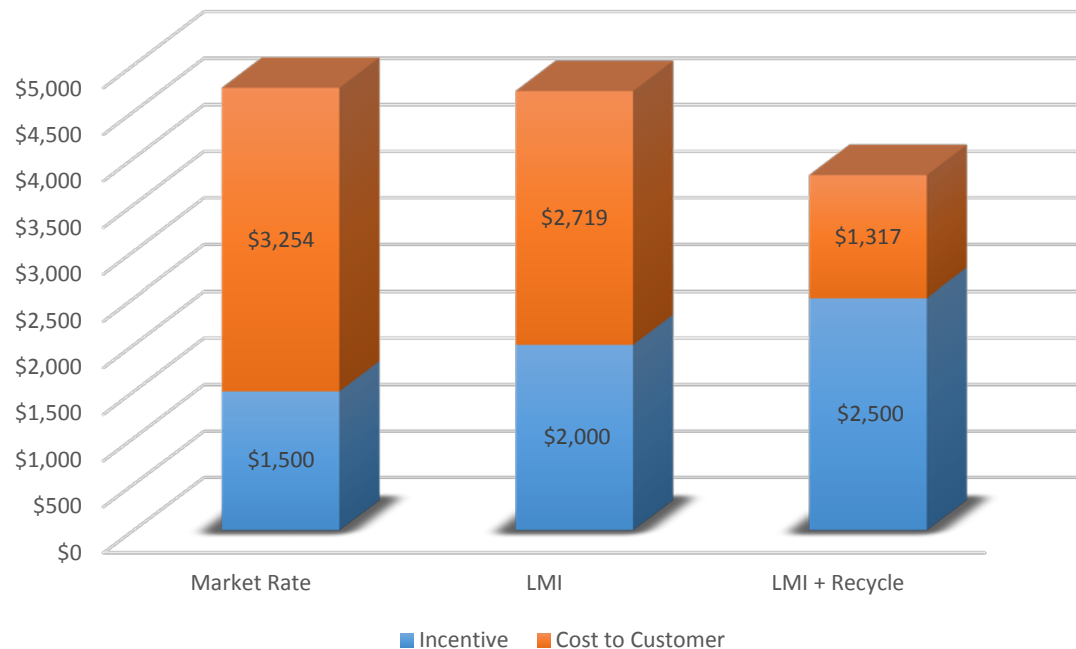
Market Rate vs. Low-Moderate Income



■ Market Rate

■ LMI

Cost Breakout per Customer Type



CH&C Programs Launched since June 2017

- **Air Source Heat Pumps (ASHP) Program [PON 3635 \$10.95M]**
 - NYSERDA will provide up to \$10.95 million in incentives to participating installers for the installation of program qualified ASHP systems in residential sites to include single-family and multifamily buildings through 2020. Incentives of \$500 per installed program qualified ASHP system are available only to participating installers on a first-come, first-served basis, up to \$500,000 per participating installer.
- **Ground Source Heat Pumps (GSHP) Rebate Program [PON 3620 \$15M]**
 - Offers \$15 million to support the installation of ground source heat pump systems at residential, commercial, institutional, and industrial buildings. Funding is available only to eligible designers and installers of renewable heating and cooling systems that have been approved by NYSERDA through June 2019.
- **Clean Heating & Cooling Communities Campaigns [PON 3723 / \$1.3 Million available in first round, \$8 Million total investment]**
 - Support for communities to increase customer awareness of CH&C technologies, reduce installed costs, and jump-start the market by implementing multi-year campaigns consisting of community-based outreach and education focused on CH&C.
 - Retained consultant to provide technical assistance to communities
- **Geothermal Clean Energy Challenge [\$3.5 Million Available]**
 - NYSERDA and NYPA will identify the best candidates for large, multi-building geothermal ground-source heat pump installations by providing free technical assistance and financial support. Open only to qualified colleges and universities, K-12 schools, State and local governments, and hospitals in New York State.

CH&C Programs Launched since June 2017 cont.

- **Cooperative Advertising and Training for CH&C Partners [PON 3694 / \$2 Million]**
 - NYSERDA has made \$2 million available to support advertising, special promotions and/or events, including training, for eligible HVAC technologies. Incentives up to 50 percent of the total cost for educational and marketing promotion opportunities to eligible participants, such as HVAC manufacturers, HVAC distributors/vendors and HVAC installers participating in PON 3653: Air-Source Heat Pump Program, PON 3620: Ground-Source Heat Pump Rebate or Renewable Heat New York
- **NEXTGEN HVAC Technology Challenges [PON 3519 / \$15 Million Available in 4 Rounds]**
 - Several heat pump related categories
- **Financing Solutions**
 - Conduct financial solutions market research for CH&C technologies (focus in financing and investing)
 - Federal tax credit of 30% residential and 10% commercial for geothermal installations reinstated
 - Green Jobs Green NY Loan Program now available to eligible GSHP installers
- **Marketing & Outreach**
 - Developing clean heating & cooling messaging with marketing consultants KSV
 - Developing customer targeting tool to identify high potential customers

Types of Business Models and Services for CH&C

- **Long term lease agreement**
 - In which a 3rd party developer owns, operates, and maintains the system, while the end use customer agrees to host the technology on site
- **Thermal storage**
 - That provides a commercially viable thermal energy storage solution that stores heat energy on behalf of residential or commercial end-users.
- **Education and workforce training**
 - To ensure a knowledgeable workforce providing quality installations
 - Developing a comprehensive strategy
- **Financing solutions**
 - Affordable financing options for clean heating & cooling technologies
- **Controls**
 - Which enable the integration of CH&C systems with conventional HVAC systems
 - Help with gas and electric demand response

Thank You

Scott Smith

Scott.smith@nyserda.ny.gov

518-862-1090 ext. 3344



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