



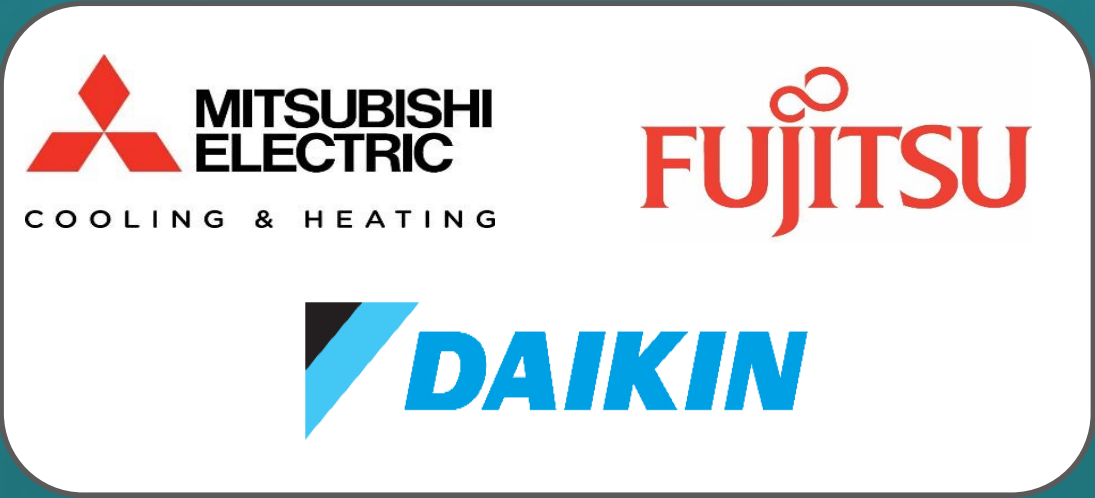
Renewable Heating and Cooling Workshop (Day 2)

June 19, 2018
Saratoga Springs, NY

Workshop Agenda- Day 2

8:00 am	Breakfast
8:30 am	Day 2 Keynote: Mary Sotos
9:00 am	Perspectives on Financing Large Scale RH&C Projects and Portfolios
10:00 am	Morning Breakouts
11:00 am	Break
11:15 am	Manufacturer “Speed-Dating” Sessions
12:30 pm	Lunch
1:30 pm	Afternoon Breakouts
2:30	Workshop Debrief
3:15	Adjourn
3:30 pm	Optional Sessions

Thank you to our Lead Sponsors!



And thank you to our workshop sponsors!



Panasonic



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Renewable Heating and Cooling in the broader Energy and Climate Context

Keynote Speaker: Mary Sotos, CT DEEP

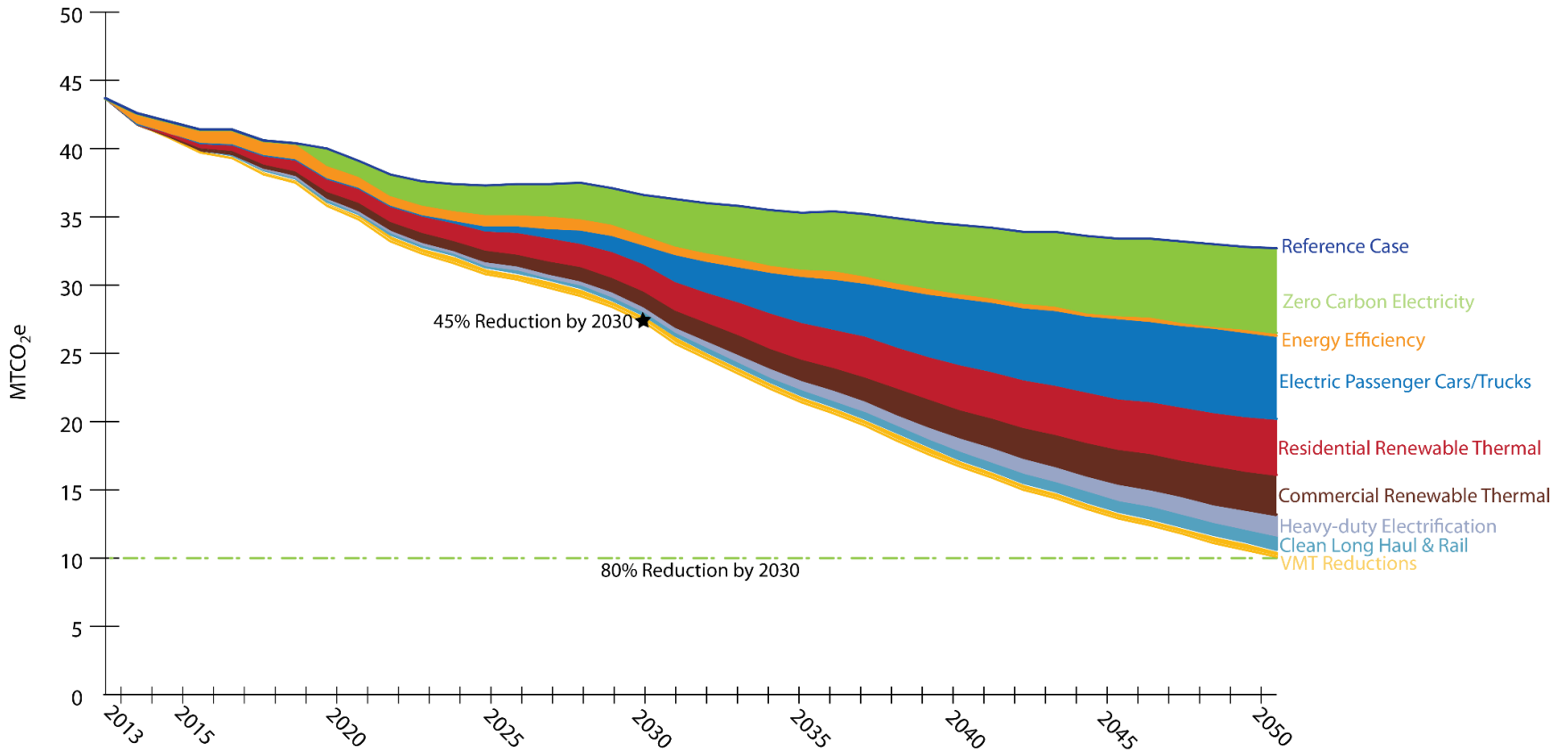


Connecticut Department of Energy and Environmental Protection

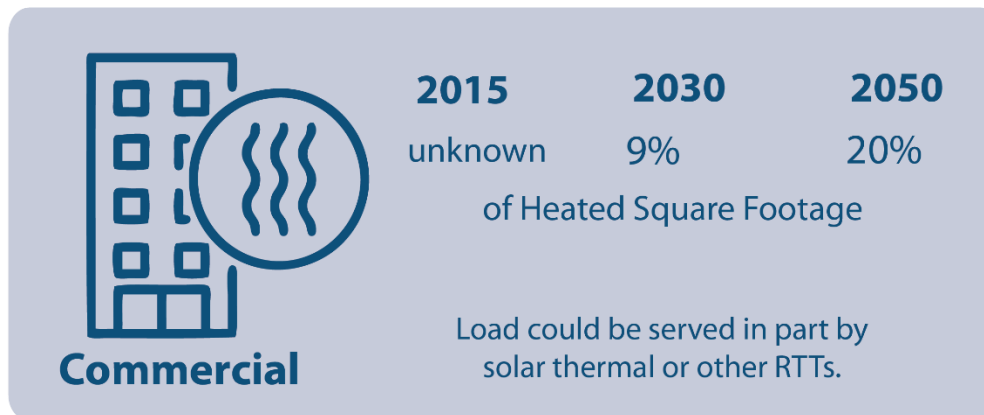
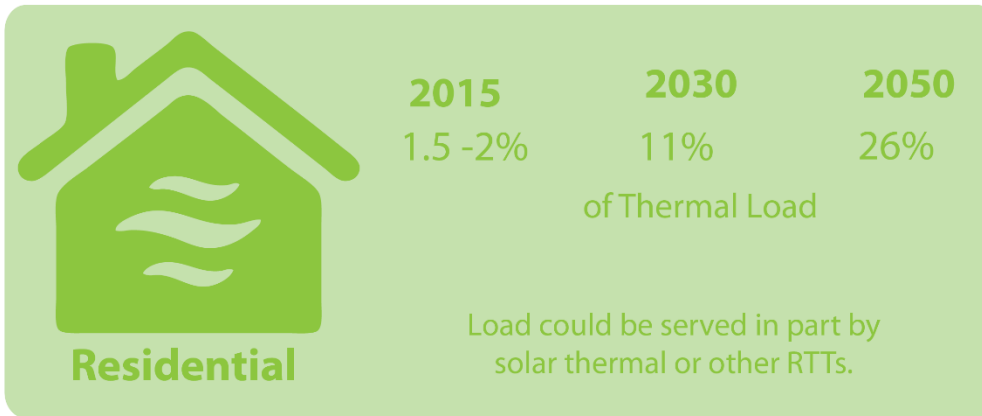


Connecticut Department of
**ENERGY &
ENVIRONMENTAL
PROTECTION**

GHG Mitigation Wedges



Renewable Thermal Deployment




Figures for 2030 assume CT's portion of regional electric grid will be 66% zero carbon.



CT Market Potential of Renewable Thermal Technologies

RTT	As Substitute For	Building Type Applicability						
		Single-Family	Apartment Building	School	Restaurant	Hospital	Hotel	Office Building
ASHP space heating & cooling with no ductwork	Electricity							
	Fuel Oil							
	Natural Gas							
ASHP space heating & cooling with ductwork	Electricity							
	Fuel Oil							
	Natural Gas							
ASHP water heating	Electricity			(not evaluated)				
	Fuel Oil							
	Natural Gas							
Ground-source heat pump space heating & cooling	Electricity							
	Fuel Oil							
	Natural Gas							
Solar water heating	Electricity							
	Fuel Oil							
	Natural Gas							

 *Cost-effective (NPV ≥ 1) in light of cost to finance, install, operate, and maintain in present market conditions and without accounting for available financial incentives*

Source: Gronli, et al. 2017. "Feasibility of Renewable Thermal Technologies in Connecticut: Market Potential."





Session 5: Perspectives on Financing Large Scale Renewable Heating and Cooling Projects and Portfolios

Mike Ryan, HJ Sims

Bert Hunter, Connecticut Green Bank

Dan Donovan, NUpower

Alex Hill, Dunsy Energy Consulting

Tim Weber, Diverso

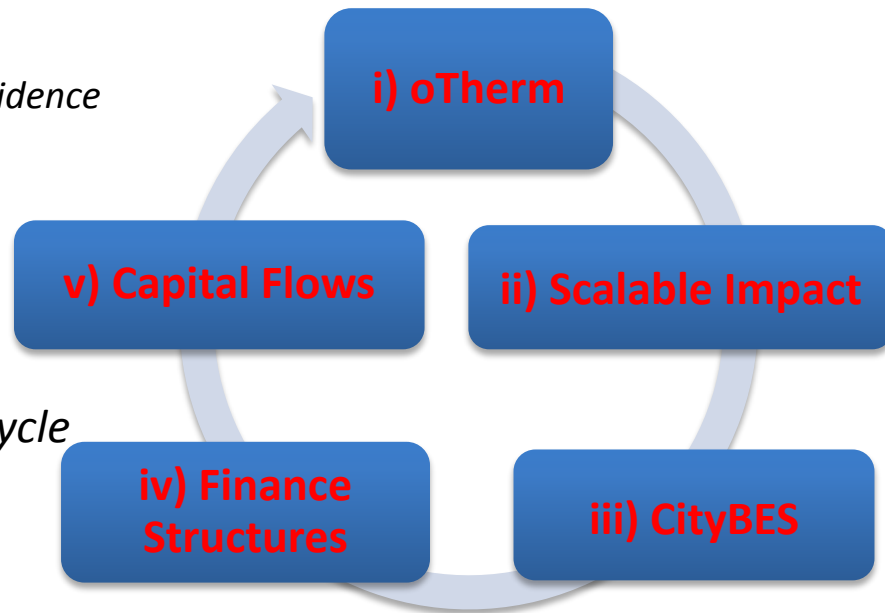
Moderator: John Joshi, NYSERDA

We need an Ecosystem with Policy, Data, Technology, Tools, Capital,....

- i. Performance Attribution
- ii. Customer & Investor Confidence
- iii. Revealing Opportunities
- iv. Impact Through Scale
- v. Investible Assets



Which creates virtuous cycle
of...Investments

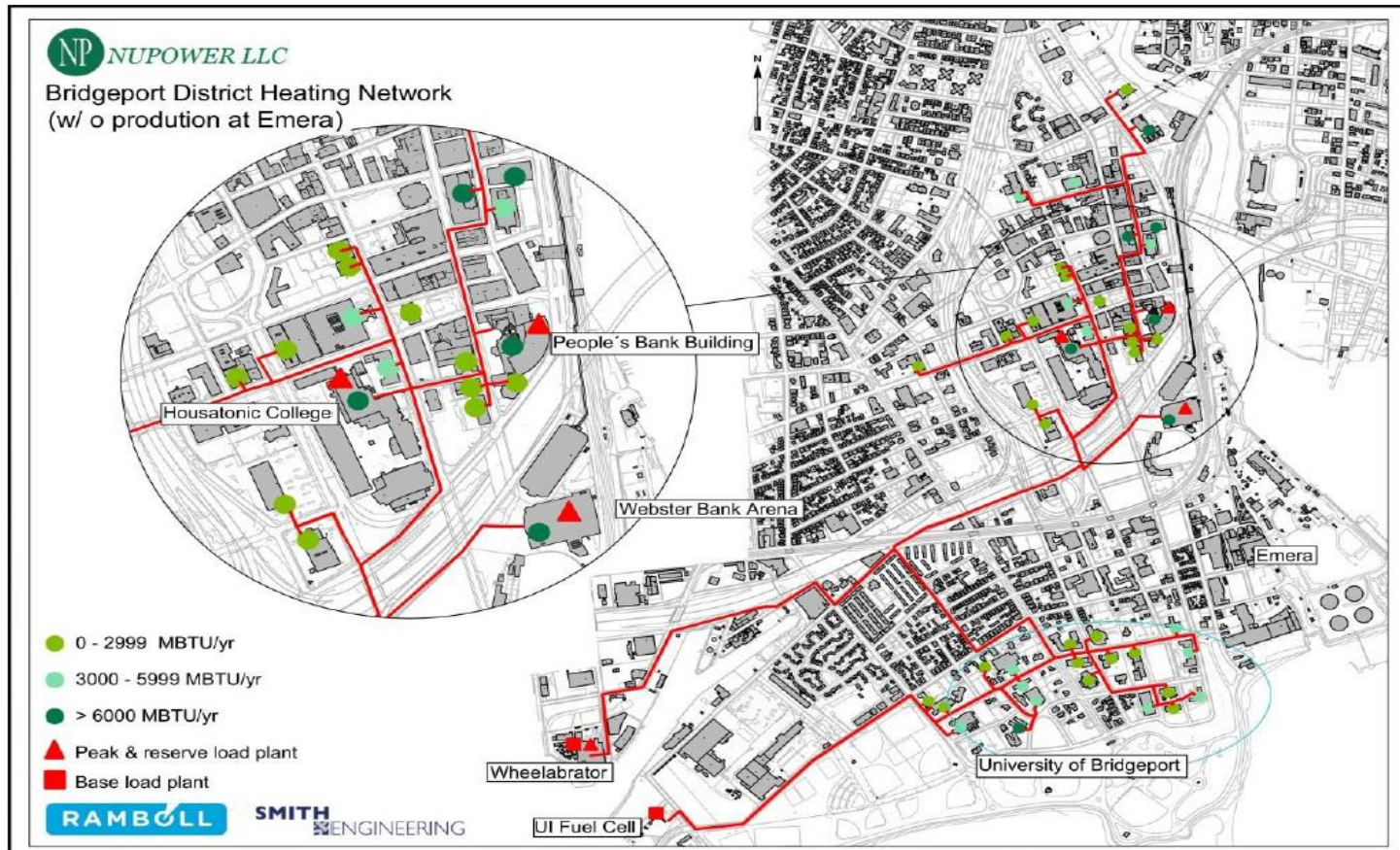




Thermal Loop Financing Criteria

- **Optimize Project location**
 - **Large customer base**
- **Reduction of Operating Cost**
 - **Use of waste heat**
- **Credit worthy customers**
 - **Sufficient credit and size**
- **Reduction of Capital Cost**
 - **Minimize piping infrastructure**
- **Adoption of CHP finance structure**
 - **Diversified and improved project revenue**

Heating Network





Potential Heat Sources



Wheelabrator WtE Facility
67 MW



United Illuminating Fuel Cell Facility
3 MW



Emera Combined Cycle Facility
520 MW



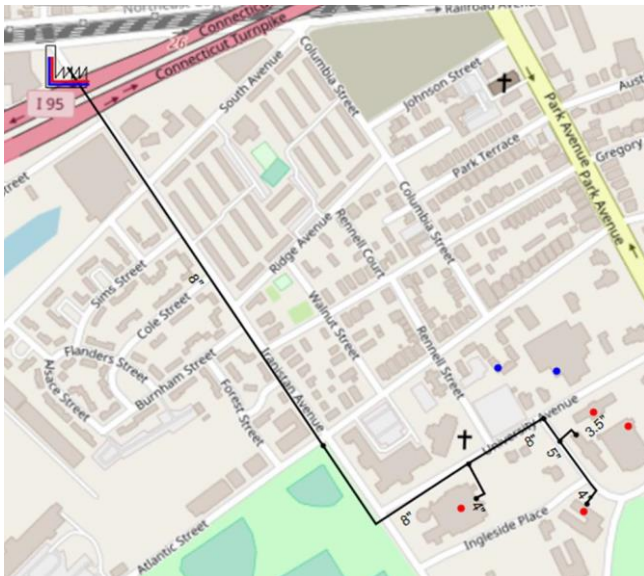
PSEG Combined Cycle Facility
500 MW



Thermal Key Customer Profile
Totaling approximately 3.5 million square feet

- **Academic**
 - **University of Bridgeport**
 - **Housatonic Community College**
- **Commercial**
 - **Webster Arena**
 - **Peoples Bank**
- **Government**
 - **City Buildings**
 - **State Buildings**

Thermal Loop – Phase 1



- **Energy Facility to be located on Iranistan and Rail Road Avenues**
- **Facility produces sufficient thermal energy to supply entire campus**
- **Phase 1 includes six buildings on west side of campus**

CASE STUDY

CLEVELAND THERMAL

\$27,850,000 | Cleveland, OH



HJ SIMS SELLS OVER \$16.5 MILLION OF TAXABLE BONDS TO ACCREDITED PRIVATE CLIENT INVESTORS



FINANCED RIGHT®

HJ Sims closed a \$27,850,000 non-rated fixed rate bond financing for Cleveland Thermal to refinance its outstanding loans. The refinancing reduced the average interest rate on its debt by approximately 3.0%. **The strength of Sims' private client investor distribution capability is exemplified by the fact that Sims sold \$16,540,000 of these bonds to its private client investor group or nearly 60% of the total par amount.** Furthermore, these bonds were taxable and could only be sold to Accredited Investors which significantly limited the pool of available and eligible investors.

Cleveland Thermal currently owns and operates the district heating and cooling systems in downtown Cleveland, Ohio that provide both steam for heating and chilled water for cooling to numerous customers (collectively, the "System"). The steam business has been in operation for over 100 years, and the cooling business became operational in 1994. The System was purchased from Dominion Energy in 2004 and includes over 15 miles of steam pipes serving 156 buildings and over 3 miles of chilled water pipes serving 18 buildings. The System serves a diverse customer base, including government facilities, office buildings, residential buildings, hotels and universities. Its largest customers include Cleveland State University, the County of Cuyahoga, the GSA's Celebrezze Federal Office Building and Courthouse and the City of Cleveland.

For more detailed information on how Cleveland Thermal was Financed Right® by HJ Sims, please call or email:

Aaron RuInick
301.424.9135
arulnick@hjsims.com

hjsims.com

HJ Sims is a member of FINRA, SIPC® and is not affiliated with Cleveland Thermal.

Who is HJ Sims?

- **Investment Bank – Bond Advisors**

- **Wealth Management – NASD Broker Dealer**

- **Background**

Founder, Herbert J. Sims, began advising and placing bonds to rebuild America's infrastructure after the Great Depression starting with bridges in Florida in the 1930s.

Today HJ Sims—still privately held—is a leading provider of financing via placing Long Term bonds in project sectors such as senior living and education, in the U.S. and Puerto Rico. Investment banking and private client wealth management offices are located throughout the U.S. and PR.

For example, HJ Sims successfully completed a \$27mm bond financing for Cleveland Thermal, which owns 15 miles of steam pipes and supplies heat and chilled water to 156 buildings in downtown Cleveland. The financing also included funds for the conversion from a coal- to gas-fired plant.

- **Nupower – Bridgeport Fuel Cell/Thermal Heat Project**

A long-time relationship with the principals of Nupower.

History – Together Dan Donovan from Combustion Engineering and I during my tenure at Pitney Bowes Capital Services completed a renewable energy financing transaction. Pitney Bowes acting as the Tax Equity and Combustion Engineering as the developer.

Here we are again working together to try and make Nupower's Project a reality.



Third Party Utility Model for Commercial Buildings

RTA/NEEP Conference 2018

Project Overview

76 Acre Development in Toronto, Ontario

3.4 mil SF of Residential

- High rise
- Mid rise
- Townhomes

500,000 SF of Commercial Office Space

150,000 SF Community Center & Arena

Phased Construction



PHASE 1



PHASE 2

Phased Construction



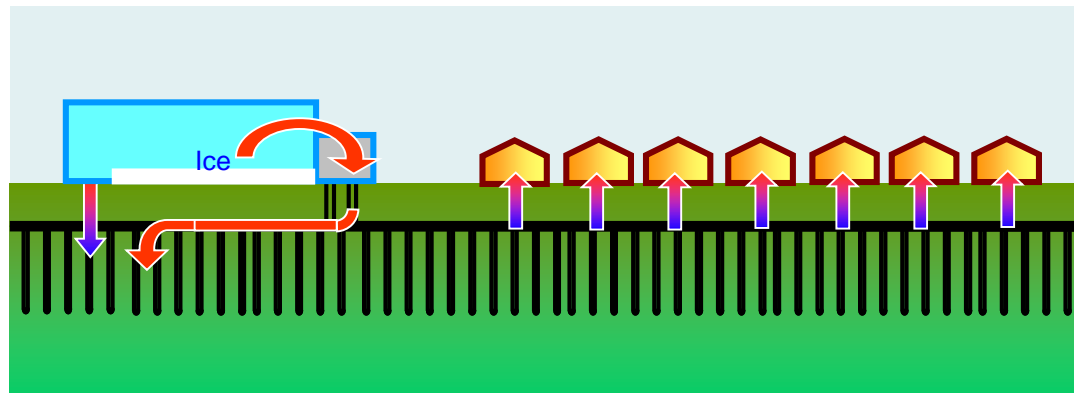
PHASE 3



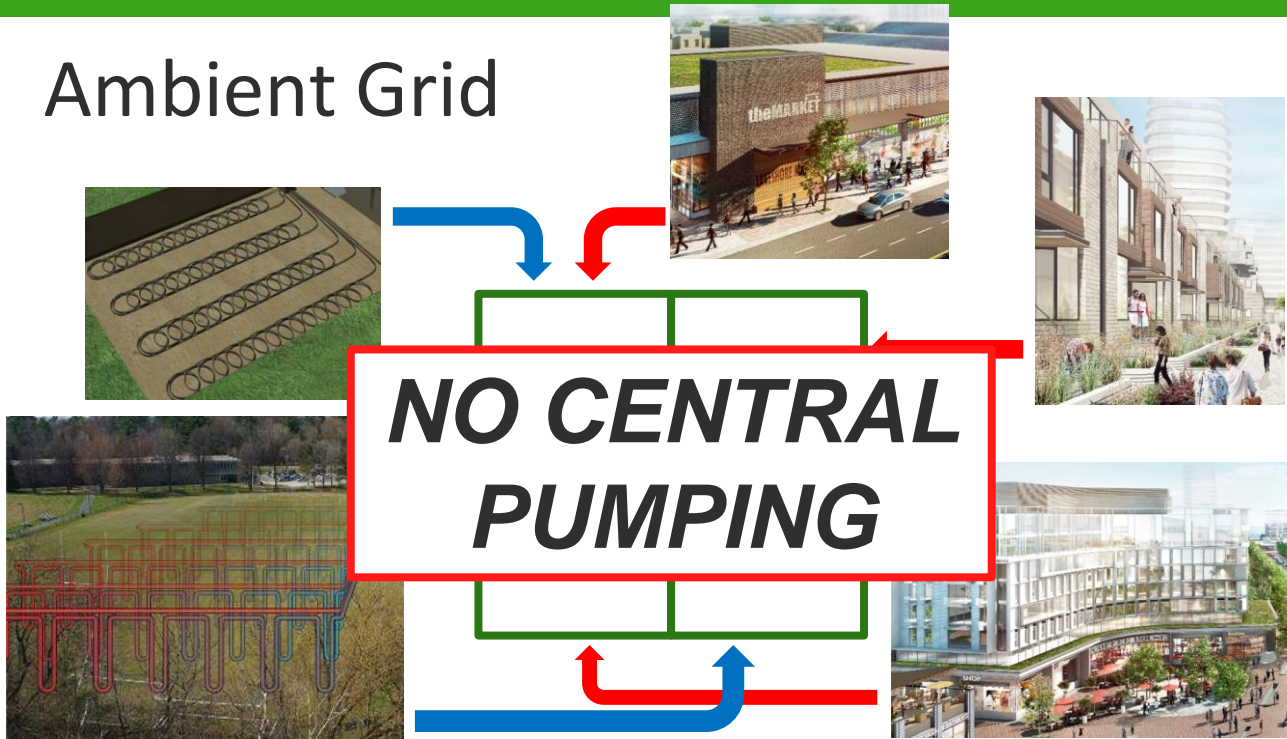
PHASE 4

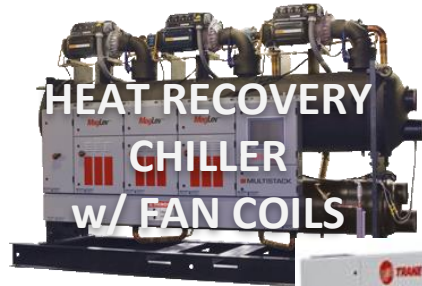
Ambient District Concept

- ❖ Instead of piping hot and chilled water through insulated pipes in a conventional district arrangement, ambient/ ground temperature fluid is circulated.
- ❖ This simple solution offers numerous financial and operational advantages.



Ambient Grid





Decisions can be made individually for each building

Session 6: Breakouts

Win Room

Breakout 1: Innovative Program Design in the Residential Sector

Philip Picotte, VEIC

Josh Kessler, Massachusetts Clean Energy Center

Maura Adams, Northern Forest Center

Moderator: Val Stori, Clean Energy States Alliance (CESA)

Show Room

Breakout 2: Commercial, Institutional, and District Opportunities in RHC

Dermot McGuigan, Energy Symbiosis LLC

Han Li, LBNL

Julian Mercado, Daikin

Moderator: Scott Smith, NYSERDA

This break is brought to you by:

CADMUS



Session 7: Manufacturers Speed Dating

Session 8: Breakouts

Win Room

Breakout 3: Growing the size and quality of the renewable heating and cooling (RHC) installer base

Jake Marin, Efficiency Vermont

Ted Kantrowitz, Canadian GeoExchange Coalition

Guy Wanegar, A&B Cooling and Heating Corp.

Moderator: Dave Lis, NEEP

Show Room

Breakout 4- Needs and Opportunities to Improve RHC Performance Metrics

Bruce Harley, Bruce Harley Energy Consulting

Matt Davis, University of New Hampshire

*Adam Sherman, Biomass Energy Resource Center
(Vermont Energy Investment Corporation)*

Moderator: Helle Gronli, RTA



Session 9: Workshop Debrief

Moderator: Peter Boyd, Executive Fellow, Yale Center for Business and Environment

Debrief exercise

1. What activities/strategies did you hear about today that are most exciting/relevant to you?
2. What are some ways in which you can individually move those activities/strategies forward?
3. Of these important areas to move forward, which would benefit from addressing regionally through regional initiatives?

The NEEP Summit is back in 2018!



The “must-go” regional event

A gathering of efficiency leaders

Exhibition opportunities

A beautiful (and efficient!) venue

Upcoming Events

- The Emerging Green Home Marketplace: Fears, Challenges & Solutions (webinar), June 27 at 11:00 a.m.
- 2018 NEEP Summit, Oct 2-3 in Middletown, RI
- Northeast Strategic Energy Management Collaborative Workshop – Nov 6 in Burlington, VT
- M&V 2.0 Workshop – Nov 7 in Burlington, VT
- HELIX Summit – Dec 7 in Providence, RI

More information at <http://www.neep.org/events>

Day 2 Optional Breakouts

Win Room

The Renewable Thermal Collaborative: Overcoming Barriers to Renewable Heating and Cooling

Show Room

NYSERDA: Fireside Chat on Financial Strategy for Scaling Renewable Thermal