Advanced Rooftop Units (ARTU) Workshop Discussion Guide
JUNE, 2015

Jon Linn, Senior Commercial & Industrial Advisor
Northeast Energy Efficiency Partnerships (NEEP)
NORTHEAST ENERGY EFFICIENCY PARTNERSHIPS
“Accelerating Energy Efficiency”

MISSION
Accelerate energy efficiency in homes, buildings & industry in the Northeast - Mid-Atlantic region

GOAL
Keep the region a national leader in accelerating energy efficiency

STRATEGIES

- Reduce Building Energy Use
- Speed High Efficiency Products
- Make Efficiency Visible
- Advance Knowledge - Best Practices

Regional energy efficiency collaborations since 1996
NEEP ARTU PROJECT

• To Advance Adoption of ARTU
• To Transform the Market—Equipment & Practices
  1. Gather Stakeholders
  2. Assess Market and Develop Strategies
PROJECT ACTIVITIES
Proposed Timeline and Working Group Participation

• Review Market Assessment and Review Market Assessment
  o Today: June 15

• Develop a Recommended Regional Market Strategy Report
  o June - July

• Review and distribute findings from Strategy Report
  o July - August
PURPOSE OF TODAY’S WORKSHOP

• Purpose:
  – Identify, discuss and develop issues & concepts to feed Draft Strategy Recommendation for 2016

• Workshop Objectives:
  – Identify issues/opportunities for partnerships
  – Identify key barriers, solutions and elements of success
  – Identifying action steps to build towards common goals
  – Build relationships among stakeholders
<table>
<thead>
<tr>
<th>Time</th>
<th>Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00</td>
<td>Welcome and Introductions</td>
</tr>
<tr>
<td>10:10</td>
<td>NEEP ARTU Project</td>
</tr>
<tr>
<td>10:30</td>
<td>Innovative, Progressive and Effective Promotions Panel</td>
</tr>
<tr>
<td>12:00</td>
<td>Lunch</td>
</tr>
<tr>
<td>1:00</td>
<td>Barriers and Solutions</td>
</tr>
<tr>
<td>2:00</td>
<td>Break</td>
</tr>
<tr>
<td>2:10</td>
<td>Activities and Priorities</td>
</tr>
<tr>
<td>3:00</td>
<td>Wrap and Adjourn – Thank you!</td>
</tr>
<tr>
<td>3:15</td>
<td>Tour of Schneider Electric</td>
</tr>
</tbody>
</table>
HIGH LEVEL FINDINGS

In the Northeast Region:

• Aging fleet of RTUs
• Thousands of Units sold every year
• Lots of room to boost proportion of High Efficiency Units
• Huge Potential E savings and D reduction
• Lots of good, strong programs
• Lots of room for improvement and new ideas
CURRENT EVENTS

Moving Targets

• Stretch Code: MA and more
• DOE Standards Updating
• ENERGY STAR HVAC specification Update
• CEE Specifications Revision
• Twenty Twenty, Twenty Two, Four Ten
ANNUAL SHIPMENTS & SALES

Table 1. Annual Sales of Commercial Packaged HVAC Units (RTUs) in the Northeast Region

<table>
<thead>
<tr>
<th>Size (Tons)</th>
<th>Total Sales (Entire Region)</th>
<th>Total Sales of Qualifying (Entire Region)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5</td>
<td>26,066</td>
<td>5,531</td>
</tr>
<tr>
<td>≥ 5 to &lt; 11</td>
<td>12,591</td>
<td>2,053</td>
</tr>
<tr>
<td>≥ 11 to &lt; 20</td>
<td>4,659</td>
<td>862.15</td>
</tr>
<tr>
<td>≥ 20 to ≤ 30</td>
<td>8,653</td>
<td>1,882</td>
</tr>
<tr>
<td>Total</td>
<td>51,969</td>
<td>10,328</td>
</tr>
</tbody>
</table>
2014 Sale of Total and Efficient Commercial HVAC Units in the Northeast & Mid-Atlantic

- Sale of Total Units
- Sale of Qualifying Efficient Units
- Sale of Rebated Units

Units

- <5
- ≥ 5 to < 11
- ≥ 11 to < 20
- ≥ 20 to ≤ 30
- Total

Tonnages

- <5
- ≥ 5 to < 11
- ≥ 11 to < 20
- ≥ 20 to ≤ 30
- Total

TOTAL AND EFFICIENT SALES
### ANNUAL SALES BY STATE

#### 2014 Estimated Annual Sales of Commercial Packaged HVAC Units (RTUs) in the Northeast and Mid-Atlantic Region, by State

<table>
<thead>
<tr>
<th>State</th>
<th>Percent of Power Sales (In the region)</th>
<th>&lt;5 ton</th>
<th>≥ 5 to &lt; 11 ton</th>
<th>≥ 11 to &lt; 20 ton</th>
<th>≥ 20 to ≤ 30 ton</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT</td>
<td>5%</td>
<td>1,382</td>
<td>668</td>
<td>247</td>
<td>459</td>
<td>2,756</td>
</tr>
<tr>
<td>DC</td>
<td>3%</td>
<td>903</td>
<td>436</td>
<td>161</td>
<td>300</td>
<td>1,801</td>
</tr>
<tr>
<td>DE</td>
<td>2%</td>
<td>442</td>
<td>213</td>
<td>79</td>
<td>147</td>
<td>881</td>
</tr>
<tr>
<td>MA</td>
<td>7%</td>
<td>1,882</td>
<td>909</td>
<td>336</td>
<td>625</td>
<td>3,753</td>
</tr>
<tr>
<td>MD</td>
<td>12%</td>
<td>3,184</td>
<td>1,538</td>
<td>569</td>
<td>1,057</td>
<td>6,349</td>
</tr>
<tr>
<td>ME</td>
<td>2%</td>
<td>427</td>
<td>206</td>
<td>76</td>
<td>142</td>
<td>851</td>
</tr>
<tr>
<td>NH</td>
<td>2%</td>
<td>480</td>
<td>232</td>
<td>86</td>
<td>159</td>
<td>957</td>
</tr>
<tr>
<td>NJ</td>
<td>16%</td>
<td>4,063</td>
<td>1,963</td>
<td>726</td>
<td>1,349</td>
<td>8,100</td>
</tr>
<tr>
<td>NY</td>
<td>31%</td>
<td>8,113</td>
<td>3,919</td>
<td>1,450</td>
<td>2,693</td>
<td>16,175</td>
</tr>
<tr>
<td>PA</td>
<td>18%</td>
<td>4,585</td>
<td>2,215</td>
<td>819</td>
<td>1,522</td>
<td>9,141</td>
</tr>
<tr>
<td>RI</td>
<td>1%</td>
<td>390</td>
<td>188</td>
<td>70</td>
<td>129</td>
<td>777</td>
</tr>
<tr>
<td>VT</td>
<td>1%</td>
<td>214</td>
<td>104</td>
<td>38</td>
<td>71</td>
<td>427</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>51,969</strong></td>
<td><strong>2,214</strong></td>
<td><strong>1,063</strong></td>
<td><strong>425</strong></td>
<td><strong>910</strong></td>
<td><strong>51,969</strong></td>
</tr>
</tbody>
</table>
## Table 2. Installed Base of Commercial Packaged HVAC Units (RTUs) in the Northeast Region

<table>
<thead>
<tr>
<th>Size BTUH (Tons)</th>
<th>Total Installed Base (# Units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;65K BTUH (&lt;5.4 Tons)</td>
<td>408,711</td>
</tr>
<tr>
<td>65K ≤ BTUH &lt;135K (5.4 ≤ Tons &lt;11.3)</td>
<td>197,427</td>
</tr>
<tr>
<td>135K ≤ BTUH &lt;240K (11.3 ≤ Tons &lt;20)</td>
<td>73,047</td>
</tr>
<tr>
<td>240K ≤ BTUH &lt;360K (20 ≤ Tons &lt;30)</td>
<td>135,687</td>
</tr>
<tr>
<td>Total</td>
<td>814,871</td>
</tr>
</tbody>
</table>
## Building Occupancy & Ownership

### Table 5 Commercial Building Occupancy Characteristics in the Northeast Region

<table>
<thead>
<tr>
<th>Percentage of Commercial Buildings in the region</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Owner Occupied</strong></td>
</tr>
<tr>
<td><strong>Lease-Tenant Occupied</strong></td>
</tr>
<tr>
<td><strong>Other or Unoccupied</strong></td>
</tr>
</tbody>
</table>

### Table 6 Responsibility for Energy Bills and Equipment Decisions

<table>
<thead>
<tr>
<th></th>
<th>Responsible for Energy O&amp;M Decisions</th>
<th>Decision Maker for Energy Equipment Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Owner</strong></td>
<td>85%</td>
<td>85%</td>
</tr>
<tr>
<td><strong>Tenant</strong></td>
<td>13%</td>
<td>12%</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>2%</td>
<td>3%</td>
</tr>
</tbody>
</table>
SUPPLY CHANNELS

Manufacturers

100%

Distributors

3% 7% 90%

Other Distributors

85%

Contractors

49% 14% 35%

End Users

Developers

Other Contractors

Purchases

Sales
Table 5. Estimated Savings Potential—Baseline to Tier 2 Annual Sales of RTUs in the Northeast Region

<table>
<thead>
<tr>
<th>Size Range Tons</th>
<th>Total Sales (# of Units) 2014</th>
<th>Demand reduction (kW) per Unit</th>
<th>Total demand reduction; 100% Annual Sales (MW)</th>
<th>Energy Savings (kWh/yr) per Unit</th>
<th>Total energy savings; 100% Annual Sales (GWh/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5</td>
<td>26,066</td>
<td>0.33</td>
<td>8.53</td>
<td>249.05</td>
<td>6.49</td>
</tr>
<tr>
<td>≥ 5 to &lt; 11</td>
<td>12,591</td>
<td>0.73</td>
<td>9.16</td>
<td>553.45</td>
<td>6.97</td>
</tr>
<tr>
<td>≥ 11 to &lt; 20</td>
<td>4,659</td>
<td>1.67</td>
<td>7.76</td>
<td>1,268.33</td>
<td>5.91</td>
</tr>
<tr>
<td>≥ 20 to ≤ 30</td>
<td>8,653</td>
<td>2.31</td>
<td>19.99</td>
<td>1,758.18</td>
<td>15.21</td>
</tr>
<tr>
<td>Total</td>
<td>51,969</td>
<td>-</td>
<td><strong>45.44</strong></td>
<td>-</td>
<td><strong>34.58</strong></td>
</tr>
</tbody>
</table>
SAVINGS POTENTIAL - EARLY REPLACEMENT

• Replacing just 5% of installed base (~40,000 units) represents a greater savings opportunity
  – Energy- 56 MW in early replacement scenario versus 45 MW in new equipment scenario
  – Peak Demand- 43 GWh/yr in early replacement scenario versus 35 GWh/yr in new equipment scenario
• Efficiencies of existing units degrade each year
MARKET BARRIERS

- Financial Barriers
  - Access to capital
  - Hidden costs
    - Engineering
    - Architectural

- Business Cultural Barriers
  - Split Incentive: Owner—Occupant
  - Business priorities vs. cost savings
  - Fear of unknown
  - Aversion to construction disruption
  - Availability of qualifying equipment
  - Payback beyond perceived business longevity
NEEP ARTU PROJECT

Regional Strategy
1. Do better at what we do well
2. New Solutions Outside of Today’s Mold

Today’s Tactics
– Steer Customers’ Selection to Efficient Options

What about Tomorrow?
– Examples?
Tomorrow’s Tactics?

Example

• Today we facilitate selection by customer
  • Intervene to reduce cost
  • Make ARTUs more available

• How about for Tomorrow we:
  1. Recognize the customer just needs cool dry air. Doesn’t really care to own equipment
  2. So. Engage someone else who gains from owning the iron box on the roof?
Thank you!

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Samantha Bresler
sbresler@neep.org 781-860-9177 x114

Northeast Energy Efficiency Partnerships
91 Hartwell Ave  Lexington, MA 02421
P: 781.860.9177  www.neep.org

Have a great day!
MARKET OPPORTUNITIES

• Region has high value for reducing peak demand through the Forward Capacity Market
  – 2015 Auction Clearing prices- $9.55 per kilowatt-month (kW-month)
• Advanced RTUs enable kW reductions via efficiency
• Connected RTUs enable kW reductions via Controls/Demand Response

Can these value streams be harnessed?
High-efficiency Rooftop Unit Technologies

NEEP Workshop:
Raise the Rooftop on HVAC Efficiency
June 15, 2015

Michael Deru

NREL is a national laboratory of the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.
Why RTU’s Are Important?

- RTUs cool over 60% of U.S. commercial building floor area
- Consume 4.3 Quads annually
- Large stock of 8 to 16 year old RTUs

Source: AHRI

Credit: Michael Deru
DOE Advanced RTU Campaign

• DOE/Industry partnership
• Promote high-efficiency RTU solutions:
  o High-efficiency RTUs (CEE Tier 2 and above)
  o Advanced RTU control retrofits
  o Quality Installation and Quality Maintenance
• Results (so far)
  ➢ 193 partners
  ➢ 40,000 RTUs
  ➢ 4 trillion BTUs
  ➢ $37 million in annual savings

www.advancedrtu.org

Advanced RTU Campaign

What is the Advanced RTU Campaign?
Older, inefficient commercial rooftop unit (RTU) air conditioning systems are common and can waste from $1,000 to $3,700 per unit annually, depending on the building size and type. By replacing or retrofitting them, you can save money, improve your energy efficiency, make your building more comfortable, and help the environment. The Advanced RTU Campaign (ARC) encourages commercial building owners and operators to replace their old RTUs with more efficient units or to retrofit their RTUs with advanced controls in order to take advantage of these benefits.

Replace. Retrofit. Reap Rewards.
Get advice. Save energy and money. Get recognized for success.

Ashrae  Rila  Better Buildings

Retail Industry Leaders Association
Educate. Collaborate. Advocate.

Federal Energy Management Program

NATIONAL RENEWABLE ENERGY LABORATORY
RTU Evaluation Process

Gather Information
- Initial RTU Inventory: RTU Inventory Spreadsheet
- Preliminary Screening: Decision Tree
- Detailed Inventory: RTU Inventory Spreadsheet
- Visual-Based Field Evaluation: RTU Field Evaluation Checklist

Analyze
- Analysis: RTU Incentives Database, RTU Comparison Calculator, 179D DOE Calculator, RTU Sizing Guidance, and ARC Case Studies

Plan
- Project Planning: ARC Supporting Partners

Take Action
- Procurement: Procurement Specifications
- Measurement and Verification (M&V): M&V Guidance
Solutions

Increasing savings, complexity & cost

1. Multi-speed Supply Fans
   - VFDs
   - ECMs
   - High Efficiency Centrifugal Fans

2. Advanced control and connectivity
   - Demand Control Ventilation (DCV)
   - Predictive Economizing
   - Web-based Control & Monitoring

3. High Efficiency Cooling
   - IEER > 18.0
   - Improved temperature and humidity control

Source: Yaskawa
Source: ebm-papst
Source: Transformative Wave
Source: Daikin
Defining RTU Efficiency

Efficiency Standards

• AHRI 210/240 for RTU < 65,000 Btu/h – EER and SEER
• AHRI 340/360 for RTUs ≥ 65,000 Btu/h – EER and IEER

Efficiency Metrics

• **Energy Efficiency Ratio (EER)** – performance at one point, usually at full load
• **Seasonal Energy Efficiency Ratio (SEER)** – More appropriate for residential applications
• **Integrated Energy Efficiency Ratio (IEER)** – weighted average of EERs

\[ \text{IEER} = 0.02 \cdot \text{EER}_{100\%} + 0.617 \cdot \text{EER}_{75\%} + 0.238 \cdot \text{EER}_{50\%} + 0.125 \cdot \text{EER}_{25\%} \]
### Historical RTU Efficiencies

#### Example: 10-ton RTU

<table>
<thead>
<tr>
<th></th>
<th>90.1-1999</th>
<th>90.1-2001</th>
<th>90.1-2004</th>
<th>90.1-2010</th>
<th>CEE Tier 2</th>
<th>RTU Challenge</th>
<th>Best Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>EER</td>
<td>8.7</td>
<td>10.1</td>
<td>10.1</td>
<td>11</td>
<td>11.2</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>EER</td>
<td>10.1</td>
<td>11</td>
<td></td>
<td></td>
<td>13.8</td>
<td></td>
<td>&gt;20</td>
</tr>
</tbody>
</table>

Credit: Michael Deru

Credit: Ian Doebber
### Historical RTU Efficiencies

**Example: 10-ton RTU**

<table>
<thead>
<tr>
<th></th>
<th>90.1-1999</th>
<th>90.1-2001</th>
<th>90.1-2004</th>
<th>90.1-2010</th>
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<th>RTU Challenge</th>
<th>Best Available</th>
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<tr>
<td>EER</td>
<td>8.7</td>
<td>10.1</td>
<td>10.1</td>
<td>11</td>
<td>11.2</td>
<td>12</td>
<td>IEER</td>
</tr>
<tr>
<td></td>
<td>7.3</td>
<td>8.7</td>
<td>9.0</td>
<td>10.5</td>
<td></td>
<td></td>
<td>degraded performance in 2015</td>
</tr>
</tbody>
</table>
High Efficiency RTUs

• Two RTU models achieved the DOE’s RTU Challenge (now five manufacturers)

• Part load efficiency ratings of IEER > 18.0
  o Variable-speed supply fans
  o Variable-speed compressors or additional cooling stages
  o ECMs for condenser fans
  o Embedded automated fault detection and diagnostics
  o Low leakage OA dampers

• NREL’s Hawaii field demonstration of a Daikin Rebel showed 35-40% savings to a 90.1-2010 baseline
RTU Operation

Aggregated operational modes across five 10-ton RTUs serving a dry-goods retailer near Seattle for 1 year (monitored data)

Source: Transformative Wave
Multi-Speed Supply Fans

- Fan laws result in greater energy savings

Multi-speed supply fan power for 5 10—ton RTUs serving dry-goods retailer near Seattle

<table>
<thead>
<tr>
<th>Mode</th>
<th>Reduced Speed</th>
<th>Reduced Power</th>
<th>Fan Power for 5 RTUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ.</td>
<td>100%</td>
<td>100%</td>
<td>7.5 kW</td>
</tr>
<tr>
<td>Heat-2</td>
<td>100%</td>
<td>100%</td>
<td>7.5 kW</td>
</tr>
<tr>
<td>Cool-2</td>
<td>90%</td>
<td>78%</td>
<td>5.8 kW</td>
</tr>
<tr>
<td>Heat-1</td>
<td>90%</td>
<td>78%</td>
<td>5.8 kW</td>
</tr>
<tr>
<td>Cool-1</td>
<td>70%</td>
<td>46%</td>
<td>3.4 kW</td>
</tr>
<tr>
<td>Vent</td>
<td>40%</td>
<td>22%</td>
<td>1.6 kW</td>
</tr>
</tbody>
</table>

Source: NREL
Advanced control and connectivity

• Improper control and maintenance issues are common for RTUs. Examples are:
  o OA damper fixed open or closed => no economizing, no DCV
  o Compressor failure due to short cycling

• Connectivity provides remote control and monitoring for automated fault detection and diagnostics

• Automated fault detection and diagnostics (AFDD) enables decision makers to be proactive rather than reactive
What are RTU Retrofit Controls?

Common Features
- Integrated Economizer Control
- Demand Controlled Ventilation

Variable Speed Fan Control

Other Potential Features
- FDD and Remote Monitoring
- Variable Speed Condenser Fan Control
- Compressor control
Best Applications for Control Retrofits

• **Existing RTUs**
  - constant speed supply fan operation
  - greater than 7.5 tons (evaporator fan ≥ 2 hp)
  - at least 5 years of remaining life

• **Existing buildings**
  - more than 50 hours per week of operation
  - high electricity rates (≥ 0.10 $/kWh blended rate)
  - located in a climate with significant swing seasons (more time in first stage cooling or ventilation only)
Other RTU Technologies

• **Energy Recovery Ventilator (ERV)**
  - Reduces heating and cooling loads – most effective in heating climates
  - Must have exhaust or relief air at RTU
  - Increase in fan energy – by pass when not appropriate for heat recovery

• **Condensing gas furnace**
  - Increase burner efficiency to > 90%
  - Best for large RTUs that have high runtime
Thank You

michael.deri@nrel.gov
VEIC/
Efficiency Vermont

NEEP “Raise the Roof”
on HVAC Efficiency

6/15/2015
Schneider Electric
Andover, MA
About VEIC

- Over 25 years of reducing economic and environmental costs of energy
- Comprehensive focus and results
- Energy efficiency, renewable energy, and transportation
- National and international consulting and implementation
- Program design, planning and evaluation; policy, advocacy and research
- Clients: government agencies, regulators, utilities, foundations, and advocates
Vermont
State Demographics

- Population (2011): 626,431
- Seven cities larger than 10,000 residents
- Burlington: largest city at 42,500 residents (2010)
- Chittenden: largest county by population at 156,545 residents (2010)
HVACR Upstream

What is Upstream?

Benefits

Timeline

Supply Channel
What is an *Upstream* program?

Rebate paid to distributor at wholesale level; *Buy-down* of efficient equipment at distributor’s *point of sale*

Distributor sells efficient equipment to Contractor or *End-User* w/ an *Instant Rebate* - new, lower price

Pass-thru of rebate to end-user
Benefits of Upstream

1. **Promotes** increased availability, sales & installation of efficient equipment
2. **Influences** distributor stocking practices
3. **Diminishes financial barriers** to contractors & end-users
4. **Facilitates** Market Transformation
Upstream Sales Submission Process

1. Distributor sells qualifying Equipment
   - Minimum customer contribution
   - Prevents market pricing deterioration!!
   - Distributor obtains minimum project information from purchaser at point of sale

2. Distributor submits sales to Efficiency Vermont (EVT) on monthly basis

3. After sales verification, EVT sends rebate check to Distributor

4. Metering and random post-installation inspection
Efficiency Vermont’s HVACR Upstream Timeline

- **September 23, 2013**
  High Performance Circulator Pumps (HPCP)

- **June 1, 2014**
  Heat Pump Water Heaters (HPWH)

- **July 1, 2014**
  Expanded Circulator Pump Program

- **December 1, 2014**
  State-wide Heat Pump / mini splits / Single Zone

- **July 1, 2015**
  State-wide Heat Pump / mini splits / Multi Zone
Participating Efficiency Vermont Upstream / Instant Rebate

HVACR Distributors; 14 Distributors covering 44 Locations !!!!!
Current Upstream Participating Manufacturers

- Daikin
- Fujitsu
- Mitsubishi Electric
- American Water Heaters
- A.O. Smith
- Armstrong
- Bell & Gossett (a Xylem brand)
- GE
- Grundfos
- Rheem
- Ruud
- State Water Heaters
- Taco (residential and commercial hydronic systems)
- Wilo
## Best Practice Guide for Working w/ Supply Channel

- Required VEIC/EVT 101 /201 Training
- *Sales, Marketing, Training, and Technology* RFI for manufacturers, manufacturer reps & distributors
- Point of sale marketing materials
- Cooperative marketing plan and materials
- Qualified Product List (*QPL*)
- Participation agreement with standard terms and conditions
- Communication plan for internal and external stakeholders
- Data tracking form
- Incentive schedule
- Evaluation plan and reporting
- Plan for future program changes or sunsetting measures
VEIC/Efficiency Vermont
101 / 201 Training
## Sample Agenda: VEIC / Efficiency VT 101 / 201 Mtg

<table>
<thead>
<tr>
<th>Time / End-time</th>
<th>Topic</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30a</td>
<td><strong>START MEETING</strong></td>
<td>GROUP</td>
</tr>
<tr>
<td>10 (10:40a)</td>
<td>Introductions / Review Agenda</td>
<td>GROUP</td>
</tr>
<tr>
<td>20 (11a)</td>
<td>Company ABC, LLC Overview</td>
<td>Company ABC TEAM</td>
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<td>20 (11:20a)</td>
<td>Vermont Energy Investment Corporation/Efficiency Vermont Overview</td>
<td>Howard/Jake/Meghan</td>
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<tr>
<td>20 (11:40a)</td>
<td>HVACR Programs</td>
<td>Jake</td>
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<td>20 (12)</td>
<td>HVACR Upstream Programs</td>
<td>Howard</td>
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<td>10 (12:10p)</td>
<td>ASHP Overview &amp; Timeline to Launch</td>
<td>Howard/Jake</td>
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<td>20 (12:30p)</td>
<td>Eligibility, Performance Request, Data Collection</td>
<td>Jake</td>
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<tr>
<td>45 (1:15p)</td>
<td><strong>LUNCH</strong></td>
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<td>30 (1:45p)</td>
<td>SMTT: Training &amp; Sales/Marketing RFI/ Efficiency Excellence Network</td>
<td>Howard/Jake/Meghan</td>
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<td>10 (1:55p)</td>
<td>HVACR Sales &amp; Marketing</td>
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<td>15 (2:10p)</td>
<td>Questions</td>
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<td>20 (2:30p)</td>
<td>Action Items &amp; Next Steps</td>
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</tbody>
</table>
Sales, Marketing, Training & Technology (SMTT)

RFI
- Manufacturers
- Manufacturer reps
- Distributors
SMTT RFI

- **Sales:** develop Sales Strategies
- **Marketing:** joint Marketing programs, leverage core competencies
- **Training:** develop education/training approach w/ Strategic Partners
- **Technology:** Impact to Supply Channel; inventory displacement due to new eligibility, innovation, etc; negotiate w/ Manufacturers for **NO** Penalties to Distributor Partners
SMTTT Examples
Joint Sales & Marketing Efforts

- 1\textsuperscript{st} Understand with Upstream

- **The Challenge:** Communicating the end-use benefits of an upstream program to contractors & customers

- **The Solution:** Visual materials
  - Efficiency Vermont Marketing worked with HVACR Manufacturers, Manufacturer Reps & Distributors
Taco SMTT Plan: Shelf Header & Poster

Introducing instant green.
Instant savings. Delta-T easy.

Delta-T Variable Speed

Viridian® — VT2218
Delta-T Variable Speed,
ECM High Efficiency Circulator

- ECM technology can save hundreds in fuel costs
- The only temperature-sensing pump in its class
- ECM motor saves up to 40% less electricity
- LCD display provides easy temperature
- 4-speed setting, pump in-line: supply & return
- Makes your job easy

$80 REBATE!
See www.efficiencyvermont.com/pumps for details.
Manufacturer Factory Trainings

1. Distributor #1 – Scheduled 8/21\textsuperscript{st} & 22\textsuperscript{nd}
2. Distributor #2 – Scheduled 8/27\textsuperscript{th} & 28\textsuperscript{th}
3. Distributor #3 – TBD
4. Distributor #4 – TBD
Joint Marketing Efforts

Box sticker – Efficiency Vermont recognition on the distributor’s shelf

![Image of a box with a sticker and a special pricing offer from Efficiency Vermont.](image_url)
HPCP Joint Marketing Efforts

Energy Savings up to 80% Instant Rebate Available
See associate for details

GRUNDFOS

Vermont Energy Investment Corporation

You've just installed the most energy efficient pump in the world.

Your Grundfos ALPHA saves energy everyday and provides you the heating you need.

Grundfos is proud to partner with Efficiency Vermont and professional installers to bring you efficient products at discounted prices—saving you energy and money. Learn more about other energy-saving opportunities, including special pricing on ENERGY STAR® qualified PCBs and LEDs. Visit www.energyvermont.com or call 888-911-5990.

Proudly Installed by: GRUNDFOS
<table>
<thead>
<tr>
<th>Type/Target Audience</th>
<th>Efficiency Vermont Employees</th>
<th>Wholesale Executive &amp; Management Teams</th>
<th>Wholesale Salespeople – Inside &amp; Outside</th>
<th>Trade Installers &amp; Service Contractors</th>
<th>End Users/Property Owners</th>
<th>Other</th>
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<td>Email marketing</td>
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<td>POS marketing</td>
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<td>Other:</td>
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</table>
### SMTT Strategic Plans

#### 6. Participating Distributors

a) For each of the below Distributors and Locations, please mark a (x) where appropriate and also summarize the Sales and Marketing Activities in the last column.

<table>
<thead>
<tr>
<th>Distributor</th>
<th>Branch</th>
<th>Your respective HPWH Products are the Primary HPWH Manufacturer</th>
<th>Your respective HPWH Products are the Secondary HPWH Manufacturer</th>
<th>Other</th>
<th>Project Related</th>
<th>Sales and Marketing Activities</th>
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<td>Springfield, MA</td>
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<td>Blodgett Supply</td>
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<td>White River Jct.</td>
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<td>Williston</td>
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<td>Woodsville, NH</td>
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<td>FW Webb</td>
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<td>Webinar for managers</td>
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<td>Rutland</td>
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<td>Plumber Training</td>
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<td>Springfield</td>
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<td>HVAC Training</td>
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<td>Williston</td>
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<td>Keene, NH</td>
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<td>Lebanon, NH</td>
<td>X</td>
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</tbody>
</table>
SMTT Supply Channel Feedback

• “You have the most comprehensive program I have seen for impacting the marketplace and we are proud to be asked to be a partner.” - Distributor #1, VP-Residential Sales

• “We, as manufacturers, look to you for guidance in what equipment to develop and bring to market. Efficiency Vermont is really a national leader on this.” – Manufacturer #1, Regional Sales Manager, Ductless Split Systems

• “VEIC team, I want to thank you all for a great meeting and looking forward to working with each of you. I am reviewing the preso and getting together the information you need. Thank you again for your time and information shared and working to get what you need by this week.” Kind regards, Manufacturer #3, Division Sales Manager
Other Marketing

Upstream Programs
Thank you!

Cross-Marketing Postcard Mailer Campaign

Thank you for purchasing & installing an ENERGY EFFICIENT HEAT PUMP WATER HEATER!

Heat pump water heaters can cost half as much to operate as traditional water heaters.

Enjoy the years of energy savings ahead of you!

Visit www.efficiencyvermont.com for more information

GOOD NEWS
If you or your contractor purchased your unit from a participating HVAC distributor, you have already received the maximum $350 rebate through Efficiency Vermont. This rebate cannot be used in conjunction with any other rebate offered by Efficiency Vermont. Please see www.efficiencyvermont.com/hpwhdistributors for a list of participating distributors.

DID YOU KNOW?
Efficiency Vermont offers mail-in and instant off rebates on other energy saving equipment for your home or small business:

- Clothes dryers are one of the biggest energy using appliances in the home. Use 32% less energy and get $200 back from Efficiency Vermont by purchasing a qualified super-efficient clothes dryer. Get an additional $40 - $75 by pairing your clothes dryer with a qualifying efficient clothes washer.
- Get $50 - $100 back from Efficiency Vermont on the purchase of a select ENERGY STAR® certified refrigerator and start saving on your electric bill.
- Retail pricing starting at $99 and $499 for ENERGY STAR CFLs and LEDs.

Clothes Dryers
ENERGY STAR Refrigerators
$.99 & $4.99 ENERGY STAR CFLs/LEDs
High-Efficiency HVAC Products for the price of conventional
Funded by Efficiency Vermont

Everybody wins
Now you can provide the energy-efficient HVAC products your customers are looking for at deep discounts.

How does it work?
Efficiency Vermont subsidizes the cost of qualifying efficient products by paying rebates directly to distributors, who pass the savings on to installers, who then pass these savings on to end-users.

Call 888-925-5990 for more information.

GOOD NEWS
If you or your contractor purchased your unit from a participating HVAC distributor, you have already received the maximum $400 rebate through Efficiency Vermont. This rebate cannot be used in conjunction with any other rebate offered by Efficiency Vermont. Please see www.efficiencyvermont.com/heatpumpdistributors for a list of participating distributors.

Thank you for purchasing & installing an ENERGY EFFICIENT HEAT PUMP WATER HEATER!
Enjoy the years of energy savings ahead of you!

Visit www.efficiencyvermont.com for more information

GOOD NEWS: YOUR CONTRACTOR IS SMART, TOO.
Your unit was purchased at a special price from a participating distributor, thanks to up to a $400 discount from Efficiency Vermont.

More smart ways to save, brought to you by Efficiency Vermont:

HEAT PUMP WATER HEATERS
$400 OFF REGULAR PRICE
CLOTHES DRYERS
UP TO $400 CASH BACK

HIGH PERFORMANCE CIRCULATOR PUMPS
DISCOUNTS VARY BY MODEL
REFRIGERATORS
UP TO $75 CASH BACK

Find information about these deals and more by visiting www.efficiencyvermont.com or call 888-925-5990.

Hybrid Water Heater Rebate
A Partnership between FW Webb - GE - Efficiency Vermont

In order to get Efficiency Vermont’s $500 instant rebate at FW Webb for the purchase of a GE Geospring™ Hybrid Water Heater, you will need to come to Webb with some basic information about the location where the equipment will be installed. Use the following checklist to ensure a smooth purchase.

Required Information:
- Purchase Type:
  - New
  - Replacement
- Replacing Natural Gas Water Heater:
  - Yes
  - No - NOT REBATE
- Replacing Electric Water Heater:
  - Yes
  - No
- Bill To Purchase Info:
  - Company or Purchaser Name
  - Address
  - Phone
- Install Location:
  - Residential?
  - Commercial?

Requested Information:
- Install Location:
  - Customer name
  - Phone Number
  - Number of bedrooms (if residential)
  - Primary space heat fuel type (Electric, LP, Oil, None, Wood/Biomass, or Other)

Efficiency Vermont
128 Lakeside Avenue, Suite 401
Burlington, VT 05401
Upstream Web Page

- efficiencyvermont.com/HVACR upstream
- Steps for program participation *(for contractors)*
- Eligible Products List
- Participating Distributors List
- FAQs
### Heat Pump Water Heater (HPWH) Qualifying Products Sorted by Manufacturer

**User-friendly with sorts & only ENERGY STAR**
Manufactures in the HPWH Upstream Program

---

#### Table: Heat Pump Water Heater Qualifying Products Sorted by Manufacturer

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Model Number</th>
<th>Brand</th>
<th>Hybrid Electric</th>
<th>Non-Hybrid Electric</th>
<th>Distributor</th>
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</tr>
</tbody>
</table>

**For more information, visit:** [www.understandingvermont.org](http://www.understandingvermont.org)

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#### Logos & Hyperlinks

- American
- A.O. Smith
- GE
- Rheem
- State
- Statewide

#### Participating Distributors:

- Bledgert
- Central Supply
- E.W. WEEDON
- Granite Supply
- H.S. Supply
- M.L. Supply
- S.H. Supply
- Supply Corp.
# HPWH Web Page

## Participating Distributor List

**Heat Pump Water Heater**

**Effective 7/2/2014 - Updated 4/15/2015**

### Logos & Hyperlinks

- **Blodgett Supply**
  - Website: [www.blodgettsupply.com](http://www.blodgettsupply.com)
- **Central Supply**
  - Website: [www.centsupply.com](http://www.centsupply.com)
- **P.J. Michael Company, LLC**
  - Website: [www.pjmichael.com](http://www.pjmichael.com)
- **F.W. Webb Company**
  - Website: [www.fwwebb.com](http://www.fwwebb.com)
- **The Granite Group**
  - Website: [www.thegranitegroup.com](http://www.thegranitegroup.com)
- **Hubert Supply**
  - Website: [www.hubertsupply.com](http://www.hubertsupply.com)
- **Premier Supply Group**
  - Website: [www.premiersupplygroup.com](http://www.premiersupplygroup.com)
- **R.E. Michel**
  - Website: [www.remichel.com](http://www.remichel.com)
- **Sid Harvey’s**
  - Website: [www.sidharveys.com](http://www.sidharveys.com)
- **VP Supply Corp**
  - Website: [www.vpsupplycorp.com](http://www.vpsupplycorp.com)

**Participating Manufacturers**

- **American**
  - Website: [www.americanwaterheater.com](http://www.americanwaterheater.com)
- **AO Smith**
  - Website: [www.aosmith.com](http://www.aosmith.com)
- **Rheem**
  - Website: [www.rheem.com](http://www.rheem.com)
- **State Water Heaters**
  - Website: [www.statewaterheaters.com](http://www.statewaterheaters.com)
- **GE**
  - Website: [www.ge.com](http://www.ge.com)

### User-friendly 1-Stop Shop!!

**Table:**

<table>
<thead>
<tr>
<th>Distributor Name</th>
<th>Phone</th>
<th>City</th>
<th>State</th>
<th>HPWH Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blodgett Supply</td>
<td>802-229-5105</td>
<td>Montpelier</td>
<td>VT</td>
<td>Rheem</td>
</tr>
<tr>
<td></td>
<td>802-384-0181</td>
<td>Newport</td>
<td>VT</td>
<td><a href="http://www.rheem.com">www.rheem.com</a></td>
</tr>
<tr>
<td></td>
<td>802-775-8364</td>
<td>Rutland</td>
<td>VT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>802-295-3148</td>
<td>White River Junction</td>
<td>VT</td>
<td></td>
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<tr>
<td></td>
<td>802-966-9651</td>
<td>Williston</td>
<td>VT</td>
<td></td>
</tr>
<tr>
<td>Central Supply</td>
<td>603-446-5116</td>
<td>Lebanon</td>
<td>NH</td>
<td>American</td>
</tr>
<tr>
<td></td>
<td>603-747-2328</td>
<td>Woodsville</td>
<td>NH</td>
<td><a href="http://www.americanwaterheater.com">www.americanwaterheater.com</a></td>
</tr>
<tr>
<td></td>
<td>802-479-3373</td>
<td>Barre</td>
<td>VT</td>
<td></td>
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<tr>
<td></td>
<td>802-447-2312</td>
<td>Bennington</td>
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<td></td>
<td>802-566-4316</td>
<td>Brattleboro</td>
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</tr>
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<td></td>
<td>800-715-1922</td>
<td>Rutland</td>
<td>VT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>800-685-8127</td>
<td>Springfield</td>
<td>VT</td>
<td></td>
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<td></td>
<td>800-527-0521</td>
<td>St Albans</td>
<td>VT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>800-748-8301</td>
<td>St Johnsbury</td>
<td>VT</td>
<td></td>
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<tr>
<td>F.W. Webb Company</td>
<td>802-863-1187</td>
<td>Williston</td>
<td>VT</td>
<td>GE</td>
</tr>
<tr>
<td></td>
<td>603-357-1877</td>
<td>Keene</td>
<td>NH</td>
<td><a href="http://www.ge.com">www.ge.com</a></td>
</tr>
<tr>
<td>The Granite Group</td>
<td>802-476-0229</td>
<td>Barre</td>
<td>VT</td>
<td>Stato</td>
</tr>
<tr>
<td></td>
<td>603-658-2747</td>
<td>Burlington</td>
<td>VT</td>
<td><a href="http://www.statewaterheaters.com">www.statewaterheaters.com</a></td>
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<tr>
<td></td>
<td>802-772-1209</td>
<td>Rutland</td>
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<td>802-383-4530</td>
<td>South Burlington</td>
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<td></td>
<td>603-357-0950</td>
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<td>Hubert Supply</td>
<td>603-442-6400</td>
<td>Lebanon</td>
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</tr>
<tr>
<td></td>
<td>802-662-6406</td>
<td>Burlington</td>
<td>VT</td>
<td>AO Smith</td>
</tr>
<tr>
<td></td>
<td>802-662-6427</td>
<td>Brandon</td>
<td>VT</td>
<td><a href="http://www.aosmith.com">www.aosmith.com</a></td>
</tr>
<tr>
<td>Premier Supply Group</td>
<td>800-257-9230</td>
<td>Brattleboro</td>
<td>VT</td>
<td>Rheem</td>
</tr>
<tr>
<td></td>
<td>603-443-9768</td>
<td>Lebanon</td>
<td>NH</td>
<td><a href="http://www.rheem.com">www.rheem.com</a></td>
</tr>
<tr>
<td></td>
<td>413-588-5801</td>
<td>Greenfield</td>
<td>MA</td>
<td></td>
</tr>
<tr>
<td>R.E. Michel</td>
<td>800-862-3663</td>
<td>Williston</td>
<td>VT</td>
<td>GE</td>
</tr>
<tr>
<td></td>
<td>518-583-4865</td>
<td>Glen Falls</td>
<td>NY</td>
<td><a href="http://www.ge.com">www.ge.com</a></td>
</tr>
<tr>
<td>Sid Harvey’s</td>
<td>802-775-8855</td>
<td>Rutland</td>
<td>VT</td>
<td>Rheem</td>
</tr>
<tr>
<td></td>
<td>800-658-0554</td>
<td>Williston</td>
<td>VT</td>
<td><a href="http://www.rheem.com">www.rheem.com</a></td>
</tr>
<tr>
<td>VP Supply Corp</td>
<td>518-459-8000</td>
<td>Albany</td>
<td>NY</td>
<td>State</td>
</tr>
<tr>
<td></td>
<td>518-563-9316</td>
<td>Plattsburgh</td>
<td>NY</td>
<td><a href="http://www.statewaterheaters.com">www.statewaterheaters.com</a></td>
</tr>
</tbody>
</table>
Upstream Data Collection

- Streamline data collection
- User Friendly data submission process
Provide minimum **project information** to HVACR Participating Distributor at time of Circulator Pump **INSTANT REBATE** purchase

1. Distributor name & sales month
2. Distributor Branch Location (if applicable)
3. Invoice date
4. Invoice number
5. Purchase Order # or Job Name (if applicable)
6. Manufacturer model number
7. Product Description
8. Serial Number (if applicable)
9. Quantity
10. Invoice Price
11. Product Incentive Amount (optional)
12. Bill To Information
   a. Company Name
   b. Address
   c. Phone
13. Install Location Information
   a. Contact Name **(requested)**
   b. Installation Address **(required)**
   c. Installation Phone **(requested)**
14. Installation type [select one]
   a. Commercial
   b. Small Residential (1-4 family)
   c. Large Residential (5+ family)
Supply Channel Approach

STRATEGY
Understanding the Market Levers to drive Market Transformation

1. SMTT Plans
2. Value Proposition
3. Incentive Levels
4. Administration / Management Fees
Understand Distributors’ Profit Model

- Gross Margins & Net Income; EE Products potential to increase GM % & GM $’s
  - Min Contribution Requirement (prevent pricing deterioration)

- **Asset Management** & how Utilities can add value!
  - **Inventory:** Increase Inventory Turns w/ Sales (incentives), Marketing, Training, Technology (no penalty for new products or programs displacing inventory)

+ 
  - **Accounts Receivable:** turnaround reimbursement faster than Distributors average Days Receivables

—

**Accounts Payable:** Work w/ Manufacturers to increase days payables

= 

- **RONA:** Return on Net Assets!!!!
Distributor Value Proposition

- **A strategic partnership**...

<table>
<thead>
<tr>
<th></th>
<th>Standard Pump ($)</th>
<th>HPCP ($)</th>
<th>Variance ($)</th>
</tr>
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<tbody>
<tr>
<td><strong>Standard Wholesale Cost</strong></td>
<td>52</td>
<td>120.25</td>
<td>68.25</td>
</tr>
<tr>
<td><strong>Standard Sell Price to Trade</strong></td>
<td>65</td>
<td>165</td>
<td>100</td>
</tr>
<tr>
<td><strong>EVT / Others Incentive to Wholesale (est)</strong></td>
<td>-</td>
<td>$100</td>
<td></td>
</tr>
<tr>
<td><strong>Sell Price to Trade</strong></td>
<td>65</td>
<td>65</td>
<td>-</td>
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<tr>
<td><strong>Gross Margin $ per HPCP</strong></td>
<td>13</td>
<td>44.75</td>
<td>31.75</td>
</tr>
<tr>
<td><strong>Gross Margin $ @ 20,000 HPCP/yr</strong></td>
<td>260,000</td>
<td>895,000</td>
<td><strong>$635,000</strong></td>
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</table>
## HVACR Upstream Incentives & Admin / Mngt Fees

<table>
<thead>
<tr>
<th>Efficiency Vermont Program</th>
<th>Current Incentive</th>
<th>Current Admin / Mngt Fee</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td><strong>Cold Climate Heat Pumps (CCHP)</strong></td>
<td>$300 Single-zone</td>
<td>$50</td>
<td>• Low incentive/incremental due to DPS</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Aggressive Admin/Mngt Fee</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Complex Sale</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Inventory Investment</td>
</tr>
<tr>
<td><strong>Heat Pump Water Heaters (HPWH)</strong></td>
<td>$550</td>
<td>$100</td>
<td>• Aggressive incentive &amp; Admin/Mngt Fee</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>• Sales under duress (95%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Small window of opportunity</td>
</tr>
<tr>
<td><strong>Circulator Pumps (HPCP)</strong></td>
<td>$80 (PA &lt;1.25 Amps)</td>
<td>$1</td>
<td>• Aggressive incentive</td>
</tr>
<tr>
<td></td>
<td>$500 (PB 1.25 Amps &lt; 5)</td>
<td>$1</td>
<td>• High $MWh resulted in low admin/mngt fees</td>
</tr>
<tr>
<td></td>
<td>$1000 (PC 5 &lt; Amps)</td>
<td>$1</td>
<td>• Increasing fees &amp; lower incentive levels effective 7/1</td>
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</tbody>
</table>
### Supply Channel MAPPING: Cold Climate Heat Pump Strategic Alliances

<table>
<thead>
<tr>
<th>Distributor Name</th>
<th>City</th>
<th>State</th>
<th>Primary ccHP Manufacturer</th>
<th>Primary ccHP Manufacturer Rep</th>
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<tbody>
<tr>
<td>Blodgett Supply</td>
<td>Montpelier</td>
<td>VT</td>
<td>Fujitsu</td>
<td>SRGI</td>
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<td></td>
<td>Newport</td>
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<td></td>
<td>White River Junction</td>
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<tr>
<td></td>
<td>CORPORATE-Williston</td>
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<td></td>
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<tr>
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<td>Rutland</td>
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</tr>
<tr>
<td>Bell Simon</td>
<td>South Burlington</td>
<td>VT</td>
<td>Mitsubishi</td>
<td>SRGI (Factory direct sales force)</td>
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<td>CORPORATE-Palmer</td>
<td>MA</td>
<td>Mitsubishi</td>
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<td>Pittsfield</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Springfield</td>
<td>MA</td>
<td></td>
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<tr>
<td>Central Supply</td>
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<td>Fujitsu</td>
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<tr>
<td></td>
<td>Woodsville</td>
<td>NH</td>
<td>Fujitsu</td>
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<td>Brattleboro</td>
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<tr>
<td>FW Webb</td>
<td>Springfield</td>
<td>VT</td>
<td>Daikin</td>
<td>N/A</td>
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<td>St Albans</td>
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<td>St Johnsbury</td>
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<td>Williston</td>
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<td>Keene</td>
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<tr>
<td>The Granite Group</td>
<td>Barre</td>
<td>VT</td>
<td>Mitsubishi</td>
<td>SRGI (direct - confirmed)</td>
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<td>Burlington</td>
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<td>Keene</td>
<td>NH</td>
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<td>CORPORATE=Concord</td>
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<td>Homans Assoc.</td>
<td>Wilmington</td>
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<td>Mitsubishi</td>
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<td>Hulbert Supply</td>
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<td>VT</td>
<td>LG</td>
<td>United Components in NY</td>
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<td>Brandon</td>
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<tr>
<td>Johnstone Supply</td>
<td>Kenilworth</td>
<td>NJ</td>
<td>Fujitsu &amp; Daikin</td>
<td>Direct - no rep</td>
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<tr>
<td>Premier Supply</td>
<td>Lebanon</td>
<td>NH</td>
<td>Fujitsu</td>
<td>Sweeney Rogers Geraghty</td>
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<tr>
<td></td>
<td>Brattleboro</td>
<td>VT</td>
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</tr>
<tr>
<td>Grainger</td>
<td>(Does not service VT)</td>
<td></td>
<td>n/a</td>
<td>n/a</td>
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<td>RE Michael</td>
<td>Williston</td>
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<td>Fujitsu</td>
<td>Sweeney Rogers Geraghty</td>
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<tr>
<td>RJ Murry</td>
<td>Williston</td>
<td>VT</td>
<td>Carrier</td>
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<tr>
<td>Sid Harvey</td>
<td>Burlington</td>
<td>VT</td>
<td>Fujitsu</td>
<td>Sweeney Rogers Geraghty</td>
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<td>Rutland</td>
<td>VT</td>
<td></td>
<td></td>
</tr>
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<td>United Refrigeration</td>
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<td>VT</td>
<td>Daikin</td>
<td></td>
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<tr>
<td>VP Supply</td>
<td>Albany</td>
<td>NY</td>
<td>Panasonic</td>
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</tbody>
</table>
**TARGET: Big 4 CCHP Manufacturers**

- 5 Firms represent 60% of the **TOTAL Distributor locations** in VT
- **+90% Market share** of the **14 Distributors/44 Locations** that service VT

<table>
<thead>
<tr>
<th>Distributor</th>
<th>Locations</th>
<th>HPWH Manufacturers</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Distributor #1 | xx | Manufacturer #1 | Ongoing Discussions  
• Initial Meeting 9/24  
• @ VEIC/EVT 10/17  
• Follow-up 11/17-21 w/ Manufacturer & Distributor  
• Other Meetings |

| Distributor #2 | xx | Manufacturer #1 |  
• Initial Meeting 9/24  
• Regional & Branch Manager |

| Distributor #3 | xx | Manufacturer #2 | Ongoing discussions  
• Stakeholder meeting 10/22-Manufactuer/Rep  
• Next 11/17-24 Manufacturer, Rep, Distributor |

| Distributor #4 | xx | Manufacturer #3 |  
• Initial Meeting – 7/29-Manufactuer  
• 10/14-Meeting-Manufactuer, Distributor  
• 11/17-11/21 –Manufacturer, Distributor |

| Distributor #5 | xx | Manufacturer #4 |  
• Initial Meeting 10/15 Manufacturer/Distributor |
Upstream Program Results
Every 2.5 Days = TOTAL ANNUAL AVERAGE before Upstream Program!!
Distributor’s “Before & After” Upstream

HPCP as a % of Sales

- 50.00%
- 45.00%
- 40.00%
- 35.00%
- 30.00%
- 25.00%
- 20.00%
- 15.00%
- 10.00%
- 5.00%
- 0.00%

- Red: 2013
- Blue: 2014
Consolidated CCHP Participating Vermont Distributors’ Results

CCHP Units

DEC  JAN '15  FEB  MAR  APR  TOTAL

0  100  200  300  400  500

Vermont Energy Investment Corporation
Distributor ABC Company - HPCP
Nov ‘13 – Sept ‘14

HPCP Sales by Branch Location

HPCP Program Market Share By Branch Location
Thank You!!!
Innovations in Energy Efficiency Finance

Phil Burke,
Manager Of Underwriting - West
Alternative Energy Solutions
Energi, Inc.
Agenda

• Who is Energi?
• ESI Overview
• Barriers to EE Adoption
• Traditional ESCO ESPC Financing
• ESA Model
• PACE & On-Bill Repayment
• Questions
Energi is a Massachusetts based Industrial Reinsurance Company that provides innovative risk management and insurance programs to segments of the energy industry. Energi offers a series of Warranty Insurance programs designed to support growth of the energy efficiency and renewable energy industries via risk mitigation.
Warranty Programs

- **Energy Savings Warranty (ESW)**
  - Insures Savings Related to Design & Installation of Energy Conservation Measures (ECM’s)

- **Solar Installation Performance Warranty (SIPW)**
  - Insures Power Production related to Design & Installation of Solar System

- **Output Performance Warranty (OPW)**
  - Insures Power Production related to Manufacturing, Installation & Design of power producing system

- **Manufacturers Product Warranty (MPW)**
  - Insures cost to repair/replace defective energy related equipment
Energi’s Role in Facilitating Financing

- Broad range of contractors can provide investment grade guarantees
- Enable new financing structures by insuring energy savings to support cash flows and repayment
- Financial Institutions have approved and/or are requiring ESW

CONFIDENTIAL: The following document and any related conversations are strictly confidential. © Energi Insurance Services, Inc.
Hurdles to EE Deployment

• Access to capital
• Balance Sheet Treatment
• Concern over project performance
• Short-term occupancy/lease
Traditional ESCO ESPC

- ESCO, or customer, arranges loan to pay for equipment
- Savings resulting from new equipment > repayment obligations
- Savings shortfall = ESCO repayment
Traditional ESCO ESPC Contd.

- “MUSH” facilities
- Large project size
- Long term leases or customer owned facilities
- Credit worthy contractor & customer
Contracts & Pays ESCO

ESCO

Performs Project & Savings Guarantee

Building Owner

Debt Provider

Debt Service

Project Loan

ESW to Cover Savings Shortfall

energi
Energy Service Agreements (ESA)

- Energy Services provider arranges financing & owns EE improvements
- Customer enters contract to “pay for achieved savings”
  - No up front capital cost for customer
  - Similar to Solar PPA
  - Shifts risk of underperformance to provider
  - Off balance sheet
- At end of term, option to transfer ownership to customer
 ESA’s contd.

• Suitable for commercial or aggregated residential projects
• Credit worthy off-taker
• Finance repayments based solely on Cash Flow from savings
**Approved Engineer**

- Provides loan to Engineer. Loan covers internal project cost & Engineer's profit.
- Provides Savings Guarantee equal to or greater than loan amount; backed by ESW.

**Debt Provider**
- Remit Cost Savings Payments to Debt Provider
- Loan for Project Cost & Engineer's Profit

**Project LLC: Project Owner**
- Remit Cost Savings Payments to LLC
- Subcontracts Engineer to install ECM's in building

**Energi**
- Provide ESW Coverage

**Building Owner**
Property Accessed Clean Energy (PACE)

- Allows commercial property owners to finance energy efficiency retrofits through property tax assessments
- Local government finances 100% of retrofit
- Savings from project > Property Tax Assessment
- PACE lien tied to property, allows for long term (20 years) financing
- Secure repayment – through property taxes
PACE Financing Opportunity
Contd.

Existing PACE programs:

1. California
2. Connecticut
3. Florida
4. Michigan
5. Minnesota
6. Missouri
7. New York
8. Ohio
9. Texas
10. Wisconsin
11. District of Columbia

- www.pacenow.org
On Bill Repayment

• Administering utility or 3rd party covers retrofit cost
• Ratepayer then repays through charge on utility bill
  – Project savings > utility bill charge
• Non-repayment = shutoff of utility service
• “Tied to meter” – assessment stays with building

• Programs administered by:
  – Utility
  – Nonprofit
  – Government entity

Example utility bill

- www.edf.org
Questions?

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