

**NYSERDA Emerging Technologies and Accelerated Commercialization – Residential
(ETAC-RES) Program
Advisory Committee Meetings
Tuesday, July 7, 2015**

Meeting Minutes

ETAC-RES Advisory Committee Members attending:

10:00 am – 11:00 am

- Anthony Aebi, Greenhill Contracting
- Rick Bain, Cree
- Cyd Cox, Buffalo Energy
- Jordan Dentz, The Levy Partnership
- James Hartford, River Architects
- Ryan Kerr, Gas Technology Institute
- Keith Libolt, Affordable Housing Concepts
- Deborah Pickett, NYSEG/RG&E
- Hal Smith, Halco
- Eric Werling, U.S. Department of Energy
- Jim Quirk, NYSERDA
- Lori Borowiak, NYSERDA
- Daniel Farrell, NYSERDA

1:00 pm – 2:00 pm

- Joseph Hitt, NYS Department of Public Service
- Maureen Mahle, Steven Winter Associates
- Julie Humes, Lennox Industries
- Jeff Irish, Hudson Solar
- Kevin Stack, NE Green Building Consulting
- Jim Quirk, NYSERDA
- Lori Borowiak, NYSERDA
- Daniel Farrell, NYSERDA

Overview:

In preparation for development of the next solicitation under ETAC-RES, the Advisory Committee (AC) has been re-engaged and new members added to gain better representation from industry, affordable housing, and other key stakeholder groups. In March, 2015, NYSERDA sent a brief market intelligence survey to AC members. At the direction of NYSERDA Executive Management, staff was asked to solicit additional feedback from the AC. Two calls

were held on July 7, 2015, to accommodate Member's busy schedules and provide more opportunity for each member to have input on the discussion.

In order to frame the conversation, Project Manager Daniel Farrell stated that because heating, ventilating, and air-conditioning (HVAC) technologies/systems were by far the most frequently mentioned measure from the market intelligence survey, NYSERDA was intending to focus the discussion on HVAC. As additional background, Daniel informed the groups that underlying drivers from NYSERDA's perspective should be: opportunity to scale-up to a broad market; replicability and cost-effectiveness; applicability to a variety of housing stock; and consideration if new construction or existing buildings (retrofits) provided the best opportunities/most significant challenges. He also stated that having proposals that address similar technologies/systems and building configurations provided better opportunities for apples-to-apples comparisons during the proposal review and award process.

Each AC member was asked in round-robin style to provide his/her input in terms of the most promising technologies. In terms of market transformation to high performance HVAC, the following were mentioned several times, or seemed to achieve widespread agreement among the members:

Overall opportunities:

- Market transformation efforts supporting very energy efficient (low heating load) new construction (updated energy codes, various certification programs, such as Passive House, Energy Star, LEED, etc., are having an effect, which provides opportunities to make different choices (i.e. lower capacity systems) in terms of HVAC systems
- Need for better/less expensive field verification protocols
- Better control technology, wifi thermostats, and applications for mobile devices can greatly improve system performance, avoid maintenance issues, raise homeowner/occupant awareness of energy use patterns, reduce "vampire" loads, etc.
- Advances in energy storage capability will be game-changer for renewable energy systems

Overall challenges:

- Consumer education - Owners (homeowners and building owners) don't understand benefits (and are slow to adopt) promising HVAC technologies
- Design/engineering professionals and construction trades need education on energy efficiency
- Code enforcement is variable
- Cost of as-installed (field) performance verification work (very expensive to get good data)
- Engineering professionals are risk averse and skeptical of load calculations associated with low-load buildings, therefore they tend to specify/require oversized equipment
- Utilities and energy program administrators have separate budgets for energy efficiency and renewable energy; these should be integrated to maximize benefits

- Limited window of opportunity for change-outs, particularly when it's an emergency service call (no heat or no A/C); difficult to upsell to higher efficiency equipment.
- Need for better balanced ventilation systems for small homes and multifamily units
- Managing dehumidification in very tight buildings with low heating loads
- Controls available have yet to improve system optimization (i.e. relative humidity rather than simply on/off); which controls work better for which systems (hydronic vs. forced air)

In terms of the most promising opportunities for specific HVAC technologies and systems, the AC members provided a number of excellent suggestions.

Opportunities and advantages for air-source heat pumps (specifically, split system ductless and ducted minisplits):

- Applicable for both new and retrofit buildings
- Great opportunities to replace older, less efficient baseboard systems or window units for energy savings and improved comfort
- Easy to install, typically pre-charged with refrigerant
- Can serve low space conditioning load homes or units well
- Can be matched with install of renewable energy system (solar PV)

Barriers and challenges for air-source heat pumps (specifically split-system ductless or ducted minisplits):

- Need to be correctly matched to load (load needs to be accurately calculated/modeled)
- Questions about cold-climate performance; lack of good field performance data; questions on whether back up heat source is required in cold climates
- Questions about cost effectiveness
- Instances noted of poor performance for ducted minisplits
- Instances noted where single-head systems do not adequately service loads (temperature stratification, cold rooms, inadequate mixing, etc)
- Put more electric load on the grid, typically at peak periods

Opportunities and advantages for ground-source heat pumps (sometimes referred to as "geothermal" or "geo-exchange" heat pumps) were as follows:

- Efficient systems that provide significant energy savings
- Opportunities to share services for groups of buildings
- Parking lots and other open spaces can be used for ground loops
- Ground loop configurations around building foundation hold potential
- No outside equipment (as with ASHPs) so weather and other damage is minimized
- NYS sales tax credits may become available

- For retrofits, new variable capacity systems are in the market that are zoning-friendly
Can be retrofit to work with existing hydronic systems; high temp systems compatible with hydronic systems
- Can be coupled with ventilating humidifier to increase customer comfort

Barriers and challenges for ground-source heat pumps:

- Costs
- Questions regarding cost-effectiveness
- Need for smaller capacity units and smaller unit designs for high efficiency new construction (need systems less than 2 tons)

The group also had several comments regarding gas-fired HVAC technologies.

Opportunities and advantages for gas technologies:

- Combi systems (gas furnace/boiler with integrated DHW unit)
- Low-capacity furnaces (15,000 Btu/hr) in the market can be coupled with small diameter duct systems to serve low-load situations
- Good field performance data is available for both combi and low-capacity furnaces
- Efficient outdoor gas heat pumps are in the market with relatively low first costs, can heat DHW

Challenges and barriers for gas HVAC technologies:

- 98 AFUE gas furnaces are available in market, but uptake is small and utility programs are not promoting through rebates.
- Limited availability and market awareness of low-capacity furnaces
- Venting for condensing equipment can be poorly understood and executed