E3T Energy Efficiency Emerging Technologies

Energy Program
Washington State University

E3T Multifamily Building TAG Final Meeting

October 11, 2016

BONNEVILLE POWER ADMINISTRATION

Today's Agenda

9:00 – 9:10	Logistics and agenda overview	*Karen Janowitz*
9:10 – 9:20	Overview of high level scores	*Rob Penney*
9:20 – 10:00	ET scores and comments	*Rob Penney*
10:00 – 11:20	Design Guidelines Panel	*Spencer Sator*
11:20 – 11:30	Meeting end, thank you	*Jess Kincaid*

Controls Scores

Ranking per criteria	Bi-Level Stairwell Lighting Controls	Advanced Lighting Controls for Parking Garages	Variable Speed Drive Pool Pumps and Controls	Hot Water Recirculation Controls	Building Automation Systems
ENERGY SAVINGS	1	2	3	4	5
NON-ENERGY BENEFITS	3	2	5	4	1
TECH READINESS	1	2	3	4	5
EASE OF ADOPTION	1	2	3	4	5
OVERALL VALUE	1	2	3	4	5
TOTAL RANKING	**1**	**2**	**3**	**4**	**5**

TOTAL AVERAGE SCORE (scale of 1-5)	**4.14**	**4.04**	**3.71**	**3.23**	**2.99**

HVAC Scores

Ranking per criteria	Ductless Mini-Splits	Energy Recovery Ventilation	Heat Recovery Ventilation	Ducted Mini-Splits	Inverter-Driven Packaged Terminal Units
ENERGY SAVINGS	1	2	3	4	5
NON-ENERGY BENEFITS	3	1	2	4	5
TECH READINESS	1	4	2	3	5
EASE OF ADOPTION	2	1	4	5	3
OVERALL VALUE	1	2	3	4	5
TOTAL RANKING	**1**	**2**	**3**	**4**	**5**

TOTAL AVERAGE SCORE (scale of 1-5)	**3.88**	**3.83**	**3.68**	**3.29**	**3.08**

Design & Airtightness Scores

Ranking per criteria	Airtightness	Net Zero Energy Ready	Passive House
ENERGY SAVINGS	2	3	**1**
NON-ENERGY BENEFITS	2	3	**1**
TECH READINESS	**1**	2	3
EASE OF ADOPTION	2	**1**	3
OVERALL VALUE	**1**	2	3
TOTAL RANKING	**1**	**2**	**3**

TOTAL AVERAGE SCORE (scale of 1 to 5)	**3.53**	**3.35**	**3.29**

Controls

Bi-Level Stairwell Lighting Controls

- Pros – cost savings, well established, required in some codes

Advanced Lighting Controls for Parking Garages

- Pros – cost savings good
- Cons – commissioning, security benefits questionable, savings for underground garages not as good

Building Automation

- Pros – non-energy benefits, reduced maintenance costs
- Cons – occupant engagement, unproven energy savings, retrofit costs prohibitive, challenging proper configuration
- Needs – training, pilot studies, qualified service providers

Controls (continued)

Hot Water Recirculation Controls

- Pros – savings for gas systems, water savings, mature technology
- Cons – very few electric systems (BPA), water temp and circulation problems
- Needs – compare savings with EE unit water heaters, plumber training

VSD Pool Pumps and Controls

- Pros – simple installation, already required in some codes, energy savings

HVAC

Ductless Heat Pumps

- Pros – proven, reliable energy savings & performance, adds AC
- Cons – aesthetics

Energy Recovery Ventilation

- Pros – possibly higher energy savings than HRV, improved IAQ, necessary for tight buildings
- Cons – cost, occupant issues, difficult for retrofits
- Needs – research, more manufacturers, proper installations

Heat Recovery Ventilation

- Pros – cost effective in cold climates with high utility rates, improved IAQ
- Cons – cost, savings can vary

HVAC (continued)

Ducted mini-splits

- Pros – more versatile than DHP is some situations, comfort, cost savings
- Cons – higher installation costs, installer learning curve, need space for ducts

Inverter-driven Packaged Terminal Units

- Pros – estimated energy savings, good if no gas available, less equipment outside and cost (compared to DHP), better than PTAC
- Cons – Needs additional research to prove performance

Design Approaches

Airtightness

- Pros – cost savings, NEBs, improved IAQ, tenant retention
- Cons – depends on good ventilation, stack effect in taller buildings,
- Needs – training, repeated verification

Net Zero Energy Ready

- Pros – cost savings, lower GHG, improved IAQ, reduced maintenance, great for new construction
- Cons – inconsistent standards

Design Approaches (continued)

Passive House

- Pros – well documented, cost savings, improved IAQ, NEBs, resilience during power outages, tenant retention
- Cons – high costs, conflicting data on energy use, better savings with larger envelope-to-floor ratio buildings, installers need to be 3rd party certified and trained

Design Guidelines Panel

Question to be addressed:

What role can/do utilities have in encouraging the use of design guidelines for multifamily buildings?

Panelists

Panelists

- Jonathan Heller, Ecotope
- Nehemiah Stone, Stone Energy Associates
- Phoebe Warren, Seattle City Light
- Sean Denniston, New Buildings Institute

Moderator

- Spencer Sator, Livingston Energy Innovations

What's Next

- In the short term we are considering multifamily measures for:
  - High efficiency new buildings
  - Stand alone heating measures
- We are also incorporating suggestions we have heard during the TAG into short-term and long-term planning regarding:
  - Adding new measures
  - Ensuring that any program platform can support the technologies recommended as part of the TAG

Thank You to TAG Members

- Great TAG – enthusiastic members
  - Industry experts with stellar reputations.
  - Good representation for utilities, implementers, designers and building operator/owners.
- TAG generated a significant number of new technologies – 26.
- TAG members agreed to extend their participation for both the number of webinars from 2 to 3; as well as the length of the webinars by 15 minutes
  - There was very little drop off during the additional discussions following the webinar even with the longer length.
- Scored significantly more technologies and strategies (13)
- High response rates for the scoring (58% to 67%)

BPA and WSU would like to thank all the TAG members for the dedication, time and willingness to share their expertise to shape the future Energy Efficiency research agenda.