E3T ResTAG

BPA E3T Residential Buildings Emerging Technology Technical Advisory Group

April 10, 2014 Meeting
GoToWebinar Logistics

- Please use your Telephone, not the Mic & Speakers! Remember to enter the PIN number!
- Minimize or maximize control panel
- Phone lines are muted
- Please use question field to ask questions during Q & A or if you have any technical issues

NOTE: Today’s presentation is being recorded and will be available at [http://e3tnw.org/Webinars](http://e3tnw.org/Webinars) within 48 hours
<table>
<thead>
<tr>
<th>Time</th>
<th>Agenda Item</th>
<th>Speaker(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:05</td>
<td>Welcome, agenda review, logistics</td>
<td>Karen Janowitz</td>
</tr>
<tr>
<td>9:15</td>
<td>Goals of today’s meeting</td>
<td>Karen</td>
</tr>
<tr>
<td>9:20</td>
<td>TAG process &amp; schedule</td>
<td>Karen</td>
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<tr>
<td>9:25</td>
<td>BPA E3T framework</td>
<td>Debra Bristow, Sarah Moore</td>
</tr>
<tr>
<td>9:45</td>
<td>TAG scope &amp; definition</td>
<td>Jack Zeiger</td>
</tr>
<tr>
<td>9:50</td>
<td>High Performance Homes</td>
<td>Jack Zeiger, Andy Gordon</td>
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<tr>
<td>10:05</td>
<td>Break</td>
<td></td>
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<tr>
<td>10:15</td>
<td>ETs discussion</td>
<td>Andy Gordon, Jack Zeiger</td>
</tr>
<tr>
<td>11:40</td>
<td>Ranking process</td>
<td>Karen</td>
</tr>
<tr>
<td>11:45</td>
<td>Wrap-up</td>
<td>Karen</td>
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Today’s Meeting Goals

- Understand TAG process, and its significance within the E3T framework
- Review schedule
- Discuss technologies & strategies (ETs)
- Add ETs not on list, if appropriate
- Begin the ranking process
Overview of TAG Process

YOU ARE HERE

Initial Meeting Brainstorming and Discussion about ETs

Scan/Prioritize

1. Sharing New Ideas
2. Ranking or Prioritize ETs

Showcase Webinar

Score the ETs

Meeting to Review Scoring Results

Showcase Webinar

Screen/Recommend

Score the ETs

Share their expertise during Showcases

1. Sharing New Ideas
2. Ranking or Prioritize ETs

Final TAG Review
<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 10</td>
<td>Initial meeting (that’s today!)</td>
</tr>
<tr>
<td>April 22</td>
<td>Begin rating</td>
</tr>
<tr>
<td>April 25</td>
<td>Rating surveys due</td>
</tr>
<tr>
<td>May 21</td>
<td>Showcase Webinar Presentations #1</td>
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<td>May 23</td>
<td>Presentation #1 scoring surveys due</td>
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<tr>
<td>June 4</td>
<td>Showcase Webinar Presentations #2</td>
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<tr>
<td>June 6</td>
<td>Presentation #2 scoring surveys due</td>
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<tr>
<td>June 12</td>
<td>Final meeting and scoring result discussion</td>
</tr>
<tr>
<td>July TBD</td>
<td>Follow-up meeting</td>
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</tbody>
</table>
Introduction
Residential TAG

Residential Technical Advisory Group
April 10, 2014
TAGS - BPA’s Secret Weapon

– Help scan the environment for up and coming technologies
– Use expertise to prioritize the most promising technologies, best practices or protocols
– Identify research questions for further assessment
– Guidance on how to best implement recommendations into utility programs
## History of E3T TAGs

<table>
<thead>
<tr>
<th>Year</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>HVAC</td>
</tr>
<tr>
<td>2009</td>
<td>Lighting</td>
</tr>
<tr>
<td>2010</td>
<td>HVAC</td>
</tr>
<tr>
<td>2011</td>
<td>Energy Management</td>
</tr>
<tr>
<td>2012</td>
<td>LED Lighting</td>
</tr>
<tr>
<td>2012</td>
<td>FLASHTAG Smart Residential Thermostats</td>
</tr>
<tr>
<td>2013</td>
<td>Lighting Controls</td>
</tr>
<tr>
<td>2013</td>
<td>IT Data Centers</td>
</tr>
<tr>
<td>2014</td>
<td>Commercial Buildings – Currently underway</td>
</tr>
<tr>
<td>2014</td>
<td>Residential</td>
</tr>
</tbody>
</table>
About this TAG

• This is the first time focusing on Residential!
• We are beginning with 60+ technologies from E3TNW.org database.
• Looking forward to expanding this list with your help today.
E3T Definition of ETs

- Commercially available
- Shows promise for energy savings
- Has non-energy benefits
- Cost effective
- Potential for successful adoption in the NW
E3T Framework

- Collaboration
- Technical Advisory Groups
- Lab & Field Tests
- Measure Design

Scan ➔ Screen ➔ Assess ➔ New Measure Documentation
BPA’s Residential Programs

What's driving us?
Goal: 1200 aMW in 5 years (504 for BPA)

<table>
<thead>
<tr>
<th>Category</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting</td>
<td>19.70</td>
<td>25.30</td>
<td>12.64</td>
<td>13.40</td>
<td>Includes CFLs, LEDs, fixtures</td>
</tr>
<tr>
<td>Refrigeration</td>
<td>1.50</td>
<td>2.00</td>
<td>1.00</td>
<td>1.00</td>
<td>Ref, Freezers</td>
</tr>
<tr>
<td>Water heating</td>
<td>1.90</td>
<td>2.70</td>
<td>1.30</td>
<td>1.50</td>
<td>Water heaters, clothes washers, showerheads</td>
</tr>
<tr>
<td>HVAC</td>
<td>1.80</td>
<td>2.80</td>
<td>1.80</td>
<td>1.80</td>
<td>Heat pumps, duct sealing</td>
</tr>
<tr>
<td>DHP</td>
<td>1.60</td>
<td>2.50</td>
<td>1.40</td>
<td>1.55</td>
<td>DHPs</td>
</tr>
<tr>
<td>Envelope</td>
<td>4.30</td>
<td>5.40</td>
<td>3.10</td>
<td>3.50</td>
<td>Insulation, windows</td>
</tr>
<tr>
<td>Whole Bldg/Mtr</td>
<td></td>
<td></td>
<td>0.12</td>
<td>0.10</td>
<td>Whole House Air Sealing</td>
</tr>
<tr>
<td>Non measure</td>
<td>0.10</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Savings</td>
<td>30.90</td>
<td>40.70</td>
<td>21.36</td>
<td>22.85</td>
<td>Savings is in aMW</td>
</tr>
</tbody>
</table>

E3T Energy Efficiency Emerging Technologies
Challenges for Residential Programs

• Nearly all BPA utilities have a residential offer but differ greatly in interests and capacity
  – Large vs. small utilities program capabilities
• Most of our technology measures will drop off the measure list in the next 3+ years
  – CFLs/LEDs, appliances
  – E-WH, HPWHs, ASHPs, DHPs
• New technologies have a steep learning curve
  – (Ex: heat pumps, heat pump water heaters)
Benefits from this TAG

• Identify promising new technologies
• Consider timeline for market readiness
• Assist with strategic planning for future program development opportunities
• Help programs identify areas of control that may have the most value
• Assist with future staffing and budget needs
• Assess areas for collaboration (NEEA, CEE, utilities)
Areas to tread carefully

• Technologies under development by NEEA
• Technologies that rely on human behavior change for savings  
  - (Ex: home energy monitor, not a programmable or learning thermostat)
• Other?
TAG You’re IT!
TAG Scope

• Single-family homes
  – 1 to 4 units in a single structure

• Multifamily residential homes
  – 5 units or more in one building up to 3 stories

• Manufactured housing
  – Factory built (manufactured and modular) housing

• Innovative utility program ideas
High Performance Homes Discussion
ETs Brainstorm

E3T Qualifying Criteria

1. Commercially available and new – that is, not in common use – in the Northwest.

2. Quantifiable and reliable electric energy savings in the Northwest?

3. Will it work as intended?
Ranking Criteria

• **Energy Savings** – How significant and reliable are the energy savings per unit?

• **Non-Energy Benefits** – How great are the non-energy advantages for the end user for adopting this technology?

• **Technology Readiness** – How ready are the product(s) and providers to scale up for widespread use in the Pacific Northwest?

• **Ease of Adoption** – How easy is it for the end user to change to the proposed technology?

• **Value** – Considering all costs and all benefits, how good of a buy is this technology for the owner?
Example of Ranking Survey

Domestic Water Heating from Condensing Air Conditioning Units - 8

Installation of waste heat recovery units on residential air conditioning condensing (outside) units to supplement domestic water heating.

Click here for technology info.

- 0- I do not support this technology
- 1- I support this technology with significant reservations
- 2- I mildly support this technology
- 3- I support this technology
- 4- I strongly support this technology
- 5- My support for this technology is enthusiastic and unqualified

Your comments are welcome
### 2013 IT TAG Weighted Rankings

<table>
<thead>
<tr>
<th>Title</th>
<th>Average Rating</th>
<th>Highest rating</th>
<th>Lowest rating</th>
<th># Responses</th>
<th>RANK by avg score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air-Side Economizer for Data Centers *</td>
<td>4.00</td>
<td>5</td>
<td>1</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>Airflow Management in Data Centers *</td>
<td>3.92</td>
<td>5</td>
<td>3</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Server Virtualization *</td>
<td>3.85</td>
<td>5</td>
<td>2</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>High-Efficiency UPS Equipment for a Data Center *</td>
<td>3.85</td>
<td>5</td>
<td>3</td>
<td>13</td>
<td>3</td>
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<tr>
<td>Efficient Power Supplies for Electronic Devices</td>
<td>3.62</td>
<td>5</td>
<td>2</td>
<td>13</td>
<td>5</td>
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<tr>
<td>Premium HVAC Equipment</td>
<td>3.54</td>
<td>5</td>
<td>1</td>
<td>13</td>
<td>6</td>
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<tr>
<td>Ongoing Commissioning of Economizers in a Data Center *</td>
<td>3.38</td>
<td>5</td>
<td>2</td>
<td>13</td>
<td>7</td>
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<tr>
<td>Storage Area Network (SAN) and Network Core Consolidation *</td>
<td>3.36</td>
<td>5</td>
<td>2</td>
<td>11</td>
<td>8</td>
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<tr>
<td>Power Management for IT Equipment *</td>
<td>3.33</td>
<td>5</td>
<td>1</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Solid State Drives (Flash Memory) *</td>
<td>3.23</td>
<td>5</td>
<td>1</td>
<td>13</td>
<td>10</td>
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<tr>
<td>Optimizing Data Center Controls</td>
<td>3.18</td>
<td>5</td>
<td>1</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Direct Server Cabinet Cooling *</td>
<td>3.15</td>
<td>4</td>
<td>2</td>
<td>13</td>
<td>12</td>
</tr>
</tbody>
</table>
E3TNW.org

Emerging Technologies Database:

A collection of energy efficiency emerging technologies submitted and scanned by energy experts and engineers. The technologies consist of basic and detail level information that highlights commercially available electricity saving technologies. You may submit new technologies, use the search and browse features in the above menu, or see the complete list of technologies.

Featured Emerging Technologies

- Lighting Technologies (by Energy System)
- Energy Management Technologies (by Focus Area)
- Residential Technologies (by Sector)
Communications

• Listserv: tag-residential@listserv.energy.wsu.edu

• Technical Leads: Andy Gordon, 360-956-2046 and Jack Zeiger, 360-956-2053

• Communications Lead: Karen Janowitz, 360-956-2096

• http://E3TNW.org

• The ResTAG Portal
  http://e3tnw.org/TAGPortal/2014ResidentialBldgTAG.aspx
ResTAG Roles

BPA Steering Committee
- Kacie Rossman
- Sarah Moore
- Debra Bristow
- Robert Weber
- Jennifer Francis
- Courtney Dale
- Stephanie Vasquez
- Mark Johnson

WSU E3T Staff
- Jack Zeiger
- Andy Gordon
- Karen Janowitz
- Angela Phillips
- Rob Penney
- David Shepherd-Gaw
Next Step

- Survey sent to you
THANK YOU!
We so appreciate your participation!