

**BPA E3T Multifamily Technical Advisory Group**

**Scoring Results – CONTROLS**

**Technologies presented at the 9/22/2016 webinar**

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

Scores (average ratings)	Bi-Level Stairwell Lighting Controls	Advanced Lighting Controls for Parking Garages	Building Automation Systems	Hot Water Recirculation Controls	Variable Speed Drive Pool Pumps and Controls
ENERGY SAVINGS	4.35	4.15	2.88	3.25	3.95
NON-ENERGY	3.05	3.20	3.65	3.00	2.83
READINESS	4.47	4.35	2.94	3.47	4.00
ADOPTION EASE	4.40	4.25	2.72	3.15	3.79
VALUE	4.45	4.25	2.76	3.30	4.00
<b>TOTAL AVERAGE</b>	<b>4.14</b>	<b>4.04</b>	<b>2.99</b>	<b>3.23</b>	<b>3.71</b>

## BI-LEVEL STAIRWELL LIGHTING CONTROLS

Summary	
Energy savings	4.35
Non-energy benefits	3.05
Tech readiness	4.47
Ease of adoption	4.40
Value	4.45
<b>AVERAGE</b>	<b>4.14</b>

- Code required in CA and elsewhere
- Not new, many utilities offer this measure
- Mostly cost savings
- I'd like to suggest that we call these "Co-Benefits," instead of "Non-energy Benefits."
- Technology readiness is unknown

## ADVANCED LIGHTING CONTROLS FOR PARKING GARAGES

Summary	
Energy savings	4.15
Non-energy benefits	3.20
Tech readiness	4.35
Ease of adoption	4.25
Value	4.25
<b>AVERAGE</b>	<b>4.04</b>

- This is required in CA and standard practice in many locations
- Underground parking savings (a subset) is only "good"
- The downside is that long distance views are somewhat hampered at night if there is no movement in farther away areas. This could be a security concern.
- It has a longer life, but I'm not sure I believe in security benefits
- Configuration/commissioning is an issue.
- There is uncertainty around the reliability of luminaire level controls.
- The owner is the property owner - savings directly flow to owner.

## BUILDING AUTOMATION SYSTEMS

Summary	
Energy savings	2.88
Non-energy benefits	3.65
Tech readiness	2.94
Ease of adoption	2.72
Value	2.76
<b>AVERAGE</b>	<b>2.99</b>

**How significant and reliable are the energy savings per unit?**

- It seems that the savings rely somewhat on the occupant to function (run the building), at optimum savings.
- Configuration is key, and that is a significantly weak point for this technology as both initial and ongoing configuration is difficult.
- Energy savings are highly dependent on the situation
- I would have rated this higher except that when the software "learns" the occupants' patterns, it CAN misinterpret the data and cause either uncomfortable situations or ones where energy use actually goes up.
- I think this field has great promise, however very little data was presented on specific control algorithms or resulting energy savings. It seems to me BAS is highly dependent on control algorithms and the field is probably too young for a blanket incentive to deliver uniform results. It might also have negative side effects such as leaving tenants feeling that they don't have to be energy conscientious because the building will do it all for them. Seems like more research is necessary from pilot projects.
- There are unproven energy savings

**How great are the non-energy advantages for the end user adopting this technology?**

- If the end user is technology-savvy it's great, but in my experience in this market segment it can have nearly zero effect if the occupants are apathetic or not keyed into the process.
- This technology gives a very high level of control, which is good.
- There is a reduction in maintenance costs with basic systems. Iotas poses an even higher value proposition for the right property.
- The "Cool" factor is a non-energy benefit.
- This will appeal to some users.

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

- I'm not sure about tech readiness because I don't know the local service providers.
- Contractors capable of doing the installation and, much more importantly, configuration, are still few.
- Lack of interoperability remains a big issue; and proprietary systems that cannot release building data prevent cost effective EE upgrades
- Basic systems are ready, lack of property manager capability may prove to be a big barrier for many locations however.
- Still some hesitation on my part due to the wide range of manufacturers playing in this space, and possible consumer confusion.

**How easy is it for the end user to change to the proposed technology?**

- It can be easy to adopt as long as the infrastructure is put in place during construction. Retrofit costs are likely prohibitive.
- There are many barriers to installation.
- It's easier to install in new construction.

**Considering all costs and all benefits, how good of a buy is this technology for the owner?**

- Although I would say it is Okay for the tenant.
- It depends, but for some MF facilities, the value could be very good. We need a market segmentation study to better understand

- The answer to this question really should be, "it depends."
- This is answered for resident (in-unit) systems. Common area systems controlled by landlord are more market ready and have greater potential

## HOT WATER RECIRCULATION CONTROLS

Summary	
Energy savings	3.25
Non-energy benefits	3.00
Tech readiness	3.47
Ease of adoption	3.15
Value	3.30
<b>AVERAGE</b>	<b>3.23</b>

### How significant and reliable are the energy savings per unit?

- Most of the savings are for gas - very little for electricity, which is the BPA mandate.
- More energy savings when a building has a central system. Much of the traditional "woody Walk ups" have individual electric storage tanks. Very few central systems are electric.
- The savings can be excellent, but the water temperature and circulation problems that can crop up can cancel out the energy benefits, I know this first hand!
- Good, but the relationship to high-efficiency individual heaters with no need for circulation is apparently unknown.
- 12.5% of energy is in recirculation losses-- not a large fraction, but the energy savings is still significant
- Demand control seems to be a no-brainer in new construction. As pointed out by some TAG members, for retrofit situations further understanding of best control strategy given site conditions is necessary to ensure energy savings result.
- good, because of the expected state of readiness of plumbers. will improve with experience and training
- This is not an ET. The control of recirculation pumps has been evaluated for years. The more ET issue is how it allows for improved plumbing design that limit volume of water in key branch and trig piping from the loop to key fixtures.

### How great are the non-energy advantages for the end user adopting this technology?

- Since most systems are natural gas there should be some carbon credit
- Instant or nearly instant hot water at the tap is a nice feature!
- The controls create the possibility for longer wait-times for hot water.
- Essentially, no lost comfort
- There are primarily water savings.
- This is mostly an energy technology. other benefits of less wear and tear on systems are secondary
- There are plumbing design &/or associated water meter savings implications

### How ready are the product(s) and providers to scale up for widespread use in the Pacific Northwest?

- The technology is pretty mature and plumbers don't really need special skill to install it.
- This is a well understood technology.

- The only real missing piece is a training and certification program to make sure that installers understand the systems they are evaluating for potential controls installation. I have seen "bad" MF recirc systems made worse by controls because the plumber did not know how that particular system was laid out or how it worked.
- With the caveat, as mentioned above, that clear guidance on matching control strategy to site conditions should be made.
- I suspect there is limited knowledge among plumbing contractors; but they can be taught relatively quickly.
- Not sure this is as big a deal as in NYC. It is already in codes.

**How easy is it for the end user to change to the proposed technology?**

- Depends greatly on the design of the building and if the units are all individually metered or master metered.
- Savvy technician is needed, not a large barrier.
- Installer needs to be trained or have experience with the technology.
- More suited for new construction.
- It is easy for the end-user only because it is not an end-user-installed technology.

**Considering all costs and all benefits, how good of a buy is this technology for the owner?**

- Savings can be significant IF done correctly, and even then circulation issues can crop up later.
- For a retrofit or new construction with no choice but a central system, I would say it is very good to excellent. But for new construction that could do high efficiency individual heaters, I would say that it is unknown right now.
- Hot water costs are generally covered by the owner, so all the savings go to the owner.
- The savings are significant and reliable as long as the right controls are installed for the specific CDHW system, they are installed correctly, and the control parameters are established correctly. Unfortunately, none of those are a given. Any utility launching a CDHW control program should take the time to train installers and/or institute a robust set of verification procedures.
- Assuming they get proper advice regarding design and installation

**VARIABLE SPEED DRIVE POOL PUMPS AND CONTROLS**

<b>Summary</b>	
Energy savings	3.95
Non-energy benefits	2.83
Tech readiness	4.00
Ease of adoption	3.79
Value	4.00
<b>AVERAGE</b>	<b>3.71</b>

- Pools are typically incredibly wasteful of water and energy. IF a multifamily facility has a pool, this technology is relevant and helpful.
- This is already required in many new codes
- There need to be better application guides and installer training.
- Compared to most EE options, installation is very simple, but still requires some knowledge/training.