IT TAG Final Meeting

December 5, 2013

The following notes are highlights from the discussion, not a transcript. Also note that they are in general chronological order, but a few sections were reordered for clarity. Finally, the discussion covered only some of the nine emerging technologies that were scored and included one that wasn't scored.

Reviewing Scoring Results

Jack: He walked TAG members through scoring results. Virtualization scored highest in nearly every category. HVAC technologies (ETs) had lower non-energy benefits, which isn't surprising. SAN scored too low to continue, and direct cabinet cooling is marginal.

Kendra: The scores on two of the slides differed. **Angela**: Two column headings were switched. She corrected these.

Solid State Storage

Jay: He's surprised that solid state storage scored as high as it did, thinking it may be hard to administer in a program. **Jack**: It would probably only do well with replacement of short-stroke hard drives. **Brian**: Solid state storage can achieve energy savings, but he agrees with Jay that it's only great for special applications with short-stroke drives, so hard to administer to find those cases. **Jack**: Data centers could even game the system by setting up hard drives to short stroke to get incentive funding.

Server Virtualization

John: It's hard to compare the ETs since they're so different. Server virtualization is the best bang for the buck but hugely intrusive. He thinks it's a lot harder to implement than indicated by the 4.3 (out of 5) score it got for adoption ease. SAN and LAN Network Convergence seems easier to adopt, and that got 2.3 on ease of adoption.

Jack: Remember our end goal: handing off measures to BPA. Some TAG members have expressed reservations about utilities incentivizing server virtualization. **Ted**: His program at Seattle City Light (SCL) is not heavily promoting it. They'll drop the limit from 200 to 100 servers for 2014 because their targeted audience is small DCs. They currently offer $150/server. They only funded two projects in 2013 but could do more if it were promoted

more. They're worried about free ridership. They agree it's good for getting traction with IT management through server virtualization and then moving on other measures. It's easier for large data centers to automate than smaller DCs, where staff may lack the time and skills needed, although small DCs will likely do it as part of a big expansion or new construction. $150/server isn't a huge contribution towards the cost of virtualization, but it helps. **Mark**: Incentives to large, sophisticated users are unwise. So either cap incentives as SCL did or limit rebates to companies on utility schedules for small commercial customers. Paying per server encourages more thorough virtualization, which is good. **Jack**: So there seems to be consensus that it makes sense to limit incentives to small customers.

On-going Commissioning of Economizers

Jack: One comment was that it's difficult to verify energy savings. Another comment is that ASHRAE is starting to require fault detection and diagnostics, so this measure is moving into codes and may preclude the need for commissioning. **Bill**: ASHRAE is writing a new standard for data centers, so DCs will be taken out of 90.1. There's a draft out for public review. **Mark B**: Actually, the new standard will only apply to new DC construction, so these measures that focus on retrofit won't be affected.

Airflow Management

John: How did airflow management, which requires a complete restack of DC to create rows, score 3.3 overall, while changing out a switch (SAN) scored only 2.1?

Mark: Most DCs are already in aisles, and there are other measures like blanking panels. But in small/medium DCs, airflow management is easier to install than economizers.

Brian: He agrees with that. Airflow management is relatively easy to install. His team did airflow management renovation for a 7,000 sf DC in one day while the DC was operating.

Jack: A barrier is the need for a full M&V process to verify savings. Don't DCs already have enough sensors and monitors for M&V?   How hard is that? **Robert J**: He only has some utility experience. They've had serious issues with airflow management; how movable the airflow management tools are. **Mark:** PG&E had portable data loggers they'd set up for a few weeks before and after implementation and then remove. **Jack**: Isn't this cost-prohibitive for any but huge projects? **Mark:** It's better for large projects, but may be okay for some smaller ones. **Bill**: Keep in mind that improving airflow management doesn't save energy by itself unless you slow fans down or turn them off. **Jack**: Have you seen projects with airflow management that didn't save energy? **Bill**: Maybe not, but this measure is rarely implemented without other projects that do save energy so it's hard to tell. **Jack**: Are there good contractors available to

help with these projects? **Bill:** Yes, there are a lot of capable service providers in the region. **Robert:** He agrees.

Utility Programs

Jay: Today we've been talking more about program design than technologies. There's not a shortage of technologies, but the need to find the right program mechanisms to effectively incentivize the right people cost-effectively.

Jack: Someone commented that it would be hard to design a prescriptive program for many data center measures. It seems training and education is needed for many measures, as well as restructuring internal management such that IT managers have more incentive to reduce energy costs. **Mark**: Of the nine measures, only a couple lend themselves to prescriptive measures. A couple others could be calculated. So for others, the measure may be limited to training and education. PG&E and SMUD offer 1-2 training and education workshops annually. Mark did a training for Seattle City light about 1.5 years ago.

Ted: These trainings were very helpful, and they'll repeat in 2014, alone or with other Puget Sound utilities. They also want more outreach to CEOs or CIOs to raise awareness. Small/mid-size data centers may be less than 5% of the building area but 40% or more of the building's energy use. DC measures may be much more cost effective than other building energy system measures. It's important to reach building managers. **Ted**: Tie energy savings into IT manager's salary. **Jack**: Or at least recognition. **Ted**: He just met an IT manager that had energy efficiency as part of his performance rating related to his salary, and he was aggressively pursuing efficiency improvement. BOMA has a "KiloWatt Crackdown" program to get business to compete. **Jack**: Utilities could do that, and provide recognition.

Jack: Don't many DCs already have enough temperature sensors installed to accomplish M&V? **Bill**: Yes, most data centers have temperature sensors that can be accessed through the network. If not, just install a wireless mesh system with broad coverage (usually better than the built-in sensors); it's fairly economical.

Debra: Are there ways to bundle measures to make them more attractive? **Jack**: One bundle of dozens of smaller measures is airflow management. **Alan**: He's seen utility programs with focus on state/local governments or K-12 and other target audiences that lag behind and need special attention and recognition. Maybe some of the savings could be shared with a department to use for their purposes. **Jack**: Ted mentioned that virtualization was a good way to start developing rapport with IT managements, and then move onto other measures. **Ann**: ETO bundles measures, and it may be worth looking at some on their website.

Jack: Training and outreach are needed because customers must have some sophistication to implement some of these measures.

DC Power

Jennifer: Can the group comment on DC power, since it didn't make the list of top nine? **Jack**: Brian's doing work on this. **Bill**: Everywhere that DC power has been demonstrated it has saved energy. With very efficient power distribution systems, savings are less. But there are barriers to implementation, and smaller data centers are unlikely to embrace it. **Jack**: How much manufacturer cooperation is required? **Bill**: The equipment exists, including power supplies and connectors, but it's a matter of changing a paradigm with IT and building managers. **Jack**: What do you think about the APC paper on using higher voltage AC power rather than DC power? **Bill**: APC points out that a really efficient AC system is close to the efficiency of DC. But DC has other benefits, such as better power quality, easy link to motor drives and PV panels, etc.

Closing

Jack: He expressed appreciation for the TAG member's contributions. **Karen**: She welcomed feedback on the TAG process. **Jack**: The TAG portal and listserv will remain available for discussions and sharing good resources. **Karen**: E3TNW is continually evolving, so members are encouraged to use it and make suggestions.