

Notes: HVAC Action Plan Stakeholder Meeting

March 30, 2011 10am-3:30pm

CPUC Auditorium – San Francisco, CA

Objective: To receive stakeholder input on draft HVAC Action Plan key elements

Meeting Goals

- Review timelines and key actions to achieve milestones
- Discuss progress to date, implementation recommendations, success factors
- Identify potential HVAC champions (individuals and organizations)

HVAC Action Plan Workshop Introduction

Kristina Skierka (CPUC), Brenda Hopewell (Portland Energy Conservation, Inc.), Simon Baker (CPUC), Mark Cherniack (New Buildings Institute-NBI)

Update

Champion testimonial – Brenda Hopewell, ZNE champion

- Involved because the California Commissioning Collaborative values both the ZNE Action Plan and the Strategic Plan, and they have relevant expertise in energy efficiency and commissioning.
- Have found champions to be an incredibly dedicated and hard-working group. There are approximately 35 people in the group.
- In terms of responsibilities, the group meets quarterly with smaller milestone-focused groups meeting more frequently. Champions need 1-2 hours/week.
- Group meetings consist of engaged discussions, progress reports and collaborative exchanges. Subgroups form for issues that arise.
- CPUC level tools for collaboration include Engage 360.
- Purpose is focused and the milestones truly help create progress.
- Finds this an inspiring experience.

CPUC support for HVAC – Simon Baker, CPUC

- In September 2008, the Commission acknowledged and identified the need for an HVAC Advisory Group to advise the utilities on their HVAC programs.
- Set aside some funding to establish organization – the Western HVAC Performance Alliance (WHPA)
- Key takeaway: the Commission had a vision for the group to organized itself and work on the Strategic Plan.

The Western HVAC Performance Alliance (WHPA) – Mark Cherniack, NBI

- Key resource (the “fountainhead of all knowledge”): www.performancealliance.org
- There are 70 member organizations.
- The Alliance is structured to meet the goals of the Strategic Plan and the HVAC Action Plan.
- The site houses a great clearinghouse for resources.
 - E.g., a recent major report on energy efficiency jobs from the Berkeley Labor Center (UC Berkeley) is available online
 - Under “Education” on www.Engage360.com or

- The Institute for Research on Labor and Employment at Irle.berkeley.edu

Goal 1: Improve Code Compliance

Eurlyne Geiszler (CEC), Bob Wiseman (IHACI)

Update

- The CEC is increasing building standards as well as educating building departments, consumers and contractors.
- Compliance is a big issue for contractors, particularly fairness in the marketplace.
- The WHPA's focus on online permitting (i.e., an easier permitting process) will help everyone (esp. contractors) and move the entire process.
 - Commonalities between cities are important; they've just launched an online permitting pilot in several cities.
- Focus on simplification for Strategy 1-4: Develop Affordable Standards and Quality Compliance Solutions.
 - Take the alterations compliance form (applicable to a lot of alterations) and separate the HVAC forms into their own form.
 - There are five different forms, specific to climate zones in California.
 - Goal: create a more simplified compliance avenue.
 - CF1-Alt HVAC form used often because it's simpler to use. The WHPA compliance committee looks at the regulations and tries to make the processes simpler.
- Focus on increasing the pulling of permits for Strategy 1-5: Enforce Penalties for Contractors Who Do Not Pull Permits or Operate without the Appropriate License.
 - CEC and the State License Board (CSLB) are working together on this issue. Homeowners and contractors who are being underbid can give the CSLB real-time information to provide enforcement.
 - 09-19 CSLB renewed building permits.
 - CSLB is accelerating their enforcement plan. Current penalty is up to \$5000 dollars.
 - CEC gets complaints on a daily basis, but defers to CSLB where appropriate.
- Compliance is critical to the Strategic Plan's energy saving goals. Increased coordination between CEC and CSLB is a huge step in the right direction, but to meet 90% permit compliance by 2020, we need to continue in this direction (serial number tracking, increased penalties perhaps) to meet our goals.
- It is incredibly encouraging to see the increased collaboration moving towards a common goal.

Discussion

- The secret to quick success: having a broad coalition of dedicated people who meet every other week and have a common vision.
- SMUD has implemented a program requiring that a permit be pulled in order to give a rebate for HVAC with a higher efficiency. CEC is working with IOUs to adopt this program. SDG&E began requiring permits at the beginning of this program year. It's not widely accepted by the industry, but they are trying to evolve towards mandatory permits. PG&E & SCE have committed to including checkboxes in the application forms

forms for incentives. They have not committed to pulling actual permit numbers at this point.

- Energy Upgrade program requires permits.
- This issue has been on the table since 2006. When will it be resolved? (Cynthia Mitchell, TURN)
 - The WHPA Compliance Committee is very active, so please bring relevant issues directly to the committee. (Luke Hermann, Enalasy)
- Related to moving the permitting process online for easier access, San Diego area has 18 jurisdictions and contractors are interested in a cross-jurisdictional form.
 - CALBO would need to be consulted, because each jurisdiction has its own standards, just as each city adopts its own energy efficiency standards.
 - Cross-jurisdictional forms have not been part of the discussion. (Jennifer Green, Center for Sustainable Energy prompted the discussion)
 - How would permit funds get to the right jurisdiction?
- There is a special case with very high building permit compliance – the Home Depot. Under their process, contractors are not paid unless they turn in compliance forms. This is a way to incentivize the behavior. (John Anderson, Rheem Manufacturing)
- A fine isn't a big enough stick. If there's a pattern of behavior, the contractor needs to be severely punished, e.g., suspend any licenses that contractor has personally (608). Suspend license for five years to get their attention. On the flipside, we have an obligation to ensure that appropriate licensing means something. A 100 answer test is not enough. Need an adequate licensing process, not a questionnaire, where training includes cutting-edge stuff. Involve third parties if jurisdictions don't have time and resources. (Tom Meyer, esco group)

Goal 1: 1-1-1 Convene an industry/local government stakeholder group, develop proposed new system, pilot test with local governments

- The general idea is to create stronger enforcement.
- Used interviews to draft the Action Plan.
- Framing: act as an additional think tank.
- Concern over staffing constraints.
 - There is a crunch on local government, but the pilot's working, arguably at a more efficient cost.
 - Revenue comes from permits, so there are jobs embedded in this process.
 - The process needs to be streamlined for the contractor. Southern California deals with 20+ municipalities, each one with a different permit and timelines. This seems excessive and it's particularly difficult for smaller shops to dedicate resources to multiple versions for one process. You'll get smaller shops with a streamlined process.
 - Online permitting pilots are in El Centro, Oakley, Antioch, Big Bear, Napa, Plumas, Vacaville and Fairfield; currently none in Southern California.

Goal 1: 1-2-1 Pilot test streamlined process with local building departments and 1-2-2 Explore possible common business licenses for multiple jurisdictions

- Addressed in previous milestone discussion.

Goal 1: 1-3-1 Adopt ANSI standards into Title 24, integrate into existing utility program designs

- What's the difference between the Title 24 standards and the ANSI standards? What are the benefits of one vs. the other? (Luke Hermann, Enalasy)
 - State code has many reference standards. The committee's trying to see how to more effectively integrate these established industry standards into practice (quality); they are going through standards and seeing which ones apply to quality installation and quality maintenance (residential and non-residential sides). Where there's a difference, they are evaluating which ones are specifically focused on quality installation and quality maintenance and how to integrate those into Title 24. The standards include SMACNA. (Erik Emblem, Western States Council of Sheet Metal Workers)
- Concern over how to integrate standards into quality maintenance program – it seems like standards are very comprehensive, so what about field feasibility, C-E, consumer acceptance and contractor acceptance? (Cynthia Mitchell)
 - Action Plan leaves some things undefined, letting implementation define those parameters.
 - The WHPA Compliance Committee hasn't addressed these issues yet.
- Current charge diagnostic in Title 24 is OK, but not for servicing newer equipment. (Dale Rossi, Field Diagnostic Services, Inc.)

Goal 1: 1-4-1 Convene stakeholder group, develop details of proposed (online) systems and determine whether to proceed

- Make permit filing more affordable
- This quarter, review the relevant approaches (e.g., Home Depot, SMUD, others)
 - CEC: developing simplified forms geared for Jan. 31, 2014, so stated deadline (available by 2012) not possible and needs to be pushed to 2013.

Goal 1: 1-4-2 Consider developing an internet-based system that tracks the status of equipment, from the initial sale to final quality check in the field

- Timeline focused on next year, AP helps prioritize
 - Concern over ability to fund this – tie objectives to getting funding to make them happen (implementation) (Luke Hermann,)
 - This hasn't gone forward yet, but it's being discussed. This is a long-term project.
 - Something to consider is that the ZNE Action Plan group had champions go out and fundraise to achieve certain milestones.
 - In the WHPA Compliance Committee, do the manufacturers and organizations remain involved in the tracking? (Dale Gustavson, WHPA)
 - When we get there, absolutely; hopefully next year. This requires participation from manufacturers and distributors.
 - Concern over storage of this and HERS reports – how is this all going to be housed? Where will it be? Brainstorming with Mazi Shirakh (CEC), Google and the Western Climate Initiative. Data, tracking and storage is a big thing, and it might be beyond the legislature (Erik Emblem, Sheet Metal Workers)
 - Since this applies to serial number tracking system, there's a glitch in the process: normally numbers are fed back in the warranty registrations. However, in California, people are not required to register

their equipment for a warranty, making a break in the loop for how to track the equipment to the end user. (John Anderson, Rheem Manufacturing)

- The state doesn't necessarily have to foot the bill for a tracking system. Groups would be happy to create one if they could get a small charge for every registration. Software company did this in New Orleans. (Howard Weiss, HVAC Excellence)
- There seems to be a need to work on the enforcement regime, as it's difficult to remedy federal and state levels. Happy to be engaged (three groups, one of America, one International) in this on first quarter for next year. (Robert Helminiak, AHRI)

Goal 1: 1-5-1 Pilot test local government fines in lieu of contractor license suspension

- Largely focused on next year
- Could use behavioral analysis to increase participation. (Ed Vine, CIEE)

Goal 1: 1-5-2 Expand SMUD program to IOUs (proof of quality installation for rebates)

- Related to Cynthia Mitchell's earlier question
- SMUD's well known for their program. Permit compliance rates are higher in SMUD's territory than in other places. What's great is that habit becomes routine as participants realize that it's not a horrible process and integrate into their work.
- SMUD has a contractor participating list on their website. Participation has become a point of pride for contractors. SMUD does follow up and exercise leverage to maintain compliance. They require some of the forms to come in with the rebates. It's currently a big paper process, so they're definitely looking forward to the online process. They think it will expedite the process and they're interested in being involved. (Ravi Patel, SMUD)
- According to CSLB, the contractors that got used to dealing with SMUD standards have continued to use them in that region. (Eurlyne Geiszler, CEC)
- SMUD currently requires the permit on the application. This is a best practice that works.
- SMUD's program has been in place for 4-6 years. Concern over how to speed up IOU compliance to adopt SMUD standard immediately (Cynthia Mitchell, TURN)
 - A lot of low-income programs already require proof of quality. Could simply expand that practice.
 - The ARRA energy program requires proof of building permits before HVAC rebates will be paid.
 - HDCRVU has been doing a similar program including verification, installation and rebates with Xcel Energy for about 5 years. Recommends talking to Xcel. (Chris Compton, HVACR Education)

Goal 1: 1-5-3 Identify local government resources needed for enforcement

Tougher these days due to recession and local government spending reductions.

Goal 1: 1-5-4 Establish action plan to phase-in mandatory enforcement

- There's a challenge in integrating online permitting software with current permitting. (Anne Marie Blakenship, Resource Solutions Group)

- Why don't the cities pass ordinances saying that contractors can't sell without permit and proof of insurance? (Tom Meyer, esco group)

Goal 2: Quality HVAC Installation and Maintenance

Don Langston (AireRite), Bob Baker (ANSI 180 Committee)

Update

- The ACCA/ANSI 180 standard project began in 2003 and the standard was published in 2008. Since then, there has been widespread adoption. The IMC and UMC codes reference it, as does the Existing Building Standard. It's a widely accepted and vetted standard. It considers what must be done, when and how often inspections of HVAC systems are needed. It does not cover how to it all.
- Efforts have become focused on the customer.

Discussion

- The WHPA and utilities have been working on the how for some time. It requires understanding the goal and then working with industry to test it in the field. People have been working aggressively to those ends. It's always been difficult for customers to determine quality. Likewise, industry has a hard time proving they've done a better job. End-users have been invited into the quality design process more recently through education to understand long-term savings. (Mel Johnson, SCE)

Goal 2: 2-1-1 Create and launch statewide quality brand an/or align with national brand

- Engage360.com is aimed towards branding with a stronger emotional tie. It's an identity association along the lines of a grassroots initiative.
- Important to think of whom you associate with a brand. E.g., ENERGY STAR has formal quality control.
- A statewide quality brand around maintenance should include contract associations and labor unions, not just manufacturers. ENERGY STAR has been a guiding force. ACEEE and the EPA have also helped move the quality installation standard. Right now there's an ENERGY STAR quality installation program built on an ACEEE standard. Let's identify other standards (installation, maintenance) that are national, vetted and align those with ours. (Dale Gustavson)
- Ecology Action could be a champion for this milestone, specifically working on incentives and home as a system approach. (Jennifer Green, Center for Sustainable Energy)
- Emphasize Dale's comments. Sheet Metal Workers would like to offer their input (Sheet Metal Workers and SMACNA – joint efforts to train). (David Vias, Sheet Metal Workers)
- This is about educating the end-users. These standards are not just a checklist – they provide a way to building a holistic approach in understanding the equipment and environment. We need marketing to help them understand and target CFOs or CEOs to strategically get out the message that being green is being responsible. Marketing and awareness will be a long battle. (Don Langston, Aire Rite)

Goal 2: 2-1-2 Develop operating and lifecycle data on economic and comfort benefits

- Being able to translate the data into something understandable for a punch line is important (Carmen Best, CPUC)
- Suggestion to let EM&V rather than staff handle this analysis. They usually handle non-energy benefits (like LCA). Idea supported by others. (Athena Besa, Sempra Utilities)
- Make sure that data is climate zone specific. (Jennifer Green, Center for Sustainable Energy)

Goal 2: 2-2-1 Develop and launch campaign

- View this milestone as California coming along with a process already in place that could be worked on more readily. Compare EPA coming alongside standard. Brand existing brands to amplify their impact. (Dale Gustavson)

Goal 2: 2-3-1 Conduct comprehensive training needs assessment to identify industry skill gaps; begin expanded training programs

- New approach to training needs in the state. Review published documents, look at the unique needs of the HVAC industry and do additional assessment that dives deeper.
- There are a lot of potential champions on the committee – ACCA, Warren Lupson-AHRI. (Erik Emblem)
- HVAC and refrigeration jobs expected to grow 20% between 2008 and 2014.
- On track for “Create request for proposal (RFP) for HVAC-specific needs assessment” (key action 3). (Dale Gustavson). The RFP has been released with a contractor identified.
- UC Berkeley conducted a big needs assessment, but didn’t get into the specifics of training and proper process. Training can’t be done in isolation, so it’s important to analyze not just the curriculum gaps, but also consider how training fits into the labor market (professionalized and stable workforce or not). (Carol Zabin, UC Berkeley Labor Center)

Goal 2: 2-4-1 Develop accreditation program requirements; begin implementation

- Partnering with local community colleges. The economic downturn means that classes are full. Marketing goes hand in hand with customer and attracting people into the trade. It’s hard to find good people and then train them, so there’s a need to set that tone early. High schools often shut down trade classes. (Don Langston, Aire Rite)
- We should focus on apprenticeship schools, because the infrastructure is built. (David Vias, Sheet Metal Workers)
- There’s a need for curriculum standards. Consider HVAC training in engineering schools – there is currently a major hole in mechanical engineering schools. PG&E and SCE have labs at their facilities. Consider moving those labs to universities so that students can take advantage of those tools and strengthen our understanding of HVAC as a discipline. Also, strengthen interaction between trade schools and engineering schools. (Robert Mowris, VERIFIED, Inc. on phone)
- Western Cooling Efficiency Center (WCEC) does not generally interact with the student population. It’s a research lab at UC Davis and part of the Energy Center

along with the California Lighting Technology Center. Grad and undergrad students work there on specific projects. (Dale Gustavson)

- Has the focus on green jobs and ARRA made a difference?
 - Industry's becoming more sophisticated (higher efficiency and more complex). So when you give a technician one narrow skill base, they will miss the big picture, that there's a system within a building within an environment. You need someone open to all of the factors. (Bob Baker)
 - Having a competent level technician takes a long time. Changes are more complex. Air balance, indoor air quality, air distribution – all these great advances beckon towards a higher technology-driven technician. Aire Rite does a lot of in-house training on a regular basis. Economizer training is lacking throughout the industry– how to set it up properly and maintain it. It's required in Title 24 code, but it's not been effective. (Don Langston)
- Would like to build on February National Engineers Week to reach out to high schools to develop thermal science and HVAC education with labs, starting as early as 7th grade. Has tried to integrate it in local schools and has been unsuccessful so far. (Robert Mowris, VERIFIED, Inc. by phone)
- Should the Department of Education be formally involved?
 - The California Department of Education works with Skills USA (national organization). The program might have gotten dropped, but WHPA should follow up on that. It targets high school and community college students with a focus on development in the trades. (Dale Gustavson)

Goal 3: Whole-Building Design

Jamy Bacchus (Natural Resources Defense Council-NRDC)

Update

- Two of the big bold goals in the Strategic Plan are ZNE and HVAC. Jamy also serves as a ZNE Action Plan Champion.
- He's worked at the NRDC for 12 months and has 15 years of experience related to mechanical design for commercial buildings, specifically on integrate (whole-building) design. Currently focused on codes and standards.
- Education's key because paper designs face challenges in the field. There's a need to look at better tools, improved design, implementation and learning from the process.
- Savings by Design program showed IOUs that we're saving money. There's a synergy between today's best practices and the future Title 24 ideas since cost-benefits have already been established.
- Condensing boilers are low-hanging fruit for industrial processing loads, so applying commercial savings to industry will help.
 - CEC will be taking over the process at the third round of stakeholder meetings. Encourages participation.

Discussion

- The Performance Alliance has set up committees to match each one of the goals. April 19th is the first meeting. The overall goal is to integrate HVAC into total system design rather than treat it as a widget.

Goal 3: 3-1-1 Pilot targeted programs

- Need to move equipment out of the hot attic. This is a cost-efficiency solution that can be mainstreamed to facilitate cooling down attics. Data from NREL show that it adds 22% to the cooling load regardless of HVAC equipment or not. Heat subduction losses can lead up to 40% added load. Dave Roberts from NREL presented a paper at the ACEEE conference – reach out to him. (Robert Mowris)
- EGIA (Sacramento) sponsors home makeover projects (residential retrofits) with contractors and manufacturers. They’ve established a high standard home, creating notoriety around it and forwarding the brand. (John Anderson, Rheem Manufacturing)
- Consider a competition for different pilot programs. Make it performance-based and include that in the evaluation activities (e.g., how much energy is saved in each pilot). (Ed Vine, CIEE)

Goal 3: 3-1-2 Incorporate radiant cooling, ductless systems, ground source heat pumps, and other alternatives into 5 percent of new and existing construction by 2012

- This doesn’t necessarily have to focus on IOUs; could work with private sector and/or Energy Upgrade California.
- Need to break this milestone down, particularly separate out new from existing. Retrofit is a challenge. Radiant systems already have 7-9% of the market share. Radiant cooling needs to understand the technology and be on board since the problem is sharing the market, not the technology. We are newcomers to an established technology that Europe already has. (Tom Meyer)
- In looking at radiant cooling, haven’t found much evidence of it in residential California. What’s the potential, logistically or technically? (Matt Ryan)
 - It’s possible and feasible. California has a dry climate. The new construction rate might be low and therefore really easy. Retrofit will be hard. It’s possible to warm boards underneath. (Jamy Bacchus, NRDC)
 - Radiant cooling in the ceiling has worked for residential buildings in Italy. The biggest problem is moisture from the shower, cooking food, internal moisture veins. It’s challenging but not impossible in residential, just need trained people. (Tom Meyer)
 - Owners are very involved in the design, so understood latent load without proper exhaust ventilation. (Jamy Bacchus)
- 5% new construction is not a big goal given low construction activity. 5% existing is too big for 2012 and if so, by when? 2020? For 2012 do we include units counts? Remodeled? (Rick Wylie, Beutler Corporation)
 - Champions will define these points.
 - Beutler Corporation on team with Berkeley, National Side and WCEC on radiant cooling. It looks pretty tough, given the challenging economics. Ground source heat pumps are just expensive. It’s not cost-effective and hasn’t proved itself in even 0.5%. (Rick Wylie)
- There should be a distinction between new construction and renovation as these are two different problems to be addressed. Also, there needs to be a focus on California climate optimization.

Goal 3: 3-1-3 Identify priorities of CEC PIER and IOU emerging technologies program activities to further support newer HVAC technologies and systems

- There's been good coordination and collaboration already, but focus on newer HVAC technologies and systems is essential.
- Timelines need adjusting

Goal 3: 3-2-1 Evaluate and update existing standards to include increased emphasis on HVAC aspects of whole building approaches

- Thermal energy storage (TES) is on p. 58 of the Strategic Plan but there is no specific strategy listed in any of the sections. There's something in 3-4 but this could be improved. Need to address the lack of appropriate metrics (p. 54 "inadequate for California...undesirable energy performance"). Key action is to translate TDV methodology to reduce peak. Also need efficiency standard for equipment. Take value of TDV and find other ways of applying it. (Brian Parsonnet, ICE Energy)
- It's challenging for HVAC contractors to enter into the marketplace. Need to explore unique contractor license for HVAC contractor to become general contractor as they're already the most active contractors interfacing with customers. (Luke Hermann)
 - HVAC contractors are currently staying away from going whole home because they can't hire internal specific contractors and this creates a barrier that ultimately impacts customers.
 - Could this be looked into at a statewide level to garner greater participation?
 - ACCA partnered with RESNET for quality assured branding/program. Will forward info on that. (Robert Helminiak, AHRI)
- Residential whole-building concept and non-residential whole-building concept is equivalent to apples and oranges. These are two complicated and different concepts. General agreement. (Erik Emblem, Sheet Metal Workers)

Goal 3: 3-3-1 Develop continuing education programs; Begin curriculum use

- Jeremy Reefe (Goal 3 lead, SDG&E), works on link in accreditation and education
- PG&E's Pacific Energy Center offers free energy-related focus classes. There is a lack of ability to scale as there is only one instructor for a commissioning class. Need to train the trainers and increase the education offerings. (Jamy Bacchus)
- Get Manual J into the hands of all contractors so they can identify loads to homeowner. Give them a pie chart, 1-2 page information (this could be online) to identify infiltration, leakage, AC and indicate the biggest items for increased efficiency. This is not currently being done by technicians, especially those trying to replace units. Get training to focus on savings and efficiency improvement for homeowners. A/C is usually the biggest load, where you can reduce 30% peak demand of load and apply the most leverage. With the right size, the contractor could bump up the efficiency level paid for by the right sized equipment.
- Heat loss/cooling loss is a system that works, so you don't need a Manual J. Need a simpler method in addition to Manual J. Get software that calculates load. The problem is that no one's doing it. Implement policy so that a contractor can't be allowed to purchase a furnace until they've completed a load calculation. The good news is that 550 technical school educators know they have to teach for the future and they're moving towards a demand-driven (for homeowners not students) industry focus. (Tom Meyer)

Goal 3: 3-4-1 Implement optional code improvements necessary to facilitate moves to whole building design approaches

- Make voluntary efforts more effective?
- Do the ZNE code improvements coordinate with this in Action Plan and reach codes? (Ed Vine, CIEE)
 - The ZNE Action Plan does focus (champions) on reach codes. There has dialogue about coordination between the action plans. (Kristina Skierka, CPUC)
 - NRDC works with all of the other stakeholders in California regarding Title 24. This could be from savings by design or the IOUs. (Jamy Bacchus)
 - Reach codes follow the same process as Title 24. (Kristina Skierka, CPUC)
 - For ZNE commercial 2030, there is an attempt to codify them into part 6 or part Title 24, but there are only two or three code cycles to get them in and they couldn't be part of the current round of Title 24 code cycle. (Jamy Bacchus)

Goal 3: 3-5-1 Conduct first competition in 2010 and annually thereafter

- Western Cooling Efficiency Center (WCEC at UC Davis) made the Western Cooling Challenge to industry to come up with high EER unit (EER 17)
 - Colorado Corporation designed 5 ton rooftop unit, tested at NREL, 80% reduction in kWh, 60% kW; direct and indirect with heat pump hybrid going to be monitored in the PNW. New Speakman 5 ton units.
 - The Western Cooling Challenge is open and remains so.
 - How these products can then be integrated (program, research, development) is a separate effort.
- Are getting to ductless systems and getting those off the roof additional goals? (Cynthia Mitchell, TURN)
 - This is advanced technology in the US market, but it has existed elsewhere such as Japan for 20+ years. Ductless systems can be mounted anywhere, roof or ground. WCEC is focusing on evaporative cooling products including water quality, water quantity.
 - Is there a way of teeing up ductless systems – technology improvements or advancements? How much of HVAC or cooling consumption is lost in the duct systems or inefficiency there? Seems like we should get out of duct systems because of loss of energy and installation/maintenance. (Cynthia Mitchell)
 - The Northwest has 6000 or more residential ductless systems installed with some metered performance. Need to measure and compare the ductless systems with standard DX rooftop units to see the performance differences.

Goal 4: New HVAC Technologies and System Diagnostics

Mark Cherniack (NBI)

Update (might be best to get his notes directly)

- DOE draft rulemaking (climate optimized standards act from 2007): national standard for efficiency for residential furnaces
 - National standard = maximum efficiency standard for enforceable building energy codes
 - AHRI is a key player
 - Appeal mechanism never been successfully gone through

- Need some differentiation in national standards (hotter and drier, hotter and more humid)
- 80% heating efficiency for residential gas furnaces is the max federal standard; Consumers can buy 90 or 92% or higher efficiencies and utilities can incentivize units to whatever efficiencies are cost-effective.
- June 30 – final DOE rulemaking for CA, NV, AZ, NM will then allow building codes to go to a SEER 15 allowable standard (SEER 13 is the current national maximum code allowable efficiency standard for new residential a/c). This national agreement will lock codes to the new SEER levels 2015-2022.
- The longer timeframe meets manufacturers needs to retool, stock inventory, develop marketing.
- Texas (humid eastside, drier westside); The new climate optimized efficiency level doesn't involve commercial equipment but should.
- ETCC – check out to see what IOUs are doing with more advanced technologies (entering the market, considered for pilot projects, potentially for programs)
- WCEC Western Cooling Challenge can be viewed at the WCEC website.
- WCEC working on Beutler on Aqua Chill product for longevity
- Growing interest in evaporative cooling technologies – significantly reduced impact on utility peak compared with standard compressor-based cooling
- Demos and projects going on for residential and commercial rooftop units
- PGE has upgraded its facilities at San Ramon test center
- TRIO program – led by SCE – working with universities and investors to bring new technologies further into the market also linked to the utilities Emerging Technology Programs, including SMUD.
- Clean Tech Open – CA-based initiative (state, national – EE, cooling)
- US DOE HVAC national HVAC Roadmap workshop (last week) – DOE looking to do new things including critical transparency and follow thru. Will focus funds on items in the Roadmap.
- IOUs and CEC have projects to submit to Title 24 to have rooftop unit fault detection and diagnostics (FDD) incorporated into Title 24 as a prescriptive measure (one step down from mandatory)
- A few weeks ago several of the largest retailers in the US issued a High Performance Rooftop Unit Challenge to the HVAC manufacturers that will up ante in energy efficiency and performance monitoring including FDD. Very helpful to FDD efforts in T24.
- HVAC wireless diagnostics and controls coming from multiple vendors. Information gateway – need operating info off the roof, instead of getting the tech to check it, when there's performance degradation then a decision can be made
 - E.g., WAL-MART receives 28,000 alarms/day from its equipment from stores in US. Needs a way to prioritize the alarmed conditions.
- HVAC EE Maintenance Study – Online at WHPA website. Assessment of field diagnostic approaches, equipment, training and more.
- Purdue Univ. has PIER-funded study to come up with a protocol to test consistency of approaches for diagnosing refrigeration cycle and condenser/evaporator faults – about a year away
- Only an abbreviated list (mostly gizmos) – there's a lot going on

Discussion

- DOE doesn't have the authority to enact S398 (Bingham and Murkowski, bipartisan support). Check out AHRI's website or contact directly. (Robert Helminiak, AHRI)

Goal 4: 4-1-1 Develop recommended standards and present to DOE

- Already covered

Goal 4: 4-2-1 Evaluate, revise and update as needed in state and federal applications

- Essentially completed. State has aligned the 16 climate zones to build the statewide system peak. HVAC was not being valued on peak very well but the current work will make ratepayer funds more effective. (Mark Cherniack, NBI)
- Has this cost-effectiveness been factored into utility portfolios? (Cynthia Mitchell)
 - Should follow up with Simon Baker and Peter Lai of CPUC
 - Regarding cost-effectiveness, staff has put out a 100-page white paper on the IDSM/DSM effort. (Bill Parsonnet, ICE Energy)
 - Energy, demand response and distributive generation, at the program level and measurable level, will be linked together and updated.
 - Weather files have been updated.
- There's a disconnect between data and EM&V. The 20-30% decline in every cycle indicates a need for cooperation and coordination for studies done by CEC to capture true assumptions to put into the E3 calculator. If the baseline assumption for residential is dropping that much, it's hard to make HVAC programs cost-effective and we'll need another approach to have a more accurate assessment for evaluation. (Robert Mowris)

Goal 4: 4-3-1 Conduct a comprehensive cost-benefit analysis of leading and prospective advanced technologies and use to prioritize utility incentive offering and HVAC industry deployment strategies

- The Strategic Plan has a keen interest in emerging technologies.
- Some of these technologies were under a recent permanent load-shifting program completed in December. Some of the technologies were advanced. Purpose of methodology was on net present value basis and value of deployment. That proceeding is now closed, moved to 2010-2012 timeline and comments are due this Friday. (Bill Parsonnet, ICE Energy)
- Internal state and install initiative is equivalent to models bringing to different states for energy savings/kWh. Happy to work on those issues (e.g., expand to thermal storage). (Robert Helminiak)
- The 3-1-2, 5% milestone needs to happen first. There are new technologies like the Aqua Chill, Dual Cool and other evaporative products. A lot of these are great and just need a jumpstart, something that they'll be working with SCE on shortly. Need subsidies to start production volumes, then they will likely develop on their own. (Rick Wylie)
- We should start looking at the technologies that have been used in Europe for the past 20 years. (Tom Meyer)

Goal 4: 4-3-2 Establish an incubator program to accelerate commercialization of most promising technologies

- TRIO is a statewide effort between the IOUs every quarter or so. It's a forum for entrepreneurs and venture capitalists to give information for how to do business with the IOUs and share ideas and technologies. There is another related forum where select entrepreneurs present projects to the IOUs. (Ayat Osman, Emerging Technologies Group, CPUC)
- The Emerging Technologies Coordinating Council website uploads all TRIO presentations and info (public forum).

Goal 4: 4-4-1 Enhance and accelerate the deployment of Title 20/24 codes

- Change dates in the Action Plan to reflect actual schedules

Goal 4: 4-5-1 Establish an industry-wide task force to develop national standard diagnostic protocols

- This is already happening within the WHPA in the AFDD Subcommittee. There's a national effort with the embedded diagnostics (focused on commercial systems). Proctor Engineering will have one this year that meets Title 24 option for residential systems for refrigeration charge faults. AFDD subcommittee (Advanced Tech Committee) focused entirely on onboard embedded stuff so far. Also, relevant work being done by Robert Mowris at Intertek Labs in Texas (Mark Cherniack, NBI)

Goal 4: 4-6-1 Benchmark existing diagnostic, repairs and maintenance protocols and develop appropriate products

- Human behavior (i.e., how will you make them do anything?) is the real challenge
 - There's a Cooling Center project starting shortly to look at messaging and key points of intervention that push decisions towards efficiency.
- The best designed system can be defeated. You have to educate not only technicians and designers but also the users (occupants). Consider reaching out to Ryan Colcher. (Tom Meyer)
- Gizmos are gizmos, but the benefits to the consumer will drive the behavior. Need to think about what makes people pay for efficiency and comfort. Also, need to think about how we compete with different industries. (Dale Gustavson)
- This a people-process-technology triangle including behavioral changes. Need to utilize the triangle and then extenuate each one. (Mel Johnson)
- Proctor Engineering is getting re-involved with process. They want unbiased, real scientific evaluation important with benchmarking (real labs, real scientists). They're excited about finding the real energy savings. (Tom Downey, Proctor Engineering)

Cross-cutting comments

- Who are the targeted markets – help champions network focus their energy
 - LEED; schools/universities are different than the commercial sector
- Particular communities or end-use sectors? Type of residential owner?
 - TURN is interested in seeing a targeted HVAC whole house effort to lower moderate central valley and inland super hot climates, essentially areas where lack of funds will not lead to early adoption. Also interested in linking peak reductions to procurement levels. (Cynthia Mitchell)

- Key takeaway from various focus groups: facility management executives most trust other facility management execs. We need to attract end-user customers on the residential side who will act together because they trust one another. (Dale Gustavson)
- There are three levels of motivation: head (logical, economic), heart (green, smaller carbon footprint) and ‘fire under the butt’ (too much money, can’t afford this operating expense). We need to go after all three groups at the same time.
- Give people targets instead of processes. Targets and directions.
- Overriding factor for objectives is to lose track of cost-effectiveness. Perhaps EM&V should be involved earlier on so that the paths can be accomplished and funding can be lined up (Athena said this earlier). (Luke Hermann)
- HVAC EM&V group quantifying the impacts from this program cycle. They will be doing some market assessment and process evaluations, some by CPUC, some by IOUs. Saturation type studies are planned for commercial and residential sectors and some on-site metering (John Stoops of KEMA). They are now inventorying info needs, so if you have points of particular interest (researchable questions), contact Carmen (Carmen.Best@cpuc.ca.gov)
- We talked about multi-site and homeowners, but what about the contracting community? 65% of all installations are contractor-recommended – if they’re early adopters, that will push everything forward (Julie Humes, Lennox Industries)

Critical success factors?

- Cost-effectiveness is important, but how do we get to ZNE if everything has to be cost-effective?
- Project Coordination Group (CPUC, IOU, sometimes CEC) collaborate and work on EM&V issues together. There is a meeting next week to talk about the Phase 2 HVAC study (what it will look like) and the status of IOU rollout HVAC programs. PCG is authorized in the decision. Info will be shared in quarterly stakeholder meetings. (Carmen Best, CPUC)
- Quantitative tracking (metric) mechanism for milestones would be useful. (Luke Hermann)

Next steps:

- Circulate notes from this meeting on the WHPA website
 - Take input and written comments, incorporate those and work within the WHPA to finalize the Action Plan.
 - Finalized Action Plan will have more text (for each strategy, progress made to date, future work) and progress indicators (quantitative metric).
 - Plan to have a launch event in Q2
 - Champions meeting in the morning of the launch day
 - Public launch event by webinar led by champions
 - Foster champion networks, continue to update the Action Plan