

**EEAC Commercial and Industrial Workshop #2
Potential Innovative Options to Explore**

Tuesday October 31st, 2017

9:00 AM – 1:15 PM

Saltonstall Building, 100 Cambridge Street, Boston

Facilitators: Dr. Jonathan Raab, Raab Associates & Toby Berkman, CBI

Draft Meeting Summary

EEAC Councilors, consultants, program administrators, and DOER staff were in attendance at this workshop. A list of these attendees is included in Appendix A. Numerous members of the public were also in attendance. The workshop background material and presentations can be found at <http://ma-eeac.org/october-31-ci-planning-workshop-2/>

INTRODUCTION AND WORKSHOP OVERVIEW

Dr. Jonathan Raab, facilitator from Raab Associates, welcomed the group to the workshop and reviewed the agenda. The workshop included the following topics of discussion:

- Lighting & Controls
- HVAC & Controls
- New Demand Management Opportunities
- Fuel Switching

For each topic, there was a similar process:

- First, a member of the consultant team presented background on the topic and a suggested recommendation that was prepared by the EEAC Consultant team, and the PAs were given an opportunity to add additional pertinent information.
- The Councilors asked questions to the PAs and consultants, and the PAs and consultants provided answers.
- After this question and answer session, the Councilors met at small tables that held 3-5 Councilors to discuss suggested revisions to the recommendation.
- Finally, the Councilors shared their suggested revisions to the recommendation to the entire group, and the Councilors agreed on the revisions.

This same process was repeated for each of the four topics in the workshop. There was also a period for public comment at the end of the workshop.

LIGHTING & CONTROLS

Presentation

George Lawrence, EEAC Consultant, reviewed the topic of Lighting & Controls and presented the consultants' suggested recommendation. Slides from his presentation are available on the workshop materials website (URL noted above).

Question & Answer Session

The Councilors asked the following questions during the question and answer session. *Responses from either the PAs or EEAC Consultants are in italics.*

- Has the baseline for residential lighting changed in different ways from the baseline for C&I lighting? How can the PAs emphasize linear lighting when available savings from residential lighting are disappearing due to rising baselines?
 - *Yes, the baselines are different. The federal Energy Independence and Security Act of 2007 (EISA) standard impacts screw-in lights but not linear lighting.*
- The idea of lighting as a service sounds intriguing but is there evidence that it's worthwhile?
 - *We see it as having potential but there's not a lot of evidence for it yet.*
 - *Lighting as a service is a financing model. It does not change anything on the technical back end, and a number of companies are doing it already.*
 - *Lighting as a service is also a "turnkey" initiative. It packages together the effort of design and contracting. In this way it may overcome other barriers besides financing. Companies like GE Solutions are already doing this.*
- Can you talk about final bullet on the "PA Perspective" slide in the presentation? (Bullet point said: "The PAs are currently investigating the implications of dual baseline and industry standard practice considerations and impacts on Lighting savings.")
 - *There are some evaluation studies under way investigating the dual baseline concept and industry standard practice that could shift what the PAs claim from a retrofit period and an end of life period. It is likely that industry standard practice will have an impact on new equipment or new construction savings such that claimable lighting will go down. The lighting being installed in new buildings is more efficient than code.*
 - *Sometimes claimable lighting savings can increase with the use of the dual baseline concept.*
 - *There are two pieces that impact claimable lighting savings: the dual baseline concept and industry standard practice. Both are in motion.*
- Does this section include streetlights?

- *Because of limited time the EEAC consultants chose not to talk about streetlights in this presentation. Most customer-owned streetlights either have been changed to LED or are in the process of being changed. On the other hand, most company (utility) owned streetlights are not LED.*
- Three years ago when the EEAC created its strategic plan, there was a chart showing the amount of non-LED streetlights remaining. Addressing this issue was a Council priority. I would like an update on company- and community-owned streetlights, so we can set a reasonable goal for the plan. I hope by the end of the next three-year plan all the streetlights will be converted.
- An update on the streetlight numbers would be helpful. DOER has been providing grant funding to convert town-owned streetlights and they project almost all will be converted by 2018.
- One recommendation is to use lighting as a lead generator. Do PAs have a sense of the number of lighting projects that are performed by lighting-only vendors versus those scoped as part of a larger project by a different type of vendor?
 - *The PAs do not have this exact number. But conceptually, our turnkey vendors are using lighting as a lead generator with small businesses in multiple ways. They look for lighting opportunities, HVAC retrofit opportunities, and cross-program promotion of any type of useful equipment. With large- and mid-sized customers, our sales teams and vendors look for lighting opportunities. Our preferred vendors use lighting to drive more and different services to customers. In addition, the upstream delivery model allows us to reach back out to customers who have purchased efficient lighting to try to get them to do more efficient things.*
- For upstream customers, how do you take the names of customers buying upstream products and then follow up individually with them to discuss other activities? What is currently happening with follow up and how can it be enhanced?
 - *The PAs use the sale of lighting products upstream to create a marketing lead list that allows them to follow up with customers.*
 - *The nature of the upstream initiative in the C&I space is different from that in the residential space. C&I customers have to give their name, contractor, and address when they purchase upstream products. The PAs are given that data on a monthly basis, and use it for marketing purposes.*
- What kind of conversion data do the PAs have on how this follow up works?
 - *The PAs have no specific numbers right now, because the account numbers previously were not tracked. The PAs are tracking these numbers now, so they will have a better idea of these numbers moving forward.*
- How are controls incentivized and how do you determine the savings from them?

- *The savings are determined by a set evaluation percentage. For example, occupancy sensors have a percentage savings, and daylight dimming has another percentage.*
- How do you figure out this percentage, since some people may choose to turn the lights down sometimes and some people may not?
 - *The percentage is based on evaluation studies.*
- On page 8 of the briefing document, it mentions maintenance barriers for controls. What is the maintenance of a control?
 - *Newer fixtures or TLEDs can be wirelessly controlled from a phone. One concern about these systems is that people can hack into them and create problems. Like any new technology it has an Achilles heel.*
- In one example, a tenant did not want to own a lighting control system because he did not want to have to maintain it. No one wants to operate a more sophisticated control system, especially in a tenant-landlord situation.
 - *One of the good things about controls is there are multiple levels of controls. With LED lighting you can tune them to the correct level from the start. There is also occupancy sensors and day lighting. One challenge is interactions. If there is a warehouse with multiple aisles and only some are occupied, it is possible get tremendous savings, sometimes up to 90%, but it's hard to predict the savings from the start.*

Modifications to Recommendation

After meeting at their small tables and then discussing the issue as an entire group, the Councilors collectively agreed to amend the consultants' draft recommendation on Lighting & Controls as shown below. Additions to the consultants' draft recommendation **are shown in red**, and deletions ~~are shown as strikethroughs~~. A clean version of all the revised recommendations (which includes highlighted language) is included in Appendix B:

The Council would like to see the PAs maximize C&I lighting savings, **and incorporate active demand potential** with an emphasis the linear lighting market. **The Council would like to see the PAs increase the percent of lighting opportunities used as lead generation for non-lighting projects.** Methods to consider include:

- A new offering, **including education and training**, to increase the penetration **and successful use** of advanced controls
- A broad-based linear lighting delivery strategy ~~that also identifies other potential customer energy efficiency opportunities to use as lead generation for the PAs and their vendors~~
- Expanding lighting design service support, **for customers and designers/engineers**, through a lighting design initiative

- Increase participation in lighting initiatives (including upstream) by increasing marketing, outreach and technical support to customers, contractors, and trade associations
- **Investor owned utilities will convert all company owned streetlights to LEDs by the end of the next three year plan**

Following the discussion on the recommendation, an EEAC Councilor asked the question below. *Answers from the PAs are in italics:*

- Do the PAs currently have a tariff for LED streetlights, and if not is that a barrier for Council support?
 - *Following its most recent rate case in 2016, National Grid now has an LED streetlight tariff, so that barrier is now gone for National Grid.*
 - *Eversource has a rate case currently before the Department of Public Utilities (DPU) in which it has a rate tariff for LED streetlights, but that proceeding has not yet been finalized.*

EEAC Consultant and PAs added the following comments:

- Streetlights do not have demand savings, so they may not be cost effective. It is important to look at the total install cost versus the overnight savings.
- The costs change continuously and there is a new Avoided Energy Supply Cost (AESC) study every two years. The PAs will need to review the new numbers to see if these measures pass. The current study will be done in Spring 2018.

HVAC & CONTROLS

Presentation

Jennifer Chiodo, EEAC Consultant, reviewed the topic of Heating Ventilation and Air Conditioning (HVAC) & Controls and presented the consultants' suggested recommendation. Slides from her presentation are available on the workshop materials website.

Question & Answer Session

The Councilors asked the following questions during the question and answer session. *Responses from either the PAs or EEAC Consultants are in italics.*

- What is the correlation between HVAC savings and the PAs' overall portfolio savings?
 - *The Massachusetts Evaluators found that there is a direct relationship between the two. Eversource has the highest percent savings from HVAC and highest percent of total consumption reduction. The other PAs correlate similarly.*

- My organization, which rents its office, had an assessment of the HVAC system. The system is 15 years old and has a gas rooftop unit. There were no incentives to replace it. What are the options and opportunities for my organization for improving the efficiency of our system, and how do the consultants' recommendations address this scenario?
 - *There are not enough incremental savings with a standalone rooftop unit to make a retrofit cost effective. For this reason, those units tend to be replaced at end of their useful life, at which point the PAs would support the purchase of more efficient cooling equipment. The American Gas Association is working with a set of manufacturers to test condensing rooftop gas units. The challenge is there is condensate on the roof that can freeze. For your organization to receive incentives, there would need to be evolution in the market for rooftop units. One option would be to issue an RFP indicating that we want this equipment at a specific price, and promising that we will bring it to our market and change a large number of systems. California has done this in the past to move the market towards better equipment.*
 - *The PAs are in frequent talks with manufacturers, encouraging them to come up with more efficient units, the PAs have limited leverage to influence them.*
 - *For rooftop units there are currently multiple options. The simplest option would be to take advantage of upstream incentives at the point of purchase when the unit is ready to be replaced. Another possible option is early replacement. The PAs are in early talks with manufacturers and distributors about targeting landlords, so we can replace these kinds of units while they are still operating and claim some savings as retrofit and some as new construction. Lastly, there is a custom comprehensive approach that may involve right sizing and building control for the HVAC system, as part of a larger project to replace all the equipment in the building.*
- The consultants did an excellent job compiling this report. The report suggests that HVAC has huge potential savings. In light of all this, why are HVAC savings decreasing? And what are the relative savings between HVAC and lighting?
 - *Savings are decreasing because of rising baselines, shrinking claimable deltas between standard efficient equipment and the highly efficient equipment the PAs incentivize, and increases to code.*
 - *HVAC accounts for 9 percent of lifetime electric savings and 44 percent of lifetime gas savings. PAs continue to focus on HVAC savings and look for opportunities while factoring in dual baseline and Industry Standard Practice (ISP) issues.*
- Is the total number of HVAC projects increasing while the savings is decreasing?
 - *Yes, the volume of unitary system projects — like installation of rooftop systems — is increasing, while the claimable savings is decreasing.*

- *The average claimable savings per custom project in Massachusetts is quite low compared to other states like Vermont.*
- Why does the briefing document suggest a 4% load reduction for HVAC?
 - *In 2015, the HVAC load reduction was estimated at 1%. The consultants believe there is an opportunity to increase this number through a systems approach.*
 - *The PAs agree that it is important to increase annual savings, but there is a concern that the methods to accomplish this goal may not have a long persistence. Alternatively, when you install new equipment, the savings lasts for 12-20 years.*
 - *The consultants agree that persistence is an important issue. They also believe it is important to address feedback issues, and to do the evaluation work necessary to claim savings through automated control of buildings.*
 - *The consultants' recommendations reflect an effort to achieve market transformation. In order to credit market transformation to the programs, it is important to do a market effects study. If the study does not begin until after the programs have been initiated, then you cannot capture the program impacts.*
 - *There are several HVAC market effects studies going on now. However, the PAs have experienced difficulty getting data from manufacturers and distributors.*
- In the next C&I strategic plan, the lighting savings may be starting to disappear, much like they are disappearing for the residential sector. When this happens, HVAC could become a significant source of ongoing savings. That is why HVAC is so important and why the Council should develop comprehensive recommendations for it.
 - *Lighting is relatively easy, but getting HVAC savings is difficult, and the PAs have been working on the challenge. The consultants see more opportunities to go further by building the capacity in the market, the demand in the market, and availability of equipment in the market to drive savings.*
 - *The PAs agree that these opportunities exist. With HVAC, there are scale issues and cost issues that are not present with lighting. Programs that involve things like continuous commissioning, feedback loops, and engaging buildings are costly.*
- HVAC is the holy grail for future C&I savings. A study at Texas Tech showed gross savings anywhere from 5-15% through doing persistent, continuous commissioning.
- If HVAC is 45-70% of a building's energy use, linear lighting may be going away in the next three year plan, and it is hard to obtain HVAC savings because the technology and equipment often is not sufficiently advanced, then it is critical for the Council to focus on HVAC now so it can be an even larger focus in the next plan.

- Lighting slightly reduces the energy needed for cooling, but it increases the energy needed for heating, so it balances out.
- What incentives can we create to eliminate the incentive for heating contractors to install oversized units?
 - *There's no easy answer. Market education would help. HVAC systems exist for human comfort, and people are less comfortable in buildings with oversized equipment. We could also consider right sizing incentives.*
- In the LEED program, there is a formula to determine whether a building is silver- or gold-rated. The size of the HVAC system compared with the number of people and the size of the building both go into the formula. The Council could adopt the LEED approach and combine it with incentives. For example, if the system is right-sized maybe the building owner or contractor would get a 5% discount.

Modifications to Recommendation

After meeting at their small tables and then discussing the issue as an entire group, the Councilors collectively agreed to amend the consultants' draft recommendation on HVAC & Controls as shown below. Additions to the consultants' draft recommendation are shown in red, and deletions are shown as strikethroughs. Outstanding questions (are in parentheses):

~~The Council would like to see the PAs increase HVAC savings and reverse the trend of diminishing HVAC savings and participation. As lighting and other end use baselines change, it is important for the PAs to build market capacity for future HVAC savings growth to reflect the increasing importance of HVAC savings in the C&I portfolio in both the 2019-2021 and 2022-2024 Plans. The PAs should work toward transformation in the HVAC market to make energy efficient HVAC systems the norm and by taking a system optimization approach for existing and new systems.~~

The Council would like to see the PAs increase HVAC savings and build market capacity for future HVAC savings growth. The PAs should work toward transformation in the HVAC market to make right-sized energy efficient HVAC systems the norm and by taking a system optimization approach for existing and new systems in order to build a long term upward trajectory for the next two three-year plans.

- The PAs should immediately conduct a market study to identify barriers and opportunities and establish existing conditions in the HVAC market. A follow up study will completed by September 2020 that would also include recommendations to increase HVAC savings in the 2022-2024 three year plan.

- Change market practices so that optimally efficient and right sized HVAC equipment become the norm at the time of purchase for retrofit, upstream and new construction applications.
- Promote building automation systems that are designed for optimal function including retro-commissioning of existing systems and rigorous design review and commissioning of new control systems (for existing and new buildings).
- Address known market barriers to upfront investment in the engineering services necessary for system optimization through innovative program offerings.
- ~~Support~~ **Substantially increase ongoing education and training programs for building operators, incentivize performance verification and ongoing system tuning** so that providers and operators learn what works, identify new opportunities, and improve practices over time as a savings strategy.
- Build a strong and growing market capacity, **including tapping existing national and industry efforts** for high efficiency HVAC system design, **purchase**, installation, operation and management

(Council needs to decide whether or not all or some of the bullets remain)

PAs offered the following additional comment on these recommendations and the Councilors' edits:

- New studies are good but they need to complement what's currently being studied, and they are very expensive. The PAs currently do lots of studies on these areas.
- In deciding whether or not to support bulleted items in the recommendation, the Council should consider prioritizing based on savings and savings potential.

An EEAC consultant added the following comment:

- A market study to track baseline market effects could serve as a platform for the PAs to claim savings from the HVAC market over time. The study would not be about equipment; it's about what people know, what they are actually doing (regarding HVAC purchasing, right-sizing, and operation), etc.

NEW DEMAND MANAGEMENT OPPORTUNITIES

Presentation

Ezra McCarthy, National Grid, reviewed the topic of New Demand Management Opportunities. Slides from his presentation are available on the workshop materials website.

Question & Answer Session

The Councilors asked the following questions during the question and answer session. Responses from either the PAs or EEAC Consultants are in italics.

- Have the PAs considered participating in price responsive demand?
 - *The PAs have not considered participating in it on the wholesale side, but we do so on the retail side. Customers can participate in both and bundle solutions.*
- Would that be a way to bring down energy costs? *Yes.*
- Progress on demand management is moving too slowly. Pilot projects were put in place after our strategic planning three years ago, but we do not yet have information on the progress of those pilots. The Councilors should look closely at the pilots before offering recommendations for this plan.
- The Council should do a lot more to address demand than the draft recommendation implies, so we can address the curves for peak demand and meet our energy needs with cleaner resources. Why didn't the EEAC consultants review the recent case study from Power Options, discuss alternative ways to attack demand, summarize the pilot studies that already took place, and address storage and other issues? When will the Council get in depth information on the existing pilot studies?
 - *The pilot studies will be reviewed at the November 2017 EEAC meeting, and we will have another meeting in January 2018. The final recommendations will not be determined until February 2018.*
- Can the consultants or PAs explain the difference between active demand management programs and demand management strategies? It is important that the meaning of the strategic recommendation be clear to the Council and the PAs.
 - *A demand management program involves an incentive or technical help from the PAs to enable the customer to manage their demand. Demand management strategies could include a low cost sequencing optimization of a facility, for example.*
 - *"Programs" refers to equipment. "Strategies" involve things like education or sequencing of operations.*
- Why will there be elevated costs of capacity passed on to consumers in upcoming years?
 - *Forward capacity auctions happen three years in advance. There were some retirements over the past few years, so the clearing price went up.*
- How will we reduce lighting demand by 10%?
 - *This is a hypothetical percentage, but it could be made into reality. We would need to make lots of change-outs and retrofits, and have controls in place to cause dimming. We would need customer's to agree to respond to peak events. We would also need an overall framework to incentive customers to act.*

- Are the PAs doing work on demand reduction outside the energy efficiency purview?
 - *There are many pathways that utilities take that are not under the Green Communities Act or this process, like non-wires alternatives focusing on a discrete spot, distribution side and customer side upgrades, and rate cases that include proposing new grid side technologies*

Modifications to Recommendation

After meeting at their small tables and then discussing the issue as an entire group, the Councilors collectively agreed to amend the consultants' draft recommendation on New Demand Management Opportunities as shown below. Additions to the consultants' draft recommendation **are shown in red**, and deletions ~~are shown as strikethroughs~~. Outstanding questions (are in parentheses):

The Council would like to see all electric PAs include **cost-effective** ~~active~~ demand management **offerings** ~~programs, and/or demand management strategies integrated within efficiency programs~~, in the 2019-2021 plan, in addition to achieving passive demand reductions through efficiency.

(Councilors recommend this be revisited in the January stakeholder workshop after additional information is available.)

EEAC Councilors offered the following additional comments on these recommendations:

- Should be addressed at later date when more information is available
 - *We expect to have more info in the November meeting. We will have an AESC update in November and some information from the potential studies.*
- Like to see actual offerings
- Eversource demand pilot was approved yesterday

FUEL SWITCHING

Presentation

Mr. Lawrence reviewed the topic of Fuel Switching and presented the consultants' suggested recommendation. Slides from his presentation are available on the workshop materials website.

Question & Answer Session

The Councilors asked the following questions during the question and answer session. *Responses from either the PAs or EEAC Consultants are in italics.*

- Given that incentives are only available for regulated fuels, how would it change available savings if the PAs could provide an incentive for switching based on the savings for the original fuel?
 - *There's not a clear answer. In some cases, Massachusetts Clean Energy Center (MassCEC) incentives are used in projects that involve switching to biomass, which is not a regulated fuel.*
- Currently, incentives are based on the incremental benefit of the replacement, not improvement over existing equipment. What if gas companies could offer incentives for new highly efficient gas systems replacing inefficient oil systems, and claim savings based on using the new gas systems?
 - *Theoretically you could claim more savings if that were allowed, as an early retirement measure.*
- I thought there was consensus that fuel switching is acceptable but the Council wants to support heat pumps not oil-to-gas installations.
- The Council needs to be careful about working within the existing statute. There is a proposed legislative amendment that would allow PAs to incentivize fuel switching for its environmental impacts, not just its cost-effectiveness. The draft recommendation seems fine but we should be careful about taking it further.
 - *In Combined Heat and Power (CHP), the PAs are already fuel neutral and already provide these kinds of incentives, but CHP is mentioned specifically in the statute.*
- Installing too many heat pumps across the state might have a negative impact during the winter peak.
- There's a three-month old report by NEEP concluding that MA (and other NE states) will not meet the goals of the Global Warming Solutions Act (GWSA) (or comparable requirements in other states) without shifting towards electric heat pumps and electric cars.
- Where does incentivizing charging stations for industrial and commercial facilities fit into this issue?
 - *When we were preparing the existing strategic plan, we included charging stations within our demand programs, but DPU stated that the PAs could not incentivize charging stations, and we pulled them out of the plan.*
 - *We could discuss this issue as part of our conversation on demand, but we should be aware that the DPU removed it during the last strategic planning process.*

Modifications to Recommendation

After meeting at their small tables and then discussing the issue as an entire group, the Councilors collectively agreed to amend the consultants' draft recommendation on Fuel Switching as shown below. Additions to the consultants' draft recommendation **are shown in red**, and deletions ~~are shown as strikethroughs~~. Language on which the

Councilors did not fully agree and wanted to further consider is highlighted in yellow. Outstanding questions (are in parentheses).

The Council recommends that the 2019-2021 Plan include support for some forms of greenhouse gas reducing fuel switching. The Council would like to see the PAs identify opportunities and support fuel switching where cost-effective, provided that the program impacts are consistent with Global Warming Solutions Act compliance. These include opportunities to strategically electrify energy uses, and to switch from inefficient equipment to more efficient fuel and/or equipment, where cost-effective. A customer should be able to choose energy efficiency services regardless of current or desired fuel, as long as the equipment or upgrade is to efficient equipment and is cost-effective.

(Use of, and modifiers for, GHG need further discussion)

WRAP UP AND NEXT STEPS

Dr. Raab asked the Councilors for feedback on the meeting process. Councilors offered the following comments; *responses from DOER are in italics*:

- For January workshop, we should talk about the work on landlord-tenant lease issues and energy efficiency in large office buildings, including whether the Council should issue recommendations on them.
- The PAs and consultants drafted an excellent report for this meeting.
- We should consider a summary workshop after the January workshop, before the PAs start their drafting work.
 - *The plan was for January to be the wrap-up workshop where we cover any uncovered issues. March is a quiet time when the PAs are drafting the plan. The Council should get the recommendations to them before that. There are also opportunities for more recommendations after the draft plan is submitted.*
- The Council should discuss marijuana. It will have a huge impact on energy consumption. Although some of the energy will be in people's homes, it is also a C&I issue.
- The group should work on analysis of the PAs potential studies and preparing potential savings targets by the next meeting.
- Prior to finalizing the Council's recommendations, it would be helpful to have the PAs explain barriers to accomplishing what the Council is asking of them (i.e., PA responses to any draft recommendations they don't fully agree with).

Dr. Raab suggested that the last workshop could involve looking at all the recommendations together, interacting with the PAs, and making the recommendations crisper.

PUBLIC COMMENT

Dr. Raab opened the meeting for public comment. Four members of the public offered comments.

Sean Burke—Power Options

Thank you for giving me the opportunity to provide public comment. Power Options' proposal is to have a formal, open and transparent process in which associations or third parties can propose strategic partnerships with PAs to deliver savings through innovative models for reaching underserved customer bases, which we identified as 300-750 kw customers. We wanted to bring this up again so the Council can consider it going forward. We'd ask you to consider this for your recommendation to the PAs in March.

Following Mr. Burke's presentation, an EEAC Councilor suggested that Power Options and the EEAC consultants should meet, so the Councilors can hear what the consultants think about how to incorporate Power Options' proposal into the EEAC recommendation.

Scott Greenbaum—Green Energy Consultants

I'm a practitioner providing sustainability, energy efficiency, and commissioning work for existing buildings. I focus on HVAC. This meeting discussed how you're not producing savings that can count towards PA goals. The existing incentive programs have become completely dysfunctional and broken for commercial and industrial clientele. IECC 2015 has kicked in. It's the first energy code that has a section 5 on existing buildings. It states that the owner is responsible to maintain the building in good working order as per the design. We all know that doesn't happen very often. With this change, the baseline for determining whether a project qualifies for incentives has moved from what the building is consistently doing to what the building would do if everything was working right. That eliminates 75 to 80 percent of our potential savings in the existing building world. Suddenly in 2016 my same applications would be rejected. My business has ground to a halt. I have worked in at least 20 jurisdictions with utility incentive programs. This is the only jurisdiction that I've worked in where the baseline is not the existing energy consumption of the building. Green Communities uses to make its grants the existing baselines of the towns. "Coffee," which new grant program for state government facilities also uses that as their baseline. I recommend you have this baseline fixed or you'll never see the HVAC savings. And the practitioners will leave because we don't have any work.

The upstream system — this incentive program — we put in new rooftop unit for the city of Woburn. We got prices for the standard and higher efficiency units. There was a significant difference in price—about 10 or 15%. When we checked with the PA they

had not applied for the rebate. We couldn't prove that the rebate actually got to the town. We were doing this under Chapter 25a. Communities were required to have the rebate to do the work without competitive bidding as a direct installer for PAs. There's no transparency in how this process works. I also priced out new rooftops for a school for them because they were failing. I asked if the price included the upstream rebates. He was furious I was asking and knew this existed, because they are pocketing it. So we need to make sure the money gets to the people paying the system benefit charges, and not just being counted by the PAs.

Also, the pay performance process: The engineering requirements for most paid performance projects require more engineering costs than actually doing the work. It is almost impossible to get the rebate for them. In one district, I need one year's data before the project and one year after the project, most of which comes from trend data from control systems. Old systems don't have it. So we delay the project or skip it. The whole system needs to be reevaluated to make it effective.

In lighting, while I don't do much work in this area I've surveyed a number of buildings with advanced lighting control systems. Most don't work and have never worked. They don't get support by manufactures. In Scituate I am on the school building committee. We just built a new middle school. We asked engineer not to put a lighting control system in. He put it in because he had an incentive from the PA to design it, and he included it in his design costs. Now we have a system we can't get running. Make sure the technologies you're pushing do work.

I've been in business since the early 80s. Back then we had brilliant ideas in technology that didn't work. People said energy conservation doesn't work so we won't bother. We need a system that works. I recommend you change the baseline for existing buildings from the current scenario to one where we can get incentives.

Councilors asked the following questions after Mr. Greenbaum's presentation. *Mr. Greenbaum's responses are in italics.*

- I'm glad you're here. You brought up some really important issues. It would be good if we could have a workshop with contractors so when we write these recommendations we make sure they're implementable. I'd suggest the Council invite contractors in to discuss all these problems so we can address them. Why was the baseline changed?
 - *I believe the energy code adopted by the state IEEC added a section for existing buildings. Beyond that I don't know. Now if I have building with old controls, I can't do anything with that building.*
- I second it would be great to hear from contractors. I want to remind people that we are planning listening session where people can discuss experiences or opinions regarding the programs. That will be announced on the EEAC website.

- *I accidentally picked up this meeting because I'm a member of Mass Energy, and read about it in their newsletter. I've been rebuffed by DOER and other places and wanted to come here to talk about these issues.*
- Of course upstream credits should go to the consumer. And of course we should support technologies that work. You said a lot of jurisdictions aren't running into the baseline issue. Do you know if those are utilizing the 2015 code?
 - *I don't know. I know it's New York NYSEDA, ConEdison, Connecticut Light and Power, New Hampshire. I work with a lot of school systems. It's a lot easier to pay the bill than to get things fixed. It's easier to spend \$100,000 extra than to find ½ million dollars of capital. Budgeting is by year. They need to go to overrides to get the ½ million dollars. They can't fix anything except in the most dire emergencies. We need to facilitate these people. Real estate people won't do anything until they get to the point where they can't get tenants.*

Bill Genre—Interval Data Systems

We specialize in helping people operate buildings better by reprogramming the control system. Control systems use 70% of building energy. The biggest inefficiency in buildings is the way they're programmed. The sequence of operations is the programming instructions the engineer gives to the programmer. If you can reprogram the building you can have a very good return on investment.

The core problem is buildings are delivered without efficient software. The reason is the process in the industry involves engineers designing the sequences of opportunities, but they're not responsible for how the building runs. The control company's job is getting the system installed and getting out as soon as possible. And the commissioning people don't commission for 24 by 7 operation. So the system ensures the automation doesn't come out anywhere near the way you want it. With the program, you have to fix the program if you want to run the building efficiently for 20 years. And what you want is for the building to run efficiently for 20 years.

We've written a white paper that discusses the existing process for how building automation is programmed in today's industry, and provides recommendations for how to change the process so you can buy efficient automation. We do this on buildings usually without any equipment changes. But lots of details are important, like having the occupancy sensor installed in the right place, that the dip-switches set up correctly, and the programmer and controller knowing the benefits of having an occupancy sensor. We'll be giving a talk as part of the I2SL webinar on November 16h. In that session, we'll show a science building that was designed to run at 204 EUI, but was running at 308. After a retro-commissioning project we identified 70 EUI in energy savings just by reprogramming it to latest ASHRAE standards for how buildings are supposed to operate.

A lot of people are familiar with this problem today. We have a solution for it. Maybe we could write a program for it, because it's tricky how to use the rebate programs. But we have a lot of data before and after the activity. We need to have this process modernized and maybe you can help do that.

Councilors asked the following question after Mr. Generre's presentation. *Mr. Generre's response is in italics.*

- Can you talk about the persistence of savings from reprogramming? And can the PAs address how they see these savings?
 - *One thing we hear is that the operators are changing things. The reason they're changing things is because the building wasn't set up correctly. We need a building that can run itself with only a limited set of things that can change. Self-driving cars are very sophisticated. For buildings, it's not that complicated. We need to learn how to do it much better. The existing organization structure between engineers, control contractors and commission agents doesn't yield that. Persistence will be better once it's appropriately programmed, and the operators are trained on what to change and what not to change. Also it's important to use the latest ASHRAE standards that are inherently more efficient.*

Jamie Dickerson, Northeast Clean Energy Council

I want to offer the briefest but firmest sentiment in favor of the importance of storage and demand management as part of this package. Storage companies and demand management companies are getting very sophisticated in this space, buoyed by the recent DPU approval of the Eversource petition. We're hoping the next plan can be a full embrace of these programs and an actual full program offering.

Related to that we hope for an opportunity to incorporate lessons learned from existing pilots and demonstration programs, even though they are summer programs and we don't have all the data to rely on them. Companies have put together applications and seen barriers, but hopefully lessons about those barriers can be sought as we develop the next plan. We'll be looking to follow up with information about those barriers from our members.

Appendix A: Attendance

The following Councilors, consultants, program administrators, and DOER staff were in attendance.

Councilors

- Arah Schuur (for Judith Judson)—DOER
- Larry Chretien—Mass Energy Alliance
- Paul Johnson—Small ESCOs (Greentek)
- Amy Boyd—Acadia Center
- Don Boecke (for Maura Healey)—AGO
- Bob Rio—Associated Industries of MA
- Rick Malmstrom—Dana Farber
- Sharon Weber—DEP
- Eric Beaton—Executive Office of Housing & Economic Development
- Paul Gromer (Energy Efficiency Business)
- Victoria Rojo (ISO-NE)

Council Consultants

- George Lawrence
- Jennifer Chiodo
- Eric Belliveau

Program Administrators¹

- Cindy Carroll—Unitil
- Ezra McCarthy (National Grid)
- Sam Alpert (Columbia Gas)
- Michael Sommer—Berkshire Gas
- Stephanie Terach (Liberty Utilities)
- Margaret Song (Cape Light)

DOER Staff

- Alex Pollard
- Matt Rusteika
- Emily Powers
- Lyn Huckabee

¹ Additional PAs attended the workshop as audience members, but are not included in this list.

Appendix B: Revised Recommendations

The following language was agreed to by the Councilors attending the 2nd Residential Workshop. Language on which the Councilors did not fully agree and wanted to further consider is highlighted in yellow. Outstanding questions (are in parentheses).

Lighting & Controls

The Council would like to see the PAs maximize C&I lighting savings, and incorporate active demand potential with an emphasis the linear lighting market. The council would like to see the PAs increase the percent of lighting opportunities used as lead generation for non-lighting projects. Methods to consider include:

- A new offering, including education and training, to increase the penetration and successful use of advanced controls
- A broad-based linear lighting delivery strategy
- Expanding lighting design service support, for customers and designers/engineers, through a lighting design initiative
- Increase participation in lighting initiatives (including upstream) by increasing marketing, outreach and technical support to customers, contractors, and trade associations
- Investor owned utilities will convert all company owned streetlights to LEDs by the end of the next three year plan

HVAC & Controls

The Council would like to see the PAs increase HVAC savings and build market capacity for future HVAC savings growth. The PAs should work toward transformation in the HVAC market to make right-sized energy efficient HVAC systems the norm and by taking a system optimization approach for existing and new systems in order to build a long term upward trajectory for the next two three year plans.

- The PAs should immediately conduct a market study to identify barriers and opportunities and establish existing conditions in the HVAC market. A follow up study will completed by September 2020 that would also include recommendations to increase HVAC savings in the 2022-2024 three year plan
- Change market practices so that optimally efficient and right sized HVAC equipment become the norm at the time of purchase for retrofit, upstream and new construction applications.
- Promote building automation systems that are designed for optimal function including retro-commissioning of existing systems and rigorous design review and commissioning of new control systems (for existing and new buildings).
- Address known market barriers to upfront investment in the engineering services necessary for system optimization through innovative program offerings.

- Substantially increase ongoing education and training programs for building operators, incentivize performance verification and ongoing system tuning so that providers and operators learn what works, identify new opportunities, and improve practices over time as a savings strategy.
- Build a strong and growing market capacity, including tapping existing national and industry efforts for high efficiency HVAC system design, purchase, installation, operation and management

(Council needs to decide whether or not all or some of the bullets remain)

New Demand Management Opportunities

The Council would like to see all electric PAs include cost effective demand management offerings, in the 2019-2021 plan, in addition to achieving passive demand reductions through efficiency.

(Councilors recommend this be revisited in the January stakeholder workshop after additional information is available.)

Fuel Switching

The Council recommends that the 2019-2021 Plan include support for some forms of **greenhouse gas** reducing fuel switching. The Council would like to see the PAs identify opportunities and support fuel switching where cost-effective, provided that the program impacts are consistent with Global Warming Solutions Act compliance. These include opportunities to strategically electrify energy uses, and to switch from inefficient equipment to more efficient fuel and/or equipment, where cost-effective. A customer should be able to choose energy efficiency services regardless of current fuel, as long as the equipment or upgrade is to efficient equipment and is cost-effective.

(Use of, and modifiers for, GHG need further discussion)