



**Energy Efficiency Board Commercial &
Industrial Committee Meeting**

Tuesday February 8, 2022

1:00 – 3:30 PM

Meeting Materials in Box.com:

<https://app.box.com/s/cy013af0uvcsgyynz7hlxw19bbfb4wgg>

Minutes

1. Roll Call

Board members: Anthony Kosior, Kate Donatelli, Neil Beup, Anne-Marie Knight, Donald Mauritz, Joel Kopylec, Walter Szymanski

Other attendees: Daniel Robertson, Emily Rice, George Lawrence, Glenn Reed, Griff Keating, Jessica Bergman, Jordan Schellens, Lisa Skumatz, Mike Doucette, Pete Jacobs, Peter Ludwig, Philip Mosenthal, Ricky Jordan, Alex Sopelak, Brandon Mark, Colleen Morrison, Dennis O'Connor, Fred Schiavi, Gary Lane, Gary Pattavina, Jay Goodman, Jessica Bergman, Joseph Roy, Lisa Randby, Madison Donahue, Peter Ludwig, Stacy Sherwood

2. C&I Heat Pump Modeling Results – Consultants

Mr. George Lawrence stated that there's been a lot of discussion of electrification and promoting heat pumps through the efficiency programs in the state of Connecticut in order to electrify heating opportunities. The Consultants have conducted in-depth analysis of space and water heating electrification economics and cost-effectiveness. Measures must be cost-effective. Mr. Lawrence shared a presentation summarizing the analysis results, intoning that further analysis may be needed.

The Three-Year Plan sets decarbonization as a priority and there's growing interest in incorporating heating electrification in CT's EE programs. Recent regional work in Massachusetts has been leverage to provide high quality analysis at low-cost.

Heating electrification presents a wide variety of implementation scenarios with different customer and utility economics. In order to incorporate electrification effectively into the C&I programs, a deep understanding of these scenarios is needed.

The two scenarios analyzed include full displacement and partial displacement. Full displacement measures assumed that heating equipment met 100% of heating needs and partial displacement assumed equipment would provide heating down to 30 degrees, with fossil-fuel supplementary heating equipment. The Total Resource Cost (TRC) test was used for both as well as the Modified Utility Cost Test (MUCT).

Mr. Lawrence provided a summary of key assumptions. Some of which include using 11/15/21 EIA CT price survey for oil and propane prices and Eversource CT pricing for electricity and natural gas. Energy prices were projected to change with the Avoided Energy Supply Cost. Financing analysis was run at 0.99% APR for a 10-year term. C&I Customers have air conditioning as well and is replaced on burnout scenario.

A number of different technologies were reviewed. The TRC test should be a 1 higher to be cost-effective. Mr. Lawrence provided preliminary results summary for each. For ductless mini splits, neither full nor partial displacement were cost-effective, but for oil and propane customers, either approach is attractive. Ms. Donatelli asked why the partial and full displacement results for natural gas were flipped (MUCT was higher for partial displacement but lower for full displacement). Mr. Phil Mosenthal noted that the MUCT is variable based on the incentives paid. Mr. Glenn Reed added that, with gas, the more you run it, the worse the economics get because you're running in operational cost deficits. Mr. Griff Keating added that the MUCT and TRC consider slightly different suite of benefits. Mr. Lawrence noted that these are preliminary results and can be tweaked going forward.

For ducted heat pumps, replacement for gas equipment was not cost-effective but replacement of oil and propane scenarios were attractive. Ms. Jordan Schellens asked what efficiencies were being used for the baseline technology. Mr. Keating said code was assumed, or 78% AFUE for early retirement. Ms. Schellens asked if the ISPs that came into place over the summer play a role in this since they have higher baselines. Ms. Lisa Skumatz shared that the recommendation is to use the ISPs rather than code. Ms. Schellens recommended that baseline efficiencies (ISPs vs code) be consistent across fuels.

Mr. Jack Traver asked if as a result of the study, we are at a point with we can take action on the information and for example, discourage ductless mini splits for replacing natural gas equipment. Mr. Lawrence noted that this is something everyone's struggling to figure out. Massachusetts has invested heavily in replacing natural gas equipment with heat pumps and is dealing with cost-effectiveness issues. This information will inform DEEP's conditions of approval in Connecticut. Mr. Lawrence says sensitivity analysis, like break points for price or other factors, could help identify the right scenarios to incentivize.

Mr. Traver referenced the comment about incentives impacting cost-effectiveness, suggesting that the Board could consider refining incentive levels to increase cost-effectiveness test results. Mr. Lawrence said a danger in lowering the incentive is free ridership increases. Mr. Reed added that residential results were shared with the Residential Committee and after sharing C&I results, the plan is to bring this topic to the Board in March for further discussion. Mr. Lawrence noted that even though there are less oil and propane customers, it's really cost-effective to chase those opportunities. Tackling these projects first can also pave the way for installers, giving them experience and eventually driving labor costs down.

Mr. Griff Keating noted that energy costs have gone up since the AESC study and those increases are not reflected in this model. Mr. Keating added that the fundamentals of the gas markets are changing and we can expect cost-effectiveness results to shift in three years. If we start developing markets now in oil and propane, we could be a good place a few years from now. Mr. Lawrence shared that the Consultants want to perform some sensitivity testing to determine what price gas

would need to be in order for heat pump replacement to be cost-effective.

Mr. Lawrence shared another scenario, a variable refrigerant flow heat pump system combined with a dedicated outdoor air system that would fully replace rooftop unit(s). This was cost effective under both MUCT and TRC tests. Mr. Anthony Kosior asked what the basis behind the heat pumps in the two previous scenarios; is that just air source heat pump? Mr. Lawrence clarified they were just heat pumps. Mr. Kosior asked if there was a consideration for a cassette-style VRF system. Mr. Kosior shared that you could install a cassette-style system as a VRF, adding that it doesn't have to be an air handler and could be a cassette-style system with nodes that push/pull refrigerant to the different boxes. Mr. Lawrence said that in theory that style of system could replace a boiler or furnace and said the Consultants could look at it. Mr. Kosior said yes, that's the key if we are going to push the envelope on efficiency.

The next scenario included full displacement of variable refrigerant flow with a ground source heat pump (new construction). This was cost-effective under MUCT for replacing electric equipment, but not under the TRC. Mr. Lawrence said this is something that is incentivized right now. Mr. Lawrence noted that Consultants have talked with Evaluators and DEEP about whether electric is the right baseline for ground source heat pump for new construction, noting that were natural gas is cheaper many builders opt for the natural gas option. Ms. Schellens agreed. Ms. Schellens noted that energy modeling offered through the programs provides information on cost-effectiveness of these different scenarios. It's only then that customers can see the economics of ground source heat pumps.

Ms. Jessica Bergman noted that a lot of these solutions seem to be aimed more at large commercial customers. Ms. Bergman works with Chambers of Commerce and asked what the goals for the small and medium businesses are and what solutions are we discussing to engage them in these programs? Mr. Lawrence responded that the first two scenarios (ductless mini splits and ducted heat pump systems) were potentially good solutions for small businesses and that's where the Consultants started. GSHPs could also be a solution, Mr. Lawrence added, through drilling wells in urban areas can be challenging.

Mr. Lawrence noted that rooftop units are pretty common for small-to-medium sized customers. Ms. Bergman asked whether a business would need to own the building to make that replacement. Mr. Lawrence acknowledged that renting versus owning presents unique challenges. Ms. Bergman shared again that she works with Chambers of Commerce, and added she has a background in EE. Ms. Bergman said that small and medium customers make up a large percentage of customers and they tend to not be participating in these programs.

Mr. Lawrence shared preliminary results for heat pump water heaters replacing gas, oil, propane, and electric units. In all scenarios besides gas, the preliminary results were cost-effective for storage and on-demand units under both tests. Mr. Mosenthal asked if this was an average for all building types, noting this may be better for certain commercial businesses like restaurants. Mr. Keating noted that low-volume usage was assumed. Mr. Lawrence added that HPWH aren't best for high-volume applications. Due to recovery requirements in the code the HPWH have to be oversized which increases cost.

Mr. Lawrence shared a summary of first year cash flow and life cycle cost for other measures evaluated, sharing a trend that displacing gas has a negative life cycle cost. Mr. Keating added that

the first-year cash flow assumes financing.

Mr. Lawrence said that the modeling tool can be used to estimate carbon impacts and conduct sensitivity testing of different space and water heating measures.

Ms. Bergman asked what the goals were around small businesses. Ms. Schellens shared that those are outlined in the Three-Year Plan. Mr. Lawrence added that there are other metrics that include targeting underserved groups. Ms. Bergman asked if there was a member on the Board for small or microbusinesses; Ms. Kate Donatelli shared that this isn't a space particularly for that customer class but there is a seat representing a Chamber of Commerce. Ms. Donatelli and Mr. Lawrence indicated that given the various interests of Board members, there were likely others with an interest in this customer class.

3. C&I 4th Qtr 2021 C&I Metrics – Companies

This presentation, shared by Ms. Jordan Schellens and Mr. Joel Kopylec, is one of the compliance orders (#18) from DEEP. Companies, Consultants, and DEEP must develop a set of quarterly data reports required for program oversight. Metrics include a status update towards the C&I program KPI metrics, C&I segmentation savings, and upstream lighting savings from C&I retrofits.

Ms. Schellens provided a table summarizing each program, its metrics, the targets, and the actual achieved. Ms. Schellens noted that COVID proved to be a significant challenge for customers. This impacted SEM, Equitable Distribution Quartiles 1-3. This made it difficult to achieve goals. Ms. Schellens noted that the Companies have the same goals this year and anticipate a stronger presence in 2022 and beyond. Ms. Schellens noted high turnover on the SEM vendor side. The Companies have pilots starting to take off and anticipate better results. Mr. Joel Kopylec noted that UI has three customers enrolled, two who are active, and one on the verge of enrolling. Mr. Kopylec noted that they are working with their vendor to ensure customers are getting adequate coaching. ClearResult is quantifying measures implemented so far. Mr. Kopylec noted that UI should have numbers to report soon.

Ms. Bergman referenced the Equitable Distribution Quartile 4 secondary metrics goal to "increase savings from customers in the Quartile 4 Retail sector", and noted it was a small percentage (0.44%). Ms. Bergman asked what the savings goals were. Ms. Schellens explained the Quartiles divided total energy use of CT C&I customers into four groups, adding that 80% of the state's energy use comes from a handful of customers. Larger uses are assigned to Quartile 1, and as you go down the volume is lower. Ms. Bergman asked if the participation rate was higher, noting that small and micro businesses pay in to the EE fund and deserve to be able to take advantage of them, even if they make a smaller impact on overall load. Ms. Bergman asked again what is being done to really engage those customers and how is it being represented in the goals and plans that are being put forth, and the discussions that you guys are having in this board meeting?

Mr. Lawrence shared that this class of customers is important to the Companies and there is a specific program dedicated to them, the Small Business Energy Advantage Program. Mr. Lawrence added further explanation of the Quartile goals; stating that the 0.44% goal for Quartile 4 represents a large number of customers compared to the 4% goal of Quartile 1. There are more customers in Quartile 4 than Quartile 1.

Mr. Ricky Jordan shared gas results. For SBEA and ECB/EO secondary metrics, Eversource met its targets. CNG did not meet either target and SCG met the SBEA target but not the ECB/EO target.

Mr. Joel Kopylec shared a UI Comparison of Large C&I Advanced Lighting Strategy. 35% of lighting savings come through upstream with controls, 29% through upstream standard, and 23% through standard offerings. There are also enhanced and high-performance offerings. UI plans to drive more success through education and vendor engagement. In SBEA, lighting savings is nearly split 50-50 between standard and enhanced. Mr. Lawrence said that the Consultants are not seeing any results on the Eversource's lighting breakout and Ms. Schellens said that it will be available for 2022. Mr. Lawrence noted that the new mid-stream breakout between controls and no controls is useful.

Ms. Schellens shared Eversource's electric savings by segment. Ms. Schellens noted that a comparison between Q1 and Q1 showed that the fire insurance and real estate (FRE) sector remained stagnant. There are challenges with those segments, but Ms. Schellens anticipates strong execution of them in 2022. Manufacturing, government and education, and retail remain strong. Mr. Kopylec shared UI's electric savings by segment. UI saw an increase in government and education (34%) and a strong showing in retail (28%).

Ms. Schellens shared Eversource natural gas savings by segment. Manufacturing (35%), government and education (21%) had a strong showing. CNG's FRE (35%) and government and education (35%) sectors performed well while SCG's manufacturing (59%) dominated savings.

Mr. Lawrence shared that the performance metrics were put into place approximately two years ago, and they were negotiation between the Companies, Consultants, and DEEP under Donna Wells. The goal is to collect insight on things that the Board found important, like what percentage of lighting projects included controls. Mr. Lawrence noted that it's been great to see the share of lighting with controls projects grow over time. Mr. Lawrence noted that another metric, the number of retro-commissioning projects, that seems to have fallen off the radar. Ms. Schellens said she was still looking in to that. Mr. Lawrence indicated it would be good to track that again and see the growth in that area.

Ms. Schellens asked if these verbal report outs are useful or whether a submission with this data, even quarterly, through the regulatory group would be more useful. Ms. Kate Donatelli said that from DEEP's perspective the verbal report outs are useful because stakeholders can ask questions. Ms. Donatelli referenced feedback provided during Plan development, noting that stakeholders not as entrenched in the process can learn about what metrics are being tracked. Ms. Donatelli shared that DEEP is considering how to get the right information to the right people with respect to these reports.

4. Fuel Switching Overview – Consultants

This is a focus area that the Board requested and the Consultants provided a presentation on the types of fuel switching and regional programs that address these types of fuel switching. Mr. Lawrence said that fuel switching and decarbonization are used interchangeably. Decarbonization is necessary to reduce carbon emissions and mitigate climate change, it can save customers money. Connecticut produces no fossil fuels, but does consume them. Producing energy in Connecticut could keep \$2.8 billion annually within the state.

Mr. Lawrence shared the Governor's Council on Climate Change targets to reduce greenhouse gases by 45% by 2030 and 80% by 2050. These savings can be achieved through multiple avenues, EE being only one. Electrification gets a lot of attention as a method of fuel switching, going from a fossil fuel to electricity for heating and water heating. Heating technologies include heat pumps

and variable refrigerant flow for space heating or heat pumps for domestic hot water. There are heat pump commercial clothes dryers.

Mr. Lawrence shared a list of Heat Pump Programs in the region; including Mass Save energy optimization incentives, Efficiency Vermont, and Con Ed in NYC. These programs offer various incentive structures to encourage uptake of heat pump technologies.

Solar heating technologies are another way to promote electrification. Solar photovoltaic generates electricity and solar hot water with heat pumps for water heating. Solar heating programs include federal tax credits and CPACE, which is a financing program in Connecticut.

Wood chip and wood pellet boilers are self-feeding and can heat/cool buildings or a campus. Chips are typically sourced from logging waste. Given the growth rate of forest in the NE, these is a renewable resource. These can be small or large; for example, the McNeil plant has 50 MW generation from their system. Efficiency Vermont, Vermont Renewable Energy Resource Center, Vermont Schools, and Massachusetts Clean Energy Center all offer varying incentives for these systems. Mr. Lawrence noted that it appears CT is moving away from renewable energy credits. Ms. Donatelli noted that there is no formal policy on the use of biomass for providing heat, but not an offering in the state. Mr. Lawrence noted that there are two pellet plans in the state.

Mr. Lawrence overviewed biogas sources and technology. Natural gas is 95% methane, biogas (methane) can be generated from wastewater digesters, farm digesters, and landfill gas. Biogas can be used on site for heating or generating electricity. Biogas can be pressurized and injected into natural gas pipelines. Most programs are focused on electricity generation as apposed to heating on site or fuel switching and energy conservation.

Fuel switching with respect to heat recovery presents some opportunities for CT. Heat recovery from an air compressor to displace heating fuel or from refrigeration systems for preheating domestic hot water. Ms. Schellens noted that the Companies promote this for natural gas customers now and in 2022 will do so for oil and propane customers too. Mr. Lawrence shared there are a number of applications well-suited for this approach; the dairy industry or grocers. Ms. Donatelli asked, to the extent that the companies are already incentivizing the heat recovery from air compression and that waste heat to displace different fuel, how does the accounting work (where are savings located)? Ms. Schellens said that it's not an actual fuel switch because it's capturing "waste" heat, so the focus is on the savings associated to the heat recovery. In other words, the savings follow the heating equipment and its fuel source.

Mr. Lawrence noted that fuel switching can go from electricity to fossil fuels. In some instances, this can be economically cheaper. Some examples include engine-driven chillers, compressors or heat pumps, gas-fired humidifiers and dehumidifiers, and combined heat and power (CHP). Mr. Lawrence noted this not to advocate, but to acknowledge it exists. Ms. Schellens noted that Massachusetts stopped incentivizing gas heat pumps and chillers in 2019. Mr. Lawrence asked if customers are asking for these types of things. Ms. Schellens said no and Mr. Kopylec also said it was uncommon in his experience. While some of these projects can make sense for the right application, the Board/DEEP should consider how they align with the state's goals.

Mr. Neil Beup wondered if the Committee should put together a list of potential recommendations for this group to opine on. Taking some of these technologies and applying them, even if it cuts across sectors, just to put it on the table. Mr. Beup said that part of this came from CIEC recommending fuel switching for commercial and industrial space, but its also driven by discussions the Board has had on the education of heat pumps. Mr. Lawrence agreed a list of

potential recommendations would be a good next step. There's a lot of crossovers with some of these technologies in terms of value and impact. For example, using wood chips that are sourced from aging trees can affect power outages caused by those same trees. Mr. Beup said it would be a really interesting technology to talk about.

Mr. Beup suggested that for next month, perhaps the Consultants can coordinate and start a document that both Committees can look at and discuss. Following those discussions, it can be presented to the Board and DEEP. Mr. Beup said it would be helpful to have DEEP at the table in this stage of deliberations. Ms. Donatelli agreed with this approach.

5. Planning for March

- a. EEB meeting Focus Area: Heat Pumps, Electrification and Fuel Switching
- b. Year-end Report on 2021 C&I Program Results – Companies

Ms. Schellens and Mr. Kopylec said this would be ready. Ms. Schellens said that if anyone had specific requests to let her know in advance. Mr. Lawrence said he would look at last year's and get back to Ms. Schellens.

- c. Green Bank update

Mr. Peter Ludwig said GB could do this.

- d. Mr. Beup asked to include 30-45 minutes on a document on cross-sector analysis of fuel switching technologies that the Committee could review and discuss; then provide recommendations to the Board
- e. Ms. Schellens shared that the vendor rollout is scheduled for March 3 and the Companies could debrief on that.

6. Public Comment

Mr. Dan Robertson said he has reviewed the heat pump incentives for MA and CT, and there was a pretty large disparity, a factor of ten in some cases. Mr. Robertson shared that MA passed legislation that advances clean energy, and they've changed some working to recognize energy versus electricity savings. Mr. Robertson wondered if there was an implication for CT. The act passed recognizes more incentives. Mr. Lawrence said the Massachusetts program administrators put together a Three-Year Plan, but the DPU order has caused confusion around electrification plans moving forward. MA is struggling with cost-effectiveness. Ms. Schellens said that part of the challenge in MA is the regulatory body committing to strategy regardless of cost-effectiveness. In MA, the social cost of carbon can be accounted for in savings which expands benefits and allows them to offer higher incentives.

7. Adjourn

The meeting was adjourned.