

Memo

To: **Energy Efficiency Advisory Council**
From: **EEAC Consultant Team**
Date: **July 14, 2015**
Subject: **2016-2018 Planning Assumptions for Key Drivers Update - DRAFT**

SUMMARY

The PAs and the Consultant Team are in the latter stages of the savings phase of the key drivers process undertaken to see if the significant gap between the PA draft plan and Consultant Team savings goal estimates can be narrowed or closed. The discussions have been helpful in allowing parties to understand positions and work toward common understandings. Although conversations are ongoing, and some additional narrowing of the savings gap is probable, the Consultant Team does not believe that the key driver process alone will be able to close the differences between the PAs and Consultants. In most cases, the differences are not related to estimates of impact factors such as unit savings but rather to estimates of the number of units that can be installed and the mix of strategies and measures. Many of the differences between the PAs' and the Consultant Team's positions are based on assumptions and forecasts about future, which necessarily carries some unknowns and the exercise of judgment. There are simply not exact levels of the future volume or mix of strategies/measures that can be predicted with complete certainty.¹ While some additional narrowing of the savings gap through the key drivers analysis is expected and would be beneficial, additional information and discussion is unlikely to bring full consensus between the PA and the Consultant Team estimates on savings goals. In addition, we are entering the phase of the key drivers analysis where we will examine costs and cost to achieve in more detail. Note that the outcome of the cost phase of the key drivers analysis will be influenced to some extent by the volume and mix of program strategies, measures, and services. Some of these factors are interrelated to the savings phase and are challenging to address.

Having reviewed many of the PAs' important assumptions and understanding how they differ from our own, the Consultants have made adjustments to our estimates of the achievable level of portfolio savings (% of sales) as described in this memo. The current result of these adjustments reflects savings goals similar to those originally proposed by the Consultants. Additional planned discussions between the PAs and the Consultant Team within the next several weeks should provide a clearer picture of whether a narrowing of the gap seems warranted. While the PAs have signaled some flexibility in several key areas, we have not yet received a formal position change in any of the key driver categories. As a result, the tables below summarize revisions to the original Consultant Team savings projections, but do not reflect changes in the PAs' position. Once the additional discussions with the PAs have concluded, we believe closing the remaining gap will need to move to a negotiation phase and will no longer be about analysis of the key drivers. We understand this negotiation will be supported by the Consultants but will take place between the Council and the PAs. We will continue to stay actively engaged in providing up-to-date information from our continued discussions with the PAs.

¹ In the absence of facts about the future, the Consultants have chosen to rely where appropriate on recent actual performance of the programs in the field, as documented in the 2014 Plan-Year Report and in other reporting on current program performance.

BACKGROUND

In April, the Consultant Team completed an analysis to identify available pools of untapped energy savings in Massachusetts. This analysis was informed by historical and projected Massachusetts data, the assessment of potential completed in March, as well as professional judgment drawn from experience in the Commonwealth and in other jurisdictions. Based on the additional savings identified, the Consultant Team recommended savings goals for 2016-2018.

After reviewing the PAs' April 30 Three-Year Plan draft, it was clear that some of the planning assumptions made by the PAs were not consistent with those made by the Consultant Team. The PAs' 2016-2018 goals and associated savings were generally lower than those proposed by the Consultants while the budgets were higher. Over the past couple months, the Consultant team has been working and coordinating with the PAs to identify and explore the main assumptions that account for differences in the proposed goals and budgets put forward by the PAs and those by the Consultants in a process called the "key drivers". This has been a collaborative process between the EEAC Consultant team and the PAs with input from other stakeholders. Additionally, the Consultant team has updated its analysis to reflect 2014 Plan Year Report evaluated data that the PAs filed in June, rather than the preliminary 2014 results provided in the 2014 4th Quarter Report, which were used in the Consultant analysis in April. Using the latest results from the 2014 Plan-Year Report generally resulted in somewhat higher savings estimates than the preliminary numbers the Consultants relied on previously. The sections below identify several key assumptions originally made by the Consultants, any changes to these assumptions from additional review, as well as an explanation of the impact those changes may have on the proposed goals. While most of our work to date has focused on analyzing savings assumptions, we are conducting a closer review of the cost and budget assumptions in July and August. However, many of the program strategy recommendations included in the Council resolution, but not currently included in the Draft Plan, could have a significant effect on the budgets and cost to achieve, since the Plan's portfolio cost is a result of which customers are included and the measures and services available to them. The program strategies-which strategies, the volume and mix of measures and services-how much of each strategy and in which markets, and the costs are interrelated. Work on budgets and costs to achieve will be largely completed in time for the August Council meeting.

REVIEW OF MAJOR ASSUMPTIONS

Residential – Electric

Since the last update in June, there have been several discussions between the Consultant Team and PAs on four residential topics. This updated assessment on residential sector goals is based on those discussions, additional research by the Team, and revised data from the PAs.

Lighting Initiative

- **Original Assumption:** Ambitious assumptions for lighting units/housing units and percent of LEDs; other factors are gross savings and NTG.
- **Updated Assumption:** No changes in key assumptions at this point in time, though the Consultants did update the impact factors with the latest results from the 2014 Plan-Year Report (which resulted in somewhat higher savings estimates). The Consultant Team continues to assess the PAs' assertion that lighting units for the Lighting Initiative will decrease over the course of the Plan in step with projected decreases in sales for the overall lighting market. A second lighting key drivers discussion was held on June 25. The Consultants asked the PAs to reconsider their assumptions for lighting costs and incentives (Consultants believe they are too high) and planned proportion of CFLs vs. LEDs (Consultants believe LED share should be increased). It is the Consultants' understanding that the PAs are actively assessing the Consultants' request, and there are plans to have another key drivers discussion on this topic within the next two weeks. As noted in the previous update memo and at the June 29 Council meeting, the parties are finding it challenging to reach an agreement for a 3-year period in a product area that is highly dynamic and uncertain.

- **Potential Impact on Goals:** The difference between the PAs' planned numbers and the Consultants' revised goal projection is approximately 280,000 MWh (2016-18).

Behavioral Initiative

- **Original Assumption:** Increased participation and increased savings per participant.
- **Updated Assumption:** No change in our previous assumptions at this point in time. The PAs and Consultants met by telephone on June 25 and exchanged information on respective assumptions. The PAs maintain that no additional participants are available and that savings per participant will decrease. Consultants continue to assess information that the PAs have provided on size of treatment and control groups and progress of savings over time. Consultants plan to meet with Cape Light Compact to discuss its plans for 2016-18.
- **Potential Impact on Goals:** The difference between the PAs' planned numbers and the Consultants' revised goals projection is more than 140,000 MWh (2016-18).

The table below shows the annual residential electric goals as originally proposed by the Consultant Team in April and an updated goals calculation with the evaluated 2014 numbers from the PAs.

Table 1. Consultant Team Residential Electric Savings Goals

Year	Annual Savings as a % of Sales (Original)	Annual Savings as a % of Sales (Revised)
2016	3.38%	3.64%
2017	3.47%	3.73%
2018	3.55%	3.83%

Residential – Gas

Behavioral Initiative

- **Original Assumption:** Increased participation as a result of Columbia Gas introducing a behavior initiative and increased savings per participant in 2017 from existing behavioral effort program innovation.
- **Updated Assumption:** No change at this point in time. Consultants' understanding is that Columbia Gas continues to assess a behavioral offering.
- **Potential Impact on Goals:** The difference between the PAs' planned numbers and the Consultants' revised goals projection is approximately 7 million therms.

HES Initiative

- **Original Assumption:** Steadily increasing participation and savings per participant.
- **Updated Assumption:** No change at this point in time. The PAs and Consultants met in person on June 24 and exchanged information on respective assumptions. The PAs indicated further assessment was appropriate, and the group is in the process of scheduling a follow-up meeting to delve further into the impact of proposed new initiatives for renters and moderate income customers on participation, savings, and costs.
- **Potential Impact on Goals:** The difference between the PAs' planned numbers and the Consultants' revised goals projection is 4 million therms.

Heating and Water Heating Initiative

- **Original Assumption:** Increasing participation and declining savings due to measure mix and reduced NTG.
- **Updated Assumption:** No change. The PAs and Consultants met by telephone on June 18. The primary focus of the discussion was on thermostats and boilers. The consultants noted an opportunity for increased wireless communicating thermostat units based on 2014 results. The PAs indicated they plan to focus most strongly on these thermostats through HES, though indicated they would look at whether to increase the numbers in HEHE. There was also discussion of boiler savings, with a focus on the evaluation finding that a significant portion of boilers through the initiative are not condensing and therefore not saving as much as they could. The PAs indicated their savings numbers do not assume a fix for the condensing boiler problem identified in the evaluation and therefore additional savings have not yet been identified. The Consultants believe increased savings numbers should be available soon and included in the 3-year plan term.
- **Potential Impact on Goals:** The difference between the PAs' planned numbers and the Consultants' revised goals projection is approximately 1 million therms.

The table below shows the annual residential gas goals as originally proposed by the Consultant Team in April and an updated goals calculation with the evaluated 2014 numbers from the PAs. Please note that in the June 16 version of this memo, the revised residential gas goals only reflected changes to the HES and Heating and Water Heating initiatives and had not yet applied 2014 evaluated results to analysis of all residential programs.

Table 2. Consultant Team Residential Gas Savings Goals

Year	Annual Savings as a % of Sales (Original)	Annual Savings as a % of Sales (Revised)
2016	1.52%	1.56%
2017	1.71%	1.74%
2018	1.82%	1.82%

Commercial and Industrial – Electric

The key driver analysis process has included a review of three C&I topics. This process, specifically with respect to CHP, C&I lighting, and streetlights is ongoing, but has led to some preliminary revisions in the assumptions and analysis. The details are outlined below.

Combined Heat and Power

- **Original Assumption:** A robust pipeline of 78 MW of identified capacity could yield significant savings. We did not include an assumption of any as-yet-unidentified CHP projects.
- **Updated Assumption:** The Consultants have reviewed the pipeline and potential projects with the PAs and DOER, and even spoken to one customer with a large project to determine the likelihood of project completion by 2018. Other customers are also being polled on the likelihood of project completion between 2016 and 2018. Some of the identified projects, originally assumed to be complete in the three year plan time period, are now assumed to have a completion data after 2018, and at least one large project is not expected to go through the efficiency programs if it happens at all. The project pipeline was weighted by the PAs according to the likelihood of project completion in the plan timeframe. Weighting a pipeline of identified projects according to the estimated likelihood of project completion is a common method to estimate results. The Consultants and DOER modified the weighting on one very large project as the result of positive feedback from the customer that they fully intended to complete the project by 2018. This had the effect of increasing the weighted pipeline estimates. An assumption was also made to add 5 MW to the pipeline as “unidentified” as the result of the hiring of a new dedicated CHP person at

National Grid, and assumptions were made about potential savings from projects of less than 1 MW for National Grid and Eversource. The resulting change from these assumptions indicates that the weighted pipeline predicts at least 42.4 MW of capacity being installed between 2016 and 2018, resulting in an estimated 252 GWh in savings

- **Potential Impact on Goals:** The BCR models include 117 GWh of savings from about 20.6 MW of installed capacity. The difference between the adjusted weighted pipeline and the BCR models is 135 GWh.

Small Business

- **Original Assumption:** If all PAs at least meet the current average savings per participant, and the number of participants stays constant at 2014 levels, there would be an increase in savings.
- **Updated Assumption:** Planned incremental improvements to the program should make increased savings more likely.
- **Potential Impact on Goals:** The Consultants continue to believe that Massachusetts could save at least 50 GWh more over 2014 levels between 2016-18 if all the PAs saved an average amount per customer in the Small Business program. The difference between the PAs and the Consultants is 50 GWh.

Streetlights

- **Original Assumption:** There are approximately 345,000 streetlights in Massachusetts that use old, inefficient technology. This pool of streetlights represents 105,000 MWh of potential savings. The Consultants assumed that 60% of the lights could be converted during the 2016-18 timeframe.
- **Updated Assumption:** Additional analysis was performed to identify the potential savings based on light ownership. There are about 124,000 non-LED streetlights that are municipal owned, and 154,000 that are utility owned. This represents 37,000 MWh of potential savings with municipal owned streetlights, and 51,000 MWh with utility owned, mostly in National Grid territory, in both cases. The utility owned streetlight potential can only be realized if the utility sells the lights or applies to the DPU for a LED tariff. Because the sale of the lights or a rate tariff will take time, we are assuming only half the potential for utility owned streetlights can be realized in the next three years. There are also other factors that may restrict the potential, such as the market's ability to provide and install lights in the next three years.
- **Potential Impact on Goals:** Streetlights are being analyzed in conjunction with all C&I lighting. Streetlights could contribute an estimated 53 GWh over the next three year plan.

C&I Lighting

- **Original Assumption:** While linear LED lamps were called out specifically in the Consultant memo, there were no savings increases or decreases predicted at the time.
- **Updated Assumption:** A recent forecast of the Vermont commercial and industrial lighting market shows the potential for a significant increase in lighting savings over the next few years from the adoption of linear LEDs, LED retrofit kits, and LED fixtures. Other forecasts from DOE and California project alternate rates of adoption, and all show increased LED market share, but on different timelines. The Consultants did an analysis to project the rate of LED fixture and TLED adoption in Massachusetts to determine to what extent it could offset the PA projected decline in C&I lighting due to the saturation of the screw in LED market. The PAs are currently predicting that C&I lighting savings in 2016-2018 will decline from 2014 levels by about 22%. The Consultant projection of savings from LED fixtures and linear LEDs (TLEDs) does not fully offset the PA predicted decline, but does bring projected C&I lighting savings in 2018 back up to 2014 levels. The Consultants are estimating 190 GWh of increased savings from LED fixtures and TLEDs, after subtracting out savings that would have come from High Performance T8 projects.
- **Potential Impact on Goals:** While the Consultants agree that the likelihood of savings from C&I

projects will decline from 2014 levels in the short term, the Consultants disagree that the level of savings will stay flat from 2016 through 2018. The difference between the PA and Consultant positions is 190 GWh over the three years.

Mid-Sized Customers

- **Original Assumption:** While mentioned in the Consultant Team memo, there was no specific number assumed or included in the initial analysis for additional savings from mid-sized customers.
- **Updated Assumption:** Additional savings are available from mid-sized customers. The Consultants assume that 25% of the identified potential from unmanaged mid-sized customers can be realized during the next Three-Year plan. The potential is listed in Table 1-3 on page 1-11 of the Mid-Sized Customer Needs Assessment.
- **Potential Impact on Goals:** The projected savings increase is 24 GWh over three years, compared to no incremental savings assumed in the first Consultant memo.

The table below shows the changes in C&I electrical goals based on the updated assumptions described above.

Table 3. Consultant Team C&I Electric Savings Goals

Year	Annual Savings as a % of Sales (Original)	Annual Savings as a % of Sales (Revised)
2016	2.82%	2.56%
2017	2.86%	2.81%
2018	2.91%	3.08%

Commercial and Industrial - Gas

No adjustments are currently considered except to the underutilized technologies as described below.

Underutilized Technologies (Gas)

- **Original Assumption:** Opportunity exists in the C&I sector for increased measures such as ozone laundry, microbead laundry, and industrial process.
- **Updated Assumption:** A reevaluation of these technologies changes the predicted savings downward slightly.
- **Potential Impact on Goals:** The Consultant Team believes that increased savings of an estimated 450,000 therms are possible from increased ozone laundry (or other laundry technologies) and industrial process improvements. The table below shows the changes in C&I gas goals based on the updated assumptions described above.

Table 4. Consultant Team C&I Gas Savings Goals

Year	Annual Savings as a % of Sales (Original)	Annual Savings as a % of Sales (Revised)
2016	1.13%	1.06%
2017	1.12%	1.05%
2018	1.14%	1.05%

Portfolio Summary

The tables below present the impact of revised residential and C&I assumptions on the portfolio savings goals to date. These values will be further revised and refined as the Consultant Team continues to discuss major assumptions with the PAs and explore additional information. Although there may be some narrowing of the savings gap as additional discussions continue, it is unlikely at the conclusion of the key drivers analysis process that the gap will be fully closed.

Table 5. Consultant Team Portfolio Electric Savings Goals

Year	Annual Savings as a % of Sales (Original)	Annual Savings as a % of Sales (Revised)
2016	2.98%	2.90%
2017	3.03%	3.09%
2018	3.09%	3.29%

Table 6. Consultant Team Portfolio Gas Savings Goals

Year	Annual Savings as a % of Sales (Original)	Annual Savings as a % of Sales (Revised)
2016	1.38%	1.37%
2017	1.47%	1.46%
2018	1.54%	1.49%

Savings Gap from Key Drivers Analysis to Date

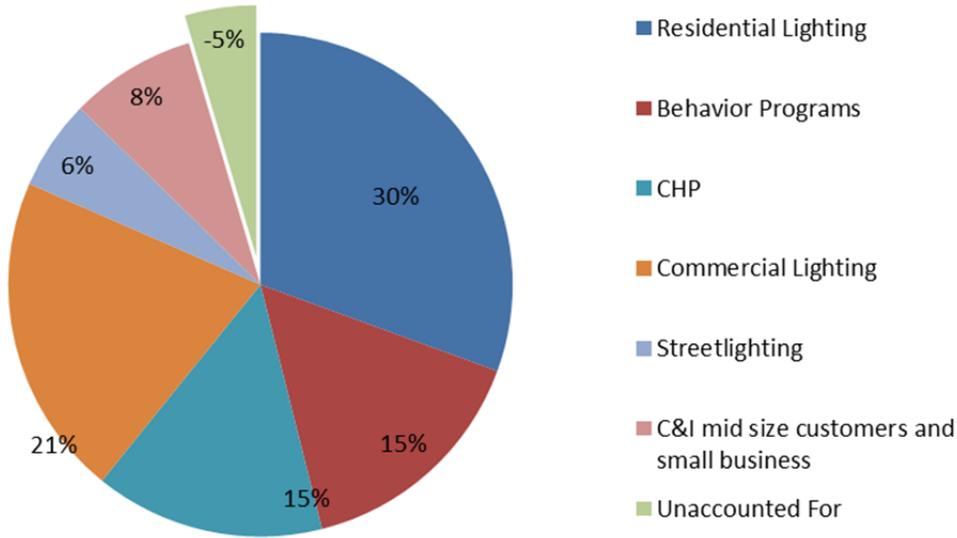
The table and figures below identify the difference in savings that remains between the PAs' 2016-2018 draft plan and the Consultant Team's revised assumptions. It is important to recognize that not all savings assumptions were reviewed. Therefore, the key drivers process will not necessarily close the savings gap even if both parties agree to the same values for the key drivers.

Table 7. Savings Gap from Key Drivers

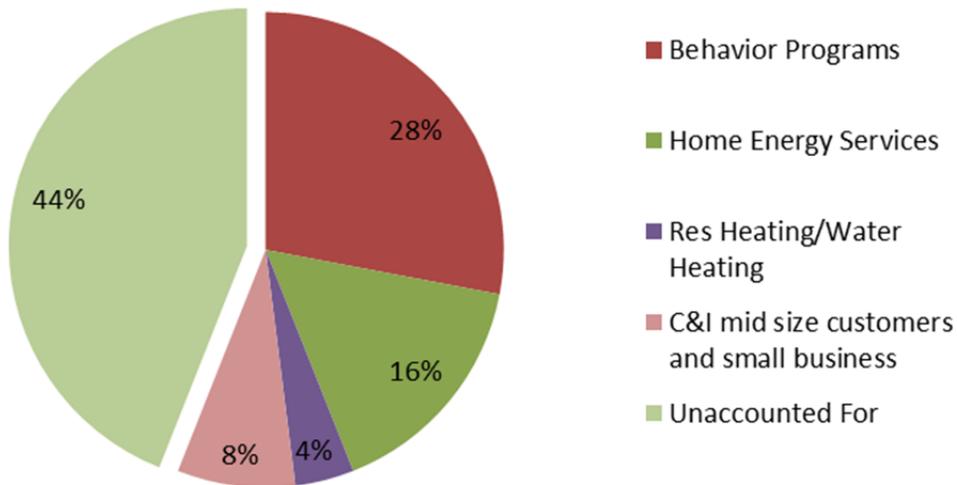
Driver	Difference (GWh)	% of Total GWh Difference*	Difference (Million Therms)	% of Total Therm Difference*
Residential Lighting	280	34%		
Behavior Programs	142	17%	7	28%
Home Energy Services (Gas)			4	16%
Res Heating/Water Heating (Gas)			1	4%
CHP	135	16%		
Commercial Lighting	190	23%		
Streetlighting	53	6%		
Mid size and Small Business Customers	74	9%	2	8%
Total	874	105%	14	56%

*Percentages based on total remaining differences (832 GWh or 25 million therms as denominator). The original savings gap was 750 GWh and 26 million therms.

Electric Savings Gap



Gas Savings Gap



Costs to Achieve

As previously mentioned, the key drivers process to date has largely focused on differences in saving and additional analysis will be done to address differences between the PA and Consultant Team's assumed costs to achieve. The table below identifies the difference in the PA and Consultant Team's assumed costs to achieve. Overall, The PAs assumed higher costs to achieve than the Consultant Team.

Table 8. Portfolio Cost to Achieve 2016-2018

	PA Program Budget (\$Millions)	Consultant Program Budget (\$Millions)	PA Cost/Annual kWh or therm	Consultant Cost/Annual kWh or therm	2013 Actual Cost to Achieve	2014 Actual Cost to Achieve
Electric	\$1,818	\$1,586	\$0.452	\$0.372	\$0.379	\$0.376
Gas	\$623	\$633	\$8.307	\$6.248	\$6.148	\$5.973

CONCLUSION

Through the key drivers process, the Consultant Team has worked collaboratively with the PAs to review important assumptions impacting savings and costs. Additional analysis and discussions has resulted in adjustments to the Consultant’s achievable savings for various fuels, sectors and initiatives. Although the process is still on-going, current information on savings has largely strengthened the Consultant Teams’ position that the original 2016-18 goals put forward are achievable and cost-effective. The Consultant Team will continue to review all available information and support the Council in the process of negotiating firm goals moving for the next three-year cycle.