

December 4, 2020

Ms. Samantha Meserve  
Deputy Director, Renewable and Alternative Energy Division  
Massachusetts Department of Energy Resources  
100 Cambridge Street, 10th Floor  
Boston, MA

Subject: ETE Response to DOER Stakeholder Questions

Dear Ms. Meserve,

This letter is in response to the Stakeholder Questions issued by the MA DOER on 11/5/2020 coinciding with the release of the Daymark Report. Energy Tariff Experts (ETE) welcomes the Department of Energy Resources (DOER) attention to the Alternative Energy Portfolio Standard (APS) program and its role in helping the Commonwealth achieve its Greenhouse Gas (GHG) reduction targets.

ETE is a Boston based consulting firm that provides cost feasibility studies for Distributed Energy Resources (DERs) throughout North America. ETE also provides regulatory research and expert witness services and conducts energy cost studies and benchmarking for large energy consumers, trade groups, and other energy related firms. ETE has had exposure in some form, either in the feasibility study phase or as an Independent Verifier (IV) for Alternative Energy Credits (AECs) to over a dozen Combined Heat and Power (CHP) projects in Massachusetts and several dozen throughout the United States.

In this letter, ETE will respond to certain stakeholder questions and provide feedback on several concerning items in the Daymark Report related to Combined Heat and Power (CHP) systems.

**Concerns Regarding the Daymark Report**

ETE's provides the following comments regarding certain claims and assumptions in the Daymark report that ETE believes to be inaccurate. These comments are summarized in the table below.

<b>Daymark Claim or Assumption</b>	<b>ETE Comments</b>
Payback for CHP is 1 year <sup>1</sup>	ETE has never worked on a CHP project anywhere in MA or the US that has had a payback of less than 2.5 years
Proposal to Cap CHP at the 2021 Level	CHP projects have development cycles that range from 2-3 years with current projects advancing under the assumption that the APS program will be available. 2021 is too soon to make a major change to program eligibility
Daymark only modeled reciprocating engines	Many campus and manufacturing environments require high volumes of steam from a turbine. Due to the engineering complexity of turbine CHP systems, capital costs for turbines are materially different than for reciprocating engines. <sup>2</sup>

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<sup>1</sup> Daymark Report p. 18

<sup>2</sup> Daymark Report Table 17

Daymark Claim or Assumption	ETE Comments
Installed cost assumptions are too low	Based on ETE's experience in MA between 2015 – 2020, the installed costs quoted by Daymark are at least \$1,000/kW too low. The EPA Report cited by Daymark indicates that installed costs presented are from 2011 and 2013. These numbers are not relevant for applications in MA. <sup>3</sup> All-in costs for capital equipment and engineering for large CHP systems are typically is close to \$4,000/kW and can be higher for complex systems.
O&M Cost Assumptions are too low	In every model that ETE builds for proposed or operating CHP systems, O&M costs are at least \$0.01/kWh (can range up to \$0.02/kWh). While O&M costs can be calculated by run hour or output, Daymark's O&M assumptions are too low by at least a factor of 4.
Rate Assumptions are not accurate	Daymark used a low load factor gas rate (NGrid G-42) (unknown if Boston Gas, Essex Gas, or Colonial Gas) to model input fuel costs. By definition, CHPs are high load factor gas consumers and should be modeled on a high load factor rate in the 50s. The assumed National Grid electric rate of G-2 is correct for small and medium customers, but no large CHP system would be served on the G-2 electric rate.
Rate Assumptions fail to capture the variability in Electric/Gas utility combinations	In ETE's experience, CHP economics differ materially based on EDC/LDC combinations. For example, National Grid Boston Gas LDC rates are very high relative to other MA gas utilities and are typically paired with Eversource Greater Boston electric rates which are mostly demand based. This results in a longer payback for CHP. Conversely, the Eversource G-53 LDC gas rate is demand based and high load factor gas customers realize lower LDC costs relative to other MA LDCs. A large part of the Eversource Gas service area has National Grid as the electric utility. National Grid's G-3 electric rate has volumetric transmission charges which result in a much faster payback for CHP. Any rigorous study of CHP incentives should consider the impact of different EDC/LDC combinations to understand CHP economics
Continued CHP growth rate of 45 MW/yr	This build rate will likely be hard to sustain in the future as many "easy" projects have been done.
Daymark calculations are unavailable for inspection	ETE's experience is that there are many variables that impact CHP economics. There is insufficient information to probe Daymark's assumption of items that impact sensitivity analyses such as unplanned trips (typically at least 1 per year), maintenance outages, compensation for exports to the grid (if allowed), competitive supply contracts for gas or electric, and capacity exempt status for natural gas

<sup>3</sup> Catalog of CHP Technologies, U.S. Environmental Protection Agency Combined Heat and Power Partnership, Sept 2017, Tables 2-2, 3-2, page 5-13

Based on a close reading of the Daymark report, it appears that the authors have little familiarity with CHP projects in practice. While it is important for DOER to conduct rigorous periodic reviews of the APS, these reviews must be done with accurate information that reflects experiences of industry participants in MA.

### **Responses to Selected DOER Stakeholder Questions**

#### **Question 1**

The APS has incentivized the buildout of CHP units at manufacturing facilities that might be at risk of closure due to globalization. The large capital expenditures for CHP and resulting reductions in energy costs help ensure that these facilities will remain in Massachusetts and continue to provide employment.

#### **Question 5**

As evidenced by recent declines in AEC prices, the current rate of increase in the APS within the RPS is insufficient to provide the certainty required to justify new investments in APS eligible technologies.

#### **Question 7**

Daymark's suggestion to apportion part of the APS requirement to gas utilities is an interesting one that deserves further investigation. Renewable thermal technologies displace fossil fuels and it would be logical to apportion some cost responsibility to gas customers.

Daymark's study focuses on the risk of AEC oversupply relative to the annual mandates. One potential solution would be to limit CHP eligibility to earn AECs after a certain period of time. The purpose of the program is to incentivize capital investments in eligible technologies. An AEC eligibility period of 10 years may better reflect the incentives required to justify a CHP investment as opposed to an indefinite ability to generate AECs. DOER might also make slight modifications to the AEC formula for CHPs to reflect the current fuel mix in ISO-NE and to ensure that the program incentivizes high efficiency CHPs.

#### **Question 8**

In every Massachusetts CHP project that ETE has been involved in, AECs were an important or deciding factor in the decision to approve the capital investment. Liquid markets for AECs, including the ability to sell them forward to REC brokers thereby locking in a revenue stream, were crucial to gaining management approval of several projects.

#### **Question 12**

DOER must be mindful of the fact that most CHP projects occur in facilities where beneficial electrification and/or renewable thermal technologies are infeasible due to issues related to cost or scale. The default is continued use of boilers and separate grid power and many CHP evaluations occur when large boiler systems are nearing end of life. If a large facility forgoes an investment in CHP and instead constructs a new boiler, the efficiencies of that system are locked in for another two decades. For energy intensive campuses and manufacturers, natural gas will continue to be used for the foreseeable future and its incumbent upon DOER to ensure that this usage is as efficient as possible. CHP plays an important role in realizing that objective.

The present report from Daymark does not provide a sufficient basis to determine the future of CHP systems in the MA APS. We urge the DOER to conduct a more rigorous analysis to better understand the true costs of CHP systems, their efficiency benefits, and the appropriate levels of incentives.

We thank DOER for undertaking this process and are cautiously optimistic that it will not devolve into a zero sum game between CHP and renewable thermal technologies.

Sincerely,

A handwritten signature in black ink that reads "Jim Bride". The signature is written in a cursive, flowing style.

James D. Bride  
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