

**Appendix E**  
**Avoided Costs**

**E-1: Staff Testimony**

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**By Ian G. Burnes  
08-21-2024**

**1. What is the purpose of this testimony?**

This testimony describes the Efficiency Maine Trust's (the Trust's or EMT's) statutory requirements, with respect to the avoided energy costs reflected in Triennial Plan VI.

**2. Who is introducing this testimony?**

The testimony is provided by Ian Burnes, Director of Strategic Initiatives at the Trust.

**3. Mr. Burnes, please state your name, title, and business addresses.**

My name is Ian Burnes, and I am employed by EMT as the Director of Strategic Initiatives. My business address is 168 Capital Street, Suite 1, Augusta, ME 04330.

**4. Please summarize your educational and professional experience.**

I have a Bachelor of Arts Degree in Economics from Wesleyan University. I have been working at EMT since 2009. My responsibilities include the oversight of the Strategic Initiatives team that implements EMT's customer tracking database, maintains the Technical Reference Manuals, oversees the program evaluations, and manages the Trust's resource in ISO-NE's Forward Capacity Market. Before coming to EMT, I worked at the Governor's Office of Energy Independence and Security.

**5. What are the Trust's statutory requirements with respect to the avoided cost methodologies and assumptions included in the Triennial Plan?**

In 2019, the Maine statute was amended to provide direction on developing and applying avoided costs. Specifically, the amended statute clarified what elements to incorporate into avoided costs when calculating maximum achievable cost-effective (MACE) energy efficiency resources.

For electric MACE, it states:

Avoided energy costs must include but are not limited to the following elements:

- (1) Retail value of electricity supply including a wholesale risk premium;
- (2) Statewide average value of avoided marginal transmission and distribution [T&D] costs;
- (3) Statewide average for line losses; and
- (4) Demand reduction induced price effects.<sup>1</sup>

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<sup>1</sup> 35-A MRS §10110(4)(A), as amended by Public Law, Chapter 313, 129th Maine State Legislature, First Regular Session, LD 1757, An Act To Clarify Certain Standards for the Efficiency Maine Trust's Triennial Plan, 2019.

For natural gas MACE, it states:

Avoided energy costs must include but are not limited to the retail value of natural gas supply including a wholesale risk premium and demand reduction induced price effects.<sup>2</sup>

Regarding how to find the values of these and any other elements of avoided costs, the statutory changes state:

The trust shall use, and the commission shall give deference to, values for each element of avoided energy cost from a regional avoided energy supply cost study as long as the analysis has been developed through a transparent process, with input from state agencies, public advocates, utilities or energy efficiency administrators from at least 3 other states in New England and the analysis has been published not more than 24 months prior to the trust's filing of the plan. When values specific to the State are not available in the regional study, the trust may use, and the commission shall give deference to, regional values provided in that regional study or values determined from other sources when supported by evidence in the record...<sup>3</sup>

**6. How does Triennial Plan V comply with the statutory requirements relating to the source of avoided energy cost values noted above?**

To comply with the statutory amendments, the Trust uses the avoided costs laid out in the *Avoided Energy Supply Components in New England: 2024 Report* (AESC 2024).<sup>4</sup> The AESC 2024 is the most recent version published from a regional, transparent process in which more than three other New England states participated meets the criteria required in the Maine statute. The process was led by Synapse Energy Economics, Inc. (Synapse) managing a team of subcontractors. The Synapse team developed AESC 2024 on behalf of a group of regional stakeholders including the Trust, other program administrators, utilities, regulators, and advocates from across New England. These parties all provided input to the study through a collaborative and open process. The report of the study's findings is updated periodically; AESC reported new results in 2013, 2015, 2016, 2018, and 2021. The AESC 2024 was released on February 7, 2024 and amended May 24, 2024, within 24 months prior to the filing of Triennial Plan VI.

**7. Are there Maine-specific avoided energy cost values that are not available in AESC 2024? If so, does the Trust use regional values or "values determined from other sources...[and] supported by evidence in the record"?**

The AESC 2024 provides a marginal avoided cost for pooled transmission facilities (PTF) and an analytical framework that individual states could use to calculate state-specific avoided cost for distribution and non-PTF transmission. The AESC 2024 does not, however, provide actual values for Maine's avoided costs for transmission, distribution and non-PTF transmission.

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<sup>2</sup> *Id.* at §10111(2).

<sup>3</sup> *Id.* at §10110(4)(A) and §10111(2).

<sup>4</sup> [Synapse Energy Economics, Inc., \*Avoided Energy Supply Components in New England: 2024 Report\*, Prepared for AESC 2024 Study Group, March 15, 2024.](#)

In 2020, the Trust contracted separately with Synapse to complete a Maine-specific study of the statewide average avoided transmission and distribution costs based on this framework. The PUC subsequently approved the Trust's request to incorporate the results of that study into its cost-effectiveness screening.<sup>5</sup> To keep this study current with the Triennial Plan VI period, the Trust adjusted these figures to \$2024 constant dollars using the Gross Domestic Product: Chain-type Price Index.<sup>6</sup>

## **8. What elements of avoided energy costs are included in Triennial Plan VI?**

Triennial Plan VI includes all four of the avoided energy cost elements explicitly required by statute:

- (1) Retail value of natural gas/electricity supply including a wholesale risk premium;
- (2) Statewide average value of avoided marginal transmission and distribution costs;
- (3) Statewide average for line losses; and
- (4) Demand reduction induced price effects.

The Appendix G-3 spreadsheet (Triennial Plan VI Avoided Energy Cost Data Set) shows the elements of the avoided costs and the values, or value sets, associated with those elements provided by the AESC 2024 that the Trust will incorporate into Triennial Plan VI. Those elements are summarized below:

### **1. Retail Electric Energy**

- a. See Appendix E-3, AppdxB Tab, Columns AX-BA for the four costing periods of Winter Peak, Winter Off-Peak, Summer Peak, and Summer Off-Peak
- b. Source: AESC 2024 Report, Counterfactual #1, Region = Maine, FCM bid assumption = 100%, Appendix B, Columns AX-BA

### **2. Retail Electric Capacity (Current-Day and Future Capacity Markets), Cleared**

- a. See Appendix E-3, AppdxB Tab, Column BR, BZ, CH
- b. Source: AESC 2024 Report, Counterfactual #1, Region = Maine, FCM bid assumption = 100%, Appendix B, Column BR, BZ, CH

### **3. Wholesale Energy Demand Reduction Induced Price Effect (DRIPE)**

- a. See Appendix E-3, User Interface Tab, Columns R-AA for the costing periods of Winter Peak, Winter Off-Peak, Summer Peak and Summer Off-Peak

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<sup>5</sup> State of Maine Public Utilities Commission, "Efficiency Maine Trust Request for Approval of Fourth Triennial Plan for Fiscal Years 2020-2022," Docket No. 2018-00321, Order on Significant Change, April 14, 2024.

<sup>6</sup> Federal Reserve Economic Data. Gross Domestic Product: Chain-type Price Index (GDPCTPI). <https://fred.stlouisfed.org/series/GDPCTPI#0>

- b. Source: AESC 2024 Report, Counterfactual #1, Region = Maine, FCM bid assumption = 100%, Appendix B, Columns L-S

**4. Wholesale Capacity DRIPE (Current-Day and Future Capacity Markets), Cleared**

- a. See Appendix E-3, User Interface Tab, Column AK, AL, AS, AT, BA, BB
- b. Source: AESC 2024 Report, Counterfactual #1, Region = Maine, FCM bid assumption = 100%, Appendix B, Column Z, AB, AH, AJ, AP, AR

**5. Wholesale Reliability (Current-Day and Future Capacity Markets), Cleared**

- a. See Appendix E-3, User Interface Tab, Column AO, AW, BE
- b. Source: AESC 2024 Report, Counterfactual #1, Region = Maine, FCM bid assumption = 100%, Appendix B, Column AD, AL, AT

**6. Avoided Cost for Pooled Transmission Facilities (PTF)**

- a. See Appendix E-3, User Interface Tab, Column AG, AH
- b. Source: AESC 2024 Report, Counterfactual #1, Region = Maine, FCM bid assumption = 100%, Appendix B, Column AG, AH

**7. Wholesale RPS (Renewable Portfolio Standard) Compliance Costs**

- a. See Appendix E-3, User Interface tab, Column J
- b. Source: AESC 2024 Report, Counterfactual #1, Region = Maine, FCM bid assumption = 100%, Appendix B, Column G

**8. Maine Specific Distribution Annualized**

- a. See Appendix E-3, User Interface Tab, Cell BJ35
- b. Source: Commission Approved updated T&D cost, page 3, mid-point

**9. Maine Specific Transmission Annualized**

- a. See Appendix E-3, User Interface Tab, Cell BJ34
- b. Source: Commission Approved updated T&D cost, page 3, mid-point

**10. Maine Specific Non-PTF Annualized**

- a. See Appendix E-3, User Interface Tab, Cell BJ36
- b. Source: Commission Approved updated T&D cost, page 3, mid-point

**11. Avoided Retail Natural Gas**

- a. See Appendix E-3, Some-Margin-NNE Tab, Columns E, H
- b. Source: AESC 2024 Report, Appendix C, Some-Margin-NNE tab, Columns E, H

**12. Gas Supply DRIPE and Gas Cross DRIPE**

- a. See Appendix E-3, DRIPE\_ME Tab, Columns, F, I, O, R
- b. Source: AESC 2024 Report, Appendix C, DRIPE\_ME tab, Columns F, I, O, R

**13. Avoided Cost of Heating Oil**

- a. See Appendix E-3, AvoidedPetCosts Tab, Column C, F
- b. Source: AESC 2024 Report, Appendix D, AvoidedPetCosts Tab, Column C, F

**14. Heating Oil DRIPE**

- a. See Appendix E-3, DFO\_home\_DRIPE Tab, Columns F, L
- b. Source: AESC 2024, Appendix D, DFO\_home\_DRIPE Tab, Columns F, L

**15. Avoided Cost of Kerosene**

- a. See Appendix E-3, AvoidedPetCosts Tab, Column L, Q
- b. Source: AESC 2024 Report, Appendix D, AvoidedPetCosts tab, Column L, Q

**16. Avoided Cost of Propane**

- a. Appendix E-3, AvoidedPetCosts Tab, Column M
- b. Source: AESC 2024 Report, Appendix D, AvoidedPetCosts tab, Column M

**17. Avoided Cost of Pellet Wood**

- a. Appendix E-3, AvoidedPetCosts Tab, Column K
- b. Source: AESC 2024 Report, Appendix D, AvoidedPetCosts tab, Column K

**18. Avoided Cost of Water**

- a. Settlement Value = \$0.0064 per gallon

- b. Source: Per the Third Triennial Plan, represents a mix of water from private wells and public utilities.<sup>7</sup>

**19. Avoided Cost of Motor Gasoline**

- a. Appendix E-3, AvoidedPetCosts Tab, Column R
- b. Source: AESC 2024 Report, Appendix D, AvoidedPetCosts tab, Column R

**20. Motor Gasoline DRIPE**

- a. Appendix E-3, Gasoline\_DRIPE Tab, Columns F, L
- b. Source: AESC 2024, Appendix D, Gasoline\_DRIPE tab, Columns F, L

**21. Retail Incremental Non-Embedded Social Cost of Carbon: Electric**

- a. See Appendix E-3, AppdxBTab, Columns BB-BE for the four costing periods of Winter Peak, Winter Off-Peak, Summer Peak and Summer Off-Peak
- b. Source: AESC 2024 Report, Counterfactual #1, Region = Maine, Appendix B, Columns BB-BE

**22. Non-Embedded Social Cost of Carbon: Natural Gas**

- a. See Appendix E-3, CoC non-electric Tab, Columns B, C
- b. Source: AESC 2024 Report, Counterfactual #1, Region = Maine, Appendix G, Columns Q, R

**23. Non-Embedded Social Cost of Carbon: Heating Oil**

- a. See Appendix E-3, CoC non-electric Tab, Columns E, H
- b. Source: AESC 2024 Report, Counterfactual #1, Region = Maine, Appendix G, Columns T, W

**24. Non-Embedded Social Cost of Carbon: Kerosene**

- a. See Appendix E-3, CoC non-electric Tab, Columns N, S
- b. Source: AESC 2024 Report, Counterfactual #1, Region = Maine, Appendix G, Columns AC, AH

**25. Non-Embedded Social Cost of Carbon: Propane**

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<sup>7</sup> [Triennial Plan III v1 12 22 2015.pdf \(efficiencymaine.com\)](#) p. 2-17

- a. See Appendix E-3, CoC non-electric Tab, Column O
- b. Source: AESC 2024 Report, Counterfactual #1, Region = Maine, Appendix G, Column AD

## **26. Non-Embedded Social Cost of Carbon: Wood Pellets**

- a. See Appendix E-3, CoC non-electric Tab, Column M
- b. Source: AESC 2024 Report, Counterfactual #1, Region = Maine, Appendix G, Column AB

## **27. Non-Embedded Social Cost of Carbon: Motor Gasoline**

- a. See Appendix E-3, CoC non-electric Tab, Column T
- b. Source: AESC 2024 Report, Counterfactual #1, Region = Maine, Appendix G, Column AI

## **9. Why did the Trust choose to implement the social cost of carbon in Triennial Plan VI, as opposed to the marginal abatement cost of carbon in Triennial Plan V?**

Factoring the cost of carbon into the Trust’s calculations of cost-effectiveness reflects the principles of the National Standard Practice Manual for Distributed Energy Resources (NSPM for DERs), Maine policy, and the input of comments received from stakeholders. According to the NSPM for DERs, one of the nine fundamental principles of benefit-cost analysis is that “a jurisdiction’s primary cost-effectiveness test should account for the jurisdiction’s applicable policy goals.”<sup>8</sup> In recent years, Maine’s policy goals have placed increased focus on the urgency and importance of reducing carbon emissions to mitigate the risk of harmful impacts from climate change. The codification of ambitious carbon reduction requirements by 2030, the establishment of renewable energy standards for electricity supply, the tightening of building energy codes, and the setting of beneficial electrification goals for the installation of heat pumps and the purchase of new electric vehicles are but a few of the more notable manifestations of this trend in Maine policy.<sup>9</sup>

For the Triennial Plan V period, the Trust adopted the marginal abatement cost of carbon. This quantification of harm caused by carbon emissions “asserts that the value of damages avoided, at the

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<sup>8</sup> National Energy Screening Project, *National Standard Practice Manual for Benefit-Cost Analysis of Distributed Energy Resources*, August 2020, pp. 2-4.

<sup>9</sup> See, e.g., Public Law, Chapter 476, 129th Maine State Legislature, First Regular Session, An Act To Promote Clean Energy Jobs and To Establish the Maine Climate Council, 2019; Public Law, Chapter 306, LD 1766, An Act To Transform Maine's Heat Pump Market To Advance Economic Security and Climate Objectives, 2019; Public Law, Chapter 313 (2019), An Act To Clarify Certain Standards for the Efficiency Maine Trust's Triennial Plan; and Public Law, Chapter 365, An Act To Support Electrification of Certain Technologies for the Benefit of Maine Consumers and Utility Systems and the Environment, 2019.



margin, must be at least as great as the cost of the most expensive abatement technology used in a comprehensive strategy for emission reduction.”<sup>10</sup>

#### U.S. EPA’s SCC recommendations

... EPA ... proposed a set of [Social Cost of Carbon] SCC estimates in November 2022, consistent with the National Academies’ recommendations. EPA provided these estimates alongside a report describing the methodological updates implemented in its calculations. While previous federal estimates of the SCC relied on default assumptions from three integrated assessment models (IAMs), EPA’s 2022 estimates rely on a detailed breakdown of the four modeling steps (“modules”) required to estimate the SCC. EPA’s approach is generally consistent with that used by Resources for the Future and that likely to have been adopted by the Federal IWG [Interagency Working Group on the Social Cost of Greenhouse Gases]. It represents the best state of the science and can be viewed as the authoritative federally derived calculation of the SCC, replacing that of the Federal IWG.

The SCC calculation modules are socioeconomics and emissions, climate, damages, and discounting. EPA used the latest scientific literature and analysis to develop the modules and ensure that each component of the analysis is state-of-the-art in its respective discipline. The socioeconomics and emissions module results (based on projections from Resources for the Future) are input into the climate module to estimate emissions impacts such as temperature change and sea level rise. These impacts are then monetized in the damages module, which represents how willing people are to pay to avoid physical climate change impacts. The report averages results from three different damage functions—one at a subnational and sectoral scale, one at a country and sectoral scale, and one at a meta-analysis level. The discounting module takes the damages outputs and discounts them to the year of emissions.

Instead of selecting constant discount rates, EPA models dynamic discount rates to account for the relationship between economic growth and consumption. This dynamic framework gives greater weight to damages in a world with low economic growth compared to high economic growth. This is an improvement from previous federal SCC calculations, which only considered static discount rates. To reflect uncertainty in the starting rate, EPA provides outputs using near-term discount rates of 1.5 percent, 2 percent, and 2.5 percent. In general, these discount rates decline over time; as a result, these three specific discount rates (1.5 percent, 2 percent, and 2.5 percent) can be thought of as “starting” discount rates.

Based on this review, the Trust determined that the SCC was a more rigorous methodology than the marginal abatement methodology relied upon previously. The Trust also notes that most other New England states use the SCC for this purpose. The Trust will apply a 2% discount rate to the value of avoided carbon. This decision is based on the analysis provided by the AESC 2024, which explained:

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<sup>10</sup> [Synapse Energy Economics, Inc., \*Avoided Energy Supply Components in New England: 2024 Report\*, Prepared for AESC 2024 Study Group, March 15, 2024](#) p. 210.

In its latest projection of the SCC, EPA includes a robust discussion of discount rates. First, EPA updates the formulation of discount rates originally performed in 2003, with some modifications. It provides two different values spanning two different time periods—one covering only the most recent 30 years (1991 to 2020), and one spanning the entire time series, inclusive of all of the years originally considered in the 2003 formulation through today (1973 to 2020). These two time periods are looked at for two reasons: first, the period covering nearer years is useful because it is more reflective of the low interest rate environment present since the early 1990s. The period covering the entire time period is useful because social discount rates should consider a long range of time. The discount rates derived for each of these two time periods are (when rounded) 1.5 percent for the more recent 30 years and 2 percent for the full 48-year time period.

Second, EPA considers additional information relevant to discount rates. It discusses discount rate formulations from the Social Security Administration’s Trustees report, and three surveys of economists published in peer-reviewed economics journals on discount rates. In this literature review, EPA notes 2 percent as a commonly identified preferred social discount rate. EPA also derives 2.5 percent as a “high” end boundary of what is reasonable for social discount rates. EPA does not identify any of these as the “correct” social discount rate, instead saying:

Therefore, considering the multiple lines of evidence on the appropriate certainty-equivalent near-term rate, the modeling results presented in this report [published by EPA] consider a range of near-term target rates of 1.5, 2.0, and 2.5 percent. This range of rates allows for a symmetric one point spread around 2.0 percent.

After the publication of this EPA document, in November 2023 OMB finalized its recommendations for discount rates to be used in cost-effectiveness analysis across the federal government. In this most recent analysis, OMB described a switch away from its previous methodology for counting discount rates to one that now utilizes 10-year Treasury Inflation-Protected Securities (TIPS) in place of a combination of 10-year Treasury yield data and inflation adjustors. OMB’s new method also makes an adjustment for the use of different inflation indices. Under this new methodology, and using more recent data than in its previous publications, OMB identifies a discount rate of 2 percent. OMB also announced a plan to update this value with the latest data every three years.

Based on this information, the Trust will apply the 2% discount rate, consistent with the OMB recommendation during the Triennial Plan VI period.

#### **10. Will the Trust include non-energy benefits in its Primary Cost Test during Triennial Plan VI?**

The Trust reviewed the EPA’s May 2021 report “Public Health Benefits per kWh of Energy Efficiency and Renewable Energy in the United States: A Technical Report.”<sup>11</sup> Staff do not recommend including benefits from this report in the quantification of benefits in Triennial Plan VI primarily because they are

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<sup>11</sup> [https://www.epa.gov/sites/default/files/2021-05/documents/bpk\\_report\\_second\\_edition.pdf](https://www.epa.gov/sites/default/files/2021-05/documents/bpk_report_second_edition.pdf)

not included in the AESC 2024. In arriving at this determination, the Staff placed considerable weight on the MRSA 35A §10110 4-A (B), which provides:

The trust shall use, and the commission shall give deference to, values for each element of avoided energy cost from a regional avoided energy supply cost study as long as the analysis has been developed through a transparent process, with input from state agencies, public advocates, utilities or energy efficiency administrators from at least 3 other states in New England and the analysis has been published not more than 24 months prior to the trust's filing of the plan.

**11. Does this conclude your testimony?**

Yes.