



Cost Effectiveness Analysis Methodology

Triennial Plan VI

(FY 2026 - FY 2028)

Board Meeting
August 23, 2023

Overview

- Statutory Framework
- Efficiency Maine Rules
- National Standard Practice Manual
- Cost Effective Calculations

Statutory Framework

Statute 35-A MRS §10110, sub-§4-A

- “The commission shall ensure that transmission and distribution utilities on behalf of their ratepayers procure through the trust the maximum achievable cost-effective electric energy efficiency and conservation resources”
- “Apply the discount rate adopted by the trust...” (§ 4-A, ¶B)
- “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 costs;
 - (3) Statewide average for line losses; and
 - (4) Demand reduction induced price effects.” (§4-A, ¶B)

Statute 35-A MRS §10110, sub-§4-A, con't

- “...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...” (§ 4-A, ¶B)
- “The commission shall consider gross efficiency savings for the purpose of determining savings that are cost-effective, reliable and achievable.” (§ 4-A, ¶C)
- “The commission shall consider whether the trust is taking reasonable steps to achieve high net and gross efficiency savings, including but not limited to the use of national standard practices as identified by the trust by rule.” (§ 4-A, ¶C)
- “Include all beneficial electrification measures that are cost-effective and reliably reduce electricity rates over the life of the measures. In determining whether a measure is cost-effective, the commission shall account for all net energy costs, including savings from avoided heating, transportation or industrial process fuels displaced by the measure.” (§ 4-A, ¶D)

Efficiency Maine Rules

Agency Rules, Chapter 3, §4 Cost-Effectiveness Test

- *“Programs that are reasonably likely to satisfy the test described in this section are cost effective. The cost-effectiveness test is satisfied when the program benefits exceed the program costs. Costs and benefits shall be considered regardless of whether they are paid or experienced by the participant, the Conservation Program Fund, or any other individual, business, or government agency.”*

Agency Rules, Chapter 3, §4.A.1 Program Benefits

- a) *Avoided electric generation costs including energy and capacity costs, using estimates of market prices and adjusting for line losses. These estimates may be differentiated by time periods that influence market prices, including but not limited to peak and off-peak periods and summer and winter periods;*
- b) *Avoided transmission and distribution costs, using estimates of transmission and distribution utility marginal transmission and distribution costs. These estimates may be differentiated by time periods that influence costs;*
- c) *Avoided fossil fuel costs, using estimated savings in oil, gas or other fossil fuel use, at estimated fossil fuel prices;*
- d) *Other resource benefits, such as reduced water and sewer costs;*
- e) *Non-resource benefits, including customer benefits such as reduced operation and maintenance costs, deferred replacement costs, productivity improvements, economic development benefits and environmental benefits, to the extent such benefits can be reasonably quantified and valued.*

Agency Rules, Chapter 4, §4.A.1 Program Benefits

- a) *Avoided natural gas commodity costs. These estimates may be differentiated by time periods that influence market prices, including but not limited to peak and off-peak periods and summer and winter periods.*
- b) *Avoided natural gas transportation, distribution, and storage costs, using estimates of gas transportation marginal costs. These estimates may be differentiated by time periods that influence costs.*
- c) *Avoided electric costs including any energy, capacity, and transmission and distribution costs avoided as a result of program implementation.*
- d) *Other resource benefits, such as reduced water and sewer costs;*
- e) *Non-resource benefits, including customer benefits such as reduced operation and maintenance costs, deferred replacement costs, productivity improvements, economic development benefits and environmental benefits, to the extent such benefits can be reasonably quantified and valued.*

Agency Rules, Chapter 3 & 4, §4.A.2 Program Costs

- a) Direct program costs, including program design, administration, implementation, marketing, evaluation and other reasonably identifiable costs directly associated with the program.
- b) Measure costs. For lost opportunity measures, including new construction or replace-on-burnout measures, measure costs are the incremental costs of the energy efficiency measure over an equivalent baseline measure. For retrofit measures, measure costs are the full cost of the energy efficiency measure, including installation, less any salvage for the replaced measure.
- c) Ongoing customer costs, including costs such as increased operation and maintenance costs, reduced productivity, and lost economic development opportunities, to the extent such costs can be reasonably quantified and valued.

Agency Rules, Chapter 3 & 4, §4.A.3-6 Other Items

- **Discount rate assumption.** *The discount rate used for present value calculations shall be the current yield of 10-year U.S. Treasury securities, plus two hundred basis points, adjusted for inflation.*
- **Net present value.** *Cost effectiveness of an energy efficiency measure will be calculated based on the net present value of the costs and benefits over the expected life of the measure.*
- **Post-program effects.** *For those programs that are expected to influence the development of self-sustaining markets, program cost effectiveness will be calculated for a reasonable additional period after the program is terminated in order to capture post-program market effects.*
- **Incentive Level Limitation.** *When developing a program that satisfies the cost effectiveness test, the Trust shall, when setting incentive levels, consider the value of the program savings associated with electrical production and delivery*

Agency Rule Chapters 3 &4, §4.B Exception

- ***Non-Quantifiable Cost-Effectiveness Test.*** *The Trust may implement a program without satisfying the cost-effectiveness test if:*
 1. *Program benefits are known to exist but cannot be quantified with sufficient accuracy to conclude that the program benefits exceed the program costs;*
 2. *The program satisfies some other statutory criterion or a goal or objective established in Maine statute in implementing the Efficiency Maine Trust Act; and*
 3. *The entire portfolio of conservation programs produces quantifiable benefits that substantially exceed total portfolio program costs.*

National Standard Practice Manual (NSPM)

NSPM – Benefit-Cost Analysis (BCA) Principles

DER = Distributed Energy Resource
Includes: Energy Efficiency, Demand Response,
Load Shifting, Distributed Generation

Fundamental NSPM BCA Principles

Principle 1 **Treat DERs as a Utility System Resource**
DERs are one of many energy resources that can be deployed to meet utility/power system needs. DERs should therefore be compared with other energy resources, including other DERs, using consistent methods and assumptions to avoid bias across resource investment decisions.

Principle 2 **Align with Policy Goals**
Jurisdictions invest in or support energy resources to meet a variety of goals and objectives. The primary cost-effectiveness test should therefore reflect this intent by accounting for the jurisdiction's applicable policy goals and objectives.

Principle 3 **Ensure Symmetry**
Asymmetrical treatment of benefits and costs associated with a resource can lead to a biased assessment of the resource. To avoid such bias, benefits and costs should be treated symmetrically for any given type of impact.

Principle 4 **Account for Relevant, Material Impacts**
Cost-effectiveness tests should include all relevant (according to applicable policy goals), material impacts including those that are difficult to quantify or monetize.

<https://www.nationalenergyscreeningproject.org/national-standard-practice-manual/>

National Standard Practice Manual – BCA Principles Continued

Principle 5 **Conduct Forward-Looking, Long-term, Incremental Analyses**
Cost-effectiveness analyses should be forward-looking, long-term, and incremental to what would have occurred absent the DER. This helps ensure that the resource in question is properly compared with alternatives.

Principle 6 **Avoid Double-Counting Impacts**
Cost-effectiveness analyses present a risk of double-counting of benefits and/or costs. All impacts should therefore be clearly defined and valued to avoid double-counting.

Principle 7 **Ensure Transparency**
Transparency helps to ensure engagement and trust in the BCA process and decisions. BCA practices should therefore be transparent, where all relevant assumptions, methodologies, and results are clearly documented and available for stakeholder review and input.

Principle 8 **Conduct BCAs Separately from Rate Impact Analyses**
Cost-effectiveness analyses answer fundamentally different questions than rate impact analyses. Cost-effectiveness analyses should therefore be conducted separately from rate impact analyses.



Cost Effective Calculations



Cost Effectiveness Calculations

Primary Benefit Cost Test

$$BCR = \frac{NPV(Lifetime\ Benefits)}{NPV(Lifetime\ Costs)}$$

Benefit Cost Ratio (BCR) \geq 1 = Cost Effective

Program Administrator Cost Test

$$PACT = \frac{NPV(Lifetime\ Benefits)}{NPV(Lifetime\ Program\ Administrator\ Costs)}$$

NPV = Net Present Value – calculation of today's value of future costs and benefits taking the time value of money into account using a discount rate. A dollar tomorrow is worth less than a dollar today.

Cost Effectiveness Calculation Building Blocks

- ***Electric, Natural Gas, and Unregulated Fuels cost-effectiveness calculated pursuant to EMT Rules.***
- **Data Sources:**
 - **Efficiency Maine Technical Reference Manuals (TRMs)** – The TRMs document the Trust’s calculation of energy and demand savings from energy-efficiency measures. Each TRM serves as a central repository and common point of reference for the methods, formulas, assumptions and sources that are used to estimate savings from energy-efficiency measures and provides a common platform for analyzing energy savings across measures and programs.
 - **Avoided Energy Supply Costs Study Group** – The group publishes the Avoided Energy Supply Component (AESC) Study report which contains cost streams of marginal energy supply components that can be avoided in future years due to reductions in the use of electricity, natural gas, and other fuels as a result of program-based energy efficiency or other demand-side measures across all six New England states. The next report will be published in 2024. The study sponsors are Avangrid, Cape Light Compact, Efficiency Maine, Eversource, Liberty Utilities, National Grid USA, New Hampshire Electric Co-op, Rhode Island Energy, Unitil, and the State of Vermont (with the State of Vermont contracting via the Vermont Energy Investment Corporation)

Cost Effectiveness Calculation Building Blocks, cont.

- **Benefits:** AESC-determined benefits including reduced energy and peak demand usage, water savings, and reduced operations and maintenance costs
- **Costs:** participant incremental costs, incentives, increased operations and maintenance, AESC determined costs due to increased energy and peak demand usage, and program delivery expenses
- Cost-effectiveness screening is assessed at **gross**.
- Cost-effectiveness screening is assessed at the **measure level**, rather than at the program level.
 - *For Low-Income Initiatives only:* screening is assessed at the *project level* (a project is defined as a bundle of related measures installed concurrently).

Cost Effectiveness Calculation Building Blocks (continued)

- The **discount rate** is set current yield of 10-year U.S. Treasury securities, plus two hundred basis points, adjusted for inflation (per Ch. 3 and Ch. 4 of Trust rules).
- **Free-ridership rates** are set at the level determined in a given program's most recent evaluation. The Trust uses a default free-ridership rate of 25% for unevaluated measures where comparable evaluated measures do not exist.
 - *For Low-Income Initiatives only:* default free-ridership rate is 0%
- **Operations and Maintenance (O&M)** costs and benefits are included in screening of measures when quantifiable and material.

Factors not Monetized in Benefit-Cost Analysis

- Full customer bill savings
 - Difference between avoided energy supply component cost and retail pricing
 - Fixed Transmission and Distribution (T&D) costs
- Lost revenues to utilities
- Non-energy benefits
 - Health impacts
 - Productivity impacts
 - Comfort impacts
 - Societal benefits of low-income programs
 - Environmental impacts

Questions?