TSC Meeting #2: Benefit Cost Analysis part 1

Non-Gas Pipeline Alternatives Stakeholder Process

December 17th, 2024

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Proposed Meeting Schedule

#	Date	Topic
1	November 18th, 2024	NPA project identification • What makes a good NPA • Project attributes including type, cost, and timeline
2	December 17th, 2024	Cost test pt. 1 • BCA framework, including discussion on benefit/cost categories
3	January 14th, 2025	Cost test pt. 2 • City of Somerville presentation on Dx upgrades and networked geothermal's impact • Continuation of BCA framework discussion
4	February 11th, 2025	Technical feasibility pt. 1 (utility) • Hydraulic feasibility • Engineering process/challenges faced by engineers
5	February 25th, 2025	Technical feasibility pt. 2 (customer) & bike rack • *Technical* challenges arising from customer participation • Decommissioning process • Customer renovation and installation experience; technical challenges; panel upgrades; weatherization • Open items from NPA Working Group process

Agenda

Time	Topic
11-11:10	Goals and Working Group Questions on Cost Effectiveness Tests
11:10-11:30	Background on Cost Effectiveness Tests
11:30-12:00	Background on Massachusetts Cost Effectiveness Tests
12:00-12:45	Eversource BCA Proposal
12:45-1:00	Wrap up and next steps

Goals and Working Group Questions on Cost Tests

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Goal of today's discussion

- BCA Meeting #1: Align on the recommended set of cost effectiveness test(s)
- BCA Meeting #2: Develop a more detailed recommendation of test(s) design including components

Working Group questions – for discussion during today's BCA meeting

Questions
1. What are the benefits and costs that should be considered within the framework?
2. How should carbon be treated?
3. Should a Participant Cost Test be evaluated?
4. How do we account for customer stranded assets?
5. Should environmental justice impacts be considered within the benefit cost analysis?

Background on Cost-Effectiveness Tests

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Objective of benefit cost tests

- **The objective of a cost test is to ensure projects or programs provide net benefit or avoid net cost**
  - Different groups see different costs and benefits, so multiple cost test perspectives exist to capture the net benefit or cost to each group (e.g., societal, participant, ratepayer impact)

Principals of cost test design[1]
1. Align test with jurisdiction's **applicable policy goals**
2. Ensure **symmetry** across costs and benefits
3. Account for all **relevant, material impacts**, even if hard to quantify
4. Conduct **forward-looking, long-term** analysis
5. Avoid **double-counting** through clearly defined impacts
6. Ensure **transparency** in presenting benefit-cost analysis and results

1 - https://www.nationalenergyscreeningproject.org/wp-content/uploads/2023/11/NSPM_for_DERs_Overview_Nov_2023.pdf

Key Excerpts from DPU 20-80 Orders on NPA Analysis

- **DPU Orders 20-80-B and 20-80-C do not specify cost-effectiveness frameworks or thresholds to use to determine NPA viability, and only specify that NPAs must be found to be "non-viable or cost prohibitive"**
  - *"As part of any future cost recovery proposals, LDCs will bear the burden of demonstrating that NPAs were adequately considered and found to be non-viable or cost prohibitive in order to receive full cost recovery." 20-80-B at 98*
- **DPU guidance specifies that NPA analysis should be applied at a project level, with room for materiality screens (e.g. program level) in LDC- and stakeholder-developed NPA analysis frameworks**
  - *"The Department confirms that an NPA analysis should be applied to all investments in new natural gas infrastructure at a project level. The Department will, however, consider the reasonableness of a materiality screen as part of our consideration of the fuller NPA analysis framework to be developed by the LDCs in consultation with stakeholders." 20-80-C at 23*

Commonly used cost test perspectives

Cost Test	Group of Interest
PCT Participant Cost Test	Customers affected by or participating in a particular measure
RIM Ratepayer Impact Measure	Ratepayers who do not participate in the measure
PACT Program Administrator Cost Test	Program administrator, i.e., utility and thus average customer
TRC Total Resource Cost Test	The state, excluding societal externalities
SCT Societal Cost Test	The state, including societal externalities

Costs and benefits categorization across tests

Test	PCT	RIM	PACT	TRC	SCT
Perspective	Participant	Ratepayer	Utility	State	State
Marginal utility cost savings		Benefit	Benefit	Benefit	Benefit
Upfront and maintenance costs	Cost			Cost	Cost
Incentives – Federal	Benefit			Benefit	Benefit
Incentives – State	Benefit				
Incentives – Utility	Benefit	Cost	Cost		
Administrative costs		Cost	Cost	Cost	Cost
Bill savings	Benefit	Cost			
Environmental benefits					Benefit

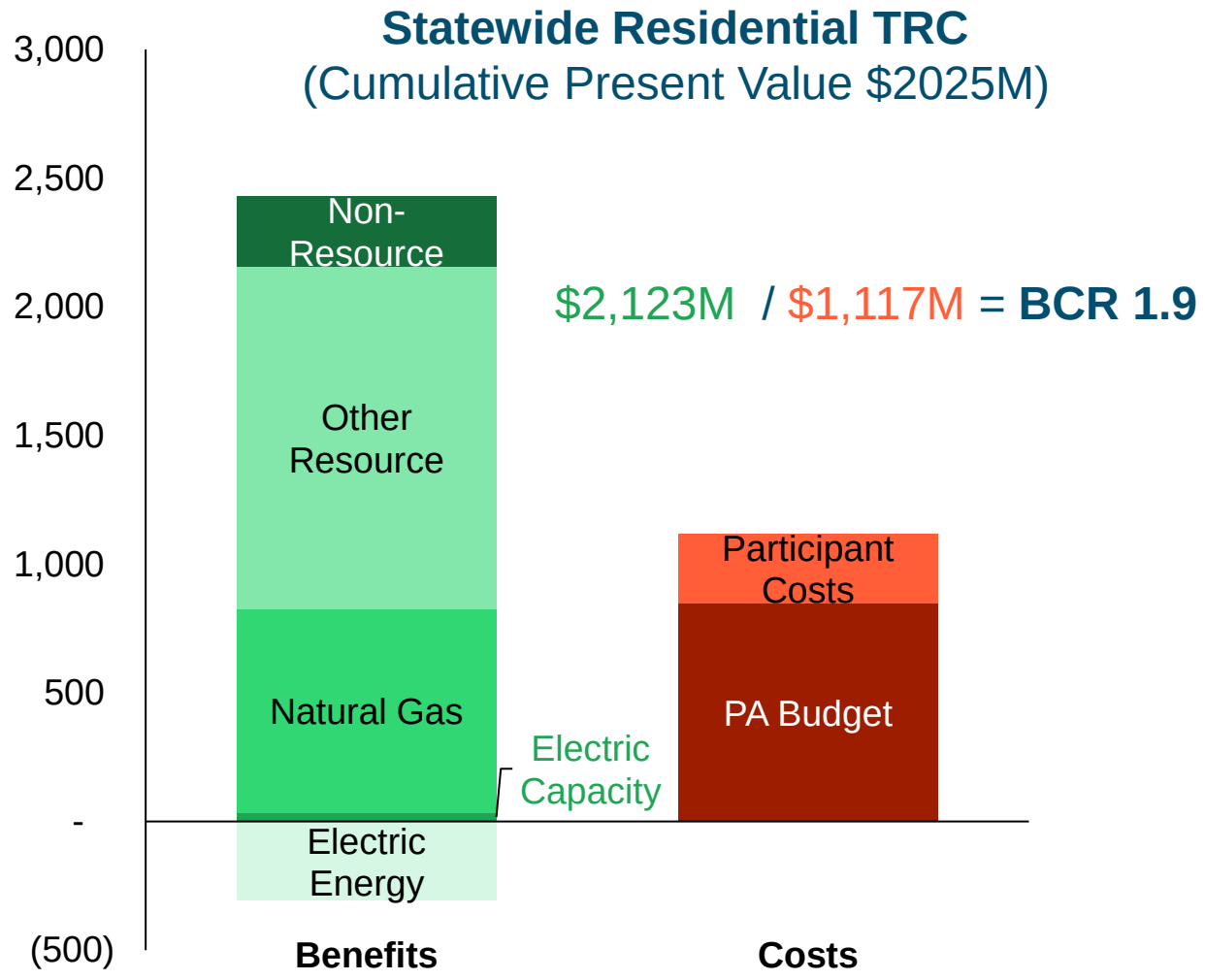
MA energy efficiency guidelines use TRC and includes avoided emissions

Not Applicable

Non-energy impacts are increasingly considered in benefit cost analyses

Cost test scores are used to evaluate whether a program or project passes a specified threshold

+ **Example of a TRC test for Energy Efficiency in Massachusetts[1]**
  - Benefit cost ratio (BCR) ≥1 is required to be considered cost effective
+ **To calculate the BCR, estimated benefits are weighed against estimated costs**
  - BCR = Benefit / Cost



1. *2025-2027 Three-Year Plan, Appendix C*

Cost thresholds in other proceedings

Jurisdiction	Program	Costs Test Used	Benefit-Cost Threshold
MA	EDC Energy Efficiency Plans	TRC + social value of avoided emissions	≥ 1.0
OR	Energy Trust of Oregon	TRC (Required) + PACT (Optional)	> 1.0
CA	IOU EE Programs	TRC (Primary) + PACT and RIM (Secondary)	> 1.0
CO	DSM Programs	“Modified TRC” including utility-specific multiplier established by PUC to capture non-energy benefits	> 1.0 except LI / disadvantaged programs
RI	Energy Efficiency Plans	"RI Test" (SCT including health, economic, and other non-energy benefits)	> 1.0

Massachusetts Cost-Effectiveness Tests

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Components Used in MA Energy Efficiency Guidelines[1]

Electricity

- Energy
- Capacity
- Transmission and distribution
- Environmental compliance
- DRIPE*

Natural Gas

- Energy
- Capacity
- Transmission and distribution
- Environmental compliance
- DRIPE*

Delivered Fuel

- Energy
- Environmental compliance

Non-Energy Impacts

- Reduced O&M
- Water savings
- Reduced arrearages
- Health costs
- Low-income customer benefits

Administrative

- Participant incentive
- Performance incentives for utility
- Marketing and advertising
- Evaluation, measurement, and verification

Participant

- Efficient equipment costs
- Total measure installation costs

Environmental

- Avoided emissions

DRIPE* = demand-reduction-induced price effect, i.e., reduction in energy and capacity prices that occur because of reduction in energy or capacity demand.

1 - *https://www.mass.gov/doc/dpu-20-150-a-appendix-a-final-revised-guidelines-5321/download*

Existing MA cost-effectiveness frameworks present important considerations about NPA BCA

+ **Timeline Considered:** Cost-effectiveness requires the cumulative present value of each sector's benefits equaling or exceeding the cumulative present value of each sectors costs.
  - For NPAs, the time horizon of considered costs and benefits would be an important parameter in determining lifetime cost-effectiveness of projects.

+ **Assumed Counterfactual:** The Massachusetts Clean Energy Climate Plan establishes a building sector sublimit of 49% by 2030. Additionally, the Multistate Memorandum of Understanding sets a target of 65% of residential-scale HVAC shipments (i.e., sales) will be heat pumps by 2030 and 90% by 2040.
  - The assumption used for what customer equipment choices would have been without an NPA influences net costs and benefits for participants and electric system upgrades.

§3.4.3.1 to §3.9.1.1, DPU 20-150-A Energy Efficiency Guidelines May 3, 2021
Accelerating the Transition to Zero-Emission Residential Buildings (MOU) January 30, 2024
Determination of Statewide Greenhouse Gas Emissions Limits and Sector-Specific Sublimits for 2025 and 2030 June 30, 2022

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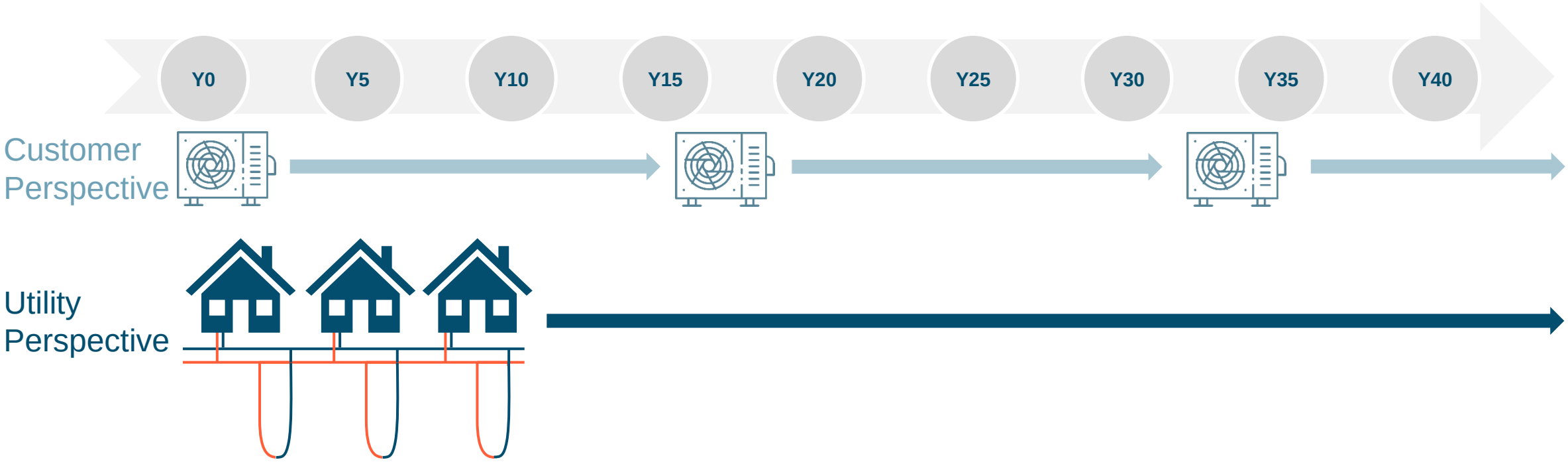

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In line with 2040 target

Efficient Upgrade	Partial Electrification	Total Electrification
Under BAU, participant expected to replace all existing gas equipment with a more efficient gas appliance at end of life	Under BAU, participant expected to replace some existing gas equipment with a mixture of gas and electric appliances at end of life	Under BAU, participant expected to replace all existing gas equipment with electric appliances at end of life

Difference in equipment assumptions between NPA and BAU (upfront cost and bill impacts)

Higher upfront participant costs
Higher electric distribution system upgrade costs

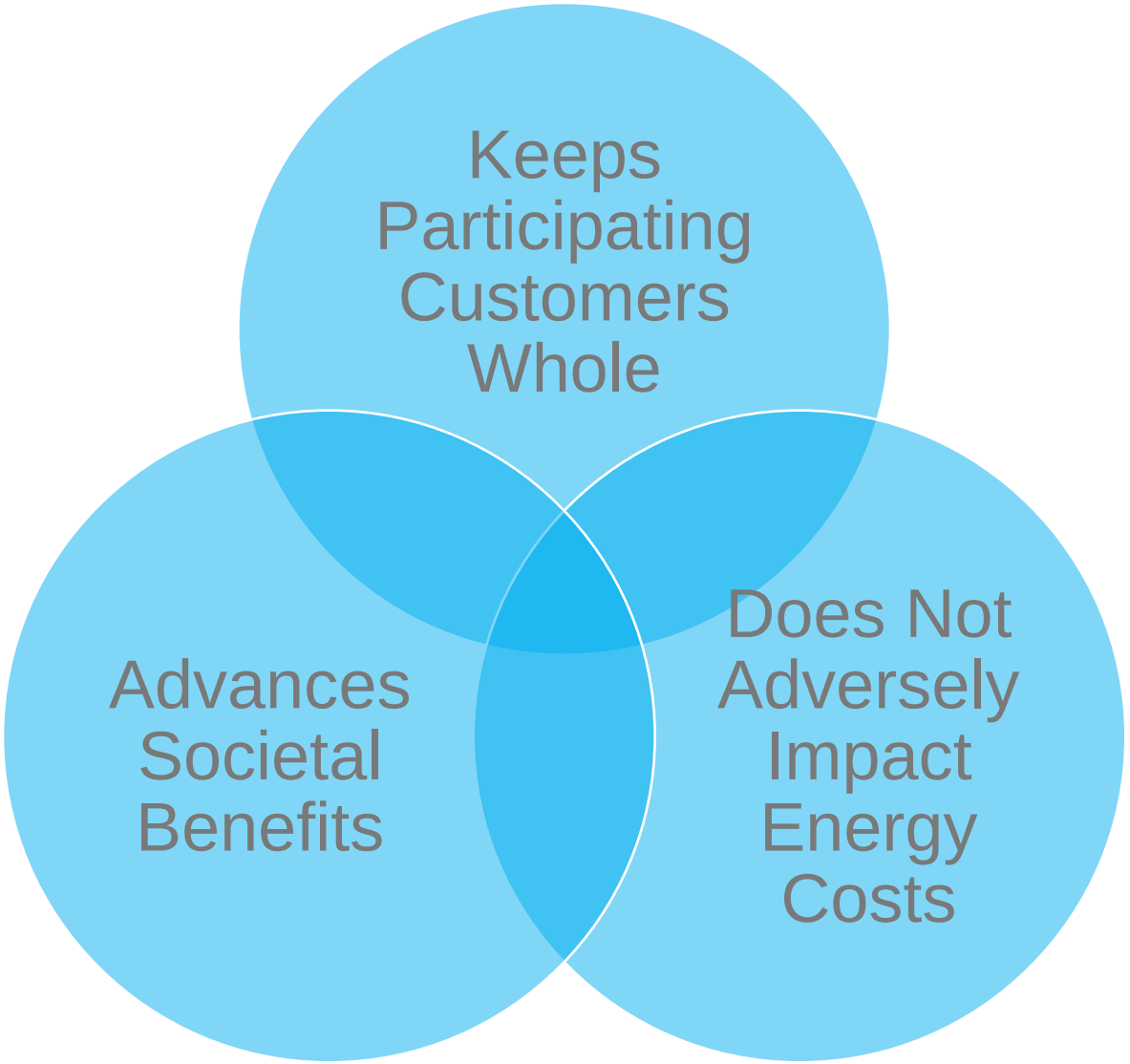
Lower upfront participant costs
Lower electric distribution system upgrade costs

Benefit Cost Analysis

Eversource Proposal

NPA Technical Sub-Committee

Objectives


Keeps Participating Customers Whole
Advances Societal Benefits
Does Not Adversely Impact Energy Costs

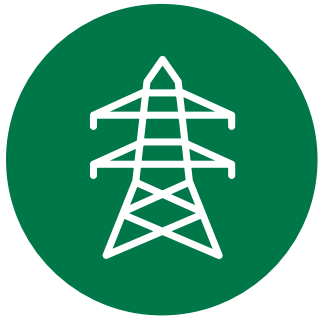
Benefit Cost Analysis Tests

Total Resource Cost (TRC)+

- Ratio of system benefits to program and participant costs.
- If the result is >1, there is positive benefit to society.

Gas Ratepayer Impact Measure (RIM)

- Ratio of gas ratepayer benefits to gas ratepayer costs.
- If the result is >1, rates are reduced, and gas customers save money.



Electric Ratepayer Impact Measure (RIM)

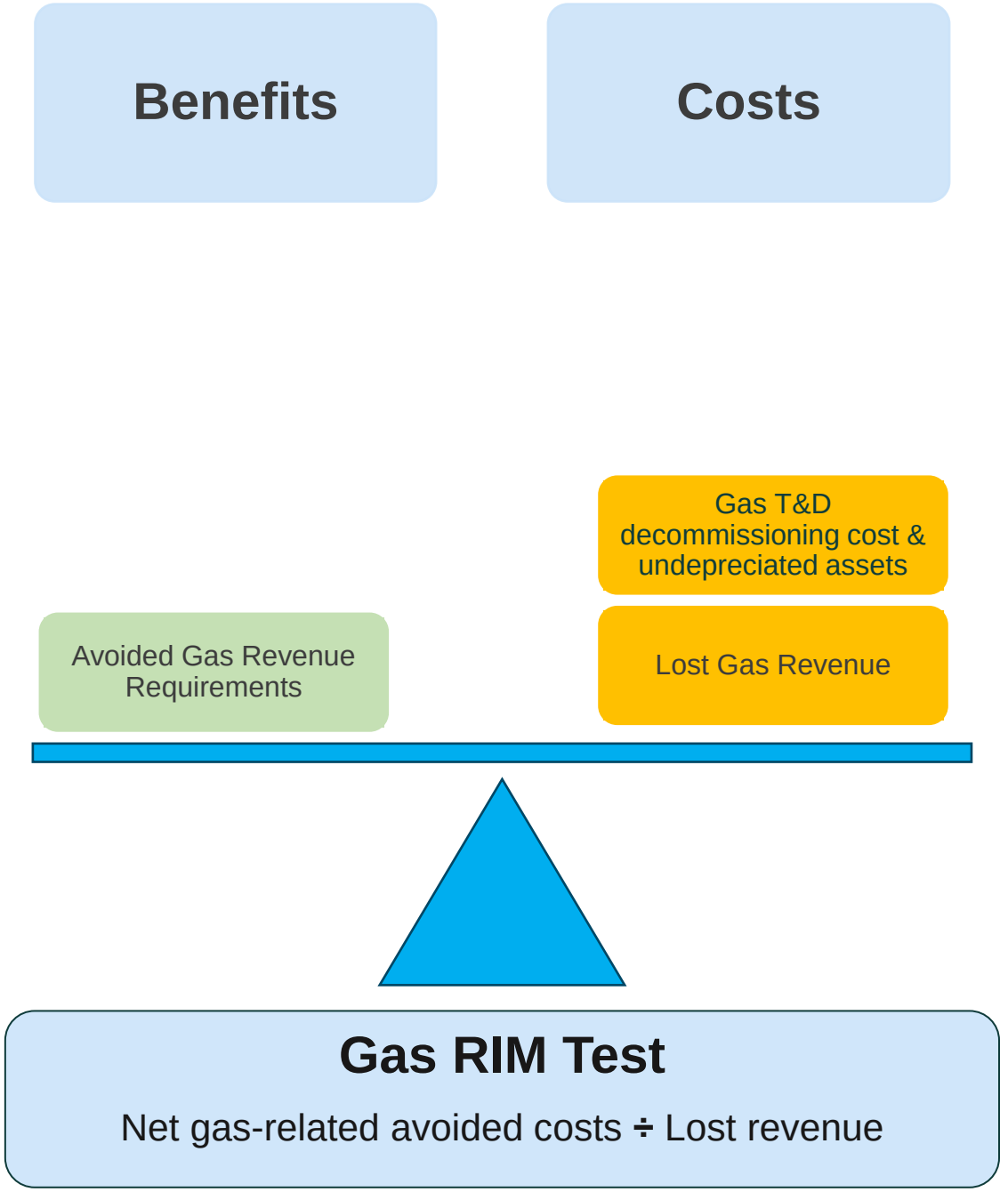
- Ratio of electric ratepayer benefits to electric ratepayer costs.
- If the result is >1, rates are reduced, and electric customers save money.

Participant Cost Test (PCT)

- Ratio of participant benefits to participant costs.
- If the result is >1, participants incur more benefits than costs by participating in the project.

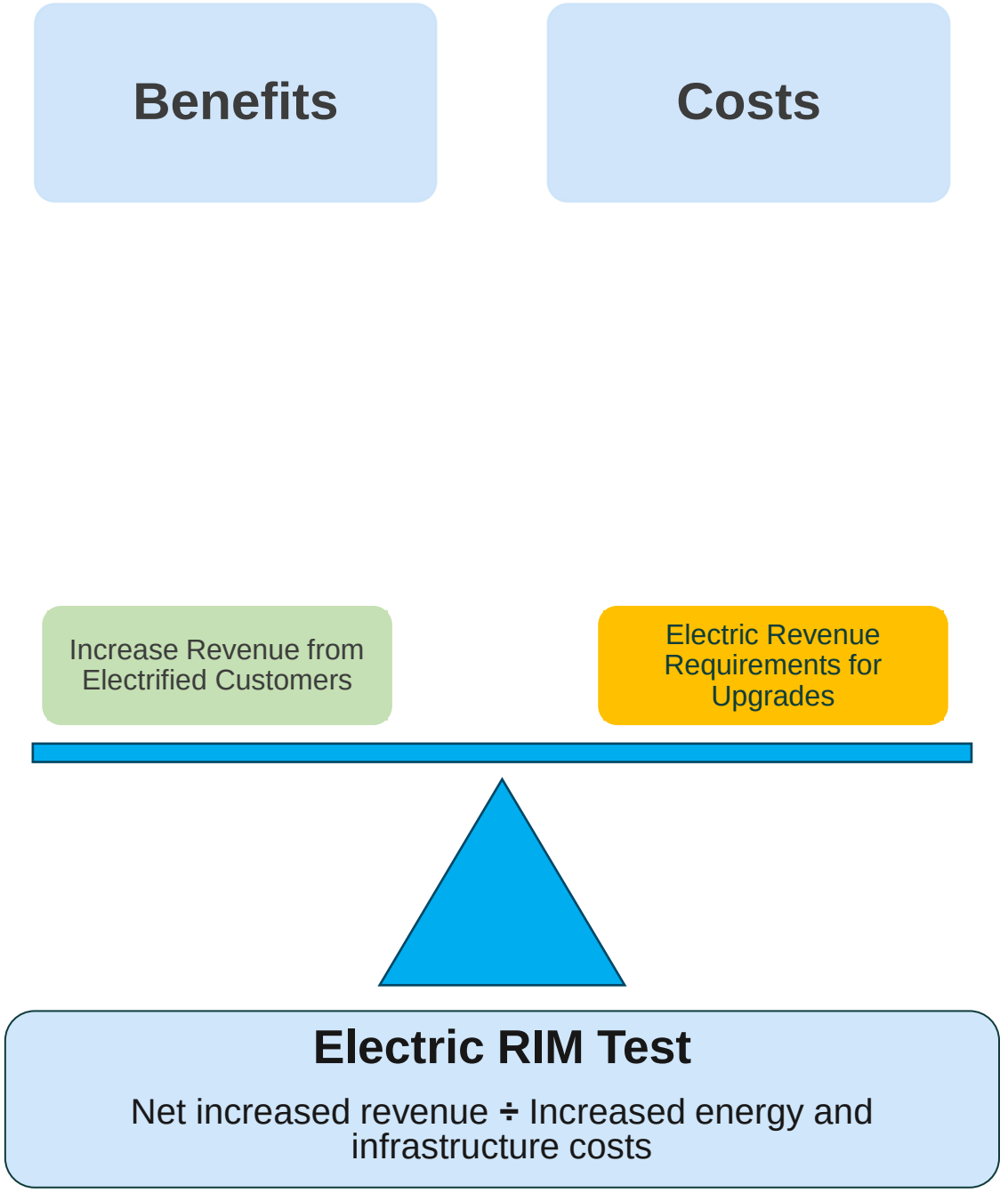
Simplified

Gas Ratepayer Impact Measure (G-RIM) Test



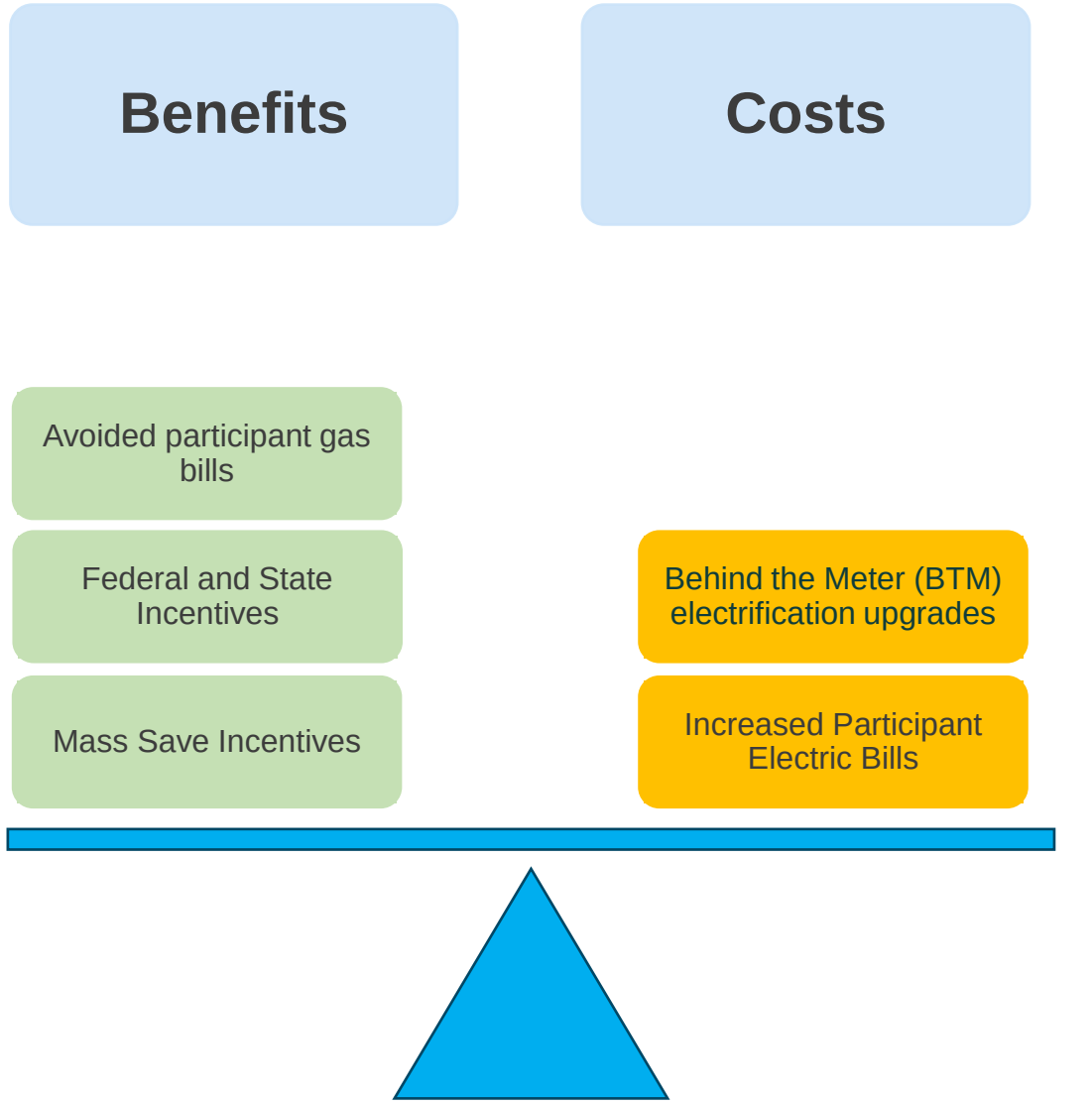
Simplified

Electric Ratepayer Impact Measure (E-RIM) Test



Simplified

Participant Cost Test (PCT)

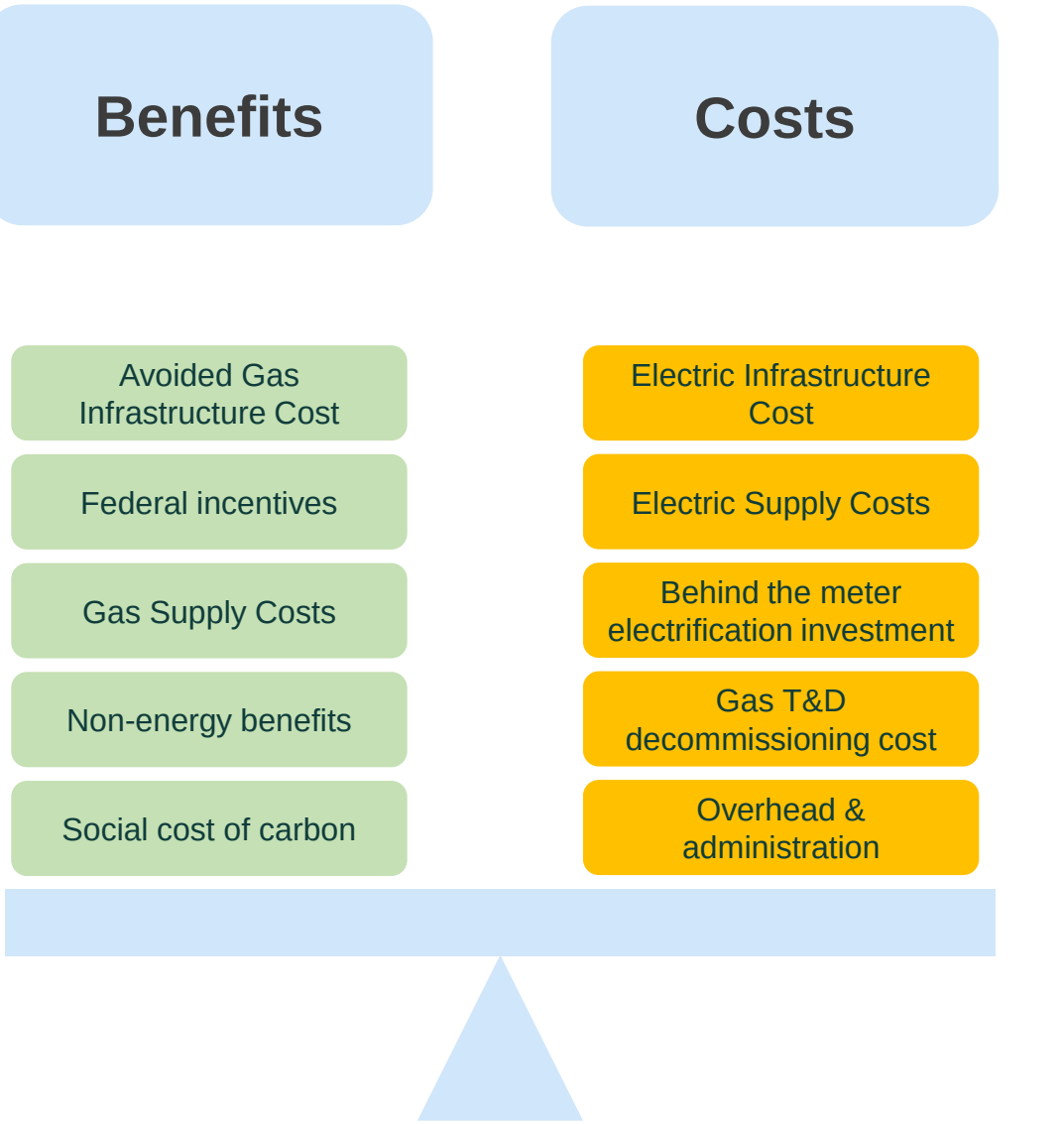


Participant Cost Test

Net bill savings ÷ Net equipment and installation costs

Simplified

Total Resource Cost Test +



Total Resource Cost Test

Net gas-related avoided costs ÷ Lost revenue

Next Steps

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Next steps and follow-up items

- E3 to share slides & meeting notes
- TSC members to provide written feedback via email within 1 week
- E3 to report out on TSC process at the Working Group on February 5th
- Any additional follow-ups?

Thank You

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