Opinion **Dynamics**

IEPEC 2022

MAGNITUDE MATTERS:

RE-EVALUATING TRADITIONAL COST-EFFECTIVENESS PRACTICES FOR ELECTRIFICATION.

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Introduction

- Main differences are of magnitude, not type
- Minimal distortion as heating electrification remains nascent, but it is important to update frameworks to address electrification now to ensure we are valuing these measures and programs appropriately when they begin to reach scale.

Topics:

- Negative benefits or positive costs?
- Existing temporal distortions
- Existing valuation distortions
- What are the right costs?

Heating Electrification

- States and cities are developing and implementing building electrification programs
- Programs are often deployed under the Energy Efficiency umbrella
  - Often driven by carbon reduction goals
  - Have the potential to dramatically change electric load shapes and energy efficiency programs
- Heating electrification is an important component and presents challenges with many traditional cost effectives practices and tools

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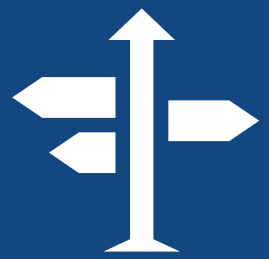


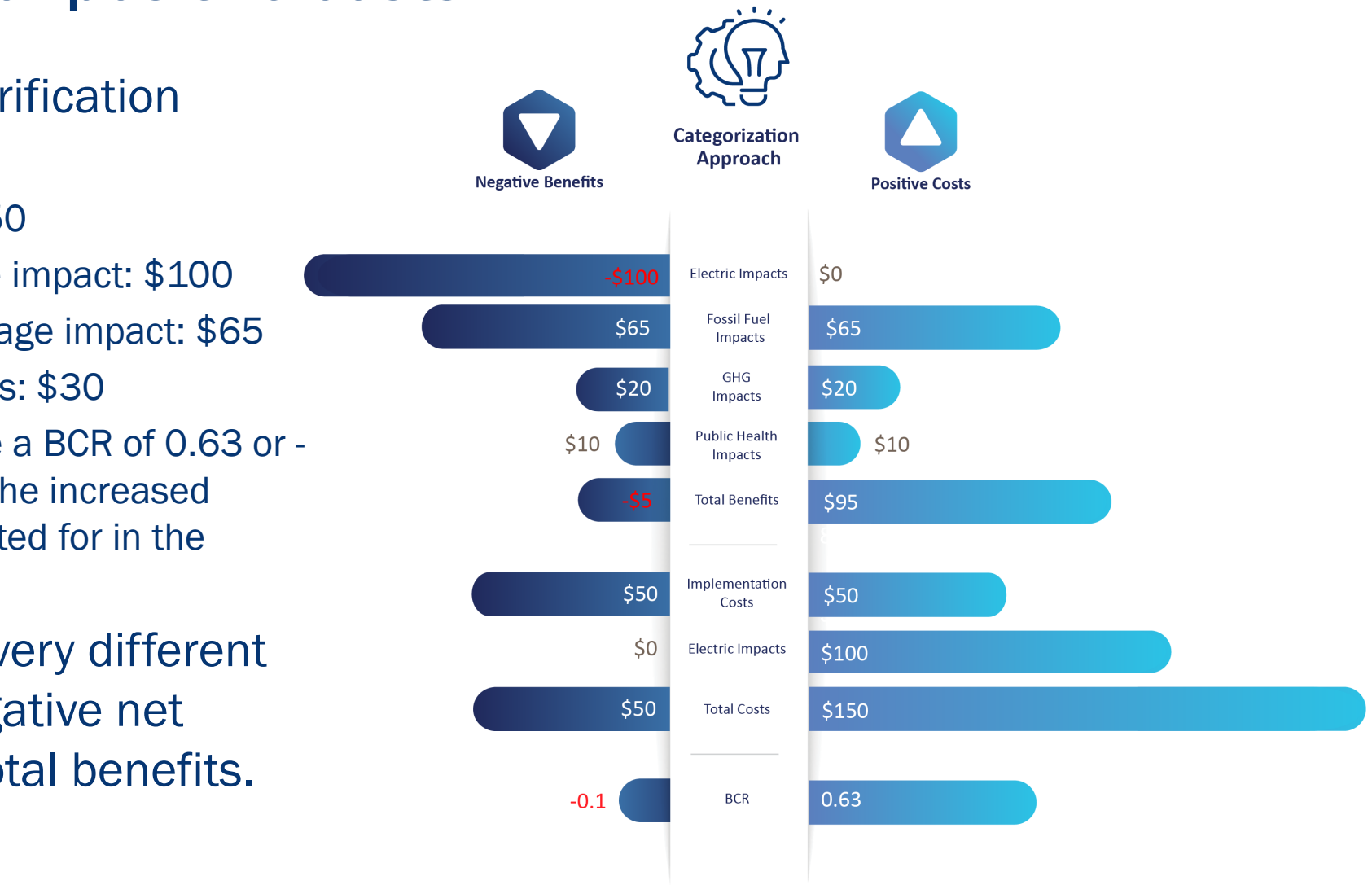
NEGATIVE BENEFITS OR POSITIVE COSTS?

Negative benefits or positive costs?

- Accounting for the negative benefits of electrification as a "cost" versus a "benefit" has real implications on the resulting BCR, although net benefits are unchanged
- When impacts are small, distortion is minimal (e.g., heating penalties)
- Energy efficiency cost effectiveness calculators are often living documents, and updates are often path-dependent

Negative benefits or positive costs?

- Example fictional electrification program
  - Implementation cost: $50
  - Increased electric usage impact: $100
  - Decreased fossil fuel usage impact: $65
  - Auxiliary societal benefits: $30
  - This program could have a BCR of 0.63 or -0.1, depending on how the increased electric usage is accounted for in the analysis (see right).
- These two BCRs send very different messages – either negative net benefits, or negative total benefits.
- Results: Indeterminate



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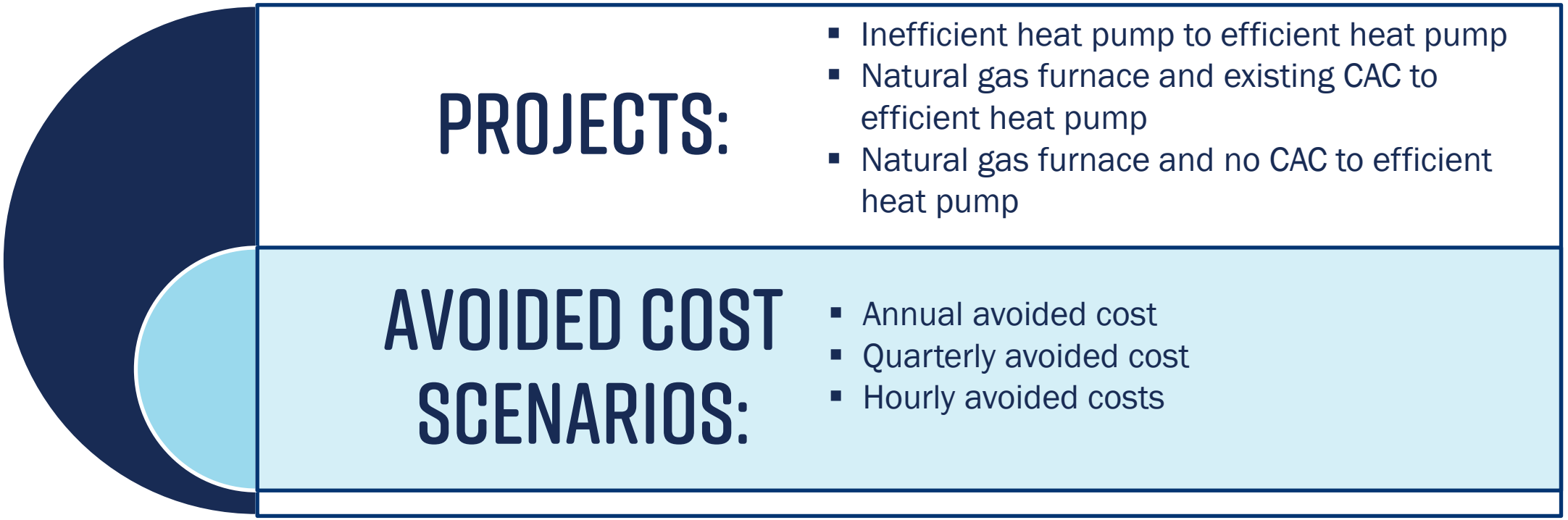
EXISTING TEMPORAL DISTORTIONS

Existing Temporal Distortions

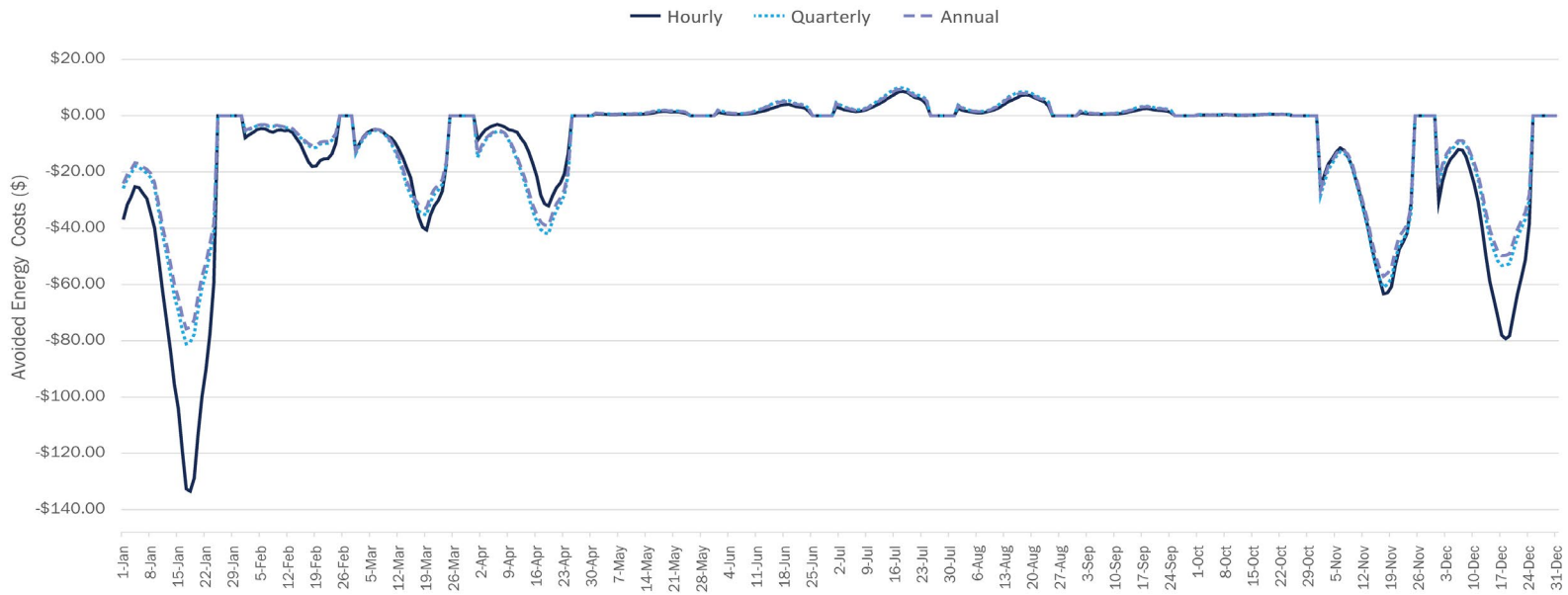
Calculated total net present value of electric benefits for three different projects under three valuation avoided cost scenarios each



Existing Temporal Distortions

- Same savings, different benefits
- Percent change in electric benefits vs annual avoided cost

Avoided cost type	Percent change of NPV of benefits (vs annual)		
	Inefficient heat pump to efficient heat pump	Natural gas furnace and existing CAC to efficient heat pump	Natural gas furnace and no CAC to efficient heat pump
Hourly	115%	134%	117%
Quarterly	115%	107%	107%
Annual	100%	100%	100%



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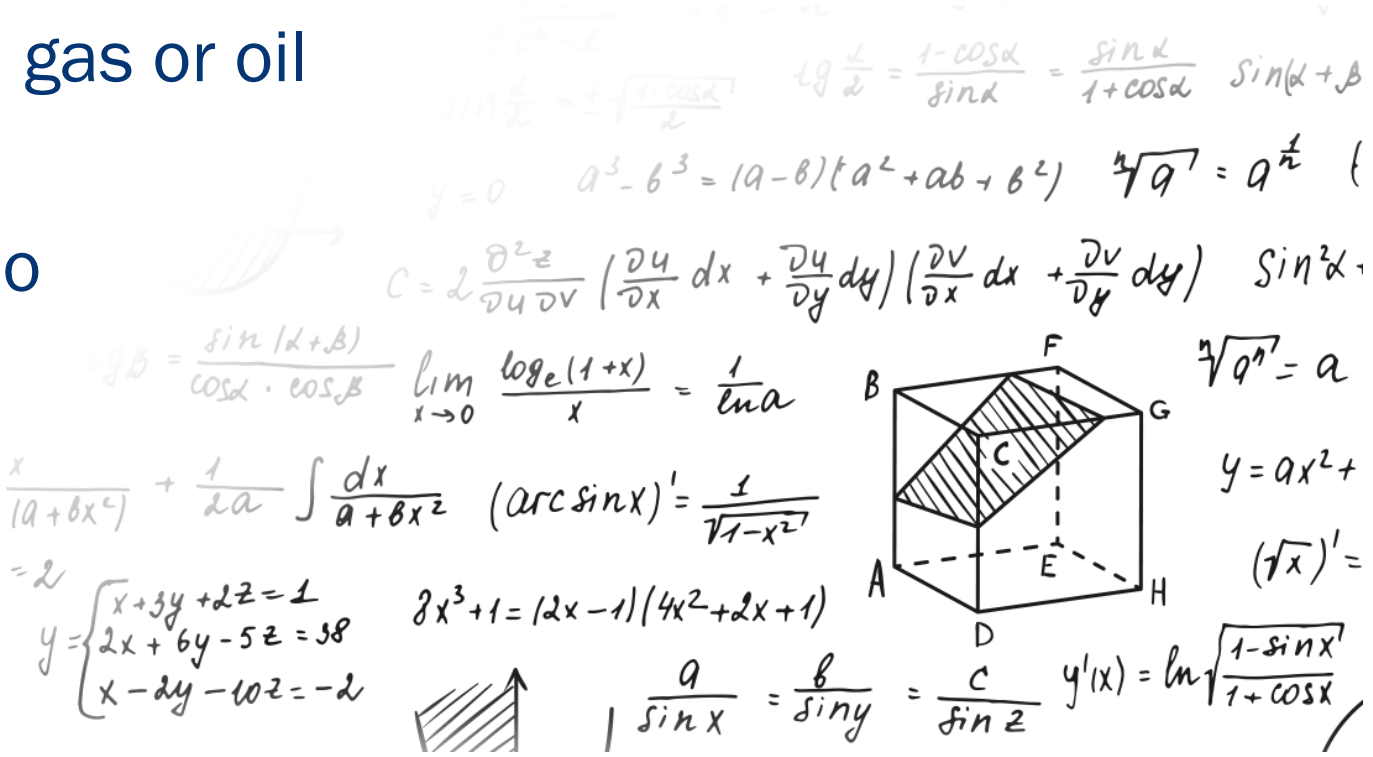
EXISTING VALUATION DISTORTIONS

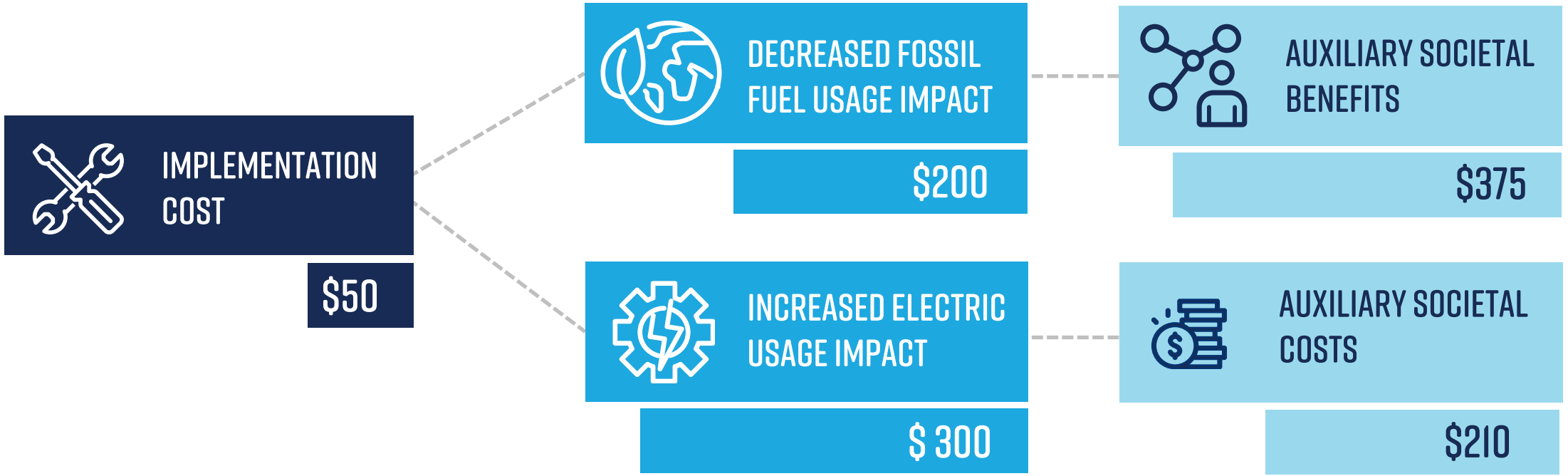
Existing Valuation Distortions

- Carbon reduction is a primary impetus for electrification programs
- The auxiliary benefits of conserving electric energy may be more studied and complete in cost effectives tools then the benefits of conserving a unit of natural gas or oil
- The BCA equation will be unbalanced and appear “too small”



Existing Valuation Distortions

Consider, if you will…



If the administrator values electric auxiliary benefits but not fossil fuel auxiliary benefits, BCRs could be significantly distorted

Existing Valuation Distortions – No Auxiliary Impacts

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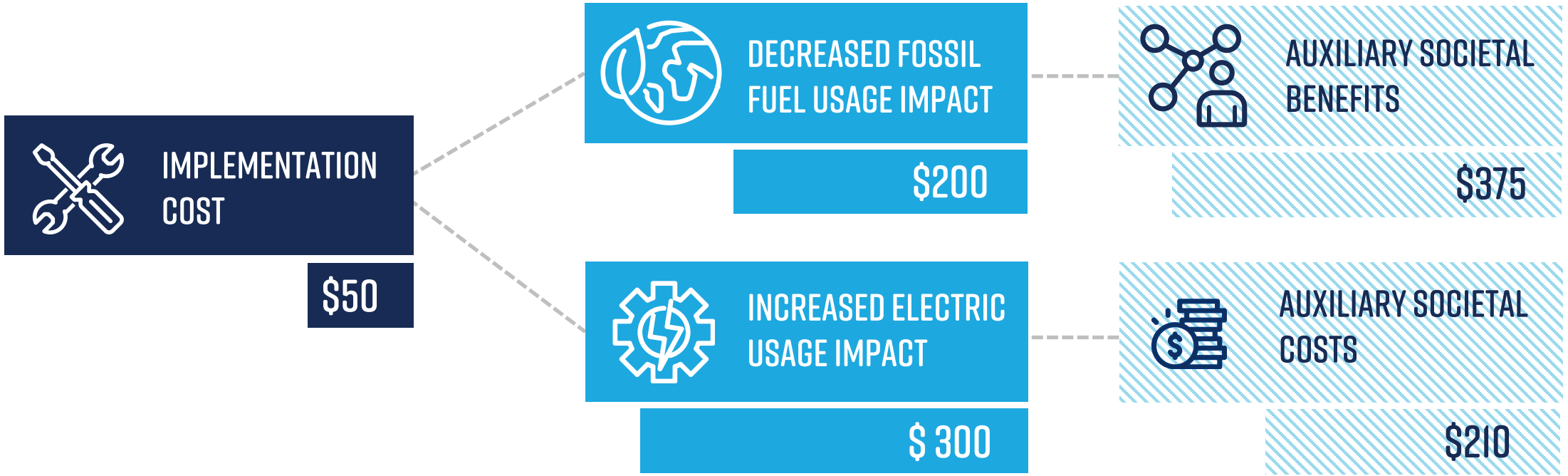

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Existing Valuation Distortions – Improper Valuation

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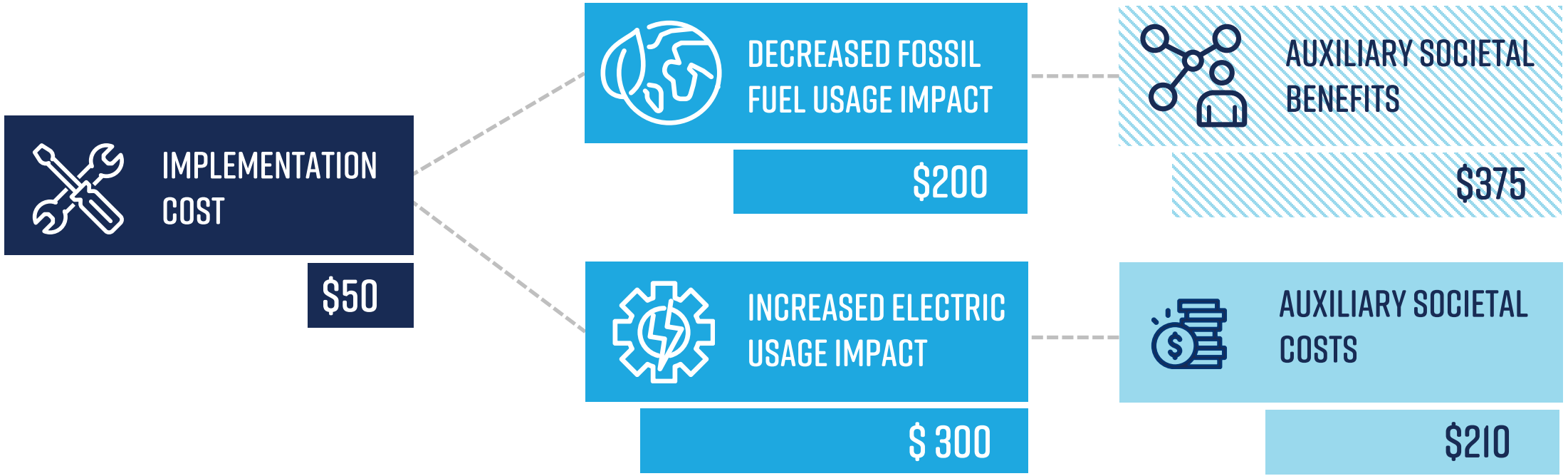

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Existing Valuation Distortions – Proper Valuation

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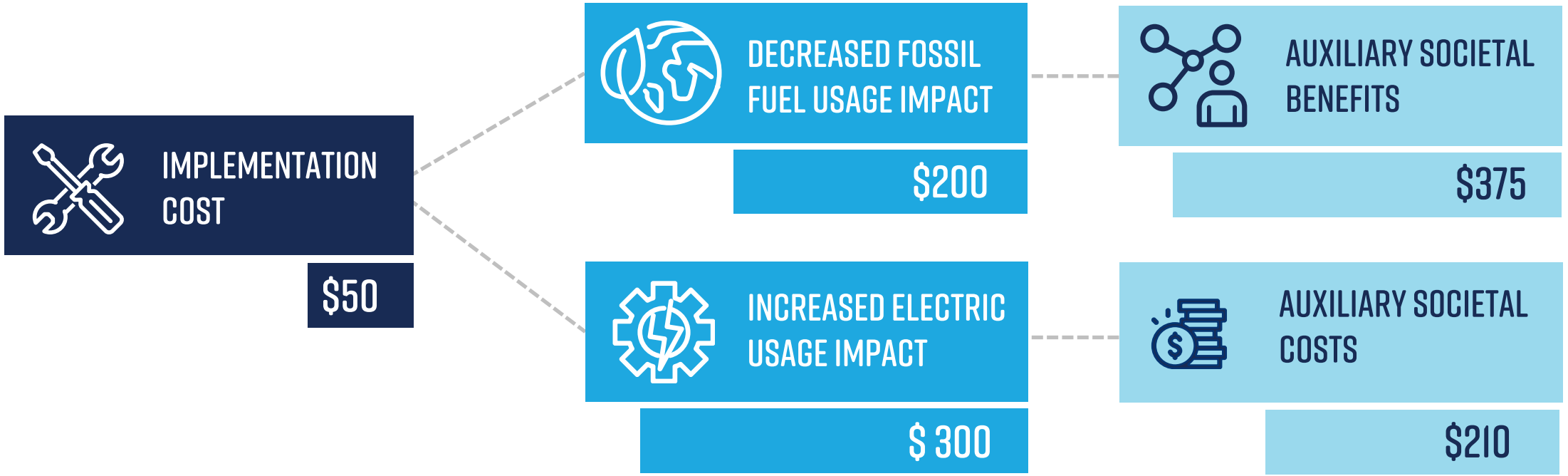

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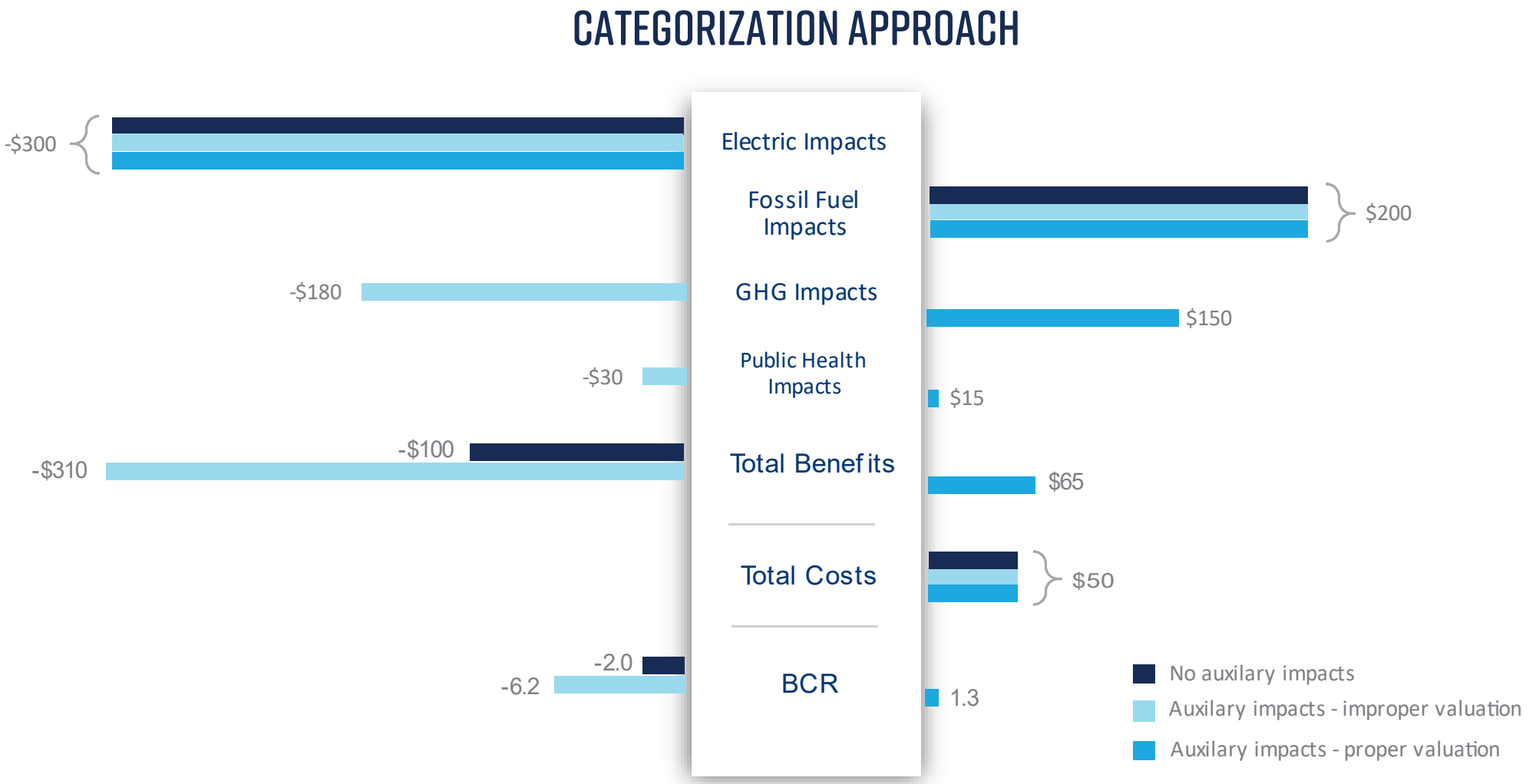
Existing Valuation Distortions



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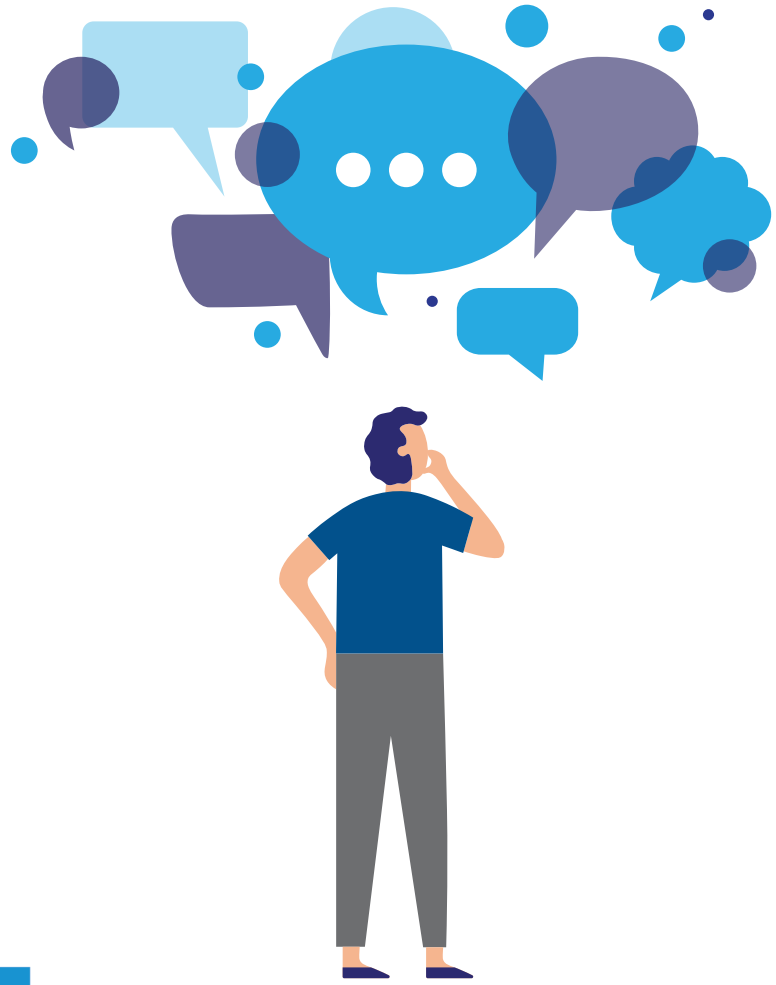
WHAT ARE THE RIGHT COSTS?

What are the right costs?

- Evaluation often relies on theoretical, counterfactuals to estimate avoided costs… and for good reason. Still true for electrification?
- Heating electrification has the potential to impact the electrical grid and utility expenditures in a significant manner.
- Should cost effectiveness consider the broader utility perspective? (e.g., distribution system planners)

Final Thoughts



- Cost effectiveness protocols are sometimes statutorily defined and prescribed, calculation tools can be unwieldy and path-dependent
- Existing distortions are amplified for heating electrification measures
- We should invest time in discussing key questions and adapting protocols and processes to prepare for the future

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