



# Metrics TAC Subgroup

Report-out to TAC  
02/04/2021

# Introduction

- The Technical Advisory Committee supports the Electrification Action Plan (EAP) -
  - *The EAP is examining how electrification can serve to reduce carbon emissions, increase energy efficiency, and optimize the electricity system with the aim of developing recommendations for policy makers, regulatory agencies, and utilities.*
- The questions the Metrics subgroup sought to answer included -
  - What is the right methodology for cost/benefit testing?
  - How do we quantify those costs and benefits?
  - How do we quantify the carbon impacts?
  - What are the rate impacts of electrification?
- Group met 3 times and benefited from active input and variety of perspectives.

# Subgroup Members

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- Topic 1 – Metrics: Cost Effectiveness Tests
- Topic 2 – Metrics: Beyond Cost Effectiveness Tests
- Topic 3 – Metrics: Electrification Non-Energy Impacts (NEIs) are Important
- Topic 4 – Metrics: More Research Needed on Delivered Fuels
- Key Recommendations

# Topic 1 – Metrics: Cost Effectiveness Tests

**Informed by best practices, cost-effectiveness (CE) tests can measure electrification benefits and costs.**

# Informed by best practice studies, cost-effectiveness tests can measure electrification benefits and costs

What should people know about this?

- The cost-effectiveness framework should be based on MN's objectives for electrification - the state's currently proposed priorities are laid out in the ECO legislation -
  - Also, the National Standard Practice Manual for DERs – “best practices” (Aug 2020) dedicates an entire chapter to electrification and how to evaluate (in EE and non-EE contexts);
- CIP cost-effectiveness (CE) testing can already accommodate heat pumps and other electrification technologies; however, prohibitions on fuel switching hinder such investments -
  - Need to further modify CIP CE to electrify all sectors/technologies (including transportation);
- Test specifics -
  - Incorporate non-energy impacts (NEIs) such as health impacts, which are harder to quantify;
  - RIM (ratepayer impact) test may be useful in evaluating electrification - consider using RIM to test price signals (electric) and to explore long term consequences for the system (gas).

# Discussion Spotlight

**How to: Applying Standard Practice Cost-Benefit  
Testing to Electrification**

# How to: Cost Benefit Testing Best Practices

- Clear path from National Standard Practice Manual for electrification measures
- CIP cost effectiveness testing can be updated to incorporate focus on electrification (depending on fuel switching rules).
- Department of Commerce stakeholder process will address Non-Energy Impact (NEI) factors in cost effectiveness updates for the 2024-2026 triennial.
- Minnesota's ECO legislation would change the metrics discussion.





# How to: Cost Benefit Testing and Electrification

**Example:** Replacing residential gas furnace and electric air conditioner with an air source heat pump.

- Benefits

- Gas capacity
- Gas O&M
- Indoor emissions (NEI)

- Can be Benefit or Cost

- Customer NEIs
- Environmental impacts (NEI)
- Public health (NEI)
- Economic impacts (NEI)
- GHG emissions (NEI)

- Costs

- Program costs
- Customer portion of equipment costs
- Electricity energy costs
- Electricity capacity costs
- Electric T&D capacity costs
- Electric O&M

*“Non-energy impacts” refers to benefits (and costs) associated with investments that are not related to cost to deliver and consume fuels (usually regulated fuels – electricity and natural gas).*

## Topic 2 – Metrics: Beyond CE Tests

**Other metrics, beyond cost-effectiveness tests, will be needed to measure the success of electrification.**

# Other metrics, beyond cost-effectiveness tests, will be needed to measure the success of electrification.

## What should people know about this?

- Can set-up specific metrics directly related to electrification that align with goals (e.g., EV penetration, heat pump penetration, system load factor, etc.) to track progress and focus efforts.
- As factor into any metrics, societal cost of CO<sub>2</sub> should increase over time because future emissions will produce larger incremental damages.
  - Effects of avoided carbon may last longer than the lifetime of the equipment.
- Can also set-up metrics to track accessibility to and benefits from electrification (e.g., disadvantaged community participation in benefits, penetration of electrification measures in disadvantaged communities, etc.).

# Discussion Spotlight

## **Metrics Beyond Cost-Effectiveness**

# Metrics beyond Cost-Effectiveness

## 1. Metrics can be prospective and retrospective.

- Prospective metrics help set goals and priorities (based on policy) that drive actions.
- Retrospective metrics assess whether goals (penetration of electrification measures, disadvantaged community access to benefits) are being achieved.



## 2. Examples include metrics that assess:

- CO<sub>2</sub> emissions avoided by electrification of transportation, buildings, agriculture, and other sectors
- Cost-effective alignment of generation and load
- Access for disadvantaged customers to electrification benefits

# Discussion Spotlight

## **Equitable Outcomes**

Equity means - elimination of barriers to full participation in the *process*, and access to the full benefits of the *outcome*.

- Ben Passer, Fresh Energy, presentation to the Metrics Sub-TAC

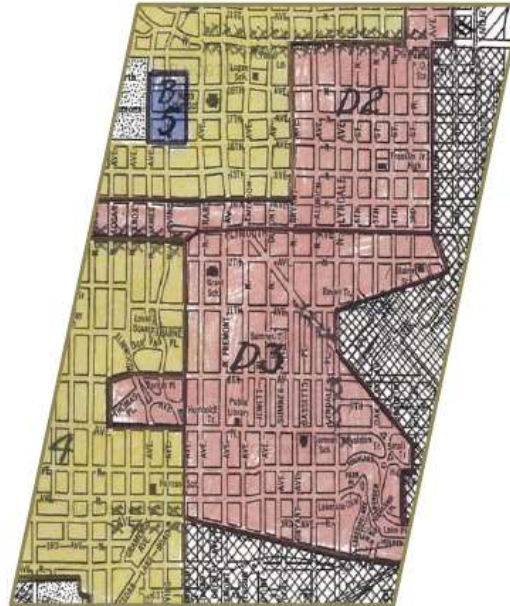
# Lessons From Past Transitions

## Transportation



Credit: Minnesota Historical Society via MinnPost

## Housing



Credit: Home Owners' Loan Corporation, via Mapping Inequality/MinnPost

## Broadband



Credit: Star Tribune



Fresh Energy



# The Greenlining/Energy Efficiency for All (EEFA) Framework

- Assess the communities' needs.
- Establish community-led decision-making.
- Develop metrics and a plan for tracking.
- Ensure funding and program leveraging.
- Improve outcomes.



# Topic 3 – Electrification NEIs are Important

**Non-energy impacts (NEIs) of electrification are important and warrant further research.**

# Non-energy impacts (NEIs) of electrification are important and warrant further research.

What should people know about this?

- Term “non-energy impacts” (NEI) refers to benefits (and costs) associated with investments in electrification that are not related to cost to deliver and consume fuels (usually regulated fuels – electricity and natural gas).
- Examples include valuations for equity, affordability, and clean air.
  - Not every group is impacted the same by electrification technologies and programs (e.g., low income, by geography).
- More research is needed to better identify and quantify NEIs for electrification.

## Topic 4 – Metrics: Research on Delivered Fuels

**More research on the potential of shifting from delivered fuels to electricity is needed.**

# More research on the potential of shifting from delivered fuels to electricity is needed.

What should people know about this?

- Delivered fuels primarily refers to propane and fuel oil (for heating, cooking, agriculture) but can also include petroleum.
- Generally, natural gas utilities are rate-regulated and can recoup costs through rates while delivered fuels companies are not rate regulated.
- Some argue that moving individuals away from propane will increase the supply/delivery costs to others, which has equity concerns.
- Electrification will impact delivered fuel customers differently. For example, agriculture may be the last sector to switch from propane and may, therefore, take the brunt of supply and price effects.

# Key Recommendations

**Focus of recommendations relates to CIP cost-effectiveness but broader metrics are needed**

# Key Recommendations

1. Establish a working group to assess the options and necessary changes in cost-effectiveness methodology for electrification and to propose specific changes. (CIP)
2. Include non-energy impacts in working group discussions. (CIP)
3. Establish metrics to track achievement of electrification beyond cost-effectiveness, especially to track equity considerations. (Beyond CIP)
4. Conduct more research on the impacts of electrification on delivered fuel customers. (CIP/Beyond CIP)

# Additional Documentation

Research Needs, Policy Implications, and Recommendations  
as identified by the Technical Advisory Committee



# Topic 1: Informed by best practice studies, cost-effectiveness tests can measure electrification benefits and costs

2) What research is needed?	<ul style="list-style-type: none"><li>• Explore how other states approach cost-effectiveness testing for electrification.</li><li>• Applicability gas and electric RIM test in evaluating electrification.</li></ul>
3) What policy issues are there?	<ul style="list-style-type: none"><li>• Changes to CIP framework.</li><li>• Incorporation into ECO legislation.</li><li>• Utilities' role in promoting transportation electrification and the nexus with energy efficiency (CIP) and demand response.</li></ul>
4) Do we have any recommendations?	<ul style="list-style-type: none"><li>• Establish a working group to assess the options and necessary changes in cost-effectiveness methodology for electrification and to propose specific changes.</li><li>• Explore adequacy of RIM test and if/how it needs to be modified to meet needs of electrification.</li></ul>

## Topic 2: Other metrics, beyond cost-effectiveness tests, will be needed to measure the success of electrification.

2) What research is needed?	<ul style="list-style-type: none"><li>• Understand which metrics would help improve equity in electrification.</li><li>• Assess how the currently planned infrastructure build out relates to projected need.</li></ul>
3) What policy issues are there?	<ul style="list-style-type: none"><li>• Who would track these metrics?</li><li>• Do we need a central decision-making body to track metrics and provide consistency?</li></ul>
4) Do we have any recommendations?	<ul style="list-style-type: none"><li>• Incorporate non-cost effectiveness metrics into the goals of the established working group - working group goals should be consistent with goals in ECO legislation.</li><li>• Absent legislation's passage, set up a group to pursue similar goals.</li></ul>

# Topic 3: Non-energy impacts of electrification are important and warrant further research, especially for low-income sector.

2) What research is needed?	<ul style="list-style-type: none"><li>• Can we incorporate electrification into existing NEI research?</li><li>• Should we study NEIs as a group or prioritize specific NEIs for more in-depth research?</li><li>• What are the job impacts (cost) of electrification, especially in segments highly reliant on natural gas?</li></ul>
3) What policy issues are there?	<ul style="list-style-type: none"><li>• Changes to CIP framework</li></ul>
4) Do we have any recommendations?	<ul style="list-style-type: none"><li>• Include NEIs for electrification in cost-effectiveness calculations.</li><li>• Leverage existing NEI research, but make sure to treat electrification separately.</li><li>• Create list of electrification NEIs to prioritize future research.</li></ul>

# Topic 4: More research on the potential of shifting from delivered fuels to electricity is needed.

2) What research is needed?	<ul style="list-style-type: none"><li>• What share of the total cost of different fuels attributable to distribution?</li><li>• Are customers who use delivered fuels different from those without? e.g., amperage needs.</li><li>• What would the economic impact of shifting from delivered fuels be, especially in rural parts of the state?</li></ul>
3) What policy issues are there?	<ul style="list-style-type: none"><li>• Impacts of shifts away from delivered fuels play a role in ECO legislation debates. May need remedies to address transition issues.</li></ul>
4) Do we have any recommendations?	<ul style="list-style-type: none"><li>• More research is needed.</li></ul>