Electrification in Minnesota

Hamline University
St. Paul, Minnesota
January 7, 2020

Agenda

9:00-9:30am	Welcome & Introduction
9:30-10:30am	Tom Wilson, EPRI
10:30-10:45am	Break
10:45-11:30am	Electrification in Minnesota, Carl Samuelson, Michaels Energy

Project Goals

1. Examine benefits and concerns of increasing electrification as a tool for grid optimization, energy efficiency, and emissions reduction in Minnesota.
2. Convene series of stakeholder meetings to provide information, facilitate discussion and solicit recommendations on key electrification topics.

Project Topics

Technologies

- Electrification technologies and strategies by residential, commercial and industrial sectors
- Cold climate heat pump performance, with focus on suitability for water and space heating in MN
- Electric vehicle technologies, applications, and storage capabilities

Metrics

- How electrification can be measured accurately and consistently with regard to energy efficiency, emissions reduction and grid optimization

Grid Modernization

- Examination of grid modernization benefits associated with greater electrification
- Evaluation of electrification as a tool to achieve system optimization through increased energy efficiency, renewable energy integration, and demand response capabilities
- Evaluation of potential risks associated with increased use of existing electric infrastructure as a result of electrification.

Electrification Action Plan

Considering stakeholder engagement, including stakeholder recommendations, project team will develop action plan detailing:

1. How Minnesota can most effectively leverage and support electrification
2. Metrics, policies and tools needed to determine if/ensure that electrification is beneficial for Minnesota

"Plans are useless, but planning is indispensable"

- Dwight D. Eisenhower

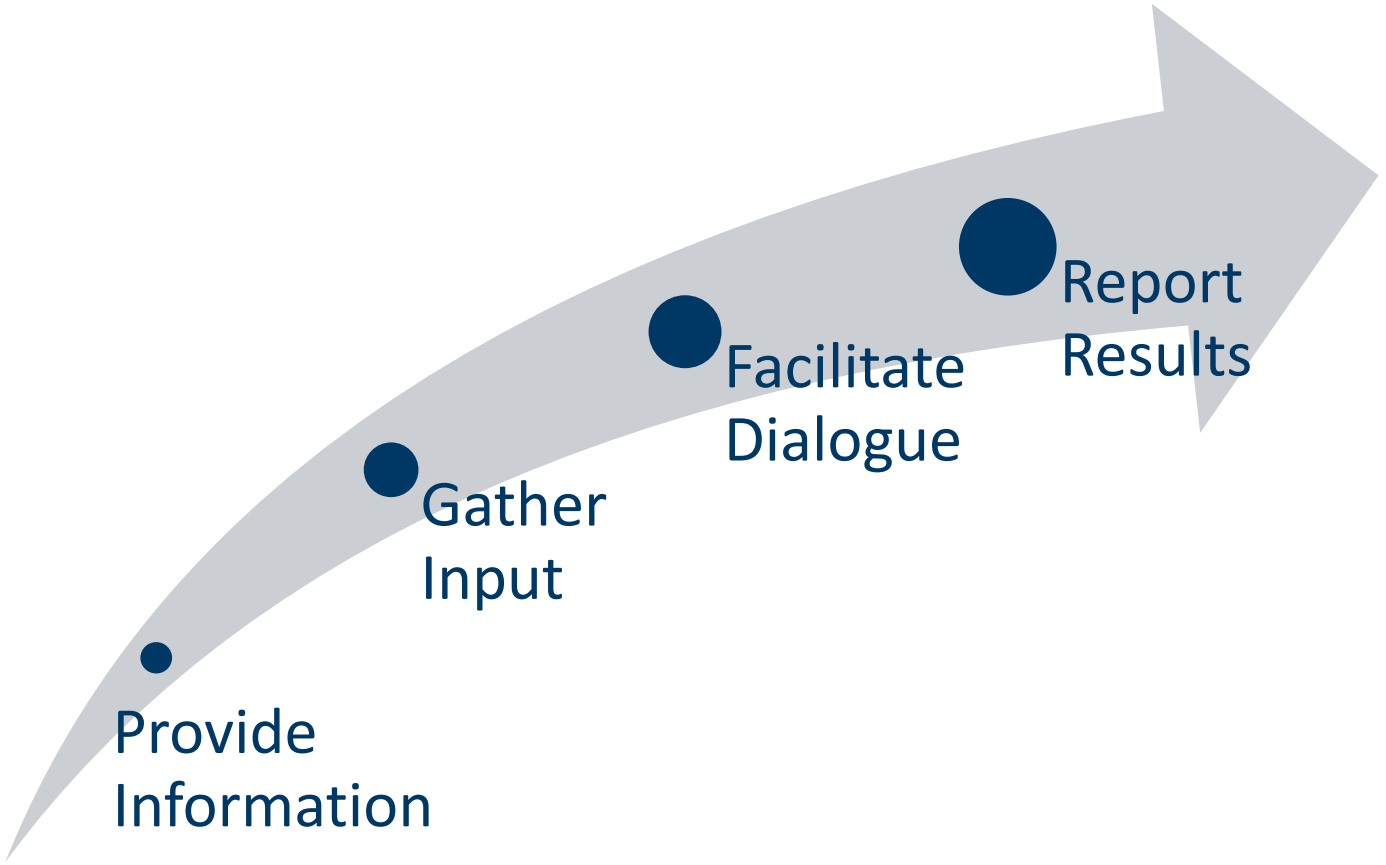
Associated Initiatives - Fuel Switching Stakeholder Process

Topics discussed included:

- Commerce authority to allow fuel switching
- How/would fuel switching advance CIP goals?
- How could fuel switching measures be included in CIP portfolios?

Status of Process:

- On hold pending outcome of 2020 legislative session



Associated Initiatives – Fuel Switching Legislation

HF 2208/S 2611 (2019) – Proposed to substantially amend Minnesota's Conservation Improvement Program.

Four-part criteria for efficient fuel-switching improvements:

1) Reduces cost and amount of source energy consumed on a fuel-neutral basis;

2) Results in lifetime net reductions of GHGs;

3) Is cost-effective on a societal basis; and

4) Does not increase utility peak demand or require significant new infrastructure.

Associated Initiatives – CARD Research

Air Source Heat Pumps

- Ductless cold climate heat pumps for multifamily applications (CEE, due 2022)
- Optimized installations of ASHP for single family homes (CEE, due 2022)
- Understanding market barriers and opportunities for ccASHPs in residential households (Cadmus, due 2020)

Heat Pump Clothes Dryer

- Field and market assessment of residential heat pump clothes dryers (Slipstream, due 2020)

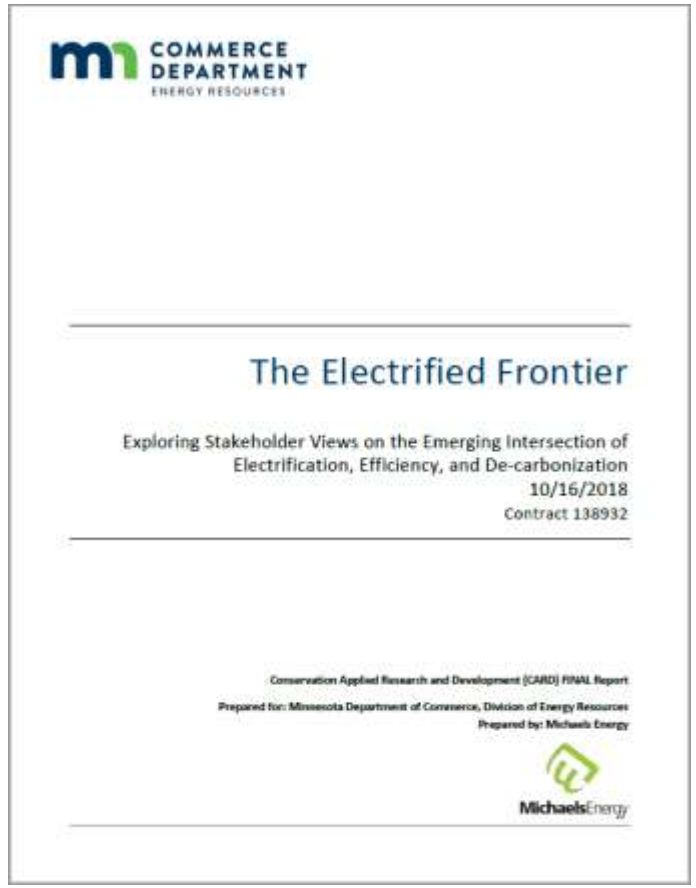
Grid Optimization

- Market potential for saving energy and CO2 with load shifting measures (Slipstream, due 2020)

Associated Initiatives - Electrification White Paper

Commissioned by DOC, completed by Michaels Energy in 2018.
Provided MN stakeholders with:

1. Introduction to electrification
2. Minnesota policy review
3. National policy review
4. Summary of stakeholder interviews
5. Technology review



Overview of Stakeholder Process

- A series of public stakeholder meetings
  - 3 meetings in early 2020, others later to review and release Action Plan
  - Next meeting is March 5th 2020
- Technical Advisory Committee of approximately 20 members
  - Focused analysis on Metrics, Technology, and Grid Modernization
  - TAC outcomes and learning reported back to public stakeholder group
- Written Action Plan capturing all stakeholder and TAC outcomes
  - Expected to be published in June 2021

Keynote Presenter

Dr. Thomas Wilson is a Principal Technical Executive in the Energy and Environment sector at the Electric Power Research Institute (EPRI).

Lead author for EPRI's US National Electrification Assessment report