



Minnesota TRM 5.0 Update

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Lauren will be the primary point of contact for the below items. In an ideal world however, you would also copy Jenna on TRM inquiries.

- TRM Suggestions/Questions
- CARD research inquiries/results
- Modifications to the TRMAC distribution list

- MN TRM v5.0 TRMAC Members and Schedule
- Measures Completed, ready for TRMAC review
- Remaining items to finish up for v5.0
- Feedback from Meeting 4 and the 'Residential HVAC – Efficient Air Conditioning System' Measure
- Next Steps

TRM v 5.0 TRMAC Members

Name	Organization	Name	Organization	Name	Organization
Anthony Fryer	MN Department of Commerce	George Roemer	Franklin Energy Services	Lisa Severson	Minnkota Power Cooperative
Adam Zoet		Nicholas Dombrosky		Darlene Weber-Scott	Missouri River Energy Services
Laura Silver		Sam Friesen	Fresh Energy	Jesse Robertson	
Lindsay Anderson		Doug Eli	Frontier Energy	Kurt Hauser	
Catherine Fair		Janhavi Datar		Lisa Fischer	
Lauren Sweeney		Matt Haley		Zach Klabo	
Jenna Lipscomb	Cadmus	Tanuj Gulati		Betty Balegana	Otter Tail Power Company
Amalia Hicks		Tom Vagts		Cristina Zuniga	
Kim Lillyblad	Avant Energy	Travis Hinck	GDS Associates, Inc.	Jason Grenier	
Lauren Runyan		Kathy Baerlocher	Great Plains Natural Gas Company	Jon Fabre	
Elyse Malherek	Big Ladder Software	Larry Oswald		Luke Meech	Pacific Northwest National Laboratory
Andy Baeten	Center for Energy and Environment	Amelinda Hendrickx	Great River Energy	Allegra Steenson	
Ben Schoenbauer		Jamie Stallman		Annie Hu	
Carl Nelson		Jeff Haase		Junke Wang	
Isaac Smith		Kelsey Kopp		David Siddiqui	Power TakeOff
Kristen Funk		Rodney De Fouw		Erin Kempster	
Ranal Tudawe		Victoria Browning	ICF	Lucas Born	
Ritika Kumbharkar		Dan Cooper	Lake Country Power	Peter Widmer	Rochester Public Utilities
Will Nissen		Chris Trembley	Madelia Municipal Light & Power	Josh Mason	
Eric Johansen	CenterPoint Energy	Grey Staples	Mendota Group	Laurie Cook	Rocky Mountain Institute
Ethan Warner		Joel Pertzsch	Michaels Energy	Olivia Prieto	
Marty Kapsch		Jen Kimmen	Minnesota Energy Resources	Andy Lick	Slipstream
Tyler Glewwe		Huei Wong	Minnesota Energy Resources - ICF	Ben Ipsen	Southern Minnesota Municipal Power Agency
Chris Droske	City of Minneapolis	Julian Graybill Brubaker		Joe Hoffman	
Isaac Evans		Katie O'Rourke		John O'Neil	
Cory Hetchler	Connexus Energy	Katy Koon		Katy Janda	University of Oxford; University of Minnesota
David Reinke	Dakota Electric Association	Zach Froio	Minnesota Power	Chris Baker	VEIC
Patrick Mathwig		Cassie Theisen		Danny Price	Xcel Energy
Gary Swanson	Energy Management Solutions	Chad Trebilcock		Erin Kern	
Dean Laube	Franklin Energy Services	Wyatt Miller		Karl Shlanta	

MN TRM v5.0 Schedule

Date	Event	Description
5/30/2025	Meeting 1 - Kickoff Meeting	Priority List for TRM v5.0 Introduced
7/2/2025	Meeting 2	Discussion on M&V Protocols and Weather Normalization Methodology to Determine ECO Goal
7/25/2025	Meeting 3	Measure Workpapers Introduction and Discussion
8/27/2025	Optional Presentation	Discussion of the Model Affecting Measures: "Commercial HVAC – Energy Recovery Ventilator" and "C/I HVAC – Heat Pump RTU"
8/29/2025	Meeting 4	Measure Workpapers Discussion Continued
9/26/2025	Meeting 5	Measure Workpapers Discussion Conclusion
10/8/2025	Redlined TRM v5.0 Issued	Redlined TRM v5.0 Issued for TRMAC Review
10/17/2025	Review Period Concludes	TRMAC Non-Regulatory Comments Due on TRM v5.0
10/20/2025	Letter + TRM v5.0 posted on eDockets	TRM v5.0 Regulatory Process*
11/4/2025	Written Comments	
11/19/2025	Reply Comments	
12/19/2025	Deputy Commissioner Decision	

*The above Regulatory Process timing represents the Department's intended timing and is subject to change

TRM Schedule and Process

MN TRM SharePoint (Internal)

- Direct Link: [MN TRMAC Collaboration Site – Documents](#)
- Find information on:
 - Measure Priority List
 - Measure Workpapers
 - Measure Workbooks
 - Measure Resources
 - Recordings and slide decks from related presentations
- You should all have access to this site. Please let Lauren know if you don't have access.

MN TRM Webpage (External)

- Direct Link: [Technical Reference Manual / Minnesota Department of Commerce – Energy](#)
- Find information on:
 - Previous TRM Releases
 - Recordings and slide decks from past meetings and TRMAC meetings related to TRM v5.0
- This should be maintained during the next couple of months as we develop TRM v5.0. We will let you know if that is not the case.

TRMAC Collaboration SharePoint Site



MN TRMAC Collaboration Site

Home + New Upload Edit in grid view

Notebook

Documents

Site contents

Recycle bin

[Return to classic SharePoint](#)

Documents > MN TRM v5.0

Name
Draft Measure Workbooks
Draft Measure Workpapers
Draft TRM 5.0
Final Excel Workbooks by Measure
Resources and Optional Meetings
z. archive
TRM v5.0 Priority List - MN TRMAC.xlsx

- Full measure updates will have workpapers
- Minor updates tracked changes in full Draft TRM
- Excel workbooks for each full measure update – when completed
- Meeting recordings
- Priority List – updated periodically



v5.0 Measure Updates - Completed for TRMAC Review

MN TRM v5.0

Measure Updates - Completed

- Commercial Measures:

Measure	Edit to Review	Workbook	Edit Made
HVAC - ERV	Workpaper	New	Algorithm remains similar, but better alignment with other TRMs and research. Added kWh savings for electric heated systems. Updates to EER deemed efficiencies to match other HVAC measures, updates to ERV efficiencies (increased) to align with recent CARD study work. Several inputs derived from calculation of deemed values, so added the final calculated input into tables to streamline savings calculation. Still no cooling savings in this measure as recent CARD study continues to confirm inconsistent use of equipment in cooling season, and increased fan energy consumption might be equal to reduced cooling energy consumption to net to nominal savings.
Appendix F	Workpaper	New	Created new workbook for this appendix, first sheet is the Appendix, second is the EPA primary resource and some calculations for CO2e. Need to go through rest of TRM to modify any emissions values given to match this Appendix F (some EFS measures) – to be completed prior to final draft TRM
HVAC – Heat Pump Systems	W/in TRM	New	This measure currently incorporates all heat pump systems, likely to be split into separate technologies in later versions once EFS baselines are incorporated. For now, new workbook created, updates to incremental costs and fleshed out inputs and tables more to represent all equipment

MN TRM v5.0

Measure Updates - Completed

- Commercial Measures:

Measure	Edit to Review	Workbook	Edit Made
Misc – Electric Forklifts	Workpaper	New	New measure mostly built on IL TRM, appears to align with Xcel and OTP deemed measures in terms of outputs.
Switched Reluctance Motors	Workbook	New	Modeled after IL TRM
LED Grow lights	Workbook	New	Modeled after IL TRM

MN TRM v5.0

Measure Updates - Completed

- Residential Measures:

Measure	Edit to Review	Workbook	Edit Made
HVAC - ERV	Workpaper	New	Created new measure based on modifications made this year to the ERV commercial measure. Have IL TRM comparison within example notes in workbook, very similar output based on MN values but IL algorithm.
HVAC – Air to Water Heat Pump	Workpaper	New	New measure developed, used VT and NY as model, but both were too simplistic and both assumed a fixed COP and capacity and full heating replacement. Created an algorithm similar to ASHP that functions well, but have written measure to direct users to use new tab in Appendix G (also a tab in the workbook for your review) for a heat load driven algorithm that varies COP of AWHP based on binned OSA temp hours. Deemed savings in written measure derived from the appendix G calculator.
Appliances – Induction Ranges and Cooktops	Workpaper	New	New measure mostly built on IL TRM, with NY and CA influence as well, see Notes tab for comparisons and reference checks to derive inputs. Note I left out the HVAC impacts portion (NY and CA leave it out, IL leave it in and adds a lot of complexity and needed customer info for <20% (penalty) impact on savings)

MN TRM v5.0

Measure Updates - Completed

- Residential Measures:

Measure	Edit to Review	Workbook	Edit Made
Misc - EVs	N/A no changes made	New	No changes made to measure, new workbook created, saved to final drafts folder, FYI if needed
HVAC - GSHP	Workpaper	New	Existing measure, mods to baselines, incremental costs. Ideally this will look similar to the Air to Water HP measure in terms of how the partial heating split will be modeled in the algorithm, the % backup figure, potentially also another tab on Appendix G, or incorporated into the same AWHP one
Hot Water – GSHP Desuperheater	Workpaper	New	This was not incorporated into original measure, felt like this really belongs in res hot water rather than tagged onto the GSHP algorithm. GSHP measure directs to use this measure to claim savings for Desuperheater installed on GSHP system. Modeled after IL, NY and WI TRMs.



v5.0 Measure Updates – Remaining Items for v5.0, and Items for v5.1

MN TRM v5.0

Measure Updates – In Progress

Remaining items for final draft:

- All workpapers (new measures) will be integrated into draft
- Take opportunity to rearrange slightly before applying measure ID numbers
- All measure tables will be modified to include measure ID, and measure fuel type (electric, gas, EFS) which might eventually become a look up table in later versions
- EFS measures to align with EFS guidance – reference to the published guidance, alignment with output metrics (net MMBtu), emissions (where given within measure) alignment with Appendix F
- Summary of changes in intro
- Intro to include new section defining prescriptive versus custom measures – proposed definitions are included [here](#).
- CARD sources to have accurate hyperlinks
- Install Rates
 - A consolidated list of proposed install rates can be found [here](#),
 - All measures affected by the addition of install rates will be modified with these updates in the draft
- All measures affected by the updated CZ2 - Res Heating EFLH value will be modified with this update in the draft

MN TRM v5.0

Measure Updates – In Progress

Remaining items for final draft:

- Concern:
 - The EFLH for Residential Natural Gas Boilers and Furnaces included in the MN TRM v4.0-4.2 do not trend as one would expect.
 - Though these values are defensible, Department Staff believe that there is more to the story that deserves to be explored.
 - Staff are still re-evaluating this work, and in turn recommend the below solution as a defensible methodology until further research or a holistic methodology shift is completed.
- Proposed TRM v5.0 Solution:
 - Update the Heating EFLH for Residential Natural Gas Boiler and Furnace in Climate Zone 2 to match the value for Climate Zone 3 at 1046.

[Workbook hyperlink](#) that outlines this a bit more.

MN TRM v5.0

Measure Updates – In Progress

Remaining items to be addressed outside of the TRM v5.0 Regulatory Process:

- Incorporate Updated Efficient Fuel Switching Guidance per the 2024 Leg Session within EFS measures
 - Soon after the EFS Technical Guidance is filed, we're hoping to share an example of this methodology with the TRMAC for review
- M&V Protocols for Large Custom ECO Projects (Draft found [here](#))
 - Will be submitted on a docket outside of the MN TRM (06-1591 or another docket number).
 - This docket will be filed about a month+ after the MN TRM v5.0, with a schedule cognizant of fall and winter holidays.
 - Planning on having this go into effect 1/1/2027 - like the MN TRM v5.0.
- Weather Normalization to determine ECO Goal
 - We need a bit more time on this work and will either bump this to TRM v5.1 or, like the M&V Protocols for Large Custom ECO Projects, this item will be submitted on a docket outside of the MN TRM likely in Q1 2026.
- Transition from pdf to excel workbook
 - To be completed after the TRM process and shared with the TRMAC in Q1 2026.
 - These workbooks are designed to not deviate from the pdf version of the approved TRM.
- Review Codes and Standards for all measures -> Develop review schedule of all TRM measures
 - To be completed after the TRM process and shared with the TRMAC in Q1 2026.

MN TRM v5.0

Measure Updates – Moving to v5.1

Measure	New/Exist	Status
Res Replacement Storm Windows	New	Have draft created, ironing out any inconsistencies between existing measure Low E Storm Windows, in terms of outputs, inputs, method, assumptions with study team.
C/I Grocery Refrig Equipment Optimization	New	Have draft created, would like CARD team to review prior to inclusion, still determining if should be a single measure with several optional activities, or each activity is separate measure
C/I Ag Grain Dryers	Existing	Looking to compare existing measure to other TRMs and triennial plans that incorporate this for any updates in method and references needed, have started this process but not completed
C/I Steam Traps	Existing	Looking to compare existing measure to other TRMs and triennial plans that incorporate this for any updates in method and references needed, have started this process but not completed
C/I ASHP / GSHP / AWHP	Existing	Waiting on incorporating EFS baseline for this measure (perhaps will be split into several more specific measures) to first determine strategy (modeling based, algorithm based, etc) and primary research to support

MN TRM v5.0

Measure Updates – Moving to v5.1+

Measure	New/Exist	Status
Res – Outdoor Lawn Equipment	Existing	Equipment additions will need to wait for data to support HOU
Res – Electric Snowblower	New	Waiting on primary data to support various inputs that would currently be assumptions
Res - Heat Pump Clothes Washer and Dryer Combination	New	Waiting on additional research to validate savings
Incremental cost updates	Throughout	Primary effort on this will take place in v5.1
Cold climate versions of various Res and C/I HVAC measures	Likely New	Likely separate new measures but similarly formatted as the non cold climate versions (Res ASHP, C/I HP RTU, etc), waiting on additional primary research to finish to support inputs, and waiting on modeling capability to support

MN TRM v5.0

Measure Updates – Moving to v5.1+

Measure	New/Exist	Status
Res - Air Fryers (replacing ovens)	New	Equipment additions will need to wait for data to support HOU
Direct Install spray foam (cans)	New	Waiting on primary data to support various inputs that would currently be assumptions
Hot Tub Covers	New	Waiting on primary data to support various inputs that would currently be assumptions



Feedback from Meeting 4 and the 'Residential HVAC – Efficient Air Conditioning System' Measure

Feedback from Meeting 4 and 'Residential HVAC – Efficient Air Conditioning System' Measure

- Feedback from Meeting 4

- 'Residential HVAC - Efficient Air Conditioning System' measure

Initial Topic: “Within the “Residential HVAC - Efficient Air Conditioning System” measure, Department Staff propose removing central air conditioners as an efficient option. This update would end incentives within the ECO Programs for above-code central air conditioning units.”

Additional Topic: “If central air conditioners were to be removed from the MN TRM as an efficient piece of equipment starting on 1/1/2027, would that be considered abrupt for MN trade allies? If a 1/1/2027 removal date is too abrupt for MN trade allies, please suggest an alternative timeline that isn't too abrupt for MN trade allies.”

- Received comments from: CenterPoint Energy, Fresh Energy, Missouri River Energy Services, and Xcel Energy

[TRMAC Submitted Comments – Workbook on the TRMAC SharePoint Site](#)

Please let us know if you sent us comments and you're not noted in the above list.

Priority List and Next Steps

Updated Priority List

Next Steps:

- Please reach out to if you:
 - Do not have access to the [TRMAC Collab SharePoint Site](#),
 - Don't see your feedback in the **Priority List – tab “MN TRM Items v5.0 – v250926”**
- You'll receive a follow up email soon with:
 - Today's slide deck, and
 - The updated TRM v5.0 Priority List inclusive of updates made in today's discussion
- Today's slide deck and recording will be posted on the [MN TRM Webpage](#)

Thank You



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