



Minnesota TRM 5.0 Update

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Contact Information



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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
- Measures in Progress, discussion points for TRMAC
- Measures still in queue (Priority List)
- 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	Wyatt Miller	Minnesota Power
Adam Zoet		Nicholas Dombrosky		Lisa Severson	Minnkota Power Cooperative
Laura Silver		Sam Friesen	Fresh Energy	Darlene Weber-Scott	Missouri River Energy Services
Lindsay Anderson		Doug Eli	Frontier Energy	Jesse Robertson	
Catherine Fair		Janhavi Datar		Kurt Hauser	
Lauren Sweeney		Matt Haley		Lisa Fischer	
Jenna Lipscomb	Cadmus	Tanuj Gulati		Zach Klabo	Otter Tail Power Company
Amalia Hicks		Tom Vagts		Betty Balegana	
Kim Lillyblad	Avant Energy	Travis Hinck	GDS Associates, Inc.	Cristina Zuniga	
Lauren Runyan		Kathy Baerlocher	Great Plains Natural Gas Company	Jason Grenier	
Andy Baeten	Center for Energy and Environment	Larry Oswald		Jon Fabre	Pacific Northwest National Laboratory
Ben Schoenbauer		Amelinda Hendrickx	Great River Energy	Luke Meech	
Carl Nelson		Jamie Stallman		Allegra Steenson	
Isaac Smith		Jeff Haase		Annie Hu	
Kristen Funk		Kelsey Kopp		Junke Wang	Power TakeOff
Ranal Tudawe		Rodney De Fouw		David Siddiqui	
Ritika Kumbharkar		Victoria Browning	ICF	Erin Kempster	
Will Nissen		Dan Cooper	Lake Country Power	Lucas Born	
Eric Johansen	CenterPoint Energy	Chris Trembley	Madelia Municipal Light & Power	Peter Widmer	Rochester Public Utilities
Ethan Warner		Grey Staples	Mendota Group	Josh Mason	
Marty Kapsch		Joel Pertzsch	Michaels Energy	Laurie Cook	Rocky Mountain Institute
Tyler Glewwe		Jen Kimmen	Minnesota Energy Resources	Olivia Prieto	
Chris Droske	City of Minneapolis	Huei Wong	Minnesota Energy Resources - ICF	Andy Lick	Slipstream
Isaac Evans		Julian Graybill Brubaker		Ben Ipsen	Southern Minnesota Municipal Power Agency
Cory Hetchler	Connexus Energy	Katie O'Rourke		John O'Neil	
David Reinke	Dakota Electric Association	Katy Koon		Chris Baker	VEIC
Patrick Mathwig		Zach Froio		Eric Flower	Xcel Energy
Gary Swanson	Energy Management Solutions	Cassie Theisen	Minnesota Power	Erin Kern	
Dean Laube	Franklin Energy Services	Chad Trebilcock		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
8/13/2025	Optional Presentation	Discussion of the Model Impacting 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
Early October	Review Period Concludes	TRMAC Non-Regulatory Comments Due on TRM v5.0
Mid October	Letter + TRM v5.0 posted on eDockets	TRM v5.0 Regulatory Process
Early November	Written Comments	
Late November	Reply Comments	
Late December	Deputy Commissioner Decision	

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
Hot Water – HP Water Heater	Draft TRM	Existing, modified	Edits to input variable EnergyHEATWATER to reference water consumption per year uniformly, some references to consumption per day remained from the last update in 4.2. Note that neither the algorithm or calculation of savings change with this modification. Also made clarification to UEF definition of V versus G, consolidated around V for rated volume of DHW tank. <i>Note same clarification made to C/I Gas DHW, – existing workbooks edited</i>
HVAC – ECM Fan Motors	Draft TRM	New	Modified upper limit for this measure to 3 HP from 1 HP. Minor clarifications made within measure
HVAC – ECM Blower Motors	No edits	New	Only created new workbook, no changes to written measure
Compressed Air – VFD Air Compressors	Draft TRM	New	Modified upper limit for this measure to 200 HP from 50 HP. Appears to be supported by other TRMs, have comparison in outputs against IL TRM in workbook for TRMAC consideration

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Measure Updates - Completed

- Commercial Measures:

Measure	Edit to Review	Workbook	Edit Made
Refrig – Demand Defrost Controls	Draft TRM and pulled out as workpaper	New	Corrected the conflicting default values between variable input list and Methodology write up, HOUbase increased slightly but very slight effect on total savings output. Corrected algorithm (example and main algorithm did not match, example was correct). Added missing variable definitions. Several references were switched around and Ref 4 didn't validate the COP value. Cross checked the referenced COP value for another C&I Refrig measure and replaced the reference to match - same COP as was within the measure already.
Food Service - Electric Oven and Range	Draft TRM and pulled out as workpaper	New	Reviewed old reference (1985) which does not validate Table 3 metrics. Propose single CF to align with other measures at 0.9. Propose same space types as other commercial food service measures and their corresponding days per year operation. Propose to derive the daily active cooking time (equipment at full power) to be essentially half the ENERGY STAR deemed daily operational hours of 12 (from CFS ENERGY STAR workbook). This equates to the same metric roughly from prior to the change (5 hours * 365 days operation = 1,825 hours = the average of the building types from Table 3 (omitting the pizza space type which is outlying). Effectively no change in output savings, but better references and more aligned with other CFS measures.

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Measure Updates - Completed

- Residential Measures:

Measure	Edit to Review	Workbook	Edit Made
Res Hot Water - Heat Pump Water Heater	Draft TRM	Existing, modified	Edits to input variable EnergyHEATWATER to reference water consumption in gallons per day uniformly, some references to consumption in gallons per person remained from last update in 4.2. The examples were modified to align with using the average MN climate zone rather than a specific one. Error in Table 1 reference corrected to align with workbook for this measure and the gas measure Table 1. Also made clarification to UEF definition of V versus G, consolidated around V for rated volume of DHW tank. <i>Note same clarification made to C/I Gas DHW, Res Gas DHW and Res HP DHW – all have existing workbooks that were edited</i>
Res Misc – E Bikes	Draft of TRM	Existing, no change needed	Reviewed, note that this error is in the example rather than the algorithm. Calculation of example remains correct, written TRM measure modified from "+" to + "-" in example algorithm for Net Savings per Year (MMBtu)

MN TRM v5.0

Measure Updates - Completed

- Residential Measures:

Measure	Edit to Review	Workbook	Edit Made
Res Appliances - ENERGY STAR Clothes Dryers	Draft TRM	New	Updated ENERGY STAR reference standard to version 2.0.
Res Appliances - ENERGY STAR Clothes Washers	Draft TRM and pulled out as workpaper	New	Updated ENERGY STAR reference standard to version 9.0. Updates to standard values required updates to example and deemed table of savings - note MF changed significantly, assume calculated incorrectly originally. Removed RE as input metric, negligible effect on savings and muddled algorithm unnecessarily
Res Appliances - ENERGY STAR Air Purifiers	Draft TRM and pulled out as workpaper	Existing, modified	Updated ENERGY STAR reference standard to version 3.0. Note that this update changed the savings methodology inputs which required reworking of measure to align.



v5.0 Measure Updates – For Discussion

MN TRM v5.0

Measure Updates – For Discussion

- Residential HVAC - Efficient Air Conditioning System measure:
 - Given ENERGY STAR sunset of criteria as it pertains to a central AC unit, propose removing the AC unit from the performance side of the criteria, proposed edit made within the Draft TRM for TRMAC review and discussion.
 - Baseline: AC units or ASHPs remain the baseline,
 - Performance: only ASHPs, same standard criteria referenced, no changes to values, but AC references removed as eligible performance case regardless of SEER value.
 - Effectively this just becomes the cooling side only of the ASHP measure, but still seems valuable to keep this as a separate measure for cooling only installation references.
 - Name change to better reflect the performance case – Res HVAC - Central Cooling System

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Measure Updates – For Discussion

- Residential HVAC – Furnaces and Boilers measure
 - Stakeholder proposal to update the deemed efficiency baseline for replacement of gas furnaces in residential applications.
 - The current deemed efficiency baseline for this measure in the MN TRM is an 80% AFUE furnace which is consistent with the current federal furnace standard.
 - The suggested deemed efficiency baseline is based on results of a contractor survey recently completed in WI and would potentially split the baseline value for single family homes:
 - 90.6% AFUE furnace for market rate applications
 - 88.3% AFUE furnace for income eligible applications
 - Department Staff don't believe the WI contractor survey is specific enough in MN to justify this change and will not be pursuing this update.
 - This topic has been identified as a research need by Department Staff to be explored in the next few years.

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Measure Updates – For Discussion

- Recent MN Legislation - Mercury Emissions in Lighting Measures and ECO
 - [MN Statute 116.92 Subd. 7b](#)
 - “(b) Effective January 1, 2025, a person may not sell, offer for sale, or distribute in the state as a new manufactured product a screw- or bayonet-base type compact fluorescent lamp, a mercury vapor lamp, or a mercury vapor lamp ballast, whether sold separately, in a retrofit kit, or in a luminaire. Effective January 1, 2026, a person may not sell, offer for sale, or distribute in the state as a new manufactured product a pin-base type compact fluorescent lamp or a linear fluorescent lamp.”
 - Department Staff propose not pursuing changes to baselines of affected lighting measures at this time.
 - The status of the MN’s Lighting Market has been identified as a research need by Department Staff to be explored in the next few years.

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Measure Updates – For Discussion

- Measure IDs – Proposed Layout within "Measure ID Outline" in Drafts to review:

First Level Number	Second Level Number
1 Residential	1 Lighting
2 Commercial & Industrial	2 HVAC
3 Agricultural	3 Envelope
4 Electric Utility Infrastructure	4 Refrigeration
	5 Hot Water
	6 Compressed Air
	7 Food Service
	8 Plug Load
	9 Appliances
	10 Misc
Third Level Number	11 Transportation, or Vehicles, or other name
Sequential by measure within category	12 Motors, or Motors and Pumps

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Measure Updates – For Discussion

- Res – ASHP
 - Evolving measure starting in v4.0 with algorithm expansion to accommodate EFS:
 - Partial heating load replacement identified as algorithm need
 - → %Backup metric needed definition
 - → EFLH capacity differences between systems posed linear algorithm difficulty
 - → Appendix G (excel based calculator) developed as preliminary attempt at defining % Backup
 - Significant limitations to functionality – switch over temp can't be lower than 30 to function, HP efficiency and capacity held constant, EFLH and capacity driven rather than heat load driven which opens the door for calculating different heat loads between systems
 - Deemed savings developed from excel based calculator in v4.0
 - Revisited in v4.1 to develop an energy model to better capture HP performance and drive systems by modeled loads rather than EFLH and capacity. Outputs added to Appendix G calculator tabs.
 - Deemed savings replaced in v4.1 with those derived from these models.



v5.0 Measure Updates – Remaining Priority List

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Measure Updates – In Progress

In development / Stakeholder requests:

- Res
 - Air to Water HP
 - Induction Cooktops
 - GSHP - Desuperheater, methodology, ICCs
 - Storm Windows Air Sealing
 - ERV/HRV
 - Furnaces – ICCs
 - ASHP – clarifications and streamline?
 - Install Rates for measures commonly found in kits or midstream programs
 - MN HER Coordination – should have an update by Meeting 4
- Appendix F
- EFS Guidance / Outputs updates
- C/I
 - C/I HVAC - ECM Circulators
 - ASHP splits in sm commercial
 - HVLS Fans – destrat add
 - Grain Dryers (Ag)
 - ERV/HRV
 - Grocery Refrigeration Equipment Op – CARD
 - Refrigeration Gasket Replacements
 - Switched Reluctance Motors
 - Steam Traps – revisit deemed metrics and algorithm inputs
 - Electric forklifts
 - Com Lighting – Grow Lights
 - Networked Lighting Controls - DLC Papers

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 – v250725”**
 - Did not receive the meeting invites to meetings 4 through 5
- 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
- You will also receive an invite to the Optional Presentation on Wednesday, 8/13
- Today's slide deck and recording will be posted on the [MN TRM Webpage](#)

Thank You



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