



# Minnesota TRM 5.1 Update – Kick-Off Meeting

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Lauren will be the primary point of contact for the below items. Can also copy Jenna on TRM inquiries, we will work together to address most items.

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

- Housekeeping
- TRM Schedule and Process
- MN Conservation Applied Research and Development (CARD) Projects
- TRM v5.1 Updates – Priority List
  - High Priority Focus areas
  - Lower Priority items
  - Future items tracked

# Housekeeping – TRMAC Members

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

# TRM Schedule and Process

Date	Event Description	Description
6/23/2026	Meeting 1 - Kickoff Meeting	Priority List for TRM v5.1 Introduced
July	Meeting 2	Measure Workpapers Introduction and Discussion
August	Meeting 3	Measure Workpapers Discussion Continued
September	Meeting 4	Measure Workpapers Discussion Conclusion
Late September	Redlined TRM v5.1 Issued	Redlined TRM v5.1 Issued for TRMAC Review
Early October	Review Period Concludes	TRMAC Non-Regulatory Comments Due on TRM v5.1
Mid October	Letter + TRM v5.1 posted on eDockets	TRM v5.1 Regulatory Process*
Early November	Written Comments	
Late November	Reply Comments	
Late December	Deputy Commissioner Decision	

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

## MN TRM SharePoint (Internal)

- Direct Link: [MN TRMAC Collaboration Site – Documents](#)
- Find information on:
  - Measure Priority List
  - Measure Workpapers – Drafts for review
  - Measure Workbooks
    - Drafts for review
    - Library of finals
  - 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 v5.1

# TRMAC Collaboration SharePoint Site



## MN TRMAC Collaboration Site

Home

Notebook

Documents

Site contents

Recycle bin

[Return to classic SharePoint](#)

Documents > MN TRM v5.1

All Documents

Name

- Draft Measure Workbooks
- Draft Measure Workpapers
- Draft TRM 5.1
- Final Excel Workbooks by Measure
- Resources and Meetings
- z. archive

TRM v5.1 Priority List - MN TRMAC.xlsx

- Priority List – updated periodically
- Full measure updates will have workpapers – in Draft folder for TRMAC review
- Minor updates to measures in tracked changes within full Draft TRM – updated periodically, live version lives elsewhere
- Excel workbooks for each full measure update – when completed
  - Draft folder for new/modified for TRMAC review
  - Final folder for running library of completed ones (from 5.0 and prior)
- Meeting recordings, other optional meetings and resources

## Recently Completed or Soon To Be Completed CARD Projects

Completed reports and webinars are within the [TRMAC SharePoint Site \(withing Folder z. CARD Research\)](#) and on the [CARD Website \(under “Research Since 2020”\)](#)

Grantee	Title	Project Expiration Date
MN CEE	Industrial Electrification Through Heat Pump Adoption for Process Loads	10/31/2025
Slipstream	Refrigeration Thermal Storage for Energy Efficiency	12/31/2025
2050 Partners	Right-Sizing Water Distribution Pipes and Water Heating Systems to Save Energy and Reduce Building Costs	12/31/2025
Slipstream	Field Demonstration of ASHRAE Guideline 36-2018 High-Performance Sequences of Operation for HVAC Systems	1/6/2026
U of MN - CSBR	The Market for Passive House Multifamily Projects in Minnesota	1/19/2026
Slipstream	Advanced Connected Diagnostics for Commissioning Residential Heat Pumps and Central Air Conditioners	3/31/2026
Michael's Energy	Ground Source Tech in Urban Buildings	7/31/2026
Slipstream	Strategic Decarbonization for Larger Utility Customers	8/31/2026
Slipstream	Indigenous Communities and Residential Electrification Pathway Demonstration	4/15/2027
Cadmus Group	Consistent Load Shapes for Fuel-Switching Tests and Assessing Flexible Load Potential	10/30/2026
MN CEE	Continuous Exterior Insulation: A cold climate solution for deep savings and a pathway to cost-effective decarbonization	10/31/2026
Michael's Energy	Ventilation Control Using Occupancy Counters	11/30/2026
Frontier Energy	District Geothermal Site Selection & Feasibility Study	11/30/2026
MN CEE	CO2 Heat Pump Water Heaters for Multifamily Buildings	12/31/2026
MN CEE	Establishing Protocols for a Commercial Energy Recovery Ventilation (ERV) Tune-Up Service	12/31/2026
MN CEE	Packaged Terminal Air Conditioner Replacement Field Study	12/31/2026
MN CEE	Floating Suction Pressure Control in Minnesota’s Existing Grocery Stores	12/31/2026
MN CEE	Heat pumps with thermal storage: Efficient and resilient electric space heating	12/31/2026
U of MN - CSBR	Unlocking the Potential for Safe Energy Retrofits Over Inaccessible Crawlspace	1/30/2029
Slipstream	Mapping Electrical Barriers, Motivations, and Perceptions about Efficient Fuel Switching	1/31/2027

# TRM v5.1 Updates – General Updates and Revisions 1

- High Priority Items for v5.1:

1. Prescriptive process/guidance resource for modeled EFS new construction projects.

- Develop standardized guidance for:
  - The division of savings between EFS and EDA
  - The baseline and performance comparisons and break points between comparisons

2. Finalize update to M&V Protocols for large custom ECO projects

- Current Protocols 2008: [Measurement and Verification Protocols for Large Custom CIP Projects](#)
- Draft in process: [M&V Protocols](#)

3. EFS savings of EVs – Potential redistribution of savings between measures related to EVs:

- Currently 100% of EFS savings lives on the EV measure, accounted for by miles driven
- Consider apportioning part of the EFS savings (TBD ~20%) to on-road charging, potential for new measure

4. EFS Guidance Incorporation into TRM EFS measures and Custom ECO projects

- EFS Excel Template development – To guide Steps 1,2,3.1 and 3.2 eligibility testing

# TRM v5.1 Updates – EFS Considerations

- EFS Guidance Incorporation into TRM EFS measures and Custom ECO projects
  - EFS Excel Template development – To guide Steps 1,2,3.1 and 3.2 eligibility testing
  - Could dedicate an entire meeting to this, likely to be introduced in depth in next CARD Load Shapes stakeholder meeting (July). Meeting invite and recording will be distributed
- Load Shapes and CF
  - Finalize dashboard for load shapes, publish to accessible location – next CARD Load Shapes meeting
  - EFS measures will reference load shape dashboard, and likely incorporate summary tables of proportion of load in peak/non peak and by months
  - CF updates for EFS measures proposed where they differ from existing significantly

# TRM v5.1 Updates – General Updates and Revisions 2

- Everything else on the priority list are lower priority items for v5.1
- Stakeholder Clarification Requests / Additions:
  - C/I Envelope - Air Sealing and Insulation – Consider prescriptive measures available
  - C/I Lighting – LED Grow lights – Revisit reflector efficiency in algorithm
  - C/I HVAC – ECM Fan Motors – Revisit algorithm to condense sub algorithm into main algorithm
  - C/I HVAC – DCV – Revisit algorithm and inputs for additional clarity
  - Residential Trans –Electric Vehicle Sales Charging Consumption – Clarity documentation requirements
  - Res Hot Water – Showerheads - Review example for additional clarity
  - Res HVAC – T stats - Review example for additional clarity
  - Res HVAC - AC/ASHP Quality Install - %Primary addition to algorithm? Discuss with TRMAC
  - Res HVAC - GSHP/AWHP – Add to Quality Install measure related to this equipment? Discuss with TRMAC
  - Res HVAC - GSHP – NC baseline of ASHP, revisit. Discuss with TRMAC

# TRM v5.1 Updates – Full Measure Updates and Adds

- Res

- Storm Windows Air Sealing - CARD
- HP Clothes Dryers, combination units
- Secondary changes needed related to Res Furnaces baseline change
  - Res ASHP – see updates to Appendix G and deemed savings based on 90%
  - Res Low E Storm Windows - modeled
  - Res Cellular Shades - modeled
  - Other areas?

- C/I

- Grain Dryers
- Grocery Refrigeration Equipment Op – CARD
- Switched Reluctance Motors
- Steam Traps – revisit deemed metrics and algorithm inputs
- Circulator pumps Eff Index – incorporate into existing or new
- cc HP RTU – MN ETA research
- LLLC updates – MN ETA research
- Prescriptive Envelope measures

# TRM v5.1 Updates – General Updates and Revisions 3

- Review recent codes and standards updates – Annual process, throughout
- Incremental Costs – throughout, Res HVAC in particular
- Web Link Updates
  - Ensure CARD research links to presentation material if published papers not yet available
  - Check through all reference links for function
- Excel format
  - *working toward this on longer time horizon*
  - Undertaking this pdf -> Excel Format transition in each version
  - Every algorithm has a dynamic calculation
  - Aids QC when inputs change, hopefully aids utility groups with Triennial support calculations
- Consolidated Reference Tables
  - Values used by multiple measures (EFLH, HOU, HDD, etc) appear in a deemed values section in addition to within each measure

# Updates for Future TRM Versions Pending Additional Research

- MN Lighting Market Characterization
  - To be completed before Q3 2028 to be included in the MN TRM v6.0
- Weather dataset standardization
  - Moving away TMY3, TMY4 does not yet exist, what is the dataset we want to use and how is it derived. Standardize across all measures
- Cold climate focused equipment measures
- Incorporate measure baselines for dual fuel home
  - i.e. ASHP and gas furnace as a baseline, in addition to the 100% gas or 100% electric assumption in place now
  - Applies to EFS measures in addition to traditional ones

# Coordination with TRMAC

- All recently and soon to be completed CARD studies
- MN Save Energy Minnesota Programs (HOMES, HEAR, State Heat Pump Program, Electric Panel Upgrade Program)
  - Department ECO Unit does not have an update on when the Save Energy Minnesota Programs will launch
- Efficient Technology Accelerator (ETA) Initiative Per Unit Savings = TRM Measure (generally)
  - Additional initiatives as they are defined within the MN ETA Emerging Technology Committee
- MN Commercial and Residential Energy Codes
  - Dept ECO Unit is tracking estimated effective dates for both codes to be in Q1 2028

# Discussion and Next Steps

## General Discussion Points:

- What are measures/topics that you would like to see included within the TRM?
- Current pain points or interest areas TRM can help to flesh out or explore?
- Do you have questions or concerns regarding this list?

## Next Steps:

- Please reach out to Lauren if you do not have access to the SharePoint Site.
- You'll receive a follow up email soon with the
  - Slide deck
  - Updated TRM v5.1 Priority List, and
  - Another When2Meet Survey to schedule TRMAC meetings for the rest of this v5.1 effort
- Today's slide deck and recording will be posted on the [MN TRM Webpage](#)

# Thank You



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