



NY TRM 2022 Updates & Stakeholder Forum

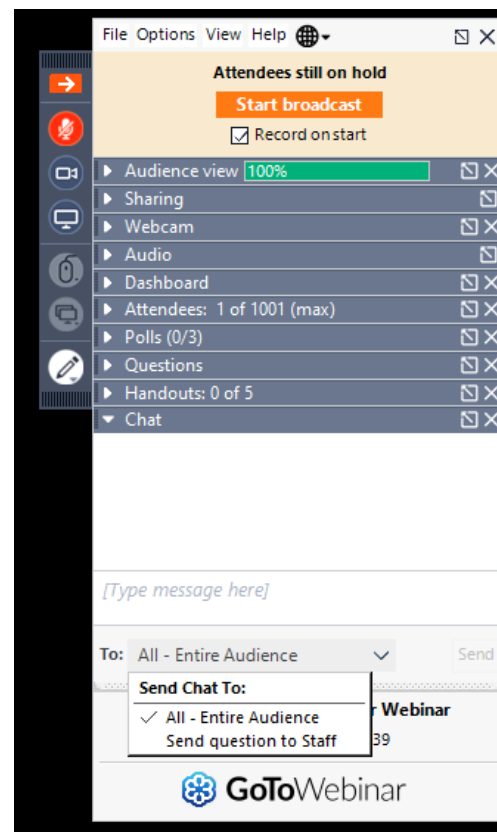
*Please e-mail erighter@trccompanies.com if you would like a recording of the presentation.

December 13, 2022

New York State Technical Resource Manual Management Committee

Co-Chairs: Harold Neale & Amy Dickerson

GoToWebinar Interface

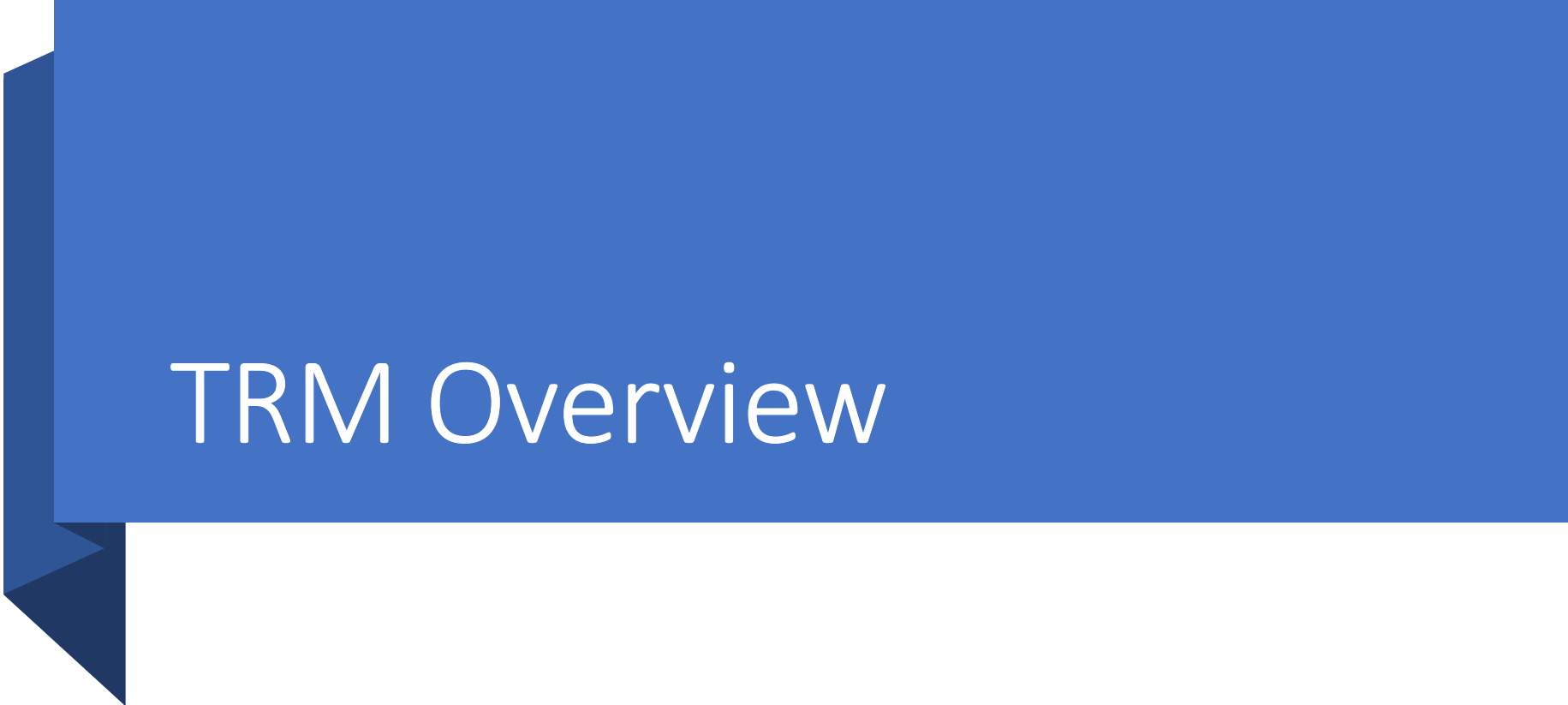


Asking Questions

Agenda

- Welcome
- TRM Overview
- Management Committee Overview
- TRM MC Processes
- 2022 TRM Updates
- Future of NY TRM
- Stakeholder Forum



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TRM Overview

What is the TRM?

- > Originated through collaboration between DPS, NYSERDA and Tech Market Works in 2008.
- > A document that provides standardized energy savings calculations and assumptions
- > Consistent energy savings calculations across New York State
- > A living document intended to adapt with advancements in technology
- > Provides transparency across customers, vendors, and utilities

TRM – MC by the Numbers

Since 2016:

- Compiled and filed 10 TRM full volumes
- Compiled and filed 27 quarterly revisions
 - ✓ 97 new measures
 - ✓ 236 measure revisions
 - ✓ 8 measure removed

How is the TRM maintained?

- > By a **Management Committee** made up of representatives from the joint utilities and NYSERDA.
- > Each utility and NYSERDA have one voting member
- > TRC was jointly selected by the MC for technical and administrative assistance

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Management Committee Overview

Joint Utilities & NYSERDA



Who are the members of the MC?

Members:

Harold Neale (Co-Chair) - NYSEG/RG&E
Amy Dickerson (Co-Chair) – National Grid
Peter Hoffman – National Grid
Joe Dolengo - National Grid
Austin Izzo – National Grid
Ann Clarke - National Grid
Dae-Yeong Lalonde – National Grid
Philip Madnick- Orange & Rockland
Mark Maloney – Orange & Rockland
Alexander Bronfman – Con Edison
Pavan Ryali – Con Edison
Ansab Khan – Con Edison
Toby Hyde – Con Edison
Erik Johnson – Con Edison
Daniel Krupa – Con Edison
Gabrielle Scibelli - PSEG-LI
Jossi Fritz-Mauer - PSEG-LI
Erik Solomon- National Fuel Gas
Edward Hornung – National Fuel Gas
Mackenzie Swanson – Central Hudson
Ron Watkins- Central Hudson
Mike Lauchaire – Central Hudson
Viraj Sheth – NYSEG/RG&E
Tanya Tillotson – NYSEG/RG&E
Dana Nilsson- NYSERDA

Advisory Members:

Joe Hitt - DPS Staff
Chris De Cotis - DPS Staff

TRM MC Officers & Contact Information

Harold Neale	Co-chair	NYSEG/RG&E	hneale@nyseg.com
Amy Dickerson	Co-chair	National Grid	amy.dickerson@nationalgrid.com
Ann Clarke	Treasurer	National Grid	ann.clarke@nationalgrid.com
Edward Righter	Secretary	TRC	erighter@trccompanies.com
Eric Readdy	Technical Lead	TRC	ereaddy@trccompanies.com

How was the MC formed?

- > PSC Order in 2015 required the utilities to collectively support TRM maintenance.
- > All gas utilities implementing energy efficiency programs ordered to participate in the maintenance of the TRM: June 19, 2015
- > PSEG LI and NYSERDA added later
- > DPS Matter 15-01319

What is TRC's role?

- > Technical review
- > Research support
- > Secretarial role

TRM MC Website

Technical Resource Manual (TRM)

The New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs - Residential, Multi-Family, and Commercial/Industrial, is a standardized, fair, and transparent approach for measuring program energy savings across New York State's energy efficiency programs. To do so, the TRM makes assumptions at the measure level for estimating energy and demand savings.

In the February 26, 2015 Order Adopting Regulatory Policy Framework and Implementation Plan in Case 14-M-0101, Proceeding on Motion of the Commission required the utilities work collectively to support the maintenance of the New York State TRM.

- **TRM Management Committee (TRM MC):** In response to the Order requirements, a Technical Resource Manual Management Committee (TRM MC) was formed from the Department of Public Service (Staff), and to work collectively to support the maintenance of the New York State TRM.

TRM MC Member List

The TRM MC includes representation from each of New York's major electric and gas utilities, LIPA, and NYSEERDA; officers of the TRM MC are:

Harold Navin	Co-chair	New York State Electric & Gas
Amy Dickerson	Co-chair	National Grid
Ann Clarke	Treasurer	National Grid
Edward Righetti, Jr.	Secretary	IRC

- **TRM Management Plan:** The management plan describes a process that ensures each utility and NYSEERDA's input is considered, all changes to the updated TRM is filed annually in accordance with the *Utility Energy Efficiency Program Cycle Guidance CE-01*.

TRM Management Plan

- **TRM Revision Process:** The TRM MC has established a functional workflow process to outline how submittals for measure additions, or revisions, are advanced through the TRM MC. The functional workflow process is available for review in the TRM Management Plan, Appendix C. Additionally, recommendations, or questions may be directed to either of the TRM MC Co-chairs or the Secretary.

Submittals to the TRM MC require a specific form and format, which includes among other things: supporting references, resource documents, and a specific form and format is available for review in the TRM Management Plan, Appendix D: *Measure Template*.

- **Work Plan:** The TRM MC includes a detailed work plan with each quarterly record of revision filing. This work plan includes a list of the new and existing measures to be reviewed in the current quarter. *Work Plan*.

- **TRM and Records-of-Revision:** (Current Program Year documents are in bold text below)

Record of Revision - Filed September 2, 2022 (effective January 1, 2023)
Record of Revision - Filed April 29, 2022 (effective January 1, 2023)
Record of Revision - Filed January 28, 2022 (effective January 1, 2023)

Technical Resource Manual, Version 9 - Filed October 27, 2021 (effective January 1, 2022)

of the measures to be reviewed in the current quarter. *Work Plan*.

- **TRM and Records-of-Revision:** (Current Program Year documents are in bold text below)

Record of Revision - Filed September 2, 2022 (effective January 1, 2023)
Record of Revision - Filed April 29, 2022 (effective January 1, 2023)
Record of Revision - Filed January 28, 2022 (effective January 1, 2023)

Technical Resource Manual, Version 9 - Filed October 27, 2021 (effective January 1, 2022)

Record of Revision - Filed September 2, 2022 (effective September 2, 2022)
Record of Revision - Filed April 29, 2022 (effective April 29, 2022)
Record of Revision - Filed January 28, 2022 (effective January 28, 2022)
Record of Revision - Filed October 27, 2021 (effective January 1, 2022)
Record of Revision - Filed April 30, 2021 (effective January 1, 2022)
Record of Revision - Filed December 31, 2020 (effective January 1, 2022)

Technical Resource Manual, Version 8 - Filed August 11, 2020 (effective January 1, 2021)

Record of Revision - Filed October 27, 2021 (effective August 30, 2021)
Record of Revision - Filed April 30, 2021 (effective April 14, 2021)
Record of Revision - Filed December 31, 2020 (effective December 31, 2020)
Record of Revision - Filed March 31, 2020 (effective January 1, 2021)
Record of Revision - Filed March 31, 2020 (effective January 1, 2021)
Record of Revision - Filed September 27, 2019 (effective January 1, 2021)
Record of Revision - Filed June 28, 2019 (effective January 1, 2021)

Technical Resource Manual, Version 7 - Filed April 15, 2019 (effective January 1, 2020)

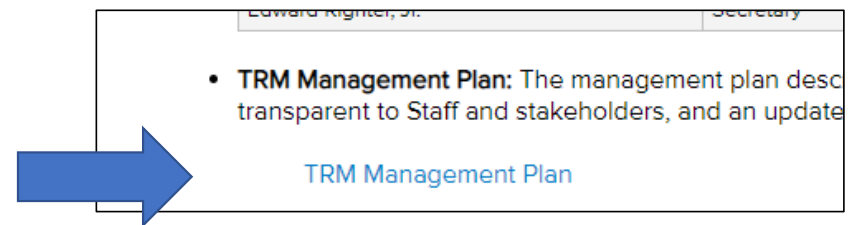
Record of Revision - Filed August 11, 2020 (effective August 7, 2020)
Record of Revision - Filed March 31, 2020 (effective March 30, 2020)
Record of Revision - Filed March 31, 2020 (effective December 23, 2019)
Record of Revision - Filed February 28, 2020 (effective February 28, 2020)
Record of Revision - Filed December 23, 2019 (effective December 23, 2019)
Record of Revision - Filed March 29, 2019 (effective January 1, 2020)

Technical Resource Manual, Version 6.1 - Filed January 31, 2019 (effective January 31, 2019)

Link: <https://www3.dps.ny.gov/W/PSCWeb.nsf/All/72C23DECFF52920A85257F1100671BDD>

TRM MC Management Plan

- > TRM Management Plan created: June 1, 2015
- > TRM Management Plan updated: August 15, 2018; November 8, 2021
 - The Joint Utilities designed the TRM Management Plan to provide the foundational venue for utilities to work together to maintain and update the TRM prospectively.
 - Refiled v9 to include NYSERDA as a voting member



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TRM MC Processes

How does the MC approach measure revisions?

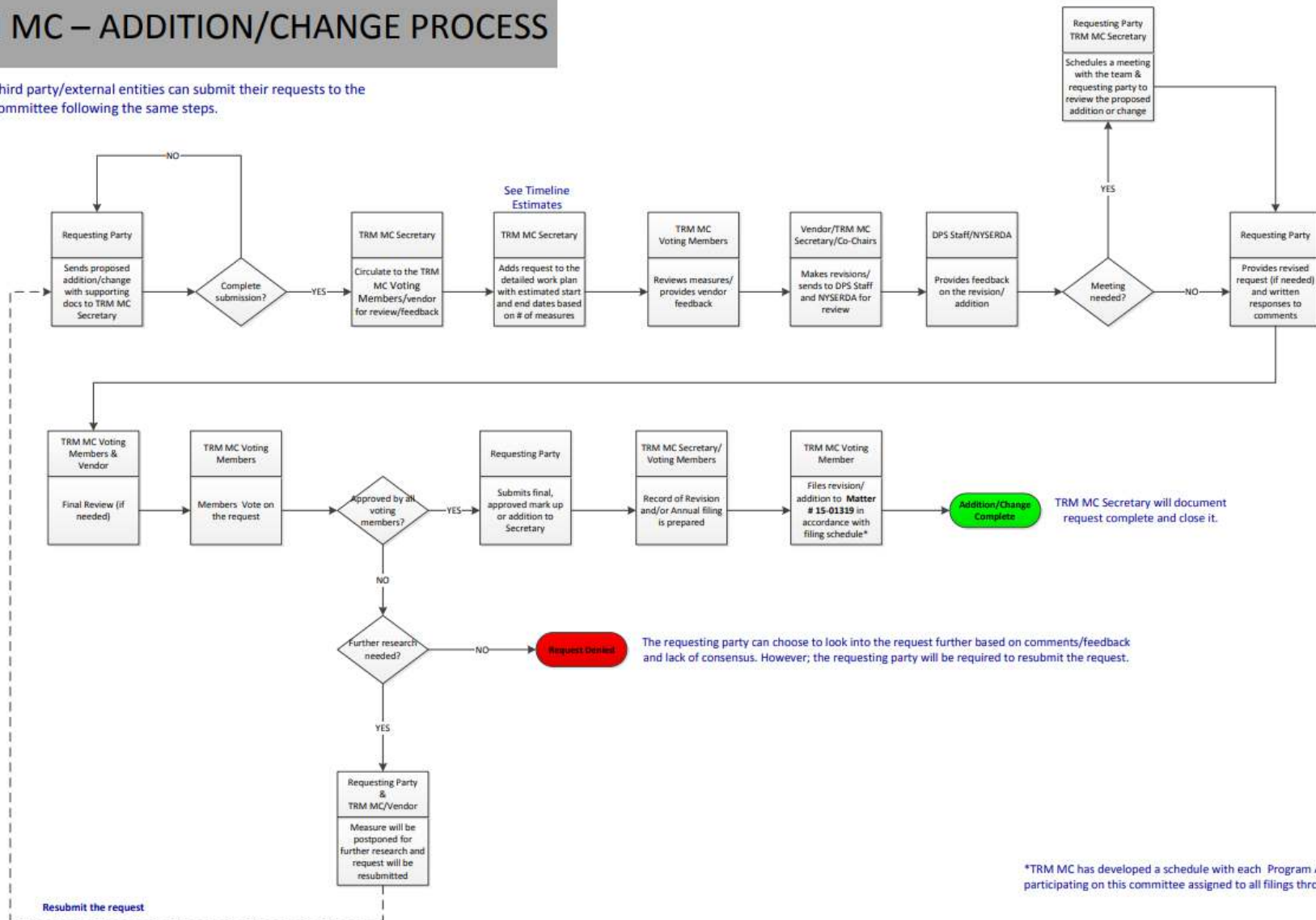
- > Secretary tracks lists of new measures, open research questions, pending revisions.
- > Parse quarterly upgrades into batches
- > Makes regular updates based on Codes and Standards changes, EM&V studies, and measure submissions
- > TRC does first pass at research and redline updates

How are measures reviewed by the MC?

- > Thorough & Objective reviews
- > ~3 month cycles
- > TRC tech reviewers perform initial review
- > MC members review proposed changes
- > DPS review proposed changes
- > MC members vote
- > Approved changes are filed quarterly

TRM MC – ADDITION/CHANGE PROCESS

Third party/external entities can submit their requests to the committee following the same steps.



*TRM MC has developed a schedule with each Program Administrator participating on this committee assigned to all filings through 2018.

Collaboration with MC from Stakeholders

- > Review quarterly work plan
- > Reach out if you have expertise, input, or interest on a measure slated for review
- > All stakeholders that submit new measures or revisions will be included in the review process
- > MC always open to questions or suggestions

DPS's TRM Responsibilities

- > New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs
- > Staff has a monitoring and auditing role
 - Measure revisions and additions, annual filing; standardized approach for estimating energy savings; transparency for all stakeholders
 - TRM MC Management Plan
- > Documenting Commission policy and/or Staff guidance
- > Maintain TRM website
(<https://www3.dps.ny.gov/W/PSCWeb.nsf/All/72C23DECFF52920A85257F1100671BDD?OpenDocument>)

DPS's TRM Responsibilities

- > Current Commission Baseline Policy, market rate programs
 - New Construction: baseline measure is assumed to be the typical measure installed without the program, incremental savings similar to Normal Replacement scenario below
 - Normal Replacement (replace on failure, replace at end of useful life): incremental savings relative to a code or standard baseline
 - Early Replacement: dual baseline approach using the Remaining Useful Life (typically 1/3 of the EUL) and performance of the existing measure and a code or standard baseline using 2/3 of the EUL
 - Special Circumstance: dual baseline approach assuming a default functional period (DFP) of 25% of the efficient measure EUL
- > Current Commission Baseline Policy, LMI programs
 - Existing conditions used as baseline
- > Baseline policy is being reviewed in Performance Management & Improvement Process
 - Details and materials are filed in DMM under Matter Number 20-01201

Custom Measure Categories

Category 1

- Unique Measures & Projects

Category 2

- Measures including prescriptive measure not in the TRM

Category 3

- Measures in TRM but used in a different application/environment

Category 4

- Whole-building analysis

Category 5

- Residential retrofit standard simulations for measure packages

Category 6

- Residential retrofit standard simulations for measure packages

DPS DMM

Link: <http://documents.dps.ny.gov/public/Common/AdvanceSearch.aspx>

Search

Cases/Matters: ☒ Documents: ☐

Case/Matter Search

Matter/Case Number:
e.g. format (99-A-9999 or 99-99999)

Start Date From:

Matter Type:

Matter Subtype:

Industry Affected:

Municipality:

15-01319



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Record of Revision TRM Filing Detailed Work Plan									
No.	Task	Estimated Completion Date	Effective Date in TRM	Comments					
1	File Q2 + Q3 2021 ROR			To be filed by National Grid 10/26	3	File Q4 2021 ROR			To be filed by National Fuel 12/30/2021
	New Measures					New Measures			Work plan for Q4 2021 is an estimate of the work anticipated to be completed for the quarter. This list is subject to change based on TRM MC priorities and workload.
RES	Dehumidifier Recycling	8/31/2021	8/31/2021		RES	Refrigerator and Freezer Recycling	12/30/2021	12/30/2021	
RES	Heat Pump Pool Heater	8/31/2021	8/31/2021	Reassessing associated pumping impacts and will provide recommendations to the MC based on this evaluation in Batch 28	RES	Induction Cooktops	12/30/2021	12/30/2021	
RES	Window-Film	8/31/2021	8/31/2021		RES	DHW Thermostat Setback	12/30/2021	12/30/2021	
C&I	Central-Pumped GSHP	8/31/2021	8/31/2021		C&I	LED Open Sign	12/30/2021	12/30/2021	
C&I	High Volume Low Speed Fan	8/31/2021	8/31/2021	Investigating default compliance efficiency and potential for cooling load displacement and provide recommendations to MC in Batch 28	C&I	DHW Thermostat Setback	12/30/2021	12/30/2021	
C&I	Heat Pump Pool Heater	8/31/2021	8/31/2021		C&I	Condenser Coil Cleaning	12/30/2021	12/30/2021	
C&I	Solar Pool Cover	8/31/2021	8/31/2021		C&I	Oven Steamer, Fryer, and Griddle	12/30/2021	12/30/2021	The values of preheat baselines are different in the revised and updated workpapers for the food service appliances.
	Review of updates/questions within various measures				C&I	High Viscosity Industrial Lubricant - Gear Box	12/30/2021	12/30/2021	
RES	Insulation - Opaque Shell	8/31/2021	1/1/2022	Combined with Residential Blown-In Insulation, which will no longer be a distinct measure beginning with TRM V9	C&I	High Viscosity Industrial Lubricant - Hydraulic	12/30/2021	12/30/2021	
RES	Air Conditioner - Room (RAC) Cover and Gap Sealer	8/31/2021	1/1/2022		C&I	Livestock Waterer	12/30/2021	12/30/2021	
						Review of updates/questions within various measures			
RES	Heat Pump Water Heater	8/31/2021	1/1/2022	It is recommended that utilities add language into program guidelines that ensures functionality/airflow of installed equipment for residential heat pump water heaters. Also, TRC will circulate the most recent draft of the C&I HPWH measure for MC review in Batch 28.	C&I	Heat Pump Water Heater	12/30/2021		The values of preheat baselines are different in the revised and updated workpapers for the food service appliances.
RES	Interior and Exterior Lighting	8/31/2021	1/1/2022		C&I	Oven Steamer, Fryer, and Griddle	12/30/2021	1/1/2023	Determine if annual hours of steam trap operation is consistent with pressurized hours, and if not, determine if the equation needs to change back to the original V7 equation for the 'other' steam trap measure.
RES	Solar Pool Heaters	8/31/2021	1/1/2022		C&I	Stream Trap - Other Applications	12/30/2021	1/1/2023	Determine if annual hours of steam trap operation is consistent with pressurized hours, and if not, determine if the equation needs to change back to the original V7 equation for the 'other' steam trap measure.
					C&I	Stream Trap - Low Pressure Space Heating	12/30/2021	1/1/2023	Determine if annual hours of steam trap operation is consistent with pressurized hours, and if not, determine if the equation needs to change back to the original V7 equation for the 'other' steam trap measure.
RES	Low-Flow Showhead	8/31/2021	1/1/2022	Will revise the Measure Description to use "prescribe" rather than "dictate" with regard to code compliance. Existing flow rate will be accommodated for LMI applications with a default of 2.5 GPM, per EPA Act 1992. Will confirm alignment with WaterSense requirements and revise as necessary. For the person/household term, from application values will be accommodated and an additional default ("AverageUnknown") will be included to address cases where the housing time (SF/MF) is not known.	C&I	Stream Trap Monitoring System - Other Applications	12/30/2021	1/1/2023	
					C&I	Stream Trap Monitoring System - Low Pressure Space Heating			
C&I	High Speed Fan	8/31/2021	1/1/2022	TRC and NYSERDA will look to revisit exhaust/ventilation fan assumed hours in Batch 28	C&I	EC Motors for Blower Fans	12/30/2021	1/1/2023	National Grid request to re-evaluate savings algorithms
C&I	Advanced RTU Control	8/31/2021	1/1/2022		C&I	EC Motors for Hydronic System Circulator Pumps	12/30/2021	1/1/2023	National Grid request to re-evaluate savings algorithms
C&I	EC Motor - Refrigerated Case or Walk-In	8/31/2021	1/1/2022		C&I	Stream Trap - Low Pressure Space Heating	12/30/2021	1/1/2023	National Grid request to re-evaluate savings algorithms
RES/C&I	Appendix P	8/31/2021	1/1/2021		C&I	High Volume Low Speed Fan	12/30/2021	1/1/2023	Investigating default compliance efficiency and potential for cooling load displacement and provide recommendations to MC
RES	Category 5 - Residential Retrofit Standardized Simulation for Measure Packages	8/31/2021	8/31/2021	New category added to the "Custom Measure" section of the TRM. It focuses on envelope measures and prioritization of heating/cooling load reduction; it can be expanded to include additional measures; it allows for peak kW and peak gas impacts; existing condition baseline applicable for "measure package"	C&I	Refrigerators and Freezers	12/30/2021	1/1/2023	Revision to the laboratory grade equipment baseline on this measure and correction of baseline for ULT Freezers.
					C&I	Air Source Heat Pump Water Heater (HPWH)	12/30/2021	1/1/2023	
2	TRM Version 9 Filing	8/31/2021	1/1/2022	To be filed by National Grid 8/31/2021	C&I	Window Glazing	12/30/2021	1/1/2023	Update kWh per unit based on impact evaluations completed by Cadmus and DNV
3	File Q4 2021 ROR			To be filed by National Fuel 12/30/2021	RES	Refrigerator and Freezer Recycling	12/30/2021	1/1/2023	National Grid request to re-evaluate savings algorithms
					RES	EC Motors for Blower Fans	12/30/2021	1/1/2023	National Grid request to re-evaluate savings algorithms
					RES	EC Motors for Hydronic Pumps	12/30/2021	1/1/2023	National Grid request to re-evaluate savings algorithms
					RES	Windows	12/30/2021	1/1/2023	National Grid request to re-evaluate savings algorithms
					RES	Low-e Storm Windows	12/30/2021	1/1/2023	National Grid request to re-evaluate savings algorithms
					RES	Solar Pool Heater	12/30/2021	1/1/2023	
					RES	Heat Pump Pool Heater	12/30/2021	1/1/2023	Reassessing associated pumping impacts and will provide recommendations to the MC based on this evaluation in Batch 28
					RES	Pool Pump	12/30/2021	1/1/2023	
					C&I	High Speed Fan	12/30/2021	1/1/2023	Revisit exhaust/ventilation fan assumed hours
4	TRM Stakeholder Forum						11/9/2021		

Measures ready for inclusion in the TRM

- > Technology readily available in the market and certified by applicable standards (UL, CPC, etc.)
- > Clear documentation and understanding of technology
- > Independent studies that verify savings
- > For technology not ready for the TRM:
 - Custom Measures

When/How can new measures be submitted for consideration?

- > Member Utility Contributions
- > Third Party Contributions
- > EM&V
- > Market Potential Studies
- > Stakeholder Input

Access the measure template on the [TRM website](#)

Measure Template

Define Sector

Name of Measure

Measure Description

A BRIEF SUMMARY OF THE MEASURE (See current descriptions in the TRM as examples)>>

Method for Calculating Annual Energy and Peak Coincident Demand Savings

<<SHOW THE CALCULATION(S) IN DETAIL<<

where:

*<<INCLUDE DEFINITION OF VARIABLES IN RELATION TO THE INFORMATION
REQUIRED IN THE CALCULATION(S)>>*

Summary of Variables and Data Sources

<<DETAIL APPROPRIATE INFORMATION HERE>>

Coincidence Factor (CF)

<<DETAIL APPROPRIATE INFORMATION HERE>>

Baseline Efficiencies from which Savings are Calculated

<<DETAIL APPROPRIATE INFORMATION HERE>>

Compliance Efficiency from which Incentives are Calculated

<<DETAIL APPROPRIATE INFORMATION HERE>>

Operating Hours

<<DETAIL APPROPRIATE INFORMATION HERE>>

Effective Useful Life (EUL)

<<DETAIL APPROPRIATE INFORMATION HERE>>

Ancillary Fossil Fuel Savings Impacts

<<IF REQUIRED>>

Ancillary Electric Savings Impacts

<<IF REQUIRED>>

References

<<LIST ALL REFERENCES HERE (INCLUDING SUPPORTING STUDIES)>>

Record of Revision

Record of Revision Number	Issue Date

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Measure Effectuation

- > Adopted additions or revisions are formally documented in the quarterly filed Record of Revision
- > Effective Dates are set in the detailed work plan:
 - New Measures are effective immediately when filed
 - Revisions are effective when the next TRM consolidated version is published, with typically a two-month grace period between filing and effectuation.
- > A TRM MC member company may choose to adopt a newly-approved measure or revision ahead of its effective date to expedite accurate program savings calculations or methodologies.

New Measures & Revisions in the TRM



5 New Measures
Added



19 Revised/Corrected
Measures



Filed Versus Effective

Highlights of TRM Version 10 Updates

Filing: December 30

- > New measures and revisions added
- > Weather Data Updates
- > General Service Lighting Standard Integration
- > Custom Category 6: Residential Retrofit Standardized Simulation for Measure Packages
- > LMI Updates in the TRM



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New Technology Showcase

New Technologies (Added to V10)

Induction Cooktops (Res + C&I)

- Increased stovetop cooking efficiency when coupled with compatible, ferromagnetic-base cookware. Induces an electric current that heats cookware via resistive heating.

Livestock Waterer (C&I)

- Provides clean drinking water to livestock year-round. Efficient and zero-energy models leverage insulation and ground heat to prevent freezing during winter months.

High Viscosity Industrial Lubricants (C&I)

- Lubricants applied to industrial hydraulic and gear systems. Products with high viscosity index maintain constant viscosity over a wider range of temperatures, decreasing energy loss and maintenance costs.

Heat Pump Clothes Dryers (Res)

- ENERGY STAR® residential clothes dryers utilizing closed loop heat pump technology.

New Technologies (Under Development)

Refrigeration Condenser Coil Cleaning (C&I)

- Removal of dust and debris buildup on commercial refrigeration condensers increases operating efficiency by improving heat exchange capabilities of the coils.

Smart Thermostat (C&I)

- Commercial counterpart to Residential Learning Thermostat measure previously published in NY TRM. Commercial facility operating and system parameters under development by NYSERDA.

Real-Time Energy Management (C&I)

- Akin to Energy-Management-as-a-Service (EMaaS), combines controls and monitoring technology with cloud-based analytics and energy expert support to review system data and diagnose and address faults and inefficiencies.

Smart Water Heaters/Controls (Res)

- Equips service water heaters with smart control technology, allowing remote control of heating element cycling, temperature setpoints and schedules. May incorporate behavioral learning capability to adapt to typical usage patterns.

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General Service Lighting Standard Update

General Service Lighting Standards: Background

EISA Passed in 2007

- The Energy Independence and Security Act (EISA) implemented standards for general service lamps (GSLs) in two phases.
- The first phase, effectuated between 2012 and 2014, reduced A-lamp energy consumption by ~28%
- The second phase was set to take effect in 2020, imposing either DOE final rule regarding definitions and efficacy of GSLs or backstop provisions (expanded GSL definitions and 45 lm/W performance standard)

Backstop Rescinded in 2019

- DOE published new rulings in 2019 rescinding both provisions of the EISA backstop.

Backstop Reinstated in 2021-2023

- DOE proposed reinstatement of the backstop provisions in August (expanded definitions) and December (increased efficacy standard) of 2021.
- These rulings were finalized and made effective in July 2022.
- Enforcement phased in between July 2022 and July 2023.

General Service Lighting Standards: TRM Impacts

Updated Baselines for Market Rate Residential Customers

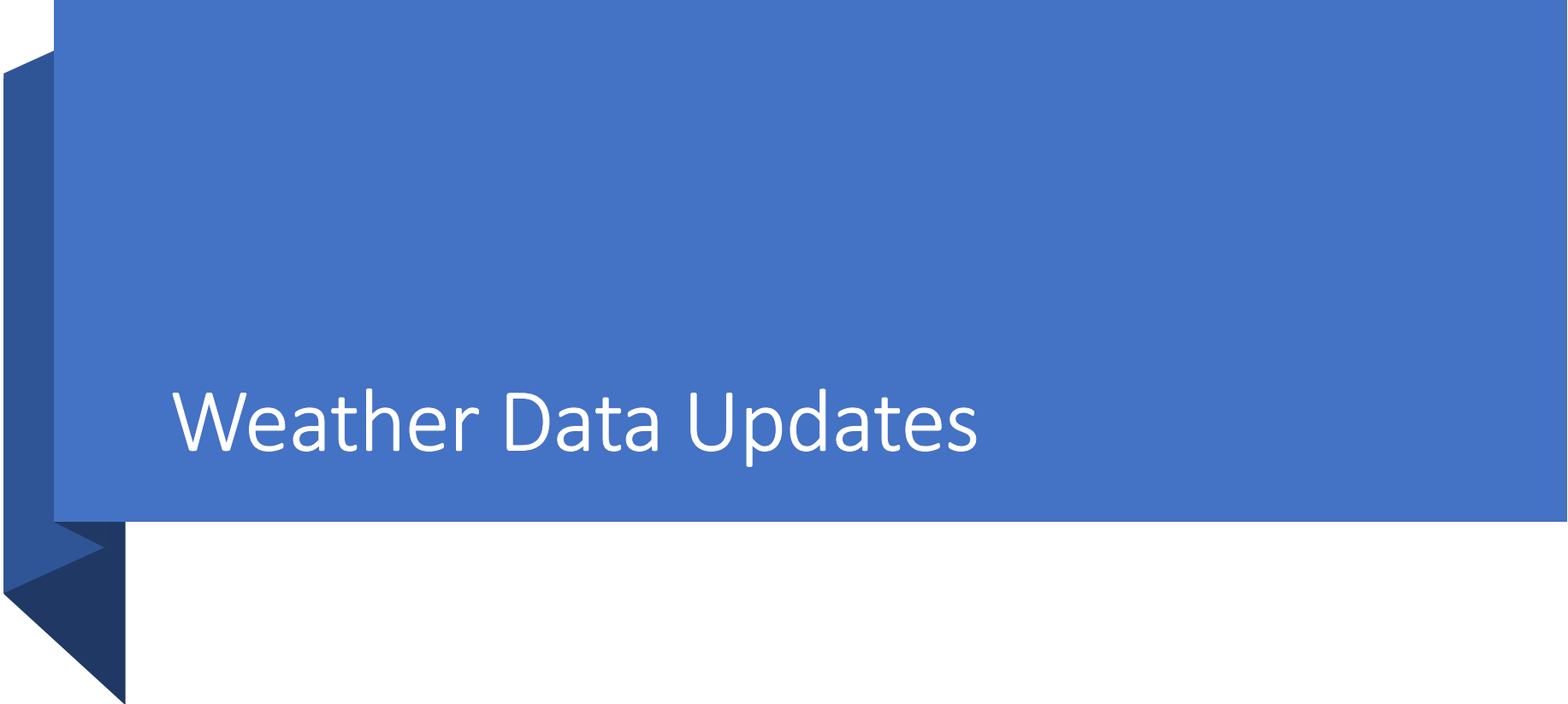
- As a result of these new standards, baseline wattages and definitions of GSLs have been updated to reflect DOE rulings.
- Updated baselines reduce wattage difference between qualified products and counterfactuals by up to 80%.
- Exempt lamp and fixture baselines remain unchanged.

Baselines for LMI

- No change. Where existing conditions are captured, existing wattage used as baseline for LMI.

Midstream Baseline Impacts

- In order to account for LMI participants, baseline adjustments have been introduced for programs where existing conditions cannot be collected. Adjustments are based on EISA 2007 standards, new DOE rulings and forecasted proportion of Market Rate and LMI customers in midstream programs.

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Weather Data Updates

Why is updated weather data important?

- > As New York State, and the world, experience the increasing effects of climate change, it becomes ever more important to utilize weather data that is updated on a regular basis, and incorporates a more recent time period.
- > A common weather standard is to use NREL's TMY3 weather data which creates a normal year of weather data by considering weather from years 1976 through 2005. A decade and a half later, similar weather conditions should not be expected in the future.
- > These changing weather conditions throughout the state can affect energy savings and technology performance estimates, especially in situations where different time periods or standards are used between studies (e.g., implementer versus evaluator).
- > Standardization helps to eliminate known discrepancies in analyses approaches across studies, however, it should be noted that moving to a more recent weather data time period cannot be construed to either increase or decrease savings or performance estimates.

Updated Weather Data Sources

- > TRM Management Committee has voted to adopt the most recent NOAA 1991-2020 weather data standard¹
 - This guidance is located in measure methodology write-ups throughout the V10 TRM wherever weather-dependent parameters are prescribed, as well as in Appendix G (Equivalent Full Load Hours). Weather data standards and source will be updated regularly.

- > Note that NYSERDA recommends more recent weather to determine weather normal, but allows flexibility depending upon use case
 - TMYx from NSRDB considers satellite-based weather data from 1998-2021¹
 - NOAA provides ability to calculate weather normal from US based weather stations based on any start and end year

¹[NOAA Climate Normals](#)

²[National Solar Radiation Database](#)

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Custom Category 6: Residential Retrofit Standardized Simulation for Measure Packages

Documentation of the Heat Pump + Retrofit Measure in TRM v10.0

**CATEGORY 6 – RESIDENTIAL HEAT PUMP PLUS WEATHERIZATION RETROFIT
STANDARD SIMULATION FOR MEASURE PACKAGES (HP+Retrofit)**

The standardized simulation savings approach outlined here can be used to determine savings for combined heat pump and envelope measure packages proposed for inclusion in residential retrofit programs. In addition to supporting the envelope measure packages established in Custom Measure Category 5, this new measure, Residential Heat Pump Plus Weatherization Retrofit Standard Simulation for Measure Packages (HP+Retrofit), supports adding both specific make and model cold climate air source heat pumps (ASHPs) and envelope packages that are pre-

The three envelope improvement package options d expanded to support additional building types, chan basements, and low-e storm windows.

HPWH are included in the HP+Retrofit Measure and heating and cooling equipment and ccASHP improve the HP+Retrofit measure, use detailed heat pump performance data. The [Efficiency Partnerships \(NEEP\) Cold Climate Air Source Heat Pump \(CCASHP\) Database](#) is an option that will reduce contrac-

In order to support ccASHP savings, simplified inputs are integrated into the HP+Retrofit measure. These designs are compared to published ACCA Manual J Version 8³ to assess the simplicity of the inputs. Additionally, the use of the established by the packages is leveraged to reduce the

The HP+Retrofit measure provides additional benefit required by the DOE Home Energy Score. Testing HP+Retrofit measure can successfully generate a HEScore Application Programming Interface.

About Standardized Simulations

As in custom measure Category 5, savings in the open source, physics-based calculation method (Open) optimized to reduce input error and contractor data streamlined alternative to deemed and partially deemed energy simulations. The simulation physics are trans-

³ <https://neep.org/heating-electrification/ccashp-specification->

² Manual J Residential Load Calculation, Arlington, VA. Air

³ The OpenStudio/EnergyPlus framework and the validation to others is described in supplemental documentation for the *Current Weatherization Retrofit Standard Simulation for Measure Pack Open Source Tools (EnergyPlus and OpenStudio)*.

Date XX. 2022

New York State Jo

**New York Standard Approach for Estimating Energy Savings from
Energy Efficiency Programs
Residential, Multi-Family, and Commercial/Industrial Measures
Supplemental Documentation**

Custom Measure Category 6: Residential Heat Pump Plus Weatherization Retrofit
Standard Simulations for Measure Packages

Issue Date – September XX, 2022

Effective Date – January 1 , 2023

> **Custom Measure Section - Category 6**

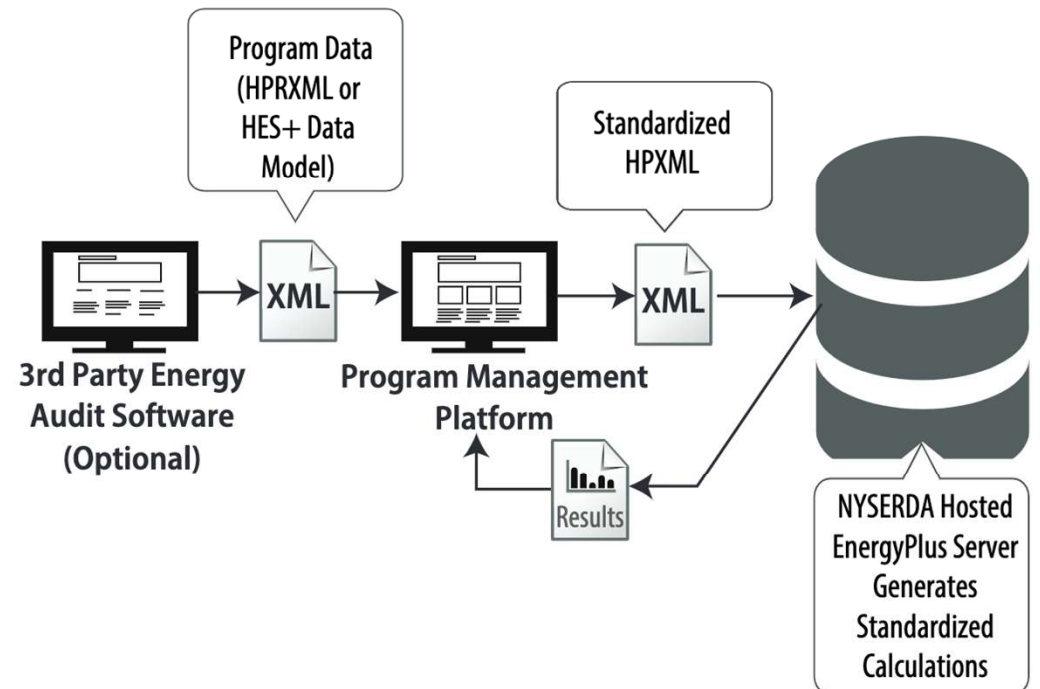
- Background on the method
- Description
- Data dictionary
- Calculation for measure life for a package of measures

> **Supplemental Documentation**, filed on DMM-15-01319

- Chapter A: Third Party Validation for Open Source Tools (EnergyPlus OpenStudio)
- Chapter B: Detailed Description for Transforming Standardized Program Data (HPRXML) into HPXML
- Chapter C: Modifying HPXML-EnergyPlus Inputs to Use NEEP Data for ccASHPs
- Chapter D: Quality Assurance Methods for Standardized Simulations
- Chapter E: Validation of Savings Results

Standardized Simulations Recap

- Supports improvement envelope retrofit “Packages” in the NYSERDA Comfort Home Pilot
- Cloud based – Easy to deploy updates
- Leverages DOE investments in open-source EnergyPlus/OpenStudio and in Home Energy Score
- A Standardized Simulation describes the transparent transformation of data into the HPXML data standard and then into EnergyPlus



New Measure Packages For HP+Retrofit

		Required Package Minimums		
Improvement Category		Package 1	Package 2	Package 3
Existing (Cat 5)	Infiltration Reduction	x	x	x
	Attic Insulation	x	x	x
	Rim Joist Insulation and Sealing	x	x	x
	Wall Insulation		x	x
	Floor Insulation		x	x
	Replacement Windows			x
		Optional Package Extensions		
New (Cat 6)	Heat Pump Water Heater	x	x	x
	Cold Climate Air Source Heat Pump	x	x	x

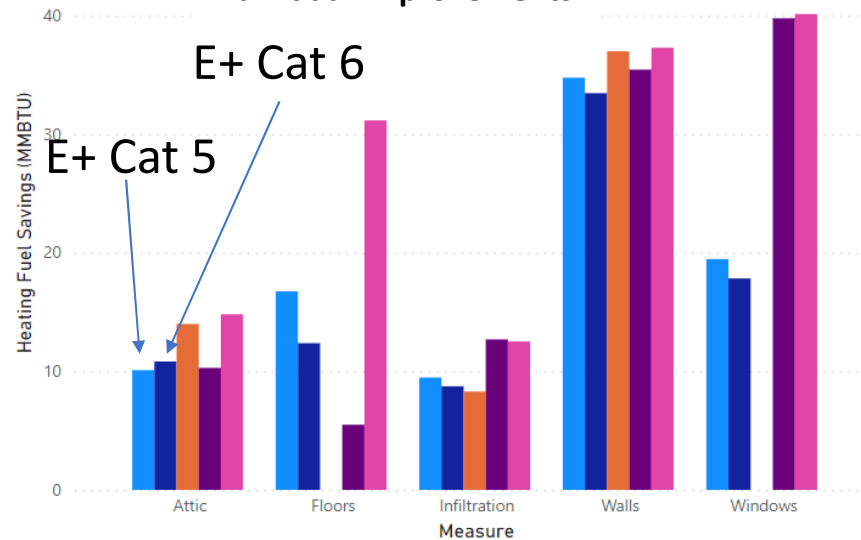
Comparing Energy Savings

New HP+Retrofit vs. Prior Standardized Simulation Results

Heating Fuel Savings (MMBTU)

Method ● E+ 68-77 (previous) ● E+ 69-77 (current) ● EMPCalc v4 ● GJGNY ● SEC (60/70)

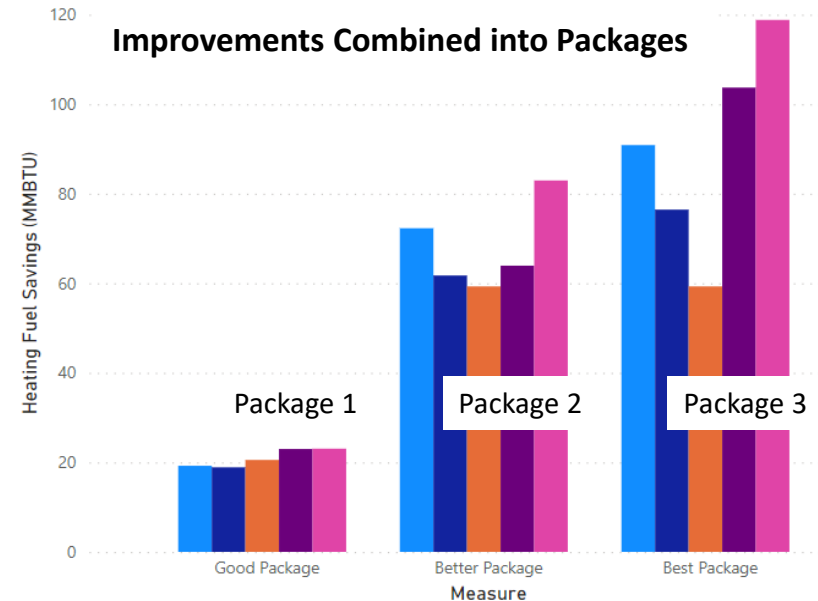
Individual Improvements



Heating Fuel Savings (MMBTU)

Method ● E+ 68-77 (previous) ● E+ 69-77 (current) ● EMPCalc v4 ● GJGNY ● SEC (60/70)

Improvements Combined into Packages



- Existing standardized simulation (Cat 5) is envelope only, so comparison is only on envelope
- Newer EnergyPlus version (E+) is slightly more conservative than version used in previous submission

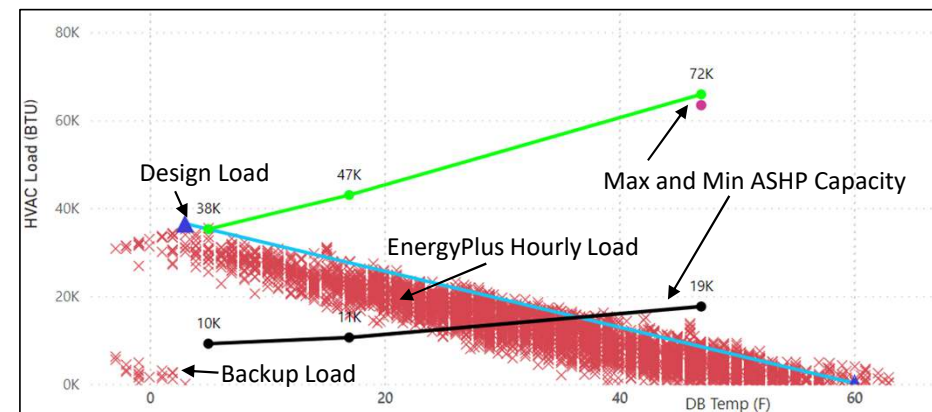
Benefits of the HP+Retrofit Development Effort

1. Expands the number of buildings where **envelope improvements can be integrated with heat pump** installations
2. Facilitates referrals (and related project information) to **better coordinate HVAC and weatherization** projects.
3. **Improves customer satisfaction** with heat pumps by improving the quality and performance of homes receiving weatherization and heat pump installations
4. Increases the savings depth and cost effectiveness of envelope improvements (NYSERDA Comfort Home) by **better integrating demand impacts** into programs
5. **Reduces need for redundant data entry** and modeling by producing energy savings, demand reduction, and load calculations for heating system sizing with a single set of simplified inputs.

Residential Decarbonization Market and Policy Barriers Addressed

- > Many more electrification projects start as heat pump jobs rather than as envelope jobs
- > There are barriers to heat pump contractors incorporating envelope improvements into their load sizing
- > There are widespread issues with the ability of heat pump contractors to correctly use load calculation software, and high program costs to validate submitted load calculations
- > Contractors are generally not aware of the impacts of oversizing on heat pump performance
- > Oversizing of heat pumps (from inflated load calculations) inflates TRM savings

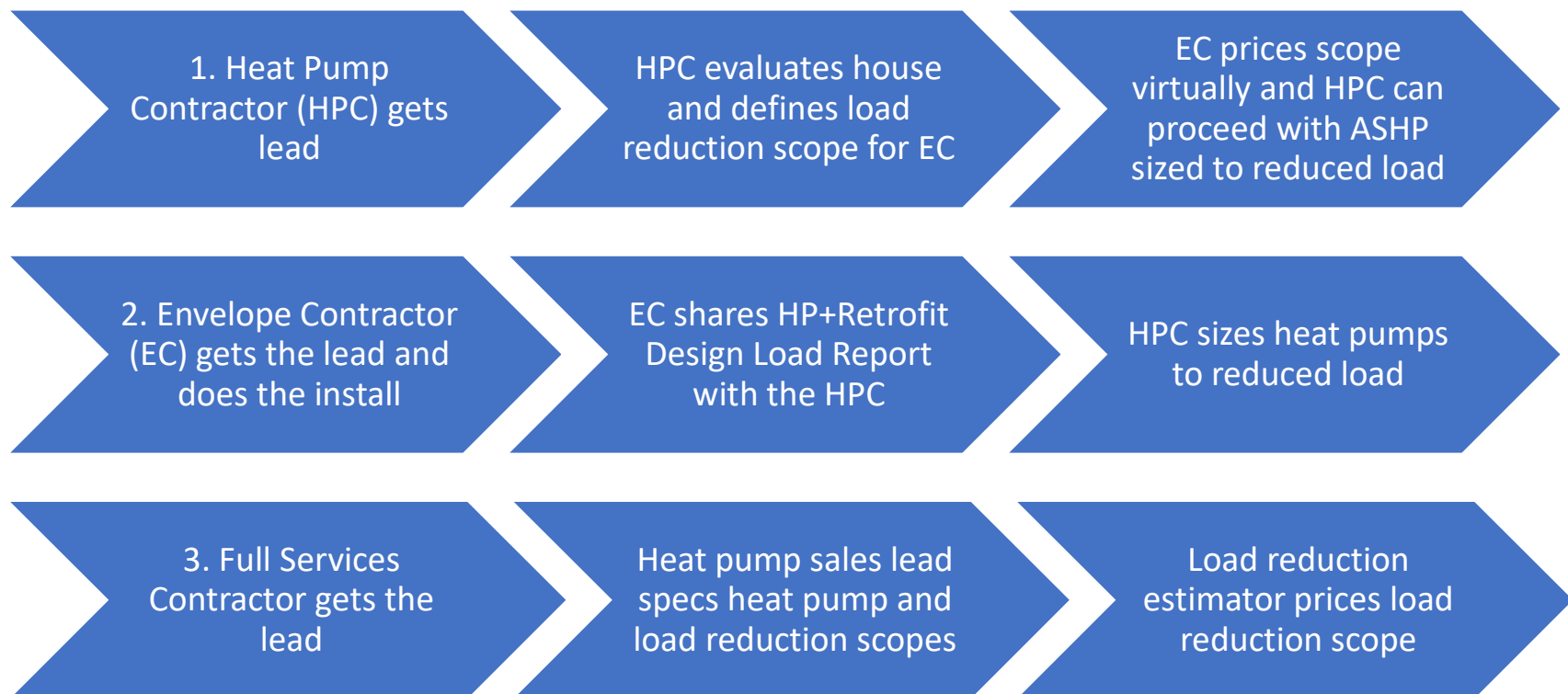
Modeling ASHP Capacity vs Design and Hourly Loads



Key Features Added to the HP+Retrofit Calculation

1. Integration of **design load calculation** with savings calculations
 - **Simplified load calculation** inputs
2. Easy **packaged based scenario analysis** of design load impacts
3. Easy assessment of the design load and savings impacts of **thermal boundary changes** to attics and basements
4. Integration of the EnergyPlus calculations with **detailed equipment performance** inputs from the NEEP database
 - Calculated **heating loads are allocated** to specified equipment
5. **Heat pump hot water heater added** as an option on all packages
6. **Expanded input checking** as integrated as part of OpenStudio calculation

Who's In First? Contractor HP+Retrofit Use Cases



Accurately Evaluating Envelope Design Load Reductions

Heating Design Load Report

Project Name: Jones House

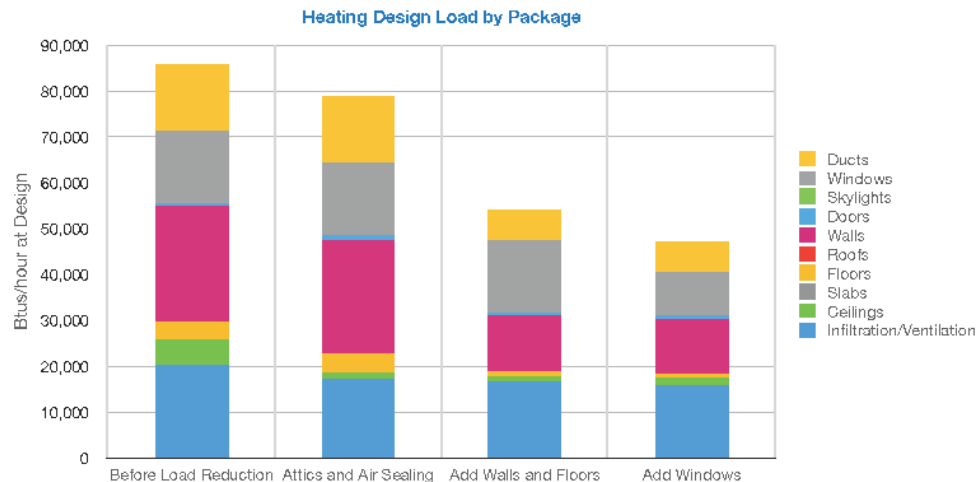
Weather Location: Albany, NY

Address: Albany, NY

Heating Design Temp: 3 F

Conditioned SF: 2000

Cooling Design Temp: 88 F



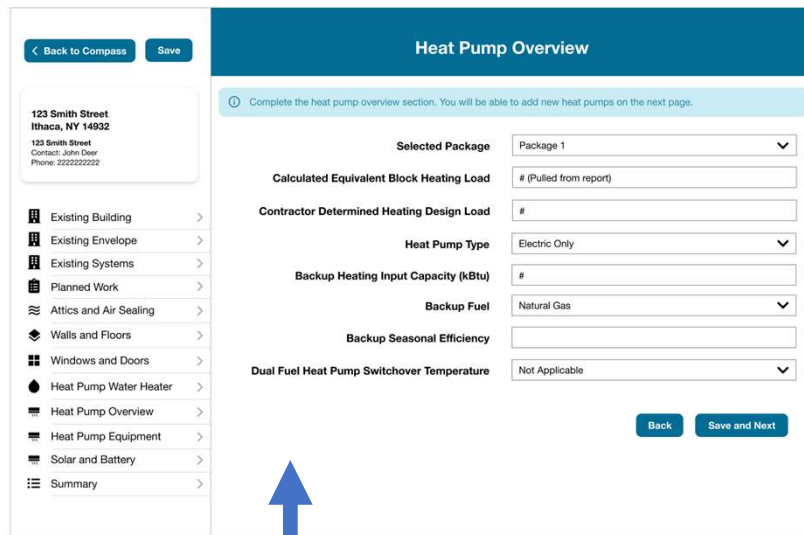
Key Load Reduction Target: Ducts in the Basement or Attic

- > 1 ton heating load reduction for this house when the unconditioned basement walls get insulated, creating a warm space for the heat pump ducts
- > Insulation investments trade off costs by reducing required heat pump capacity plus provide significant annual savings
- > Attic encapsulation is also supported, with similar impacts

Heat Pump Load Reduction by Package (tons)

Ductless	0.6	2.0	2.6
With Duct Losses	0.6	2.7	3.3

Simplified Load Calculation Data Model: Forms Based Data Entry



Heat Pump Overview

Complete the heat pump overview section. You will be able to add new heat pumps on the next page.

123 Smith Street
Ithaca, NY 14932
Contact: John Deer
Phone: 2222222222

- Existing Building
- Existing Envelope
- Existing Systems
- Planned Work
- Attics and Air Sealing
- Walls and Floors
- Windows and Doors
- Heat Pump Water Heater
- Heat Pump Overview
- Heat Pump Equipment
- Solar and Battery
- Summary

Selected Package: Package 1

Calculated Equivalent Block Heating Load: # (Pulled from report)

Contractor Determined Heating Design Load: #

Heat Pump Type: Electric Only

Backup Heating Input Capacity (kBtu): #

Backup Fuel: Natural Gas

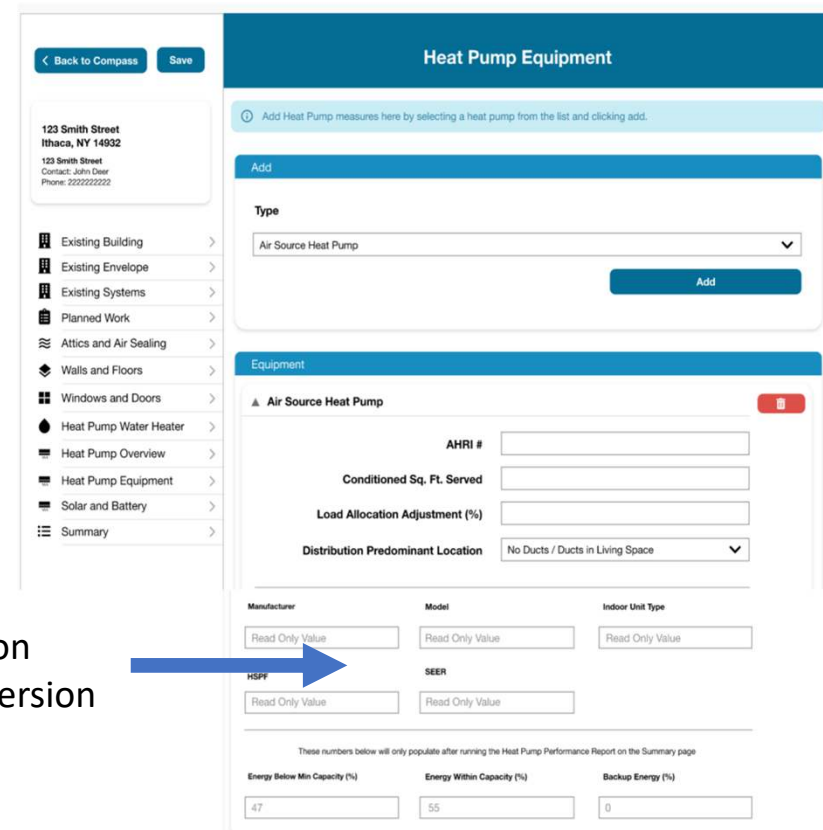
Backup Seasonal Efficiency:

Dual Fuel Heat Pump Switchover Temperature: Not Applicable

Back Save and Next

Heat Pump
Set Up

Equipment Specification
and Link to Licensed Version
of NEEP ccASHP List



Heat Pump Equipment

Add Heat Pump measures here by selecting a heat pump from the list and clicking add.

123 Smith Street
Ithaca, NY 14932
Contact: John Deer
Phone: 2222222222

- Existing Building
- Existing Envelope
- Existing Systems
- Planned Work
- Attics and Air Sealing
- Walls and Floors
- Windows and Doors
- Heat Pump Water Heater
- Heat Pump Overview
- Heat Pump Equipment
- Solar and Battery
- Summary

Add

Type: Air Source Heat Pump

Add

Equipment

Air Source Heat Pump

AHRI #

Conditioned Sq. Ft. Served

Load Allocation Adjustment (%)

Distribution Predominant Location: No Ducts / Ducts in Living Space

Manufacturer: Read Only Value

Model: Read Only Value

Indoor Unit Type: Read Only Value

SEER: Read Only Value

These numbers below will only populate after running the Heat Pump Performance Report on the Summary page

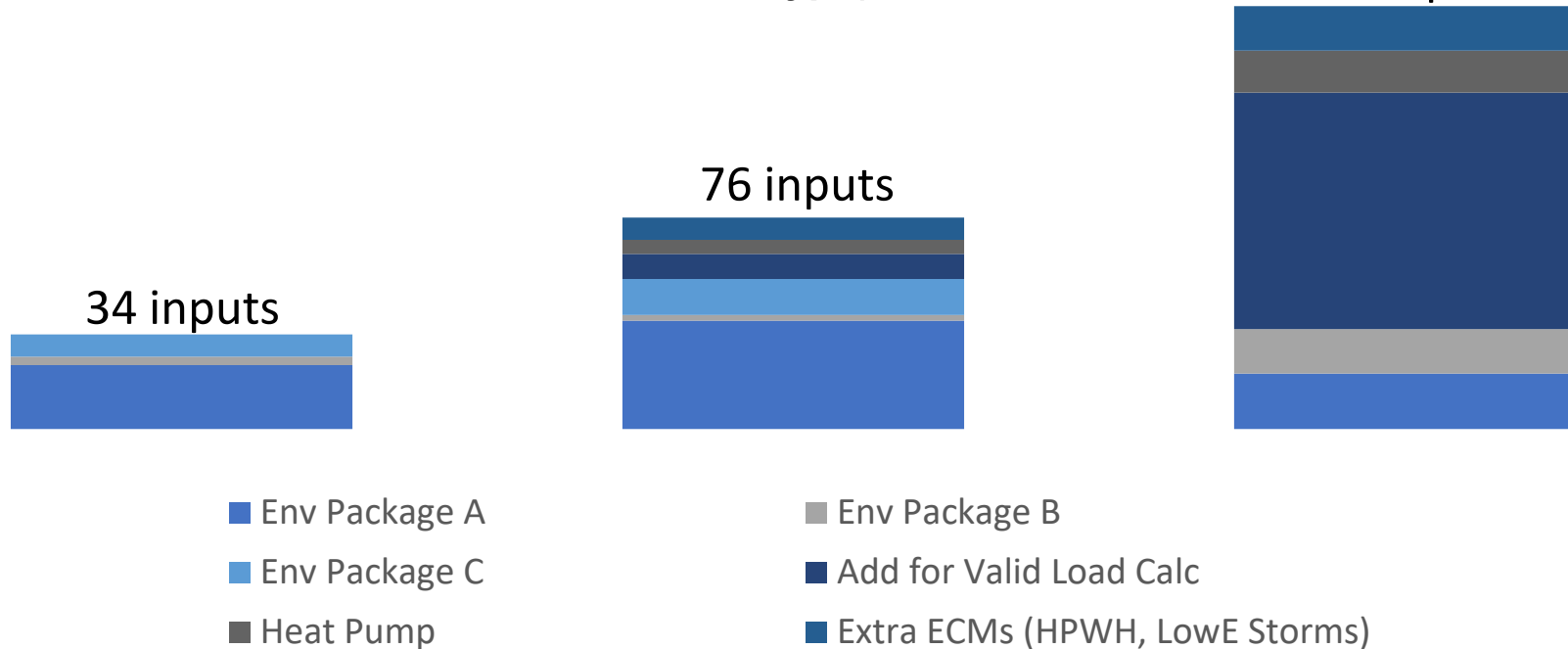
Energy Below Min Capacity (%) 47

Energy Within Capacity (%) 55

Backup Energy (%) 0

Integrating Envelope Savings, Load Calcs, Heat Pumps and Home Energy Score

Minimum Required Inputs (Estimated for a Simple Colonial House Type)



Next Steps: Initial Deployment

> Where:

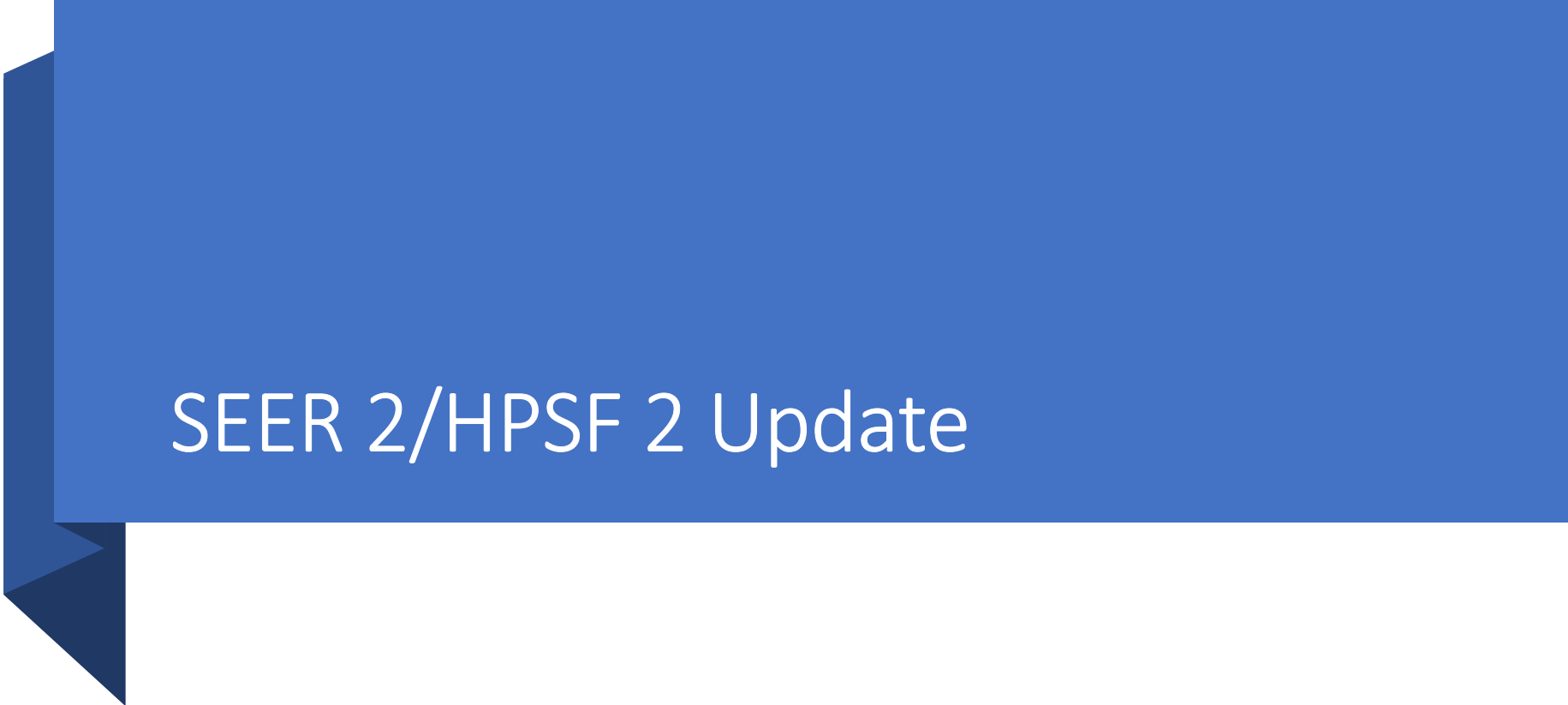
- NYSERDA Comfort Home Pilot
- NYSERDA Low Income Innovation Pilot in Tompkins County

> What:

- Further use case development
- Training materials development and testing
- Contractor feedback on interface and reports
- Interval meter data analysis

Questions

- > Gregory Thomas, PSD gthomas@psdconsulting.com
- > Dana Nilsson, NYSERDA Dana.Nilsson@nyserda.ny.gov
- > Courtney Moriarta, NYSERDA Courtney.Moriarta@nyserda.ny.gov
- > Caroline Hazard, NYSERDA Caroline.Hazard@nyserda.ny.gov

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SEER 2/HPSF 2 Update

SEER2/EER2/HSPF2 Update

New CAC & HP Testing/Rating Standard (Appendix M1)

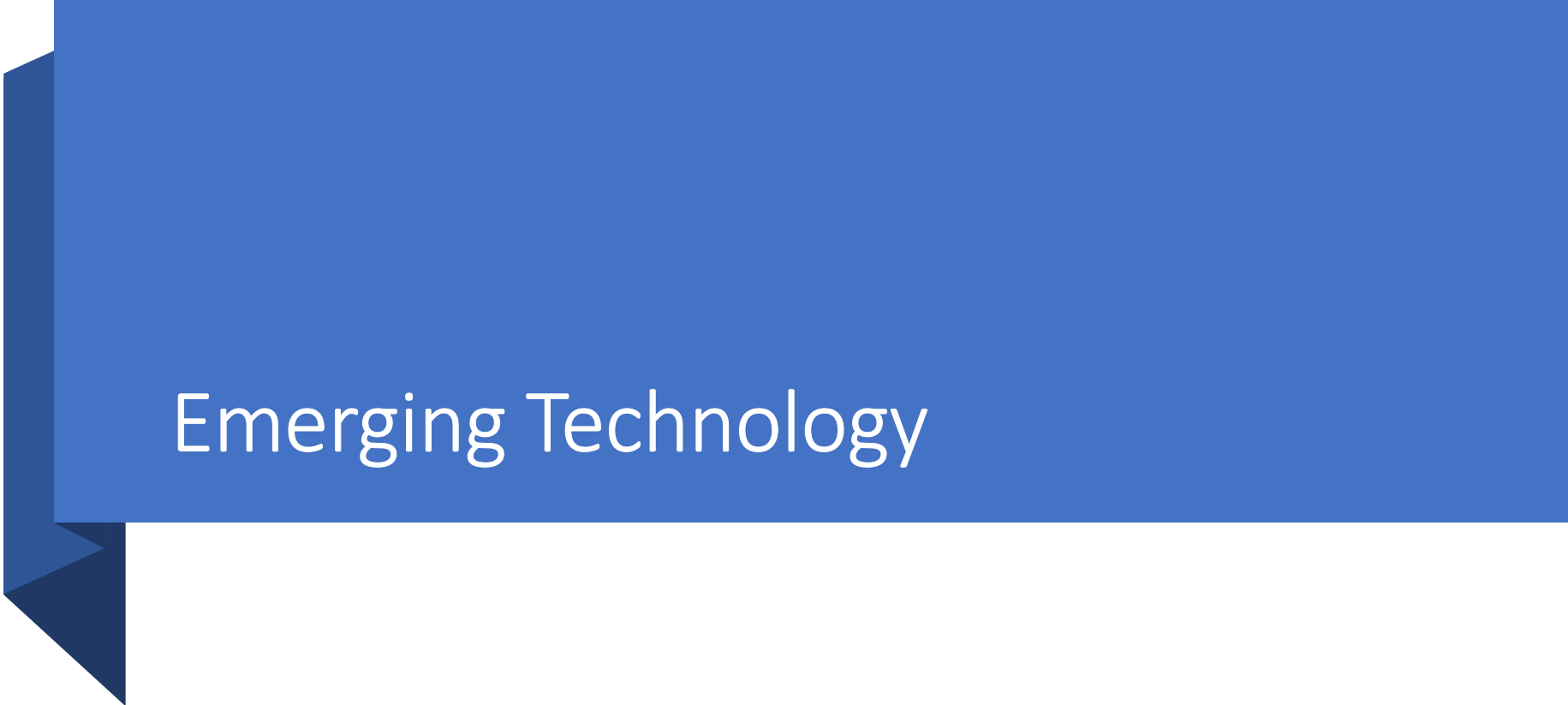
- Split and packaged central AC and HPs w/ cooling capacity <65,000 Btu/h
- Change to standard testing conditions (5x increase in external static pressure), reducing rating value

System type	SEER2/SEER	HSPF2/HSPF
Split System	0.95	0.85
Single Package	0.96	0.84
Small Duct High Velocity	1.00	0.85
Space Constrained	0.99	0.85

- Effective 1/1/2023
- Requirements vary by region
- Northern US: All newly manufactured equipment must carry SEER2/EER2/HSPF2 rating as applicable
- Equipment rated in accordance with Appendix M can still be sold/installed after 1/1/2023

TRM Impact

- New baselines in SEER2, EER2, and HSPF2, per federal standards, to allow like-for-like comparison
- Provisions added to all pertinent measures to accommodate equipment rated in either set of metrics (Appendix M v. M1 testing standard)

A blue ribbon graphic with a 3D effect, featuring a dark blue shadow on the left side. The ribbon is horizontal and has a folded appearance on the left end.

Emerging Technology

Emerging Tech & Future Initiatives

ASHRAE Guideline 36

- Standardized guidance on optimized HVAC controls sequencing
- Under MC evaluation for future inclusion as a standardized custom measure or prescriptive measure

Agnostic Decarbonization

- Program design concept that combines energy efficiency with beneficial electrification, load management, and renewable/distributed energy resources – performance based on predicted GHG emissions reductions
- TRM would need to codify GHG reduction estimation methods

ccASHP Analysis Refresh & Capacity Update

- Updates to ccASHP measures to reflect NEEP ccASHP v4.0 Specification (new products, SEER2/HSPF2 rating standards)
- Update to basis of heat pump sizing parameter for downstate applications (Max @ 17F rather than Rated @ 17F)

A blue ribbon graphic with a folded end on the left side, containing the text "Questions/Survey".

Questions/Survey

Open Forum



Questions

1. Are there customer types, end uses, measure categories, etc. that are underrepresented in the current NY TRM?
2. Any new and emerging technologies or missed opportunity measures that the TRM MC should be aware of?
3. What can the TRM MC do to improve transparency of our process and stakeholder engagement?
4. Is the TRM itself comprehensible and user-friendly? Any formatting, layout, nomenclature conventions or other improvements that would make the document more useful to stakeholders?

Additional Questions?



Co-Chair: Harold Neale

hneale@nyseg.com

Co-Chair: Amy Dickerson

amy.dickerson@nationalgrid.com

Secretary: Ed Righter

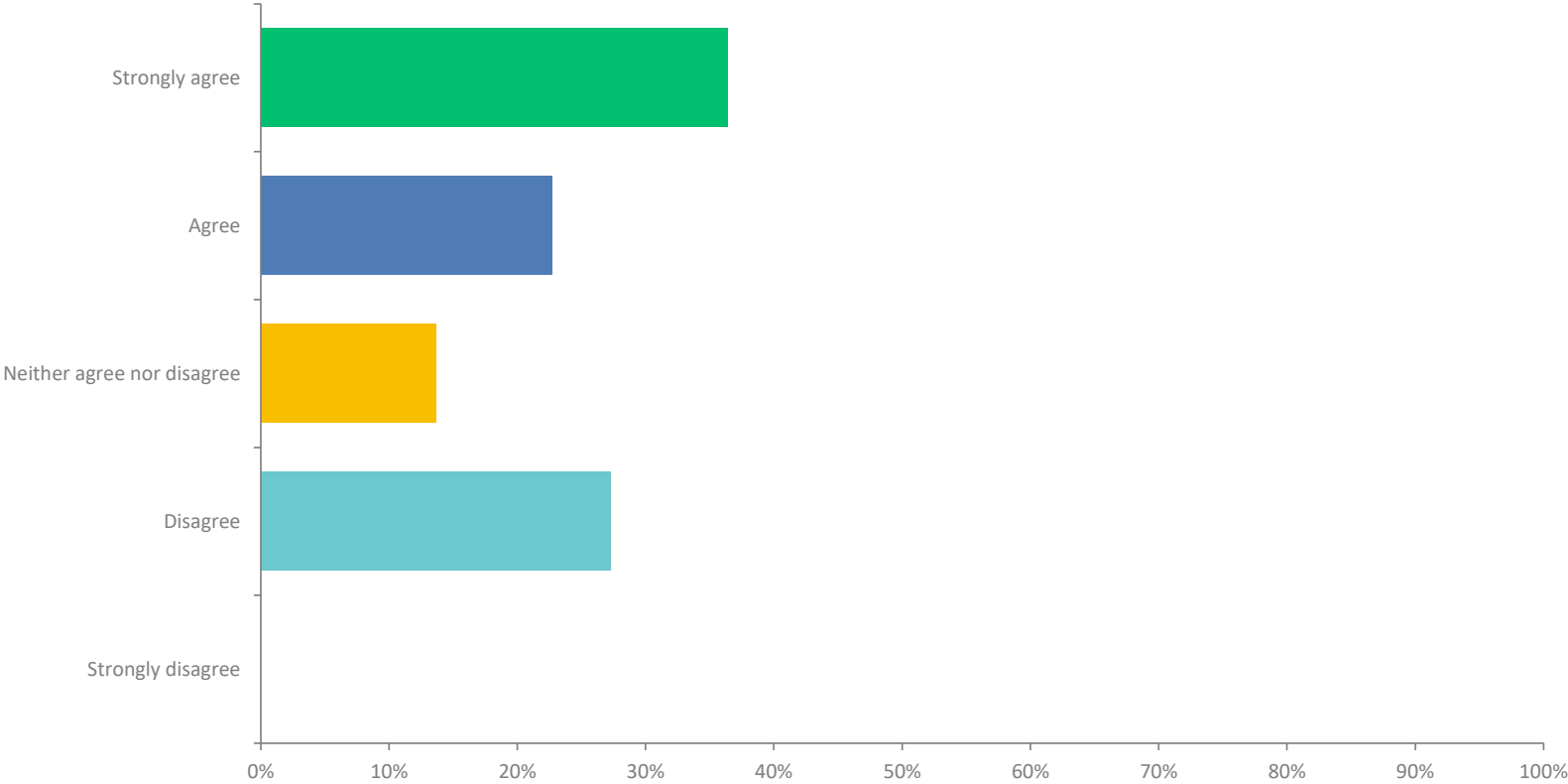
erighter@trccompanies.com

A blue ribbon graphic with a folded end on the left side, containing the text "Pre-Forum Survey Results".

Pre-Forum Survey Results

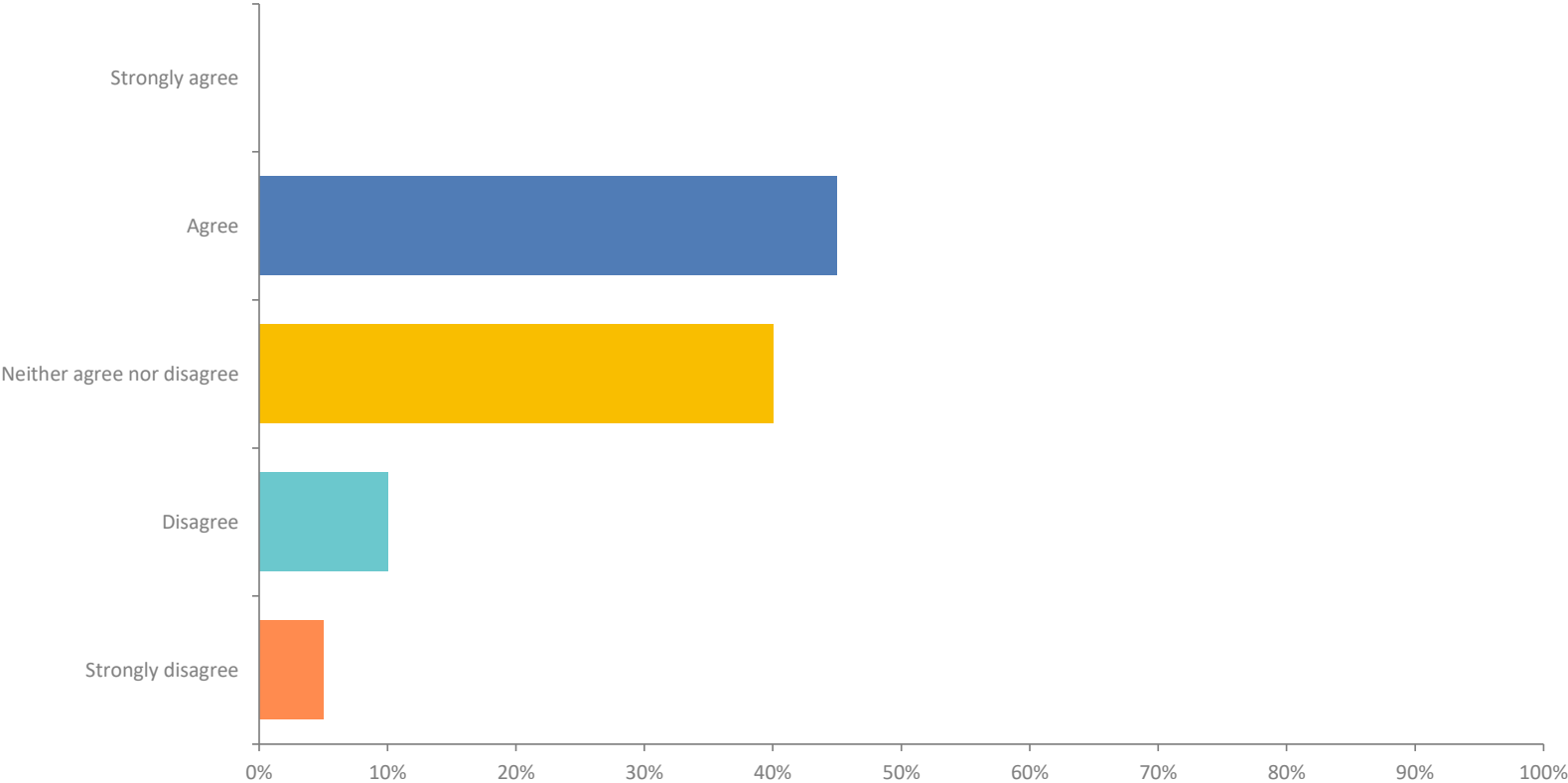
Q1: I use the NY TRM as a primary reference document for developing and/or validating energy and environmental impact estimates, evaluating project cost-effectiveness or identifying resources relevant to either or both.

Answered: 22 Skipped: 0



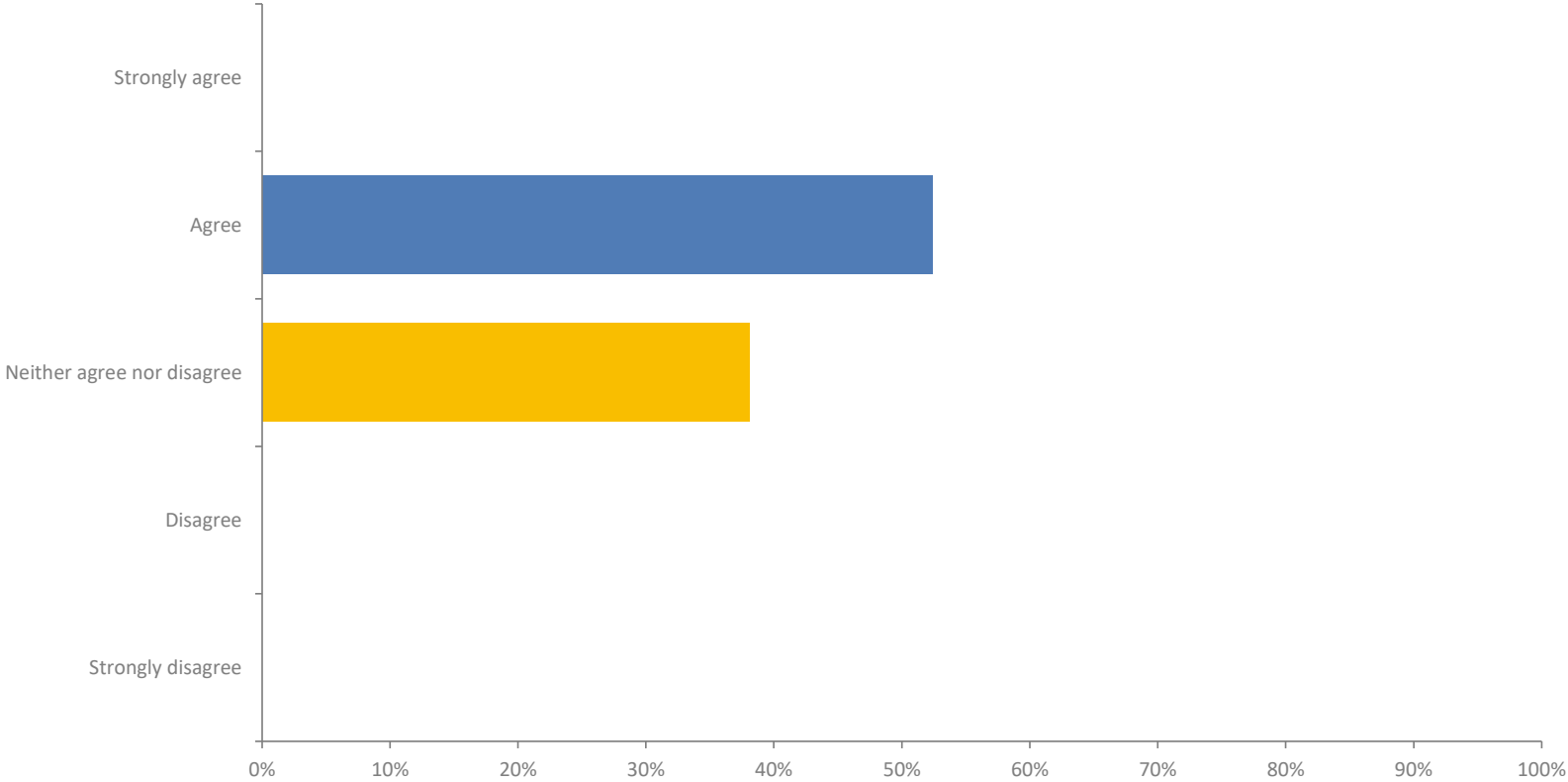
Q2: The NY TRM and supplemental webpages are easy to find and navigate.

Answered: 20 Skipped: 2



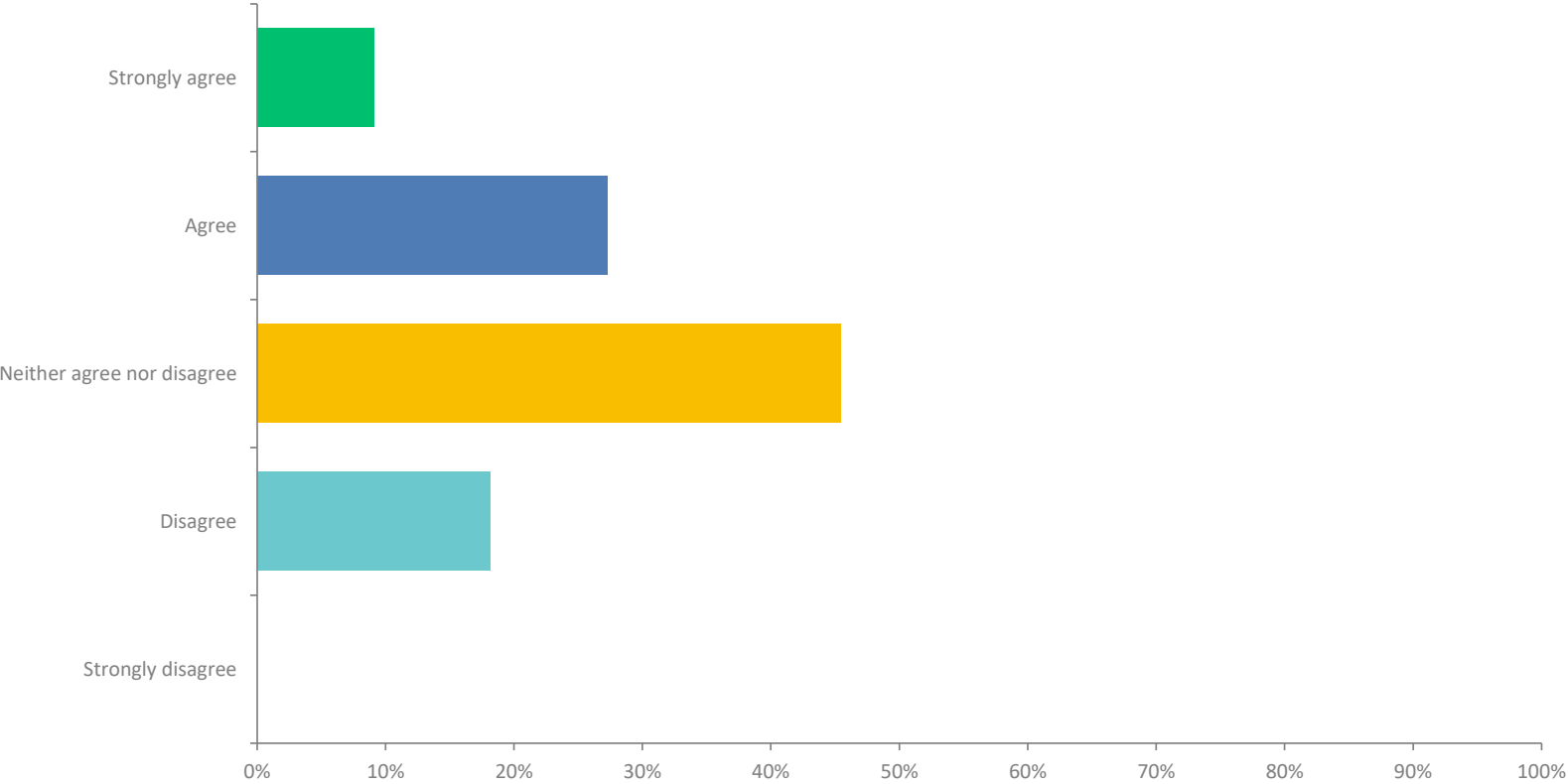
Q3: The NY TRM layout is user-friendly (i.e., I am able to find what I'm looking for)

Answered: 21 Skipped: 1



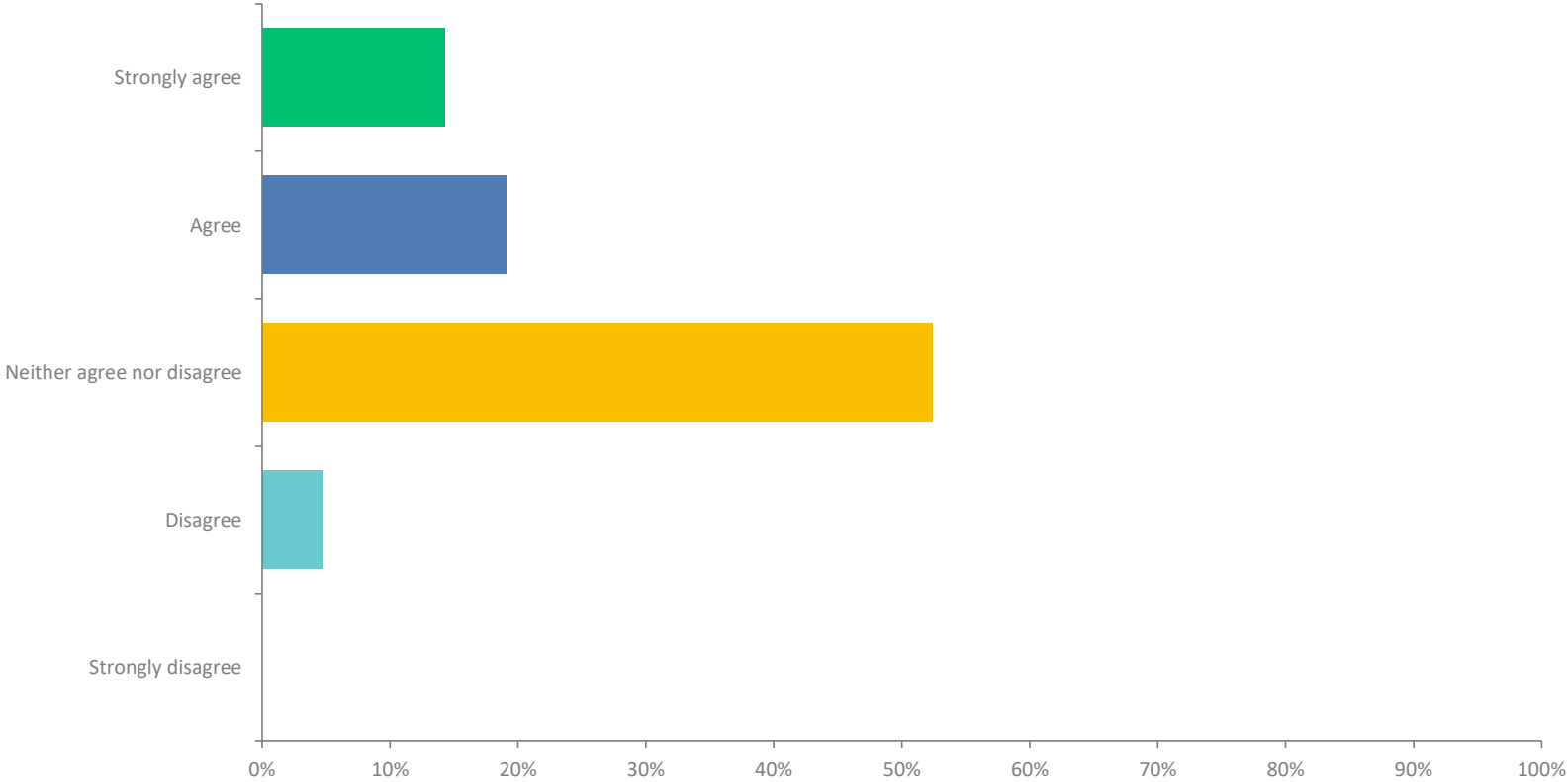
Q4: The NY TRM is comprehensible and the measure savings methodologies are easy to follow.

Answered: 22 Skipped: 0



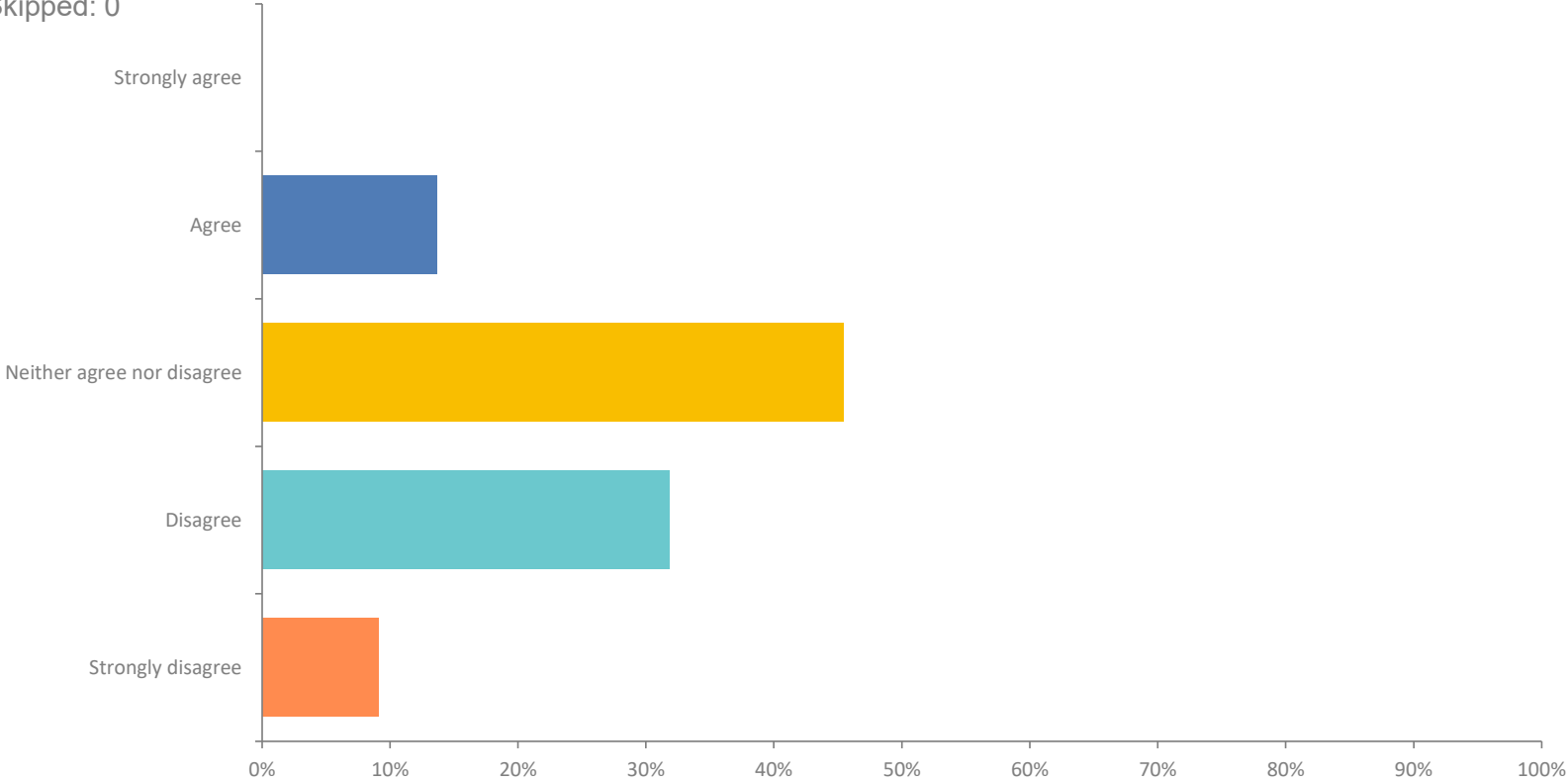
Q5: The NY TRM is comprehensive in addressing market sectors, customer types, technology types, end uses, measures, etc. relevant to my needs.

Answered: 21 Skipped: 1



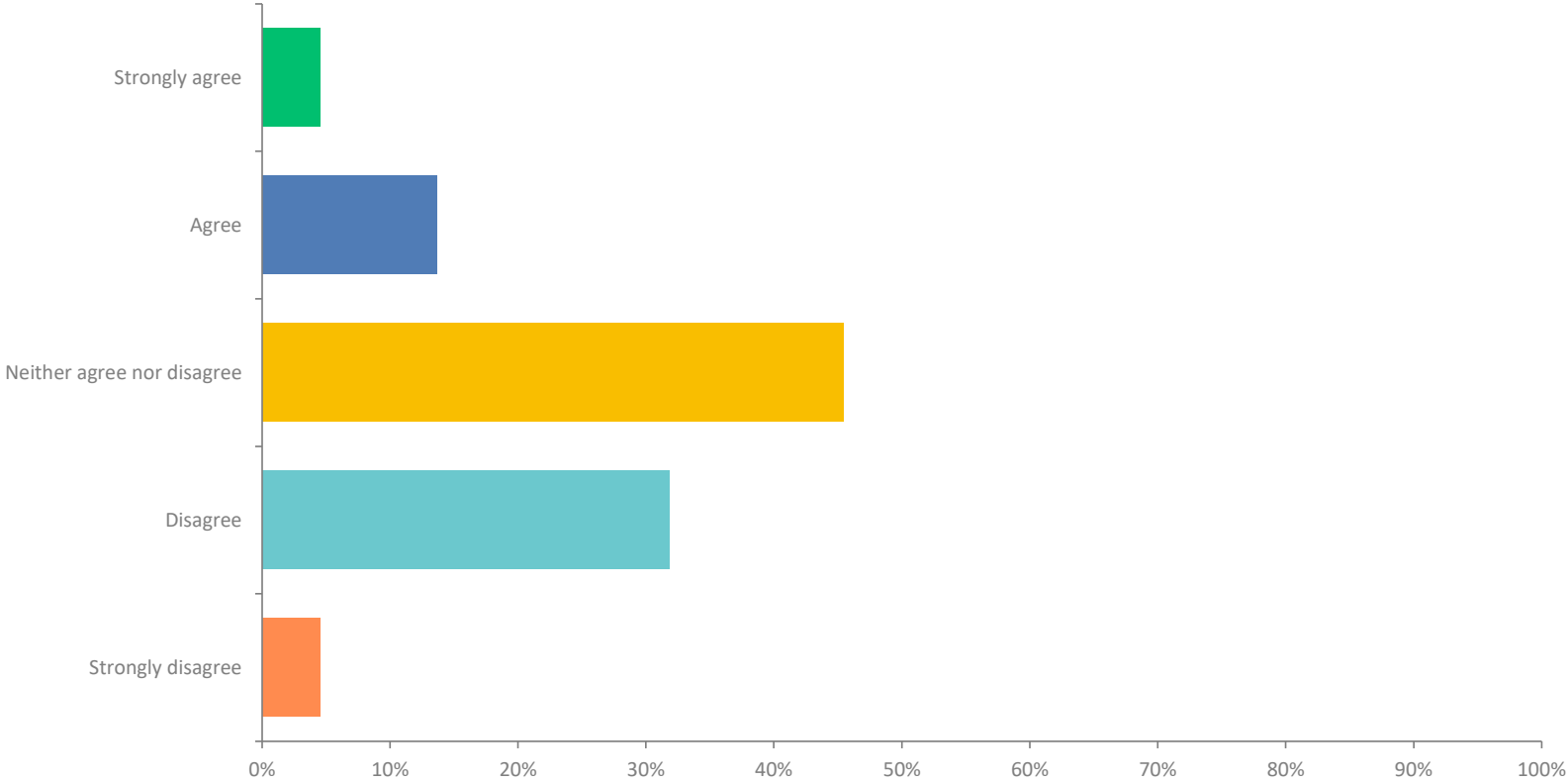
Q6: I understand the NY TRM Management Committee’s (MC’s) processes (e.g., new measure submission, technical reviews, filing process, effectuation schedules, etc.).

Answered: 22 Skipped: 0



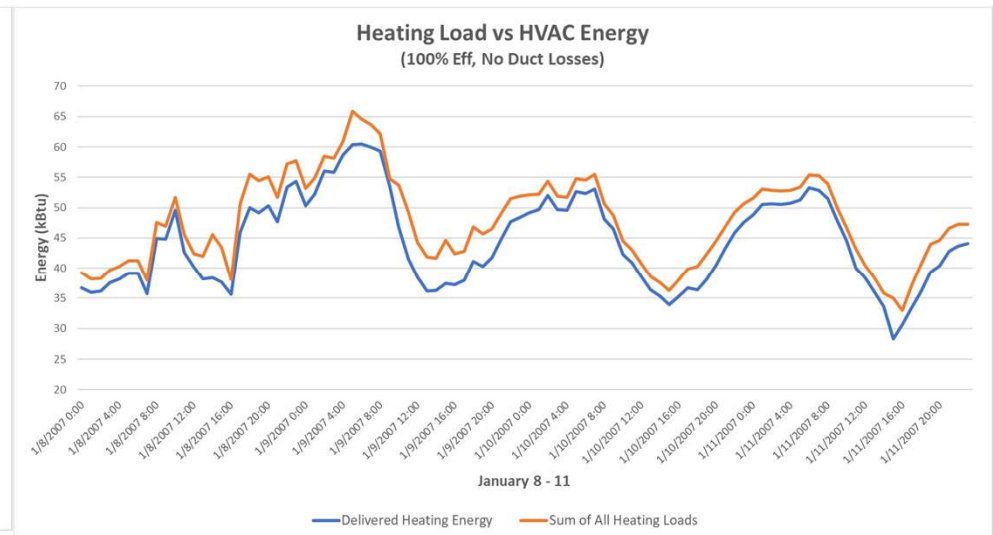
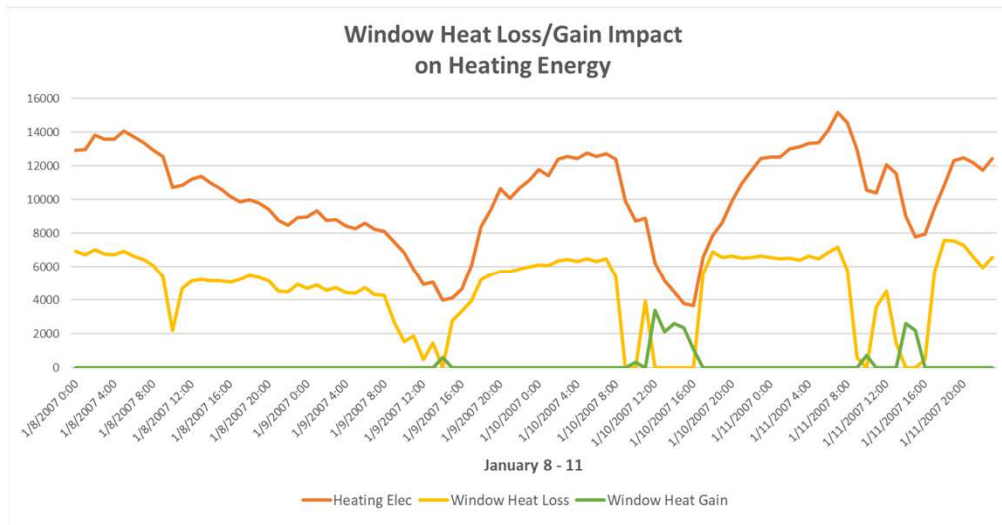
Q7: The NY TRM MC’s processes are sufficiently transparent and I know when changes that impact me are published and effectuated.

Answered: 22 Skipped: 0



Additional Slides for Custom Measure Category 6

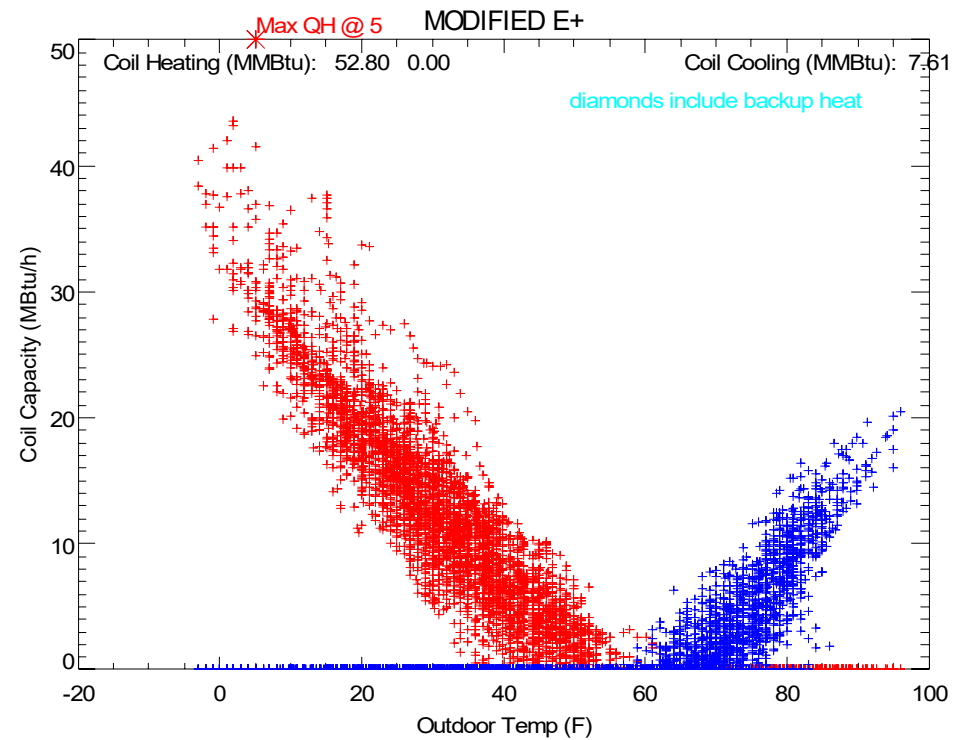
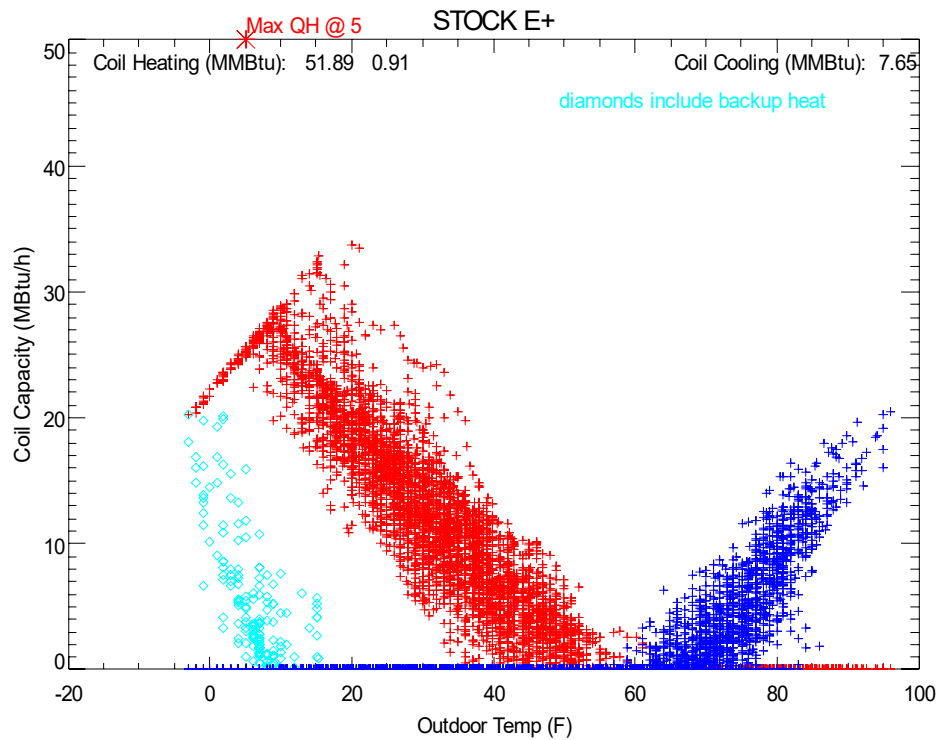
WHY ARE WINDOW SAVINGS LOW?



Current E+ Windows Physics:

- Savings still much lower than TREAT, Engineering and GJGNY calcs
- Much more complex algorithms accounting for sub-hourly solar gains/losses
 - EnergyPlus HVAC simulation accounts for thermal lag/drift of the space, meaning not all gains/losses translate into HVAC consumption

HOURLY ENERGYPLUS LOADS – NREL DEFAULT VS USING NEEP AVAILABLE INPUTS



Hugh Henderson