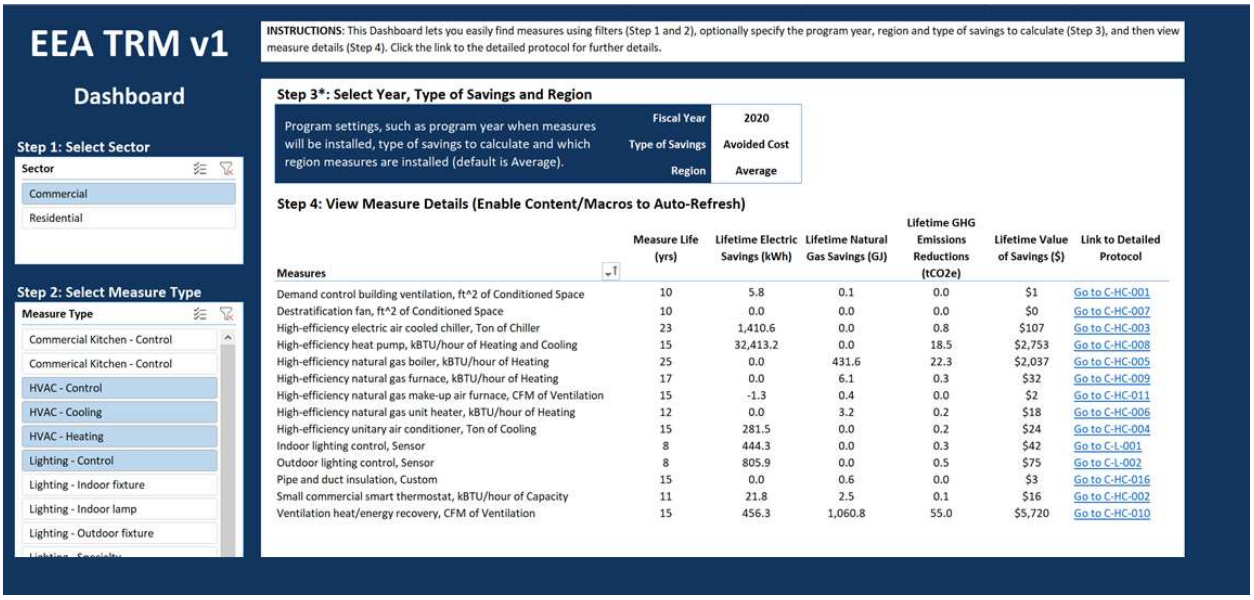
Energy Efficiency Alberta TRM Introduction

This document is intended to provide a high-level understanding of the Energy Efficiency Alberta Technical Reference Manual (TRM), including background, how it was constructed, its intended use and general guidelines for maintenance and further development.



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Contents

IMPORTANT TERMINOLOGY

Avoided Cost of Energy – the estimated societal value of energy savings including only those costs that are avoided (net) including customers and non-customers, and the utility.

Energy Bill Savings – the estimated value of energy bill savings, including electricity, natural gas and avoided carbon tax payments by the customer only.

Measure Protocol – all Alberta consumers of energy, of which some will have participated in Energy Efficiency Alberta's programs for the 2017/2018 fiscal year.

Global References - a person or organization who has participated in one or more of Energy Efficiency Alberta's programs for the 2017/2018 fiscal year.

Measure– the period spanning April 1 to March 31 (inclusive) of the respective calendar years. For example, the 2017-18 fiscal year refers to April 1, 2017 to March 31, 2018 (inclusive).

Technical Reference Manual – full-time equivalent jobs created.

Estimated Useful Lifetime – the additional cost associated with a participant choosing to install an energy efficient version versus what is considered to be normal practice. Part of this cost will be allocated to a program participant (see Participant Cost) and the remainder by incentives.

tCO_2e – an equivalent tonne of Carbon Dioxide emissions, the typical unit of measure to quantify Global Warming Potential. This unit captures not only CO_2 emissions but also N_2O and CH_4 (methane).

1 Introduction

This document provides a high-level summary of the Energy Efficiency Alberta Technical Reference Manual (TRM) which was developed by Energy Efficiency Alberta as a central source of measure savings documentation for energy efficiency programs. It is a standard system for managing and updating measures, and a framework for defining measures, their general eligibility and energy savings algorithms. Properly institutionalized and maintained, the Technical Reference Manual also enables continuous improvement of prescriptive measure savings estimates as inputs and assumptions are refined through ongoing research and development.

What is documented?

The body of the TRM is essentially a catalogue of energy efficiency measures undertaken to save energy, along with their associated energy savings. A measure may involve retrofit, replacement or new installation of equipment or it may involve specific, quantifiable behaviour changes.

Measures are categorized by sector:

- Residential
- Commercial (and Institutional)

… and by end-use:

- HVAC (control, cooling, and heating)
- Motors and drives
- Commercial kitchen
- Lighting (control, indoor fixture, lamp and outdoor fixture)
- Refrigeration
- Water heating
- Whole building
- Alternative energy

Each measure is also defined in terms of the project scenario, as either a retrofit of existing equipment or an end-of-life replacement (aka “replace-on-burnout”). Both types of measures are described below:

- **Retrofit** includes replacement of existing equipment before the end of its expected life. Energy savings are associated with
    - Energy Savings – Energy savings above existing equipment for remaining useful life of the equipment being replaced, and above Codes and Standards for the remaining lifetime of the new equipment
    - Cost – Full cost of the equipment
- **Replace on Burnout (ROB)** includes situations when new or replacement equipment has been installed due to imminent or actual failure of pre-existing equipment.
    - Energy Savings – Energy savings above Codes and Standards for the lifetime of the new equipment
    - Cost – Incremental cost of new equipment above that of Code and Standard equipment

Energy savings that are calculated and document for each measure include:

- Electricity savings in kilowatt-hours (kWh)
- Natural gas savings in giga-Joules (GJ)

Purpose

The TRM contains energy efficiency measure information used in program planning, implementation, tracking, reporting and evaluation. The TRM:

- Serves as a common repository of measure data for all stakeholders[1]
- Provides transparency and consistency regarding saving assumptions and calculations and underlying sources of those assumptions
- Serves the marketplace by providing savings documentation to enable trade allies and program representatives to include similar language when claiming energy savings and GHG reductions to facilitate coordination of, and confidence in, the valuation of energy savings
- Provides documentation of savings estimates for program impact evaluation
- Provides a process for periodic record keeping, record maintenance, and a record of deemed parameters

Users

The TRM can be used by implementers, program administrators and evaluators as a guide to assign and evaluate measure savings. Program administers will use the measure definitions in the TRM for program planning. Implementers will use the TRM to assign appropriate savings at the measure level. Evaluators will use the TRM for evaluating the program retrospectively, and to provide input values for prospective updates.

Contents of the TRM

The TRM is accessible via an Excel Workbook. This documentation refers to version 1. This TRM is the primary source for EEA energy efficiency savings assumptions and calculations. The following section outlines the contents of the TRM workbook.

Dashboard

The dashboard tab in the Excel Workbook lets you easily find measures using filters (Step 1 and 2 of the dashboard), optionally specify the program year, region and type of savings to calculate (Step 3), and then view measure details (Step 4).

- **Step 1: Sector** – choose from commercial (includes institutional and non-profit measures) or residential
- **Step 2: Measure Type** – choose from a list of one or more types (use the Control key to select more than one type of measure in the list)
- **Step 3: Year, Type of Savings and Region –** use these inputs to specify the fiscal year of the program for which the measure will be implemented and/or evaluated; the type of energy savings to calculate; and the region in which the measures will be installed.

[1] If an update is necessary and does not align with the TRM update process, then the implementation may use an alternative value, only upon approval from EEA, that may be addressed as part of the evaluation cycle and retrospectively adjusted for the verified savings.

Measure Summary

Detailed description of each measure in the TRM in table format. Each row references information from each of the measure protocols (corresponding to the name of each Excel Sheet). A list of important fields includes the following:

- **Measure ID –** this is a unique ID used to identify each measure corresponding to the name of the Excel Sheet in which the measure is defined (called the 'Measure protocol').
- **Measure Name** – the name of the measure
- **Unit Basis** – energy savings is calculated per unit quantity of the measure. The quantity of a measure is defined in terms of its unit basis. Some measures are counted in terms of number of widgets installed (e.g. lamp), and others by rated output capacity (e.g. kBTU/hour of a boiler) or square feet of applied area (e.g. square feet of insulation).
- **Common inputs** – several fields that describe the type of building, region, fuel type and replacement type of the measure.
- **Energy savings and cost information –** the estimated energy savings, GHG emissions reductions and incremental cost per unit basis. Cost information is currently not populated in the TRM, although future versions may include this.
- **Performance information –** additional information about lifetime value of energy savings and GHG emissions reductions.

Measure Protocols

Measure Protocols are the standardized template for documenting energy savings calculations, inputs and assumptions. Each measure protocol Excel Sheet is named according to its unique measure ID.

History of its Development

The TRM v1 was developed to provide EEA staff and programs a consolidated, standardized source of information on all measures. It relies heavily on algorithms published in the Illinois Technical Reference Manual (IL-TRM), which is updated on an annual basis. Most protocols use the IL-TRM Version 8.0. Other manuals are also referenced, including but not limited to Michigan, Minnesota and Vermont.

Energy savings calculated from algorithms also require updated inputs that reflect the Alberta climate, baseline conditions (information about equipment being replaced), and energy efficiency standards of new equipment. Where possible, this information was determined from analysis of EEA past program data. In other cases, reasonable assumptions from other TRMs were used or scaled to the Alberta climate using known differences in Heating and Cooling Degree Days.

TRM v1 is the first publishable version of the EEA TRM, having been subjected to numerous internal reviews to check the accuracy of algorithms and appropriateness of inputs.

2 Global Variables and Primary Reference Data

Global references and underlying assumptions of the TRM are documented in this section.

Global Variables

Global variables include high-level inputs used to calculate measure impacts and cost-effectiveness, including discount rates, job creation and GDP multipliers, greenhouse gas (GHG) emissions intensity factors for electricity and natural gas, and general engineering constants. The sources and references for these factors are documented in-line within the Variables sheet of the TRM.

The Variables sheet also summarizes important building and equipment baseline information for both residential and commercial sectors. The type of baseline information includes existing furnace and boiler efficiency, flow rates and fuel shares of space and water heating equipment. The baselines are sourced from past EEA program data, and complimented by TRM and potential study analyses.

Value of Energy Savings

Value of energy savings is a total of electricity and natural gas savings, and carbon levy savings on GHG emissions reductions associated with natural gas. The present value of each year's future cost of energy is first brought back to present terms. Since the future values are expressed in nominal (year of) terms, the nominal discount rate of 2.1 per cent is used to convert individual values back to present terms. The discount rate is documented within the Global Variables sheet. The calculation looks as follows:

$$Value\ of\ Electricity\ Savings\ [\$] \quad = Annual\ Electricity\ Savings\ \left[\frac{kWh}{year}\right] \cdot \sum_{i=1}^{Lifetime} PV\ (\ Cost\ of\ Electricity_i\ [\frac{\$}{kWh}])$$

$$Value\ of\ Natural\ Gas\ Savings\ [\$] \quad = Annual\ Natural\ Gas\ Savings\ [\frac{GJ}{year}] \cdot \sum_{i=1}^{Lifetime} PV\ (\ Cost\ of\ Natural\ Gas_i\ [\frac{\$}{GJ}])$$

The value of GHG emissions reductions is calculated as follows:

$$Value\ of\ GHG\ Emissions\ Reductions\ [\$]$$
$$= (Annual\ GHG\ Emissions\ Reductions\ [tCO2e]\ ) \cdot \sum_{i=1}^{Lifetime} PV\ (\ Carbon\ Price\ _i\ [\frac{\$}{tCO2e}])$$

Total energy savings is the sum of electricity, natural gas, and GHG emissions reductions.

The cost of electricity and natural gas to be used depends on the type of savings selected in the TRM Dashboard. Options are:

1) **Avoided Cost** – represents the value of energy from the societal perspective (does not include value of transmission or distribution as these are difficult to allocate in the short to medium term)

Avoided Cost Component	Electricity	Natural Gas
Energy[1]	✓	✓
Capacity	✓[2]	✖

2) **Bill Savings**– the value of energy from the perspective of the project owner (where energy savings are realized) on utility bills. Along with value of energy, this includes variable component of distribution and transmission charges.

Building Data

Data in the Building Data sheet summarizes key inputs for measure energy savings calculations by type of building. For each building type the following inputs are documented:

- Conditioned Floor Area of the Building (sq. feet)
- Lighting Interactive Effect for Heating and Cooling (%)
- Lighting Interactive Effect for Heating and Cooling (%)
- Lighting Runtime Hours per year (hours)
- Lighting Waste Heat Factor for Natural Gas heated buildings (GJ per kWh)
- Operating Hours of Hot Water Pump per year (hours)
- Operating Hours of HVAC Supply and/or Return Fans per year (hours)
- Operating Hours of Water Pump and Cooling Tower Fan per year (hours)
- Operating Hours when Building is Occupied per year (hours)
- Water Heating Minimum Capacity Requirement (BTU / hour per ft^2)
- Water Load per Conditioned Floor Area (Litre / ft^2)

Building types included:

- Accommodation - units
- Accommodation - common area
- Apartment - common area
- Apartment - high-rise
- Apartment - low-rise
- Apartment - unknown type
- Assembly
- Assisted living
- Convenience store
- Garage
- Healthcare clinic
- Home - attached
- Home - detached
- Home - unknown type
- Hospital
- Manufacturing facility
- Movie theatre
- Office - high-rise
- Office - low-rise
- Office - mid-rise
- Other
- Pipeline transportation
- Religious building
- Resource extraction
- Restaurant
- Retail - department store
- Retail - food
- Retail - strip mall
- School - primary
- School - secondary
- University or college
- Utility service
- Warehouse
- Waste management
- Wholesale trade

Sources for the building data are documented in the respectively named columns. Many of these inputs were derived from other TRM documentation, including the Minnesota and Illinois TRMs.

Climate Data

Climate data includes inputs for measure energy savings calculations that vary by climate zone and building type. The inputs documented include:

- Annual Heating Energy Required to Heat Fan Exhaust Make-Up Air for Kitchen Ventilation Only (BTU/CFM)
- Annual Refrigerator Economizer Operating Hours (when outside air is used in place of running compressor) (Hours)

- Average outdoor temp during heating season by indoor setpoint (F)
- Average wind speed during the heating season (mph)
- Climate data includes inputs for measure energy savings calculations that vary by climate zone and building type. The inputs documented include:
- Demand Control Ventilation - Cooling Savings Factors (kWh / 1,000 ft^2) by EEA Region and Building Type
- Demand Control Ventilation - Heating (Electric Resistance) Savings Factor (kWh / 1,000 ft^2) by EEA Region and Building Type
- Demand Control Ventilation - Heating (Heat Pump) Savings Factor (kWh / 1,000 ft^2) by EEA Region and Building Type
- Demand Control Ventilation - Heating (Natural Gas) Savings Factor (GJ / 1,000 ft^2) by EEA Region and Building Type
- Equivalent Full Load Cooling (EFLC) hours by Building Type and Region
- Equivalent Full Load Heating (EFLH) hours by Building Type and Region
- Heat Load per CFM of Outdoor Air per Supply Air Temperature Requirement (°C) at 100% Fan Runtime (% of year)
- Heating Days per Year (Days)
- Residential ECM Furnace Fan Savings (kWh / Ton of Cooling) * Note: 'Ton of Cooling' is used in ECM Motor for Residential Furnace algorithm regardless of whether cooling system is installed
- Wind speed correction factor due to wind direction in heating season (%)

These inputs were predominantly derived by taking values from the Illinois TRM and scaling them up or down using Alberta and Illinois' Heating and Cooling Degree Days. Since Alberta climate is generally colder, values pertaining to heat load are scaled up proportionate to the increase in Heating Degree Days.

3 Measure Protocols

This section provides an overview of the measure protocol that defines organizes and defines information about each measure such as eligibility, energy savings calculations and key inputs and assumptions.

Overview of the Measure Protocol

TRM Summary - TEMPLATE	Value
Measure ID _Version	0
Sector	ERROR
Name	

Measure Summary	Value	Notes
External Measure ID		
Measure Type		
Version		
Valid From (date)		
Valid To (date)		
Gross electricity savings (kWh/yr)	0.00	
Gross electric demand savings (kW/yr)	0.00	
Gross natural gas savings (GJ/yr)	0.00	
Incremental cost (CAD)	$0.00	
Unit Basis		Source
Measure Lifetime (yrs)		

Description	
Definition of Measure	
Description of Efficient Condition	
Description of Baseline Condition	

Application	Value	Description
Region	Average	
Replacement Type	RET	
Building Type	Home - detached	
Space Heating Fuel	Natural gas	
Water Heating Fuel	Natural gas	

Cost characterization	Value	Unit	Source
Labour Cost		CAD	
Efficient Equipment Cost		CAD	
Baseline Equipment Cost		CAD	
Total Installed Cost	$0.00	CAD	
Incremental Cost	$0.00	CAD	

Savings (Gross at meter)

Adjusted Gross Savings	Measure level savings, corrected for interactive effects and any other impacts EEA want to consider (such as ISR)	Value	Unit	Source
Total electric demand savings	ΔkW_total = ΔkW_gross + ΔkW_interactive	0.000	kW	
Total electricity savings	ΔkWh_total = ΔkWh_gross + ΔkWh_interactive	0.0	kWh	
Total natural gas savings	ΔGJ_total = ΔGJ_total + ΔGJ_interactive	0.000	GJ	
Total water savings	Δm^3_total = Δm^3_gross + Δm^3_interactive	0.000	m^3	

Technical Savings	Direct savings from the measure (for fighting: direct impact of delta watts, before interactive effects or other impacts)	Value	Unit	Source
Gross electric demand savings	ΔkW_gross =		kW	
Gross electricity savings	ΔkWh_gross =		kWh	
Gross natural gas savings	ΔGJ_gross =		GJ	
Gross water savings	Δm^3_gross =		m^3	

Interactive Effects	Any energy (or other resource) impact on other end-uses (positive or negative)	Value	Unit	Source
Interactive electric demand	ΔkW_interactive =		kW	
Interactive electricity savings	ΔkWh_interactive =		kWh	
Interactive natural gas savings	ΔGJ_interactive =		GJ	
Interactive water savings	Δm^3_interactive =		m^3	

Variables and Calculations

Variable	Variable Name	Definition	Lookup Name	Lookup Label	Value	Unit	Source / Notes
1							
X							

Constants and Conversion Factors

Index	Constant	Value	Unit	Source / Notes
1				
X				

Lookup Tables (copy and repeat as necessary)

Table Name		Labels and Values to Look up										Source / Notes
		Label 1	Label 2	Label 3	Label 4	Label 5	Label 6	Label 7	Label 8	Label 9	Label 10	
Index	Lookup Name and Description											
1												
X												

Figure 1: Protocol Template

TRM summary

- **Measure ID and Version**: Unique identifier of the measure and version number
- **Sector**: Commercial or Residential sectors
- **Name**: Name of the measure (singular)

Measure summary

- **External Measure ID:** Unique identifier of the measure (version number is not included)
- **Measure Type:** Abbreviated measure category (e.g. HVAC) followed by sub-category (Heating)
- **Version:** Version number of the measure
- **Valid From (date):** Year, month, and day when the measure version is first to be used
- **Valid To (date):** Year, month, and day when the measure version is in its last day of use before it is to no longer be used
- **Gross electricity savings (kWh/yr):** Gross electricity savings (at meter) in kWh per year
- **Gross electric demand savings (kW/yr):** Gross electric demand savings (at meter) in kW per year
- **Gross natural gas savings (GJ/yr):** Gross natural gas savings (at meter) in GJ per year
- **Incremental cost (CAD):** Cost of the installation of one unit of the measure in Canadian dollars
- **Unit Basis:** Unit by which the measure's savings and costs are calculated
- **Measure Lifetime (yrs):** Useful life of the measure expressed in years

Description

- **Definition of Measure:** Short description of the measure including any limitations on use, fuels, etc.
- **Description of Efficient Condition:** Details, including minimum specifications of the efficient equipment
- **Description of Baseline Condition:** Details, including assumptions and standards assumed by the calculations for the existing equipment being replaced (where applicable)

Application

- **Region:** Region where the measure is installed (Average represents entire province)
- **Replacement Type:** Measures replacement type. Either RET (retrofit) or ROB/NEW (new installation). **Do NOT change. Currently specified default replacement type. Algorithm for other type is not yet built.**
- **Building Type:** Category of building where measure is installed.
- **Space Heating Fuel:** Heating fuel used to heat space. Either natural gas or electricity.
- **Water Heating Fuel:** Heating fuel used to heat water. Either natural gas or electricity.

Cost characterization (not completed in version 1 of the TRM)

- **Labour Cost:** Labour cost associated with installing the measure including GST
- **Efficient Equipment Cost:** Total new cost of the new equipment including GST
- **Baseline Equipment Cost:** Total new cost of the existing equipment being replaced (or equivalent equipment meeting current minimum codes and standards)
- **Total Installed Cost:** Total cost of the new equipment including GST
- **Incremental Cost:** Cost differential between efficiency measure and existing equipment (if existing equipment is not being replaced (e.g. new lighting control) then the incremental cost is equal to the total installed cost of the new equipment.

Savings (Gross at meter)

Each savings category includes the savings algorithm (written out using the Variable Name from the Variables and Calculations table), a savings value (contains Excel formula with cell references), the unit in which savings value is expressed and the source of the savings calculation (e.g. website, TRM, etc.).

- **Adjusted Gross Savings:** Measure level savings (i.e. electric demand, electricity, natural gas and water savings), corrected for interactive effects and any other impacts EEA want to consider (such as ISR). The sum of interactive effects and technical savings for any energy savings category (e.g. electric demand, electricity, natural gas and water savings) equals the adjusted gross savings for that energy savings category.
- **Technical Savings:** Direct gross electric demand, electricity, natural gas and water savings from the measure (for lighting: direct impact of the "delta", or difference, in watts (between the baseline equipment and the efficient equipment), before interactive effects or other impacts)
- **Interactive Effects:** Any energy (or other resource) impact on other end-uses (positive or negative).

Variables and Calculations

Each variable, which is used in the savings algorithms in the Savings (Gross at meter), has a Variable number, Variable Name, Definition, Value, Unit in which the value is expressed and a cell dedicated to variable Sources and Notes. Certain variables have a Lookup Name and Lookup Label for variables whose values change depending on factors such as Building Type and Region.

Constants and Conversion Factors

The Constants and Conversion Factors table contains constants and conversion factors that are used in measure savings algorithms. The table contains a column for the Constant ID or name, the Value of the constant, the Unit in which the value is expressed and the Source / Notes for the constant.

Lookup Tables

Lookup tables are for variables whose values change depending on multiple factors. Each table has a column for Lookup and Description, Labels and Values to Look up, and the Source / Notes for each Lookup.

4 Using the Technical Reference Manual

The following sections provide some additional guidance for how to use the TRM. It can be used by implementers, program administrators and evaluators as a guide to assign and evaluate measure savings. Program administers will use the tools in the TRM for program planning. Implementers will use the TRM to assign appropriate savings at the measure level. Evaluators will use the TRM for evaluating the program retrospectively, and to provide input values for prospective updates.

Portfolio Planning

A balanced mix of measures, or targeting groups of measures to a specific market segment can help hit portfolio targets for overall energy savings, GHG emissions reductions and/or cost-effectiveness. The TRM provides a convenient way to assess overall impact of a portfolio of programs, and underlying measures by providing a consistent definition and value of energy savings across the portfolio. The resulting portfolio is also easier to benchmark against its goals.

Program Design

Each program design consists of a mix of measures. The TRM provides a library of consistently defined measures to choose from. If past programs use the same definition, their past uptake and performance information can be used to predict appetite of measures by market segment, and thereby estimate impact of the program design.

Monitoring and Evaluation

A standardized TRM used throughout the lifecycle of a program (from design to implementation) makes monitoring and evaluation of the same program easy. The evaluability of a program increases when the same TRM is used for all stages of a program's lifecycle.

Reporting

Standardized use of the TRM makes it easy to report performance of the entire portfolio of programs, specific programs and by specific measure. Using standardized measure protocols also allows reporting on measure performance across programs. For example, the performance of tankless water heaters across a custom home retrofit program, mass market direct install, and affordable housing program.

5 Maintenance and Continued Development

The following section provides some guidance as to maintenance and continued development of the TRM.

Maintenance

To ensure that the TRM remains a valuable tool for the energy efficiency industry, its contents must be updated and reviewed on a regular basis. Effective, ongoing management of the TRM is relies on:

1. **Technology –** version control and update schedule, storage and dissemination, new measure development, integration with CRM tools or databases
2. **People –** roles and responsibilities, staff/stakeholder review, communication of updates/changes

Development

New Measures – For developing a new measure the *Protocol Template (see Figure 1)* should be copied inside the Excel TRM file. The new measure should be named as per its new Measure ID.

This new measure protocol contains all its details, including input assumptions for calculating energy and water savings, and other measure related data. All data sources must be well documented in the template. The measure information should be reviewed by internal technical staff and/or a third-party team or external consultants. The review process will provide the opportunity to propose, present research, review and add a new measure to the TRM. The new measure will be effective by the start of the next program cycle in which it is intended to be used. However, if a program wants to add a new measure mid cycle, then the measure may be evaluated retrospectively.

Existing Measures – Existing measures can be updated to correct errors, refinement of current measure data, and expansion of application of a measure. A measure can be refined by any new data available for variable inputs through new research. The research data used to update current measure assumptions should be statistically accurate and different from the data being used.

Changes to an existing measure will be effective starting the next program cycle. If any critical errors are identified in an existing measure the TRM can be updated and the changes will be effective retroactively from the beginning of the existing program cycle. These changes must be communicated to implementation contractors to revise and align their external systems accordingly.

Best Practices

A summary of best practices from Table 1: Threshold Technical Issues to Consider in "Technical Reference Manuals Best Practices from Across the Nation to Inform the Creation of the California Electronic Technical Reference Manual (ETRM)" is included below for additional considerations in the continued development and maintenance of the TRM within your organization.

Table 1: Threshold Technical Issues to Consider

Area	Issue
Individual Measure Development	What is a discrete measure?
	When should a measure be deemed, custom or "hybrid"?
	When should measure savings be determined through building modeling vs. engineering algorithms?
	How complex should measures be, and when should parametric analysis be conducted to identify a reasonable number of measure permutations without creating "false precision."
	When and how does measure characterization need to vary based on field conditions and/or implementation strategy?
	Create standard format and data structure for all measures.
	Develop guidelines/standard approaches for determining "best available data", "industry standard practice" and other recurring technical issues.
	Establish written QA/QC process and standards to ensure high quality, error free measures characterizations.
	Identify process for prioritizing measures for development or review.
Parameter Development	Identify which measure parameters most impact key measure values (e.g. savings and cost effectiveness); prioritize resources to refine most impactful inputs/parameters.
	Identify which parameters need more certainty – develop data collection plan to refine values during program implementation.
	How should interactive effects be derived and applied?
	Identify how and whether program implementation strategy will affect the parameter.
	How should EULs be determined and updated?

TRM Structure	How should technologies or measure be grouped or organized?
	What tables/appendices are needed that contain information used across multiple measures?
	Should TRM be hard copy or housed in an electronic repository (emerging trend)?
	Determine what source(s) will be used for building prototypes.
	Identify information that will be used for multiple measures; create readily accessible appendices and/or look-up tables with clear, well-documented common methods, assumptions and values, including: • Building prototypes used to model energy and demand savings, including the sources for building prototypes assumptions. • Climate zones or weather stations. • Interactive Effect Values – which may vary based on utility and climate zone. • Non-Energy Benefits (NEBs) – in jurisdictions that include NEBs, NEBs often vary by measure, but also may be the same across a class of measures (such a low-income weatherization measures) • Standard Formulas: Standard formulas for calculating values consistently, such as the Coincident Demand Factor Formula. • Load shape curves for common measures, and the sources for those load shape curves. • Common Variables: hours of operation, coincidence factors, flow rates, temperature (water), interactive effects, heating and cooling degree days. • Common approach to defining how peak demand savings should be calculated.
Building Modeling	Identify modeling tool(s) that will be used to model measures savings.
	Identify or construct building prototypes that will be used for modeled measures. Ensure building prototypes reflect jurisdiction – specific building stock and operational characteristics. Building models also need to have source documentation for all key assumptions to ensure they are appropriate representation of jurisdiction-specific building stock and operational characteristics.
	Determine consistent process for validating modeled measures.
Process	Determine the process by which participants will be selected for the technical collaborative; include regulatory staff.
	Establish process rules and website or other public repository to ensure work is public and transparent.