

The Missouri
**Technical
Reference
Manual**



Origin and Next Steps

Missouri Division of Energy

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The content and views expressed in this document are those of the Department of Economic Development Division of Energy.

FOREWORD

Energy efficiency, when employed as an alternative to conventional generation, produces significant cost savings in addition to producing economic and health benefits. Passage of the Missouri Energy Efficiency Investment Act (MEEIA) revolutionized the regulatory landscape by valuing investments in efficiency equal to investments in traditional generation. However, implementing MEEIA in a manner that realizes the vast efficiency potential that exists – and the associated economic development opportunities – has challenged Missouri’s utilities, policy-makers, and consumer and efficiency advocates. Disputes over MEEIA programs have not only involved program design and implementation, but also savings estimates and the compensation that utilities receive based on these estimates. Participants in the statewide MEEIA collaborative noted that tensions and disputes raised in protracted MEEIA proceedings could be ameliorated by collaboratively developing and adopting a statewide technical reference manual (TRM) containing common and consistent measure characterizations.

The Missouri Department of Economic Development – Division of Energy identified and built a coalition of partners to secure a U.S. Department of Energy grant to fund a TRM development effort. The application demonstrated strong interest among energy efficiency, utility, regulatory, consumer, and other key stakeholder groups in developing commonly accepted algorithms and input values for defining energy savings benefits. Project funding enabled the development of a tool through which businesses and residents of the state will have access to strong and responsive efficiency programs, providing broad monetary, reliability, environmental, and health benefits.

Under the grant, stakeholders cooperatively developed a statewide TRM with representation from Missouri utilities, government agencies, and local and national experts. The Division of Energy working with the Vermont Energy Investment Corporation (VEIC), is pleased to have facilitated this important, year-long process. Through the dedication of VEIC and significant contributions by cost-share partners, the TRM is a meaningful step to bring consistency to existing and future energy efficiency programs. We recognize the integral role of our partners to ensuring the success of this project and we were fortunate to have committed organizations to serving active members of the stakeholder group to ensure that the statewide TRM developed with this award is accepted as a valuable EM&V tool for all entities that support energy efficiency programs in Missouri.

Building on the momentum of the collaborative TRM process, stakeholders will next develop a sustainable approach to evaluation, measurement, and verification (EM&V). The TRM will facilitate coordinated program planning across all Missouri utilities by increasing certainty. Once adopted by the Public Service Commission and other decision-makers, the TRM will have a transformative impact on the delivery of efficiency programs in the state. Continued development and implementation of the TRM, in conjunction with an EM&V 2.0 framework, will position Missouri and the Midwest region to draw on “big data” and other emerging tools to reduce administrative overhead and enable greater focus on efficiency program design and implementation.

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The Missouri Technical Reference Manual 2017 is directly and wholly attributable to the voluntary contribution of data, expertise, and collaboration among the cost-share partners, as well as the expertise and facilitation of the Vermont Energy Investment Corporation. The Missouri Statewide Technical Reference Manual would not have been possible without the financial support of the U.S. Department of Energy and the hard work of those who engaged in the collaborative process.

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I. Origin

A. Energy Efficiency Challenges in Missouri

The Missouri Division of Energy is committed to empowering and assisting Missouri businesses and households in realizing the benefits of more efficient energy use. Historically, Missouri has enjoyed low energy rates, but the cost of providing needed energy resources continues to rise. More efficient energy use affords consumers a hedge against rising utility bills. Energy efficiency is also a key factor in ensuring that goods and services produced in Missouri are cost competitive both nationally and in global markets. Reducing the emissions associated with wasted energy will also contribute to a cleaner, healthier environment, making Missouri a more attractive place to live and work.

Central to achieving widespread adoption of energy efficiency is the need for well-designed programs that inform customers of how to improve energy efficiency, as well as to provide the assistance necessary to help them overcome barriers to achieving more efficient use. The majority of Missouri's investor-owned utilities, as well as some municipal providers, rural cooperatives, and other public and private interests, have worked to address this need through incentives and technical assistance; however, significant potential for greater efficiency remains untapped. The Technical Reference Manual (TRM) project was facilitated by the nationally recognized Vermont Energy Investment Corporation (VEIC) using the collective knowledge, experience and best practice recommendations contributed by stakeholders. This resource should streamline the design and evaluation of current energy efficiency programs and inspire and facilitate additional private and public investment in energy efficiency, with the goal of benefitting all Missourians through maximizing energy savings at reasonable costs.

The least expensive unit of energy is the one saved. During the energy crisis of the 1970s, Americans were encouraged to reduce energy use by turning down thermostats in the winter and turning off the lights when leaving a room. Through energy efficiency, the customer achieves the desired level of service while using less energy. There are over one hundred common energy efficiency measures offered under programs funded by Missouri's municipal, cooperative, and Public Service Commission-regulated utilities. One of the most dramatic and familiar measures is the replacement of incandescent light bulbs with light-emitting diode (LED) bulbs, increasing efficiency by roughly eight-five percent.

Key to the success of any program – regulated or not – is informed design and the ability to accurately measure energy savings. Barriers to implementing energy efficiency programs include:

- Inconsistencies in the assumptions and estimates used for potential studies, resource plans, program filings, and evaluations;
- Lack of a transparent and standardized Evaluation, Measurement & Verification (EM&V) framework to determine savings associated with efficiency programs;
- Insufficient sharing of best practice information to design, implement, and evaluate new programs; and,
- Uneven customer access to a broad array of efficiency programs across the state.

B. Achieving Missouri's Energy Efficiency Potential

The passage of the Missouri Energy Efficiency Investment Act (MEEIA) in 2009 was a milestone in removing the disincentive for additional investor-owned electric utility efficiency programs. MEEIA empowers ratepayers to achieve direct bill savings through participation in energy efficiency programs, in addition to broader benefits including reduced system costs and improved health, safety, and environmental quality. MEEIA authorizes regulated utilities to recover the costs of voluntarily implementing energy efficiency programs, along with the recovery of lost revenue from reduced retail

sales and an “earnings opportunity” associated with investments in demand-side resources. The Public Service Commission rule implementing MEEIA also directed the regulated electric utilities and affected stakeholders to address the creation of a “technical resource manual.”

The Division of Energy and the Missouri Energy Initiative jointly convened the first MEEIA Statewide Collaborative meeting on July 31, 2013. The Public Service Commission convened subsequent meetings in October of 2014, December of 2015, and November of 2016. The development of a statewide TRM was discussed at the 2013 and 2014 meetings, but no subsequent action occurred.

C. Show Me the Savings: A Statewide TRM as a Catalyst for Energy Efficiency in Missouri

Driven by the Comprehensive State Energy Plan (CSEP) discussions and ensuing recommendations guiding the cause and purpose of the development of a TRM¹, in 2015 the Division of Energy sought funding from the U.S. Department of Energy to develop a TRM by submitting a proposal entitled *Show Me the Savings: A Statewide TRM as a Catalyst for Energy Efficiency in Missouri*. One of the factors that led to the Division’s success in competing for the grant funds was that the project had the formal support of thirteen cost share partners: Union Electric Company d/b/a Ameren Missouri (Ameren Missouri), Kansas City Power & Light Company, Spire Inc. (formerly The Laclede Gas Company), The Empire District Electric Company, Summit Natural Gas, Missouri American Water Company, the Missouri Energy Initiative, Renew Missouri Advocates d/b/a Renew Missouri, the Sierra Club, the Natural Resources Defense Council, Department of Natural Resources, the Office of the Public Counsel, and the Staff of the Public Service Commission.²

The grant proposal detailed the potential benefits of a Statewide TRM, specifically:

- Providing a transparent, well-documented assessment of energy savings to facilitate program planning and portfolio reviews;
- Providing more certainty and consistency in calculating cost-benefit tests in support of energy efficiency program design and evaluation;
- Streamlining regulatory oversight, reducing costs, and greater energy savings impacts;
- Providing a resource for utilities which do not yet offer energy efficiency programs;
- Facilitating coordinated program planning across all Missouri utilities, increasing potential savings; and,
- Allowing tracking and documentation of savings for purposes of future energy efficiency resource standards and/or federal regulatory compliance reporting.

D. Project Scope

Given the grant amount of \$258,000 and the two-year timeline for completion, the 2017 TRM (MO-TRM-2017) is not inclusive of all energy efficiency program measures being utilized or considered by Missouri utilities. It is designed to address standard program measures; custom program measures are typically evaluated on a case-by-case basis. The focus of this first TRM was to capture those high impact measures that account for approximately 85 percent of total energy savings across gas and electric portfolios and then to include as many additional measures as the remaining budget and time allowed.

What the TRM is: The MO-TRM-2017 is a text-based document that contains agreed-upon, transparent, and consistent inputs and formulas for calculating electric savings (kWh), peak demand savings (kW), and natural gas savings (therms) for selected commonly available, prescriptive energy efficiency

¹ Missouri Department of Economic Development Division of Energy. October, 2015. *Missouri Comprehensive State Energy Plan*. <https://energy.mo.gov/energy/docs/MCSEP.pdf>. Pages 214 and 222.

² The Missouri Public Utilities Alliance joined as a cost-share partner after the grant was awarded.

measures and technologies. For those measures included, the following types of information are documented: name and description, definition of baseline case, definition of efficient case, deemed measure life and cost, persistence, loadshape, summer coincident peak demand savings, coincident factor, calculation of electric savings, natural gas savings, interactive effects, supporting algorithms, assumptions, references and documentation, water impact description and savings calculations where applicable, and a measure identification code.

What the TRM is not: The MO-TRM-2017 is not a comprehensive listing of all prescriptive measures currently offered by utilities and other energy efficiency program administrators across Missouri. The absence of a particular prescriptive program measure within the TRM should not preclude an entity from offering the measure. The TRM is also not intended to include protocols for determining savings from custom program measures, or renewable technologies. The TRM includes algorithms for measuring efficiency, but does not contain case-specific solutions.

E. Guiding Principles for Development

A successful TRM is credible, accurate, transparent, comprehensive, standardized, easy to use, and supported by stakeholders. Characteristics of TRM development included:

Best data. Building upon previous successes in TRM development, VEIC offered recommendations for data sources and developed the format, algorithms, and modeling used in the development process. Missouri-specific information was used whenever possible as a starting point for developing the TRM. Doing so leverages stakeholders' insights, program knowledge, and expertise. This TRM incorporates substantial information provided by the stakeholders, along with savings calculations, program insights, market data, weather information, and information gathered from other jurisdictions when appropriate.

Best practices. By using local data as a framework and then benchmarking and supplementing with relevant information, data, and lessons from other jurisdictions, measure characterizations are as accurate as possible and relevant to Missouri. When appropriate, the TRM relies on the U.S. Department of Energy's Uniform Methods Project protocols and includes enhancements informed by experience in other jurisdictions.

Prioritization. Not all measures or savings assumptions are equally important. The development of this TRM was focused on establishing highly reliable results for those measures, assumptions, and protocols that are likely to have the greatest impacts on energy savings and cost-effectiveness for Missouri programs. Shared information and experience, along with a focus on the most significant assumptions, provided guidance for the development of the remaining measures. Continuing to prioritize new and evolving measures through future development cycles will be an effective way to balance considerations of usefulness and cost.

Stakeholder involvement. The most transparent and useful TRMs not only include data from utilities and stakeholders, but also reflect their input and buy-in for the process and the final decisions made. The TRM project was built on the momentum created by the successful stakeholder engagement process utilized to complete the Missouri Comprehensive State Energy Plan (CSEP). The development of this TRM provided extensive and inclusive opportunities for stakeholder involvement through the Oversight Committee, the Technical Advisory Committee (TAC), and other forums for input and discussion. Regular committee meetings were used to maximize the level of collaboration and visibility into the measure characterization process. Including supplemental calls, TAC members met a total of 19 times during the TRM development and measure characterization process, whereas Oversight Committee members met a total of 13 times. The TRM development process was designed to achieve and represent a broad consensus among the stakeholders. Where consensus did not emerge on specific measures or issues,

a lack of consensus was documented. While the Staff of the Public Service Commission and the Office of Public Counsel participated in the TRM development process, those parties wish to preserve their ability to evaluate use of the TRM within the particular set of facts presented by an investor-owned utility's EM&V activities under MEEIA.

F. Development Process

VEIC: As a USDOE grant partner, VEIC led the technical development of the MO-TRM-2017. VEIC is a national leader in this technical area and led the development of TRMs in Vermont, Illinois, Iowa, Ohio, the District of Columbia, and the Mid-Atlantic region. VEIC also brought experience in implementing the energy efficiency programs of Vermont, the District of Columbia, and those multiple municipalities participating in Efficiency Smart.

Oversight Committee: An Oversight Committee comprised of the project's cost-share partners provided policy and overarching guidance. The Oversight Committee: a) shared relevant information and resources; b) evaluated recommendations provided by the TAC, VEIC, and stakeholders; c) considered policies and methods for integrating the TRM into regulatory processes; d) outlined ways to maintain and update the TRM; and, e) strove for consensus whenever possible.

Technical Advisory Committee: The TAC was comprised of the technical and program delegates from the Oversight Committee and provided assistance in the development of project deliverables. The TAC solicited data and information for measure development; it also reviewed, and sought consensus on, methods and assumptions for developing the template for TRM measure development. The TAC provided and reviewed Missouri-specific and national information including program implementation models, market penetration, program savings and participation.

Transparency: Stakeholders were engaged through open and inclusive meetings, along with measure development tracking, reporting on measure development, file sharing, and knowledge management through SharePoint and other tools.

G. Products

MO-TRM-2017 Volume 1: Overview and User Guide

Volume 1 explains the technical organization, structure and assumptions that went into creation of Volumes 2 and 3, includes a glossary of terms, and contains appendices which list the measures contained within Volumes 2 and 3.

MO-TRM-2017 Volume 2: Commercial and Industrial Measures

Volume 2 includes algorithms, methods, and inputs for 65 commercial and industrial energy efficiency measures. Savings calculation methods are presented for measures such as:

- Compressed air nozzle;
- Commercial steam cooker;
- Hot food holding cabinet;
- Circulator pump;
- Small commercial programmable thermostats;
- Steam trap replacement or repair;
- LED exit sign; and,
- Strip curtain for walk-in coolers and freezers.

MO-TRM-2017 Volume 3: Residential Measures

Volume 3 includes algorithms, methods, and inputs for 36 residential energy efficiency measures. Savings calculation methods are presented for measures such as:

- Ceiling insulation;
- Storm windows;
- Doors;
- Ground source heat pump;
- Furnace/boiler tune up;
- Water heater wrap;
- Advanced power strips; and
- Clothes washers and dryers.

Considerations and Recommendations to Missouri for TRM Update and Maintenance Processes

This document provides considerations and recommendations for TRM updates for use by the Missouri Oversight Committee and the Division of Energy to help facilitate and support the separate development of a Missouri TRM Update Process. In addition to discussing how the process could be designed, this document also reviews what the roles and responsibilities of stakeholders could be, and illustrates timelines and other factors that have been considered important in other jurisdictions.

II. Next Steps

A. TRM Update and Maintenance Processes

With the start of the grant project period in January 2016, development of MO-TRM-2017 occurred prior to regulatory guidance or direction. As a result, Task 4 of this grant, Development of the TRM Update and Maintenance Process, recognizes that the Public Service Commission’s pending MEEIA rulemaking will ultimately establish how Missouri’s TRM will be used and maintained. However, there was discussion in the Oversight Committee regarding best practices from other states on this and other policy issues surrounding a statewide TRM. The Division of Energy anticipates that VEIC’s “Considerations and Recommendations to Missouri for TRM Update and Maintenance Processes” will guide stakeholders as they develop recommended rules and processes to update and maintain the TRM.

B. Pending MEEIA Rulemaking

The Division of Energy’s comments on the MEEIA rulemaking will reflect the goal of continuing the collaborative process involved in the MO-TRM-2017 creation as the basis for its implementation and update. The Division of Energy supports regulatory changes that promote the statutory goal of achieving all cost-effective demand-side savings. Full use of, and timely, collaborative updates to, the TRM will facilitate this goal. Despite the uncertainty surrounding how the MO-TRM-2017 would be used, the process resulted in a meaningful initial product informed by stakeholders’ knowledge and experience. A key element in revising the MEEIA rules will be solidifying the use of an independently facilitated collaborative process to update and maintain the MO-TRM-2017 for both the investor-owned utilities and other stakeholders. Collaboratively updating the TRM based on best practices will foster confidence in the accuracy of the savings calculations. This should lead to streamlining both the planning and evaluation of future demand-side programs, increasing certainty for utilities and encouraging them to expand the range of available programs for customers.