2014 Regional Evaluation, Measurement & Verification Forum Annual Report

A Commitment to Building Transparency and Consistency in Energy Efficiency and Evaluation Reporting and Savings Assumptions

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Executive Summary

Energy efficiency is a significant demand side energy resource that can support the transition to a sustainable energy system: one that provides more reliable and affordable energy for residential, commercial, industrial and public uses, and helps to achieve a cleaner environment. The Northeast and Mid-Atlantic states lead the nation in policy support for energy efficiency as a resource.[1] This leadership includes nearly $2.5 billion in annual ratepayer funding budgeted in 2014 for gas and electric energy efficiency programs, of which about 2.5% on average is budgeted for Evaluation, Measurement and Verification (EM&V) purposes.[2] These investments offset growth in energy consumption, reduce energy bills and reduce power plant emissions, even while the regional economy continues to grow.[3]

The Forum continues to provide the region with best practices to make the accounting of energy efficiency program costs and savings transparent, publicly accessible and comparable, thereby ensuring the best use of public and ratepayer funds.

Steering Committee Co-Chairs Commissioner Bob Scott and Rich Sedano

As investments in energy efficiency measures have increased throughout the Northeast and Mid-Atlantic over the past two decades, there has been a growing need for transparency and consistency in measuring and reporting actual energy and demand savings, and associated costs and impacts, to support a range of energy, economic and environmental state and regional policies or needs. In 2008, the New England Conference of Public Utility Commissioners (NECPUC) and the Mid-Atlantic Conference of Regulatory Utility Commissioners (MACRUC) recognized this need, and each entity passed respective resolutions supporting the creation and funding for a regional forum to build consistency in evaluation, measurement, and verification (EM&V) and reporting of energy efficiency. The resulting body, the Regional EM&V Forum (EM&V Forum) brings together a diverse range of stakeholders to build a shared understanding of EM&V and efficiency data via common reporting methods and platforms, and to conduct joint research to develop consistent savings assumptions, leveraging state EM&V funds.

Today, EM&V documentation of the costs and benefits of efficiency programs is as important as ever in the context of meeting state energy, economic and environmental goals, as well as supporting state and regional energy forecasts. The regional energy forecasts assist states with power system planning, development of state energy plans, and compliance with Clean Air Act requirements for power plant criteria air pollutant and greenhouse gas emissions (GGE) reductions.

In 2014 the EM&V Forum continued to deliver on the intent of the NECPUC and MACRUC Resolutions. The Forum focused on 1) developing and maintaining standardized reporting tools to support understanding of energy efficiency program evaluation practices, 2) enabling comparison and/or aggregation of energy efficiency

[1] The 2013 Energy Efficiency State Scorecard by the American Council for an Energy Efficient Economy listed six Northeast and Mid-Atlantic States in the top ten states for energy efficiency with MA #1, NY #3, CT #5, RI #6, VT#7 and MD #9. See: http://aceee.org/state-policy/scorecard

[2] EM&V budgets as a percent of total EE budgets vary across states, as well as from year to year depending on evaluation cycle.

[3] See "NEEP Energy Efficiency Policy Snapshot: Energy Efficiency by the Numbers Fall 2013" at: http://www.neep.org/Assets/uploads/files/public-policy/outreach-and-analysis/EE%20Policy%20Snapshot%20Update%209.19.13.pdf

impacts across states to help inform best practices, and 3) conducting research to develop savings assumptions that are used to calculate reported energy and demand savings. A significant aim of this work, over time, is to reduce the administrative burden of evaluation and measurement on state agencies, air regulators, regional planners and efficiency program administrators. The Forum's work in 2014 also continued to inform national EM&V protocol discussions, where important efforts follow and further advance EM&V nationally.

"Participation in the EMV Forum provides insight into what is important and what is not important to other states and agencies."

NEEP Strategic Planning Survey

The collective work of the Forum, informed and guided by state agency and program administrator representatives from each of the Forum states, is continually building the credibility of energy efficiency as a resource through development of a common and transparent platform for EE reporting. Working together, the Forum participants have contributed toward the long-term goal of providing transparent, consistent, comparable and easily accessible energy efficiency data. This 2014 EM&V Forum Annual Report provides a summary of the projects undertaken together, as well as an accounting of the expenses that were incurred and the revenue provided to support these critical projects.

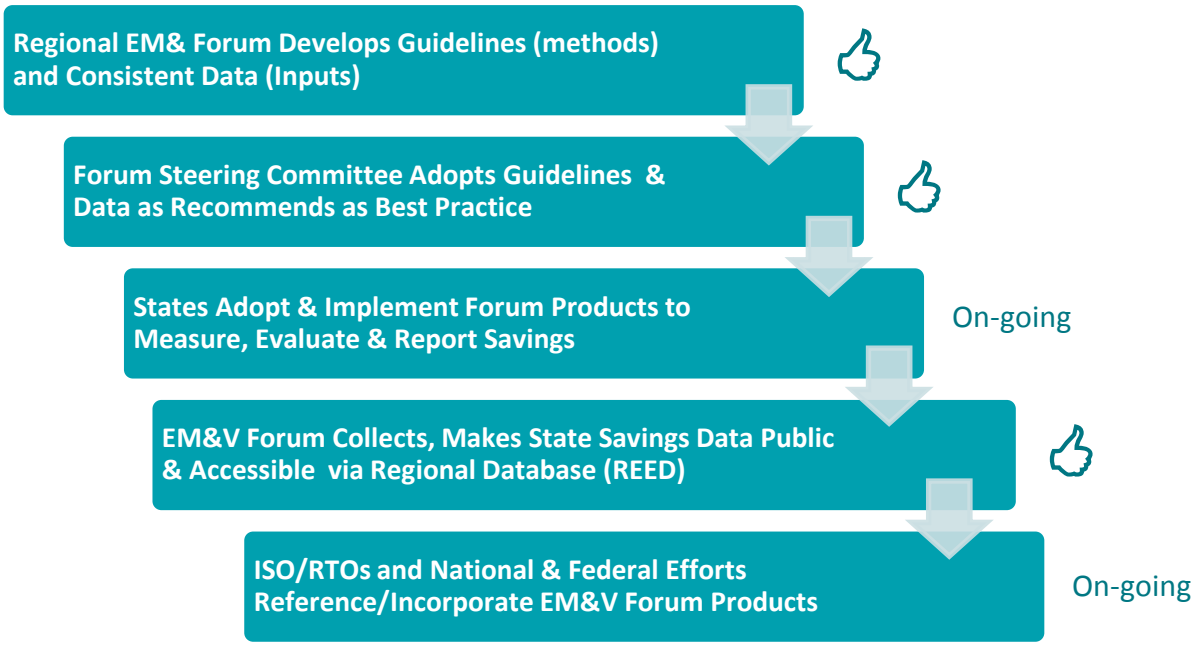
EM&V Forum Goals and Purpose

The purpose of the EM&V Forum is to support the use of consistent energy efficiency assumptions by developing standardized guidelines and tools to evaluate, measure, verify, and report the energy and demand savings, costs, and avoided emission impacts of energy efficiency (EE). Specific goals include:

- **Increasing the credibility of demand resources** in the context of meeting state energy goals, integration of EE into energy system and T&D planning, and inclusion of EE in state implementation plans to meet national air quality standards, and state greenhouse gas plans;
- **Informing the development of national standards and protocols**; and
- **Reducing individual state evaluation and other research costs** by pooling resources and leveraging other funding sources (e.g., federal and private grants).

Since its inception in 2009, the Forum has made significant progress towards achieving these goals using the process of development, adoption and implementation of Forum products (see Figure 1).

Figure 1. Forum Process of Product Development, Adoption and Implementation



2014 Steering Committee Leadership and Members

The EM&V Forum is guided by a regionally representative Steering Committee, provided in Table 1. In 2014, the Steering Committee was led by co-chairs Richard Sedano, Director of the Regulatory Assistance Project and a NEEP Board Member, and Robert Scott, Commissioner of the New Hampshire Public Utilities Commission, along with vice chairs Commissioner Kelly Speakes-Backman of Maryland (who also served as chair of the Regional Greenhouse Gas Initiative), and Arthur Marin, Executive Director of the Northeast States for Coordinated Air Use Management (NESCAUM). The Steering Committee co-chairs lead the development and adoption of revisions to the Forum's Operational Guidelines, project agenda and budget, and with the vice-chairs, inform preparation of Steering Committee meetings. Project Committees, with state representation, guide Forum projects and activities, per an organizational structure and process provided in Appendix A.

Table 1. 2014 EM&V Forum Steering Committee

State	Name	Agency/Organization
	Steering Committee Co-Chairs† and Vice Chair††	
	Rich Sedano†	Regulatory Assistance Project, NEEP Board Member
NH	**Commissioner Robert Scott†**	NH Public Utilities Commission
Air	**Arthur Marin, †† Executive Director**	NE States for Coordinated Air Use Management (NESCAUM)
MD	**Commissioner Kelly Speakes-Backman***	MD Public Service Commission

State	Name	Agency/Organization
CT	**Katie Dykes, Deputy Commissioner** Diane Duva, Director of Energy Demand	CT Dept of Energy & Environ. Protection
DE	**Robert Underwood, Energy Director** Jessica Quinn (Staff)	DE Dept of Natural Resources & Environmental Control
DC	**Keith Anderson, Director** Lance Loncke (Staff)	District Dept of the Environment
ME	**Commissioner David Littell** Denis Bergeron (Staff)	ME Public Utilities Commission
MD	**Commissioner Speakes-Backman*** Marissa Paslick (Staff)	MD Public Service Comm.
	Abigail Ross Hopper, Director Kevin Lucas and Daniel Lauf (Staff)	MD Energy Administration
MA	**Commissioner Jolette Westbrook** Benjamin Davis and Justin Brant (Staff)	MA Dept Public Utilities
	Commissioner TBD Tina Halfpenny (Staff)	MA Dept of Energy Resources
	Nancy Seidman – Asst. Commissioner	MA Dept of Environ. Protection
NH	**Commissioner Robert Scott**† Leszek Stachow (Staff)	NH Public Utilities Commission
NY	**Colleen Gerwitz, Director** Peggie Neville and Bill Saxonis (Staff)	NY Department of Public Service
RI	**Commissioner Paul Roberti** Todd Bianco (staff)	RI Public Utilities Commission
VT	**Commissioner James Volz** Mary Jo Krolewski (PSB Staff)	VT Public Service Board
	Barry Murphy (DPS Staff)	VT Dept of Public Service

EM&V Forum Core Project and Service Areas

Since its launch in 2009, the EM&V Forum has delivered a range of products through a participant consensus-driven process of nine jurisdictions[4] in the region, managed and facilitated by NEEP. The Forum's strategies cover three core areas, each of which serve to advance the Forum's goals and objectives. These are:

1. Standardized Reporting & Guidelines
2. Research & Evaluation, and
3. Education & Information Access

Standardized Reporting & Guidelines projects (previously referred to as 'Protocol Development' projects) focus on developing tools that enable greater transparency and understanding of state energy efficiency program savings and other impacts, and the underlying EM&V practices, using standardized reporting formats. This category of projects also involves monitoring and informing national EM&V protocols (e.g., US DOE's Uniform Methods Project, North American Energy Standards Board projects) and regional EM&V protocols (e.g., ISO New England and PJM capacity market M&V). Further, in some years, the EM&V Forum's agenda has involved developing guidance on specific topics such as cost-effectiveness screening and geo-targeting of energy efficiency investments to help defer or avoid T&D investments.

> ***"REED was instrumental in helping make the case to build US DOE's support for referencing energy efficiency as a key state strategy to meet EPA's Clean Power Plan emissions guidelines*** **[CAA 111(d)].** ***REED helped demonstrate that the energy efficiency resource is real."***
>
> ***US DOE staff***

> ***"I have gotten so much good info via the process and R&E study results from Forum projects these last years…"***
>
> ***NY Utility Forum Member***

Research & Evaluation (R&E) projects offer the states the opportunity to leverage resources to fund research on topics of mutual interest where there are gaps in savings assumptions, and where economies of scale make the research more affordable. These joint research projects also foster greater consistency in use of assumptions across states. Forum R&E projects include a particular focus on loadshape studies, research on selected emerging technologies, and incremental cost research. Projects typically include a mix of primary and secondary research, depending on available data.

[4] Participating Forum jurisdictions include: NY, MD, DE, DC and the New England states with the exception of Maine, which has not participated in the Forum since 2013.

Education & Information Access by the Numbers

2014 Annual Public Meeting – 102 attendees from 9 Forum states

18 topical webinars reaching 438 stakeholders

Education & Information Access activities of the Forum include a host of services that help inform Forum members about evaluation activities across the region, and emerging issues and hot topics. These activities include topical webinars, a comprehensive repository/library of cutting edge data evaluation studies, and hosting the Forum's in-person Annual Public Meeting, which brings together over 100 stakeholders from across the region to a rotating location annually.

2014 EM&V Forum Activities and Funding

In 2014, the Forum's agenda included a comprehensive range of activities, shown in Table 2 below. For the purposes of this 2014 Annual Report, which reports on *actual* activities and costs incurred during 2014, the specific projects described herein include 2014 projects as well as those that began prior to 2014 and continued into 2014. Appendix A provides a summary schedule of the 2014 project activity.

Table 2. 2014 Forum Project Activity

Base Services
Forum Operations and Quarterly Meeting Facilitation
Project Management
Education and Information Access
Standardized Reporting and Guidelines Projects
PD13-1: Net Savings Methods
PD13-2: Cost-Effectiveness Screening Guidelines
PD14-1: Regional Energy Efficiency Database (REED)
PD14-2: EM&V Methods (Standardized Reporting Forms; National EM&V)
PD14-3: ISO New England – Support on M&V Issues for PAs/PUCs
PD13-5 and PD14-4: Mid-Atlantic TRM – Common Savings Assumptions
PD14-5: Ductless Minisplit Heat Pump Meta Study
PD14-6: Geo-Targeting of EE Programs – Case Studies, EM&V and Guidance
Research and Evaluation Projects
RE12-1 and RE13-2: Loadshape Research – Variable Speed Drives and Commercial Refrigeration
RE13-2: Emerging Tech – High Efficiency Clothes Dryer Research
RE14-1: Early Replacement – Measure Life Research
RE13-3 and RE14-2: Incremental Cost Research

The EM&V Forum's revenues are fully restricted to support the specific activities and projects of the Forum, and no other areas of NEEP activities. Of the Forum's total $1.787m expenses, about 60% is a pass-through to 3rd party contractors who conduct the large scale Forum research projects.

The Regional EM&V Forum is funded through state and ratepayer efficiency funding (i.e. program administrator energy efficiency EM&V budgets, state energy office funding, etc.), leveraged with federal and foundation grants. In 2014, the grant portion was lower than in past years, given reduced funding available from federal grants.

The EM&V Forum funds are 100 percent restricted to fund Forum operations, projects and activities, as described in this Annual Report. Table 3 provides a summary of actual 2014 Forum revenues and expenses, where expenses include pass-through costs for 3rd party contractors retained to conduct the large scale research projects, and technical advisor input to review the contractors' analyses.

Table 3. 2014 Forum Revenues and Expenses (Actual)

Northeast Energy Efficiency Partnerships, Inc. Regional EM&V Forum Annual Report for the year ending December 31, 2014	
Revenues	**2014 Actual**
2014 State Funding	1,011,690
Prior Year State Funding (Carryover)	659,650
Contracts and Grants	116,300
Total Revenue	**$1,787,640**
Expenses	
Personnel and Related:	
Staff with Taxes and Fringe	406,970
Consultants and Contract Labor	1,051,940
Total Personnel	**$1,458,910**
Travel Meetings & Conferences	20,260
Other (Printing, Communication, Fees, etc.)	640
General and Administrative Allocation	255,640
NEEP Fiscal Fee	52,190
Total Expenses	**$1,787,640**

EM&V Forum 2014 Services and Projects

1. EDUCATION & INFORMATION ACCESS, AND FORUM OPERATIONS

Core to the Forum's work in 2014 was providing EM&V education and information to inform Forum members about evaluation activities, emerging issues and hot topics across the region. In 2014 these services and products included the following:

> ***"The Forum promotes exchange of knowledge about what other states are doing and finding in their evaluations."***
>
> ***Maryland PSC staff***

1. Hosted an Evaluation M&V 2.0 Workshop, '*Evaluating Energy Efficiency: 5 Top Things You Should Know About the Emerging Evaluation World,*' that covered current and future challenges the evaluation industry must overcome as 'big data,' smart meters and devices, and automated M&V tools evolve. The workshop took place the day before NEEP's annual Northeast Energy Efficiency Summit, and brought over 60 policymakers, program administrators, system planners, EM&V practitioners, and federal agency representatives from across 15 states, together in Newport, R.I. on June 2 for the workshop.
2. Maintained the EM&V Resource Library of state TRMs and evaluation studies and other EM&V resources to help support easy access to EE data.
3. Hosted a 2014 State Evaluation Webinar that brings the Forum states together to learn about recently completed, current and planned evaluation studies, and fosters information and data exchange.
4. Updated the EM&V Forum website, including a Private Portal website available to Forum members to access all project materials including agendas, scopes of work, draft and final materials, and budget information.
5. Provided timely and informative communication to Forum members, including monthly updates and newsletters.
6. Provided relevant EM&V information to states (e.g., topical webinars, presentations) to support state use/implementation of Forum products.

The Forum Operations and Project Management scope of services, which combined with Education & Information Access, comprise the Forum's Base Costs. Key activities in 2014 included:

1. Planned and developed multi-state Forum agenda & budget with input from Forum participants, Project Committees and subcommittee meetings;
2. Facilitated quarterly Forum Steering Committee, Project Committees, and many project subcommittee meetings;
3. Implemented Forum operational policies (Operational Guidelines, ensure access to Forum materials and protecting confidential information, etc.);
4. Served as a fiscal agent for jointly funded research including 24 contracts to provide 2014 EM&V Forum funding;
5. Requested and managed federal funding to complement state and efficiency program funding;
6. Managed third party contracts for 23 projects; and
7. Retained and provided technical expertise to inform project scopes and review of project deliverables.

2. STANDARDIZED REPORTING & GUIDELINES PROJECTS[5]

This section provides a summary of each of the projects listed in Table 2, the respective participating states and key project deliverables. Many of the Forum's projects span multiple years – detailed project descriptions for 2013 and 2014 are available for review on the NEEP website.

PD13-1: Net Savings Methods

The Net Savings Methods project is addressing challenges in methods to address spillover and market effect (multi-year) impacts given the bias typically placed on measuring free-ridership, and is monitoring efforts to develop new approaches and appropriate applications. The project builds on Forum research to date on the topic, including findings and recommendations from the Net Savings 2012 Scoping Paper, which recommends consistent definitions for net and gross savings, and provides an overview of state use and application of net saving for various policies/markets. The project's 2013-2014 activities focused on monitoring and commenting on US DOE's Uniform Methods Project (UMP) Net Savings Methods protocol, which was published by DOE in September 2014. With a delay in the US DOE Net Savings protocol project (which pushed the Forum 2013 project into 2014), the second part of the Net Savings Project – to develop net Savings principles and more detailed guidance, is being undertaken in 2015.

- **States Involved:** All EM&V Forum states
- **2014 Deliverables:** The Forum's effort in 2014 focused on reviewing and developing comments on US DOE's Uniform Methods Project development of Net Savings Methods guidance.

PD13-2: Cost-Effectiveness Screening Guidelines

> ***"Guidance like this goes right to the core of what the Forum should be doing… the Forum works in a sensitive environment and it's important to provide guidance, but to ultimately leave the final decisions to the states."***
>
> ***NH PUC upon Steering Committee adoption of the Cost Effectiveness Screening Guidelines***

The Forum developed Cost-Effectiveness Screening Principles and Guidelines to establish overarching principles that states should consider in reviewing their energy efficiency screening practices, as well as guidelines on specific cost-effectiveness issues. A Survey of State Cost-Effectiveness Screening Practices, conducted in 2013, served as the basis for the guidance document. The guidelines are not intended to be prescriptive in recommending any one test over another, inclusion of any particular costs or benefits, or use of a specific discount rate. However, states with open proceedings on the topic of cost-effectiveness screening in 2014 consulted the guidelines to help inform the review of their state screening practices, including consideration of building greater transparency and understanding of what costs and benefits should be considered, options for how they can be quantified or determined, and considerations for how to account for risk of energy efficiency resources.

[5] This category of projects has in past been referred to as *Protocol Development* (PD) projects, but more recently clarified to characterize the nature of the projects which focus on building transparency and understanding of EM&V practices, and provide guidance to policymakers on selected issues.

States Involved: All EM&V Forum states

- **2014 Deliverables:** The Forum finalized, and the Steering Committee adopted, the Cost-Effectiveness Screening Principles and Guidelines in November 2014, whereby the states encourage the consideration of the guidelines at appropriate junctures in the review of their respective state cost-effectiveness screening practices.

PD14-1: Regional Energy Efficiency Database (REED)

> ***"REED is used to confirm that our states' EE findings are consistent with NH Benchmarks as well as a resource when seeking to respond to ACEEE survey material'***
>
> ***NH PUC Staff***

REED provides data and analysis on the high level impacts of energy efficiency programs at the state and regional level, including energy and demand savings and associated costs, avoided emissions, and job impacts. The database serves as a valuable public resource on electric and natural gas energy efficiency program data for CT, DE, MA, ME, MD, NH, NY, RI, VT and the District of Columbia. The REED database enables stakeholders to compare program areas and performance across states, as well as aggregate data to sub-regional and regional levels. Importantly, REED, as a multi-year on-going service to the Forum, serves to build transparency and consistency in reporting, thus demonstrating the cost-effectiveness of energy efficiency as a resource.

- **States Involved:** All EM&V Forum states
- **2014 Deliverables**:

  a) Issuance of the REED Program Year 2012 Annual Report which provides a comprehensive report on state by state EE reporting impacts and comparisons on key reporting parameters.
  b) Collection of 2013 program year data, data review/QC and analysis, and annual report on state and regional trends. This involved coordinating data collection with regional system operators (e.g., ISO New England). The report includes observations on key differences across states to support state benchmarking.
  c) Improvements to the REED interface based on subcommittee input, and updates to data assumptions such as avoided emissions assumptions working with key state air quality agencies (including NY DEC staff).
  d) Coordination with national organizations (LBNL, ACEEE, CEE, EIA Form 860) to identify priority areas for developing greater consistency in definitions for key terms and reporting typology, and to identify opportunities to avoid duplicative reporting requests to states and program administrators.

PD14-2: EM&V Methods Project

The Forum's work on EM&V Methods is an on-going multi-year effort to build transparency and understanding of underlying EM&V practices to support public utility commissions, air quality regulators, and ISO needs. The scope of work also includes informing the development of national EM&V protocols to help ensure that EM&V

> ***"Regulators could use the [EM&V reporting form] as a starting point for a deeper discussion with program administrators on how to interpret the data. [It's] important that the information encourages these discussions."***
>
> ***RI PUC staff***

practices in the Forum region, which in many cases represent best practice EM&V, be reflected in national protocols. Particularly in the context of EPA's Clean Air Act 111(d) rules, the Forum aims to inform EM&V requirements such that they are consistent with best practice in the Northeast and mid-Atlantic regions.

- **States Involved:** All Forum States
- **2014 Deliverables:** Three key areas of Forum work for this project in 2014 were:

  a) *Standardized EM&V Methods Forms:* The first of its kind standardized EM&V reporting forms were developed in 2013-14 with extensive stakeholder input, culminating in a final deliverable of Version 1 of the on-line EM&V methods reporting forms, which were formally adopted by the Forum Steering Committee in July 2014. NEEP began discussions with several states in fall 2014 to plan for fully piloting the forms in 2015.

  b) *Input to national EM&V protocol efforts,* focusing on the US DOE Uniform Methods Project (UMP) by providing comment on draft impact evaluation protocols for a range of measures. The Forum also monitored and participated in the American National Standards Board (ANSI) project to develop a standardization roadmap for EE EM&V that identifies existing standards/protocols and gaps (via the ANSI EE Standardization Coordination Collaborative). The deliverables for this effort included periodic updates on national protocol efforts with written comments prepared by NEEP staff with Forum technical advisors, and review/input from interested project subcommittee members.

  c) *Comments submitted to US EPA on section 111(d) of the Clean Air Act:* On June 2, 2014, the EPA issued its proposed Clean Power Plan (CPP) to cut carbon pollution from power plants—the largest source of carbon pollution in the U.S.—by 30 percent from 2005 levels. The proposed draft rule included state-specific goals for carbon dioxide (CO_2) reductions with guidelines for the development, submission, and implementation of state plans. In applying a "best system of emission reduction" standard, the EPA established four "building blocks" through which states can develop and implement their compliance plans, including demand-side energy efficiency to reduce the amount of electricity generation. NEEP, with ACEEE, led the development and coordination of comments to EPA on its 111(d) EM&V guidelines and requirements, focusing on appropriate EM&V methods. NEEP filed joint comments with 14 other stakeholders from across the country in November 2014, including a mix of NGOs, other REEOs, and state agencies.

PD14-3: ISO New England – Support on M&V Issues for Program Administrators and Public Utility Commissioners

This project provides the New England states funding this work with updates on ISO New England activities that could have bearing on energy efficiency programs and that may require coordinated input from the states where public input is invited and appropriate. This project was developed with a placeholder budget in anticipation that there may be a need for further input into the ISO New England's FCM Performance Incentive Proposal regarding treatment of energy efficiency. It is a follow up to the Forum facilitated New England stakeholder joint recommendation to FERC to exempt efficiency from the revised ISO-NE rule that was ultimately accepted by FERC in its order on ER14-1050-000-001.

- **States Involved:** New England states (MA, RI, VT, CT, NH)

- **2014 Deliverables:** Funding for continued support to the states on EM&V in context of capacity was not ultimately needed in 2014, given FERC's decision. The funding for this project was carried over to 2015 and is being considered as additional budget for a New England loadshape data catalog project.

PD13-5 and PD14-4: Mid-Atlantic Technical Reference Manual (TRM)

> ***"The Mid Atlantic TRM is used extensively and has been an invaluable tool in our evaluations. It helps reduce evaluation costs, and improves evaluation accuracy and reliability."***
>
> ***Maryland PSC staff***

The Mid-Atlantic TRM project maintains and updates the TRM savings assumptions used to calculate program impacts in order to ensure the TRMs continued value and use for program planning and savings calculations in MD, DE and Washington, DC. This project began in 2009, and involves annual updates to the TRM beginning in November and ending in June.

- **States Involved:** Maryland, District of Columbia and Delaware
- **2014 Deliverables:** Version 4.0 of the Mid-Atlantic Technical Reference Manual (TRM) was released in June 2014 and included over 30 new and updated residential and C&I measures. The accompanying O&M Cost Calculations spreadsheet includes information for lighting fixtures and screw-based lamps. The measures added, deleted or modified were based on recommendations by the participating states according to the TRM Update Procedures that was developed for the TRM. Tasks included systematic review of old measures and prioritization of changes needed. Selection of measures for the Version 5.0 update began in the fall of 2014.

PD14-5: Ductless Minisplit Heat Pump Meta Study & EM&V

This project provided up-to-date information to determine the potential for energy efficiency savings, inform efficiency program designs and recommend appropriate EM&V methodologies to assess energy savings associated with ductless heat pumps (DHPs). Project contractors analyzed studies from 40 relevant programs and conducted industry interviews to identify key findings in terms of DHP performance, market barriers and opportunities, market acceptance and satisfaction, future product features and growth, program recommendations, and knowledge gaps.

- **States Involved:** NY, MA, CT, DC, NH, RI, VT
- **2014 Deliverables:** *Emerging Ductless Heat Pump Meta Study* –The Final Emerging Technologies Primary Research Report on Ductless Heat Pumps was released in May 2014 and includes the results of primary research conducted on ductless mini-split heat pumps (DHPs) in the residential sector specifically for heating-dominant climates.

PD14-6: Geo-targeting of EE Programs

This project provided foundational information for policy makers, utilities and other stakeholders to understand and assess the value of geo-targeting of energy efficiency programs in the context of energy transmission and distribution planning. The report documents the EM&V practices around geo-targeting programs in terms of the flow of program benefits and costs (inter and intra-state/regional), with in-depth case studies from around the country.

> ***"The geo-targeting report provides informative case studies from different jurisdictions and is a useful resource for us."***
>
> ***MA DPU staff***

The report also addresses the limitations of geo-targeting in the absence of adequate regional planning or cost allocation infrastructure that would enable energy efficiency to respond to RFPs pertaining to T&D.

- **States Involved:** NY, MA, NH and VT
- **2014 Deliverables**: A final report titled Energy Efficiency as a T&D Resource Using Geo-Targeting was issued for Forum members, followed by a presentation at the Forum's Annual Public Meeting.

3. RESEARCH & EVALUATION (RE) PROJECTS

RE12-1 and RE13-2 Loadshape Research – Variable Speed Drives and Commercial Refrigeration

> ***"Forum loadshape research continues to provide program designers, implementers and evaluators with information that is essential to the cost effective advancement of energy efficiency in the region."***
>
> ***MA Evaluation Consultant***

Loadshape data measures the impact of electric energy efficiency programs during identified periods of time (e.g., hourly, seasonal and annual consumption data used to analyze coincidence factors and other usage patterns) and is useful in planning and implementing EE programs, assessing peak savings required for participation in capacity markets and assessing air quality improvements resulting from EE. In 2014, the Forum continued research on loadshapes, building on previous studies to develop 8760 hour loadshape data and coincidence factors for priority measure(s)/end uses identified by the participating Forum states. While many program administrators conduct some loadshape research independently, a Forum project offers the opportunity to leverage costs, sampling efforts, and previously collected data across multiple funders. This can be especially useful in cases of measures that are not large contributors to savings, but for which there is limited current information or what exists is outdated (ISOs require that data have a vintage of 5 years or less). In these cases, consistency is advantageous and it is much more cost-effective than individual PAs conducting the research on their own.

During 2014, the Forum completed work on the Variable Speed Drive (VSD) project, which was launched in 2012 (RE12-1). During late 2014, an RFP was developed and issued to conduct loadshape research on Commercial Refrigeration (RE13-2). The timing of these projects requires M&V on a statistically significant sample of facilities over a measurement period that includes summer and winter months, hence the long project timeframe.

- **States Involved:** NY, MD, MA, NH, DC, RI and VT.
- **2014 Deliverables:** The Variable Speed Drive Loadshape Project Final Report was issued in 2014 and provides results of the VSD Loadshape study to determine the hourly energy and demand impacts of variable speed drives installed on heating, ventilation, and air conditioning (HVAC) equipment in existing nonresidential buildings throughout the Northeast and Mid-Atlantic. These study results and primary results could support regulatory filings for energy efficiency programs, demand resource values submitted to forward-capacity markets, and air quality research. Users can also download the VSD Spreadsheet Tool from the NEEP website.

RE13-2 Emerging Technology – High Efficiency Clothes Dryers Research

This research project provided baseline assumptions and information to support efficiency programs for advanced clothes dryer technologies for the residential market. The research was part of a continued effort to assess several emerging technologies and innovative program approaches by the EM&V Forum. The residential clothes dryer study metered 23 existing residential electric clothes dryers in single household homes in Vermont, New Hampshire, Maine, and Massachusetts. In addition, targeted secondary research of other studies that focused on the energy consumption and usage patterns of electric clothes dryers was performed.

- **States Involved:** NY, MA, NH, DC and VT.
- **2014 Deliverables:** Research was conducted during 2014, with participant comments on draft research results and draft report. The final Residential Clothes Dryer Baseline Study was issued in early 2015.

RE14-1: Early Replacement Measures Scoping Study: Phase 1 Research Report

This scoping study represented the first phase of a study designed to fill knowledge gaps around issues related to early replacement retrofits, equipment remaining useful life (RUL), and the potential use of multiple baselines for energy savings calculations. The project was launched in early fall 2014, with research carrying over into 2015. Research included conducting in-depth surveys of program participants who qualified for early replacement incentives in order to improve measure life estimation in the region. The focus of the 2014 survey was on describing the baseline assumptions and procedures employed to qualify measures for early replacement incentives and to determine energy savings. A final report for the project will be issued in 2015.

- **States Involved:** All Forum states
- **2014 Deliverables:** Research and a survey on baseline assumptions and procedures employed to qualify measures for early replacement incentives and to determine energy savings. A final report for the project will be issued in 2015.

RE13-3 and RE14-2: Incremental Cost Research

> ***"Cost studies are expensive, and typically get low priority in planning or evaluation budgets. But by combining forces and leveraging funds studies are affordable. Further, many program administrators are short on staff to manage multiple studies, and so joint studies managed by the Forum help relieve constrained resources."***
>
> ***Efficiency Vermont – Annual Public Meeting***

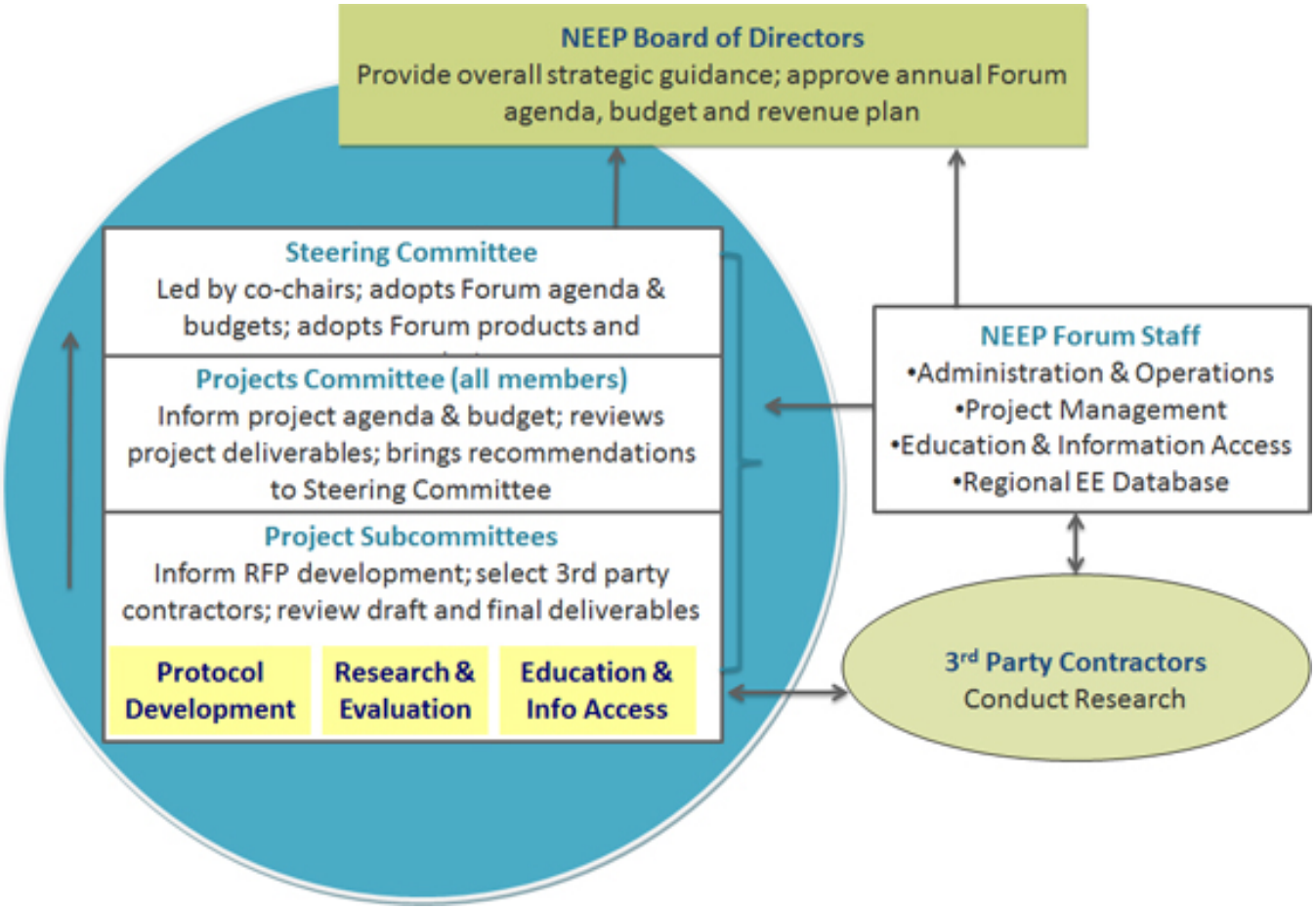
As with previous Forum Incremental Cost studies, these projects are developing incremental cost estimates and cost curves (costs at varying energy efficiency levels) for selected measures and/or program types (gas and/or electric) to help inform program design and rebate levels. The projects aim to study incremental costs of common prescriptive measures and of new/emerging measures, and update costs periodically as markets change. Unlike some other aspects of efficiency measures, data on costs of baseline and efficient measures can be difficult to obtain and are likely to be similar within sub-regional markets rather than obeying state boundaries. Development of cost curves rather than measure by measure estimates is more economical and flexible.

- **States Involved:** All Forum states with exception of DE.

- **2014 Deliverables:** The Incremental Cost Study Phase 3 Final Report (RE13-3) was completed in June 2014, along with accompanying workbooks that include cost curves for the following efficiency measures: air source heat pumps, LED refrigeration case lighting, unitary AC, steam traps, and heat pump water heaters. Research began on Phase 4 (RE14-2), which carried forward to 2015.

Appendix A

Regional EM&V Forum Organization Structure



Forum Participation by State

State	Agency or Company	# Participants *
CT	CT Dept. of Energy & Environmental Protection (DEEP)	28
	Utilities: Eversource (CT); United Illuminating	
	Other (CT EM&V consultants to EEB)	
DC	District Department of the Environment	6
	DC Sustainable Energy Utility	
	Metro Washington Council of Governments	
DE	Delaware Office of Energy and Climate	3
MA	Massachusetts Department of Public Utilities	47
	Massachusetts Department of Environmental Protection	
	Massachusetts Department of Energy Resources	
	Utilities/PAs: Eversource (MA); National Grid, Unitil, Cape Light Compact, Columbia Gas, Berkshire Gas	
	Other (MA EM&V consultants to EEAC)	
MD	Maryland Public Service Commission	29
	Maryland Energy Administration	
	Utilities/PAs: Baltimore Gas & Electric; PEPCO/Delmarva; Potomac Edison; Southern Maryland Electric Coop	
	Other (MD EM&V consultants)	
ME	Maine Public Utilities Commission	3
(observing)	Efficiency Maine	
NH	New Hampshire Public Utilities Commission	11
	Utilities/PAs: Eversource (NH); Unitil; Liberty Utilities; NH Electric Cooperative	
NY	New York Department of Public Service	55
	New York State Energy Research & Development Authority	
	New York Department of Environmental Conservation	
	Utilities: Consolidated Edison; Central Hudson Gas & Electric; NYSEG/RG&E; National Grid	
	PSEG Long Island	
	New York Power Authority	
RI	Rhode Island Public Utilities Commission	6
	RI Office of Energy Resources	
	National Grid	
VT	Vermont Public Service Department	24
	Vermont Public Service Board	
	Utilities/PAs: Efficiency Vermont; Burlington Electric; Vermont Gas	
Other	ISO/RTOs (ISO-NE, NY ISO, PJM)	3
	Federal Agencies (US DOE, US EPA)	3
	NESCAUM	2
	NGOs	15
	TOTAL	***235***

* Participation #s reflect assigned state representatives to range of Forum projects or committees. Level of participation varies within states and across states.

Appendix B

2014 Project Activity Schedule