



Energy Technologies Area

Lawrence Berkeley National Laboratory

Energy Efficiency EM&V in EPA's Clean Power Plan

Steven R. Schiller, Senior Advisor/Affiliate
Lawrence Berkeley National Laboratory

<http://emp.lbl.gov>

srschiller@lbl.gov

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Do I need to do EM&V?

- Mass –
 - EGU Emission Standards Plan – Not really
 - State Measures Plan – Yes, but not fundamental to compliance calculations
- Rate –
 - EGU Emission Standards Plan - Yes, fundamental to compliance calculations
- CEIP –
 - Mass or rate plans - Yes

EM&V “musts”

- Prepare an EM&V plan that provides for quantified and verified savings by applying industry best-practice protocols and guidelines
- Provide regular interval EM&V and periodic reports
- Use a baseline that represents what would have happened in the absence of the demand-side EE activity – common practice baseline
- Address savings persistence
- Have independent verification
- No double counting

For the CPP, EM&V is primarily associated with successfully quantifying and verifying savings for generating emission rate credits (ERCs) and adjusting an emission rate

Efficiency EM&V Coverage in the CPP

CPP Document	Type of EM&V Information	Notes
CPP Emissions Guidelines – see Section VIII.K	Requirements	Must do for CPP compliance to quantify and verify savings
Proposed Model Trading rule – see Section IV.D.8.	Presumptively approvable EM&V approaches	Strongly recommended characteristics of EM&V for approvable State Plans. Any alternative EM&V approaches implemented by a state must be “equivalent” to the presumptively approvable provisions
EM&V Guidance for Demand Side EE	Applicable guidance	Further information and recommendations covered in this companion document

Energy Efficiency in the CPP – Rate-Based Approach

- EE can be used to generate Emission Rate Credits (ERCs) that are used to help meet the rate target
- Rate based approaches are where there are significant CPP EM&V and tracking requirements for EE

CPP Emissions Rate =

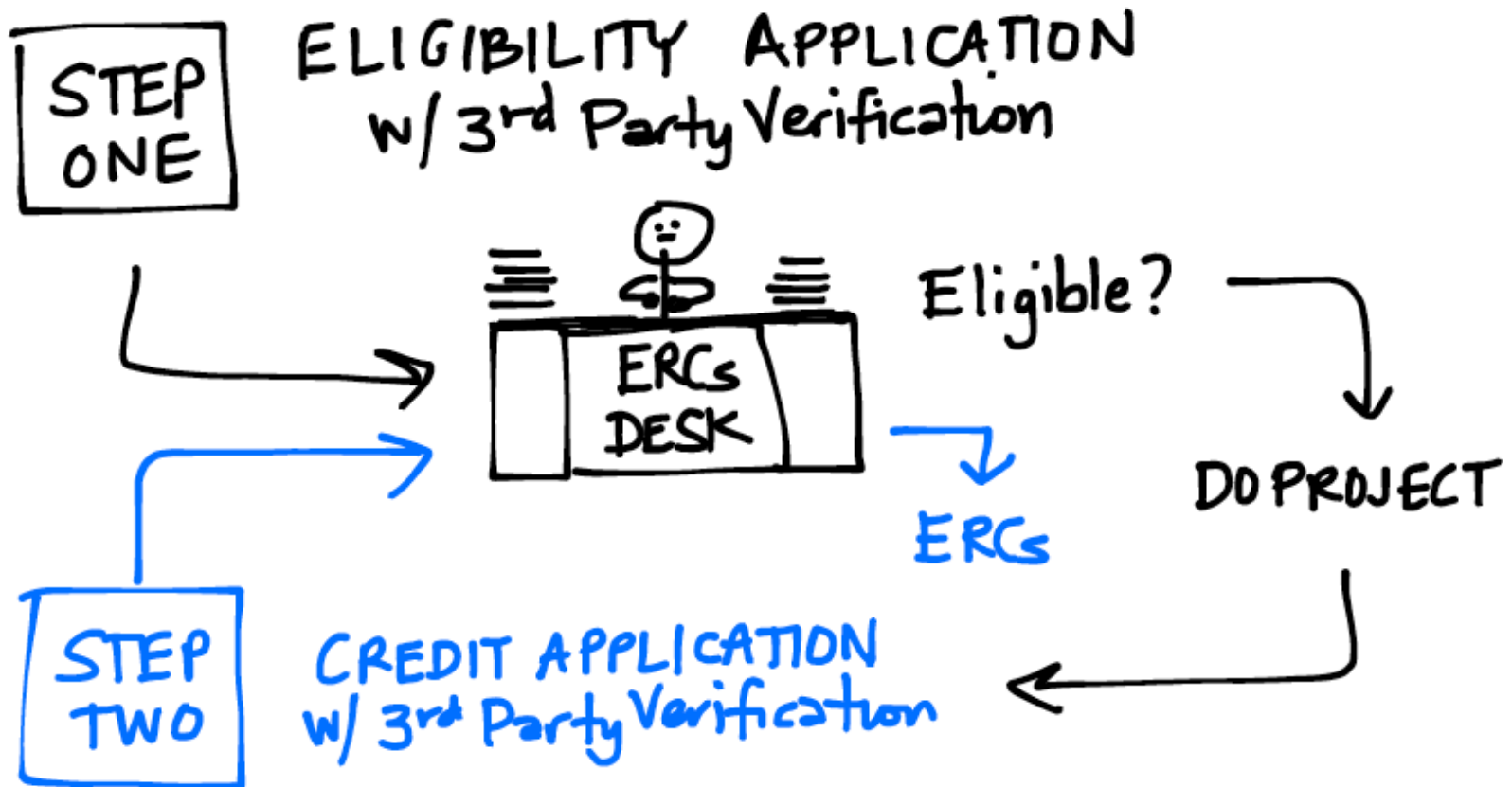
(Affected EGU Emissions, lbs/year)

(Affected EGU Generation, MWh/year) + (ERCs, MWh/year)

Example:

- Emission = 1,000,000 lbs/year
- Generation = 1,000 MWh/year
- Emission rate = 1,000 lbs/MWh
- Target = 800 lbs/MWh
- ERCs required = 250 MWh/yr → CPP Rate = 800 lbs/MWh

*Metric is
Annual MWh*



! Liability for improperly issued ERCs lies with the affected EGU who uses them for compliance !

Energy Efficiency in the CPP – Rate Based Approach (continued)

- *Reminders:*
 - *Only emission standard plans use rate-based approaches (not state measure plans)*
 - *In proposed federal plan there are no end-use efficiency ERCs*

Some detail from CPP:

“..a state may implement a **market-based emission trading program**, which enables EGUs to generate and procure [Emission Rate Credits] **ERCs**, a tradable compliance unit representing **one MWh of electric generation (or reduced electricity use)** with zero associated CO₂ emissions.”

“...These ERCs may then be used to adjust the reported CO₂ emission rate of an affected EGU when demonstrating compliance with a rate-based emission standard. **For each submitted ERC, one MWh is added to the denominator of the reported CO₂ emission rate, resulting in a lower adjusted CO₂ emission rate.**”

Eligible EE for Adjusting CO₂ Emission Rates

Rate Based Approach



- Broadly speaking – all actions must be **quantifiable, verifiable, enforceable, non-duplicative and permanent**
- “Demand-side EE may include a range of eligible measures, provided that the measures can be **quantified and verified** in accordance with the EM&V requirements in the Emission Guidelines...”
- Examples in the CPP documents and for which there is specific discussion in the proposed EM&V Guidelines— “utility” programs, building energy codes, product energy standards, performance contracting, and others

Energy Efficiency in the CPP – Mass-Based Approach

- *Reminders:*
 - *State measure plans are mass plans*
 - *Emission standard plans can be rate or mass plan*

- **EE reduces emissions mass “indirectly”:**
 - **Complimentary programs – e.g., energy codes, EERS, public buildings programs**
 - **Could be funded with allowance auction funds**
- **Emission Standards plan – EE does not have to be defined and thus EM&V does not have to be defined in plans (probably)**
- **State measures plan – EE measures do need to be defined and thus EM&V Plan is required**

Energy Efficiency in the CPP – Mass-Based Approach

Reminder: State measure plans are “mass plans”, emission standard plans can also be “mass plans”

EE EM&V is less of an issue with mass-based approach, because it is not fundamental to compliance calculations but:

- **EE is implemented with complementary programs, which should have their own EM&V plans**
- **California’s and RGGI’s approaches to a mass cap can be examples**

From Emissions Guidelines

Emissions Standards Plans:

-incentivizes the use of strategies such as RE and demand-side EE as complementary measures that reduce CO₂ emissions.
- unlike under a rate-based approach, there is no need to address and describe these state measures in a state plan submission or quantify and verify ...EE MWh of ... savings...
- recognizes a wide range of ... actions while being relatively simple implement and administer.

State Measures Plans

- Measures implementedcould include.... demand-side EE requirements and deployment programs.
- This plan type would allow the state to implement a suite of state measures that are adopted, implemented, and enforceable only under state law, not federally enforceable

- In the final Emissions Guidelines, the agency laid out the high-level parameters of the CEIP including a requirement for EM&V
- However, EPA also stated that it would seek input before fully developing the specific details related to the design and implementation, including EM&V, of the CEIP program
- One expectation would be for EPA to indicate for the CEIP the same EM&V requirements and guidance provided for efficiency ERCs

How EE/RE Fits in the Clean Power Plan

- slide from U.S. EPA



How EE/RE Fits in the Clean Power Plan

slide from U.S. EPA

State Plan Approach	Role of EE/RE in State Plan	State Strategies for EE/RE	EM&V Needed?	Considerations
Emission Standards	Mass	<p><i>EE reduces cost, EE/RE lowers CO₂ emissions but are not enforceable or written into the state plan</i></p>	<ul style="list-style-type: none"> Allocate CO₂ allowances for EE/RE (e.g. through a set aside) <input type="checkbox"/> Auction allowances, use \$ for EE/RE <input type="checkbox"/> Secure matching allowances for solar, wind and low-income EE from Clean Energy Incentive Program (CEIP) <input checked="" type="checkbox"/> 	<ul style="list-style-type: none"> EM&V generally not required for CPP purposes, except for CEIP and set asides specifically created to meet the leakage requirement Unlimited flexibility with EE/RE implementation
	Rate	<p><i>Explicitly written into state plan; Used to generate ERCs and directly adjust reported CO₂ emissions rate of affected EGUs</i></p>	<ul style="list-style-type: none"> Include EE/RE ERC tracking, trading, and issuance provisions in the state plan <input checked="" type="checkbox"/> Issue ERCs for quantified and verified MWh savings from eligible EE/RE measures <input checked="" type="checkbox"/> Secure matching ERCs from CEIP for solar, wind, low-income EE <input checked="" type="checkbox"/> 	<ul style="list-style-type: none"> EM&V plans and M&V reports required EE/RE is explicitly tracked & credited Trading-ready plans facilitate broad access to ERCs EE/RE implemented after 2012 can generate credits starting in 2022
State Measures	<p><i>Explicitly included as supporting material for state plan – enforceable under state law; State EE/RE policies and measures can be used to help affected EGUs meet mass goal</i></p>	<ul style="list-style-type: none"> Implement state EE/RE policies and programs (e.g., EERS, RPS, building codes) that are enforceable under state law, either to meet goal or in conjunction with federally enforceable limits <input checked="" type="checkbox"/> Secure matching allowances from CEIP for solar, wind and low-income EE <input checked="" type="checkbox"/> 	<ul style="list-style-type: none"> Projection of EE/RE impacts required and EGU CO₂ performance required <input checked="" type="checkbox"/> EM&V Plan for EE/RE measures must be included as supporting material for state plan <input checked="" type="checkbox"/> Backstop emission standards for affected EGUs if CO₂ reductions don't materialize <input checked="" type="checkbox"/> 	

Emissions Guidelines (EG) requirements are general and relatively limited, including (see EG for complete description):

- State plan would include EM&V plan for quantifying and verifying electricity savings on a retrospective (ex-post) basis using industry best-practice EM&V protocols and methods that yield accurate and reliable measurements of electricity savings.
- Assessment of the independent factors that influence the electricity savings and the expected life of the savings
- Baseline that represents what would have happened in the absence of the demand-side EE activity
- Periodic M&V reports
- Independent verification
- Skill certification is also discussed

Double counting must be avoided – potential sources:

1. Same savings (project) counted twice
2. Program (baseline) overlaps
3. Trading between states (possible unintended consequences)

From Model Trading Plan:

- EM&V should address “How double counting will be avoided through the use of tracking and accounting procedures to ensure that the same MWh of electricity savings is not claimed more than one time (for example, two EGUs claiming savings from the same lighting retrofit).
- The types of double counting that may arise are discussed in the EPA’s draft EM&V guidance.”

Examples from EM&V Guidance:

- Two EGUs or an EGU and an ESCO claiming savings from same project
- Savings from same retrofit being claimed by residential behavior-based program and retailer point-of-sale incentive program
- Claiming savings from enacting a building code and specific project savings with below code savings

Cover wide range of EM&V topics, including the following list from CPP EM&V Guidance document:

- EM&V Methods
- Electricity savings metrics and baselines
- Reporting timeframes and considerations
- Deemed savings
- Independent factors
- Accuracy and reliability
- Avoiding double counting
- Persistence of savings
- Savings quantification/verification cycles
- T&D savings adders
- Interactive effects
- EE EM&V Protocols and Guidelines

Also Covered in Guidance and/or Model Rule:

- Tracking and compliance systems
- Independent verification and review
- Additional EM&V guidance for several common EE program and project types
 - Programs implemented using utility customer funds (“utility EE programs”)
 - Individual or aggregated EE projects, such as those implemented by ESCOs or at industrial facilities
 - Building energy codes
 - Appliance energy standards
- Glossary of key terms
- Templates for program and project EM&V plans.
- Examples for several common measure types

- Trading is allowed, encouraged in the Rule –
 - Emission rate credits (for a rate-based standard) or
 - Allowances (for a mass-based standard)
- Trading of ERCs, including EE ERCs under Rate Based Approach, can support CPP compliance:
 - Intra-state and Inter-state
 - Final Plan does not require complex air quality modeling to identify location of emission impacts from efficiency nor adjustment or discounting of efficiency impacts that cross state lines
- In terms of mass plans:
 - There is not a currently defined mechanism for trading efficiency-based allowances in the CPP documents
 - One case in which efficiency could receive allowances under a mass-based plan approach is through a *set aside* for efficiency program and projects

From Emission Guidelines:

Tracking system must:

- Record the issuance, transfer and surrender of ERCs for compliance or retirement
- Provide electronic public access
- Provide for transfers of ERCs to/from another ERC tracking system

From Model Trading Plan:

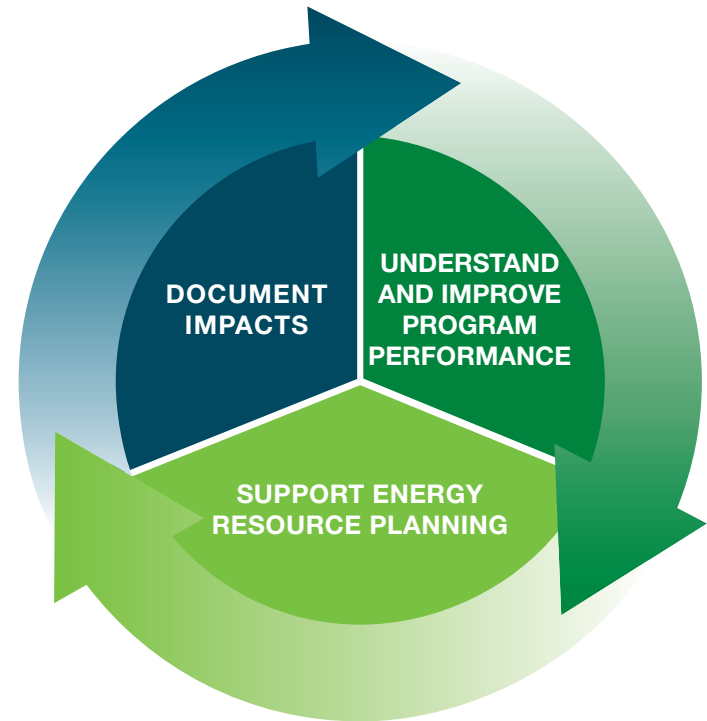
EM&V plans must describe how

“...double counting will be avoided through the use of tracking and accounting procedures to ensure that the same MWh of electricity savings is not claimed more than one time (for example, two EGUs claiming savings from the same lighting retrofit). The types of double counting that may arise are discussed in the EPA’s draft EM&V guidance.”

From EM&V Guidance:

Implement “**systematic tracking and accounting procedures**, including the use of well-structured and well-maintained tracking and reporting systems such as those already being used by many states and EE providers.”

Whether for complimentary efficiency programs as part of a mass based plan or just efficiency in general without use for CPP compliance states will need their own EM&V and tracking requirements to help ensure successful implementation



**EVALUATION SUPPORTS SUCCESSFUL
EFFICIENCY PROGRAMS**

Can Arizona Use Its Current EM&V Practices?

Selected Topics	What CPP Says
EM&V approaches	<p>From EG: All electricity savings must be quantified and verified based on methods and procedures detailed in an industry best-practice EM&V protocol or guideline. “States may not allow MWh values that are quantified using ex-ante (pre-implementation) estimates of savings.” <i>Model Plans –presumptively approvable – “all electricity savings must be quantified by applying one or more of the following methods: PB-MV, comparison group approaches, or deemed savings.”</i></p>
Baselines	<p>From EG: “<i>Common practice baseline or CPB</i> means a baseline derived based on a default technology or condition that would have been in place at the time of implementation of an EE measure in the absence of the EE measure (for example, the standard or market-average or pre-existing equipment that a typical consumer/building owner would have continued to use or would have installed at the time of project implementation in a given circumstance, such as a given building type, EE program type or delivery mechanism, and geographic region). <i>Model Plans – CPB is presumptively approvable</i></p>
Independent verification	<p>From EG: “... results are verified by an accredited independent verifier, and its verification assessment must be included as part of the M&V report submitted to the state regulatory body.” Further guidance provided in Model Trading Rule</p>
Persistence of savings	<p>From Model Trading Rule: “All EE programs, EE projects, or EE measures must be quantified at time intervals (in years) sufficient to ensure that MWh savings are accurately and reliably quantified.”</p> <ul style="list-style-type: none"> • C&S: every four years • Utility and public funded programs: every 1, 2 or 3 years • Commercial and industrial projects: every year (unless can justify...)

- “Workers who perform the EM&V of ... EE performance will be certified by a third party entity that:
 - 1) Develops a competency based program aligned with a job task analysis and certification scheme;
 - 2) Engages with subject matter experts in the development of the job task analysis and certification schemes that represent appropriate qualifications, categories of the jobs, and levels of experience;
 - 3) Has clearly documented the process used to develop the job task analysis and certification schemes, covering such elements as the job description, knowledge, skills, and abilities;
 - 4) Has pursued third-party accreditation aligned with consensus-based standards, for example ISO/IEC 17024”
- The Model Trading Plans have information on:
 - Accreditation procedure for independent verifiers
 - Conflict of interest provisions
 - Process for the revocation of accreditation status for an independent verifier

- **Emission Guidelines:**

- *3. EM&V requirements for RE, demand-side EE, and other measures used to adjust a CO2 rate*
- Pages 1282 – 1291
- *Evaluation Measurement and Verification Plans and Monitoring and Verification Reports* -
Pages 1503- 1506

- **Model Trading Plans**

- *8. Evaluation, Measurement, and Verification (EM&V) Plans, Monitoring and Verification (M&V) Reports, and Verification Reports* - Page 183-218 (Demand Side EE starting on 202)
Requests for comments starting on page 211
- *§ 62.16260 What are the requirements for evaluation measurement and verification plans for eligible resources?* - Page 506-523 (Demand Side EE starting on 514)
- *§ 62.16265 What are the requirements for monitoring and verification reports for eligible resources? § 62.16270 What are the requirements for verification reports?* Pages 523-529
- *§ 62.16275 What is the accreditation procedure for independent verifiers? §62.16280 What are the procedures accredited independent verifiers must follow to avoid conflict of interest? § 62.16285 What is the process for the revocation of accreditation status for an independent verifier?* - Pages 529-537

- **EM&V Guidance**

- Includes request for comments list on Page v

- **Clean Power Plan website:**
<http://www2.epa.gov/carbon-pollution-standards>
- **Specific Documents:**
 - **CPP Emission Guidelines:** <http://www.epa.gov/airquality/cpp/cpp-final-rule.pdf>
 - **Federal Model Plan:** <http://www.epa.gov/airquality/cpp/cpp-proposed-federal-plan.pdf>
 - **EM&V Guideline:**
<http://www2.epa.gov/cleanpowerplantoolbox/draft-evaluation-measurement-and-verification-guidance-demand-side-energy>
- **For additional resources to help states develop plans, visit the CPP Toolbox for States:** <http://www2.epa.gov/cleanpowerplantoolbox>
- **EPA Overview and energy efficiency presentations:**
<http://www2.epa.gov/cleanpowerplan/clean-power-plan-overview-webinar>
<http://www2.epa.gov/cleanpowerplan/fact-sheet-energy-efficiency-clean-power-plan>

- EPA/DOE State and Local Energy Efficiency Action Network (SEE Action)–
 - focuses on providing assistance states need to advance policies and practices that bring energy efficiency to scale.
www.epa.gov/cleanenergy/energy-programs/seeaction/index.html
- The Northwest Regional Technical Forum –
 - an advisory committee established to develop standards to verify and evaluate conservation savings. <http://www.nwcouncil.org/rtf/about.htm>
- Regional EM&V Forum (Northeast and Mid-Atlantic) –
 - supports the development and use of common and/or consistent protocols to evaluate, measure, verify, and report the savings, costs, and emission impacts of energy efficiency. Covers 11 states. <http://www.neep.org/emv-forum>
- EVO –
 - capacity building for M&V best practices www.evo-world.org

Thank you

Steve Schiller

Senior Advisor
Electricity Markets and Policy Group
Lawrence Berkeley National Laboratory
1.510.486.7780
srschiller@lbl.gov