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Decision **PROPOSED DECISION OF COMMISSIONER GRUENEICH**
(Mailed 9/28/2010)

BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Examine the Commission's Post-2008 Energy Efficiency Policies, Programs, Evaluation, Measurement, and Verification, and Related Issues.	Rulemaking 09-11-014 (Filed November 20, 2009)

DECISION ON EVALUATION, MEASUREMENT, AND VERIFICATION OF CALIFORNIA UTILITY ENERGY EFFICIENCY PROGRAMS

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APPENDIX A – Core Objectives of Energy Efficiency Evaluation, Measurement, and Verification

DECISION ON EVALUATION, MEASUREMENT, AND VERIFICATION OF CALIFORNIA UTILITY ENERGY EFFICIENCY PROGRAMS

1. Summary

This Decision paves the way for future evaluation, measurement, and verification (EM&V) of California Public Utilities Commission (Commission) energy efficiency programs.[1] In this decision we establish the Commission's energy efficiency EM&V objectives for post-2012 programs, identify challenges that must be addressed before those programs begin, and launch a series of workshops designed to address those challenges collaboratively and transparently.

California's energy efficiency markets are increasingly dynamic. New influences on these markets and more comprehensive programmatic initiatives demand greater clarity of purpose and innovation in energy efficiency EM&V. This Decision provides that clarity and makes way for those innovations, by setting up stakeholder meetings well before the launch of post-2012 programs and dedicating resources to the effort.

2. Background

2.1. The EM&V Policy Framework

In 2003, the Commission, in collaboration with the California Energy Commission (CEC) and the now defunct California Consumer Power and Conservation Financing Authority developed California's first Energy Action

[1] EM&V are activities which evaluate, monitor, measure and verify performance or other aspects of energy efficiency programs or their market environment. Energy Efficiency Policy Manual, Version 4.0. at 6.

Plan (EAP).[2] The EAP sets forth a loading order that prioritizes which energy resources California will use to meet its future energy needs. The loading order stipulates that energy efficiency is California's "resource of first choice." Since the loading order issued, the Commission has invested in energy efficiency programs designed to displace or defer costly supply-side alternatives.

It is in the context of energy efficiency as a resource that the Commission's existing EM&V policy framework took shape. Decision (D.) 05-01-055 returned California's Investor Owned Utilities (IOUs)[3] to the role of energy efficiency program administrators and tasked the Commission's Energy Division with EM&V of the utility programs. D.05-01-055 defined the objectives of EM&V as follows:

> 1) measure and verify energy and peak load savings for individual programs, groups of programs, and at the portfolio level; 2) generate data for savings estimates and cost-effectiveness inputs; 3) measure and evaluate the achievements of energy efficiency programs, groups of programs and/or the portfolio in terms of the "performance basis" established under Commission-adopted EM&V protocols; and 4) evaluate whether programs or portfolio goals are met. (D.05-01-055, at 12.)

D.05-04-051 subsequently adopted policy rules for energy efficiency and defined the utilities' "performance earning basis."[4] Informed by these fundamental

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[2] "Energy Action Plan 1," California Energy Commission, California Public Utilities Commission and California Consumer Power and Conservation Financing Authority. May 8, 2003. Available at: http://docs.cpuc.ca.gov/word_pdfREPORT/28715.pdf.

[3] In this Decision, "utilities" and "IOUs" refer to Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas & Electric Company (SDG&E), and Southern California Gas Company (SoCalGas).

[4] Energy Efficiency Policy Manual, Version 3.

EM&V components and plans, the IOUs designed their 2006-2008 energy efficiency portfolios. The portfolios, subsequently approved in D.05-09-043, were largely made up of up-stream lighting programs, that primarily focused on the Compact Fluorescent Lighting (CFL) markets.

In 2007 the Commission issued D.07-09-043, laying the groundwork for a Risk/Reward Incentive Mechanism (RRIM) which allows utility shareholders to profit by achieving defined energy savings targets and sets up penalties for significant underperformance. Determination of utility earnings or penalties through the RRIM was to rest on evaluations of program performance. The need to inform these determinations added new and greater emphasis on the transparency, accuracy, and reliability of EM&V results. Since its inception, the mechanics of the RRIM, as well as the defined targets (goals), have been highly contentious. Parties continue to disagree over whether the RRIM provides effective incentives to foster improvements in energy efficiency program design or performance.

In 2008 two significant developments reshaped California's energy efficiency landscape and added new objectives to those identified in the EAP. First, pursuant to Assembly Bill (AB) 32 (California's Global Warming Solutions Act), the California Air Resources Board (CARB) expects to achieve up to 15% of the mandated reductions in Greenhouse Gas (GHG) emissions through energy efficiency. Thus, with the passage of AB 32, energy efficiency became not only the state's energy resource of choice, but also a primary factor in achieving California's GHG reduction targets.

The second development, inspired in part by AB 32, was the development of the California Long Term Energy Efficiency Strategic Plan (Strategic Plan).[5] The Strategic Plan envisions an energy efficient future for each customer segment and identifies market transformation strategies to help transform utility energy efficiency programs. The Strategic Plan also directs IOU energy efficiency programs to transition away from measures which provide short-term energy savings (i.e., CFLs) in favor of more comprehensive, long-term savings.

In D.08-07-047 the Commission updated its energy efficiency goals. Prior to D.08-07-047 energy efficiency goals were limited to energy savings achieved by IOU programs. This had the unintended outcome of creating disincentives for cooperative programs.[6] D.08-07-047 replaced the earlier, narrower, definition of goals with "Total Market Gross" goals. Total Market Gross goals reflect the Commission's expectation that utility programs should complement and enhance state building standards, expected federal appliance standards, Big Bold Energy Efficiency Strategies, and AB 1109.[7]

In 2009 the Strategic Plan's emphasis on market transformation and long-term savings began to be incorporated into the IOUs' programmatic energy efficiency activities. D.09-09-047 approved the IOUs' 2010-2012 portfolios and began implementing energy efficiency programs designed to achieve the

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[5] www.californiaenergyefficiency.com.

[6] D.04-09-060, Table 1A-1E.

[7] AB 1109, the California Lighting Efficiency and Toxics Reduction Act, requires reductions in energy usage for lighting and encourages the use of more efficient lighting technologies. (http://www.leginfo.ca.gov/pub/07-08/bill/asm/ab_1101-1150/ab_1109_bill_20071012_chaptered.pdf)

objectives of AB 32 and the Strategic Plan. In D.10-04-029 the Commission authorized a Joint Energy Division/IOU EM&V plan to evaluate the 2010-2012 programs. The evaluation of the 2010-2012 programs will help bridge the gap between the past and future of energy efficiency. Evaluations will measure savings from behavior-based programs, progress toward the market transformation objectives outlined in the Strategic Plan, and quantify the demand side energy resources created as a result of portfolio investments.

California is now being served by a multitude of energy efficiency programs. In addition to the Commission's energy efficiency programs, energy efficiency services are being provided through the American Recovery and Reinvestment Act (ARRA), local governments and private entities, and building and appliance standards. Each of these services is provided by an independent administrator with its own funding mechanism, program structure, and performance metric. This presents new challenges for EM&V.[8] Among other things, determinations of program impact and cost-effectiveness will have to meld multiple expenditure streams. The success of these programs will depend on our ability to integrate efforts and leverage resources just as disputes over who gets to claim energy efficiency savings (attribution) will inhibit success. This raises new challenges for how we go about assessing the effectiveness and merits of ratepayer expenditures to support utility energy efficiency programs.

In short, the policy framework underlying energy efficiency has undergone significant transformation since its conception more than five years

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[8] "Lessons Learned and Next Steps in Energy Efficiency Measurement and Attribution: Energy Savings, Net to Gross, Non-energy Benefits, and Persistence of Energy Efficiency Behavior." Skumatz, Lisa, Ph.D. and Skumatz Economic Research Associates (SERA). November 2009.

ago. Energy efficiency faces new priorities and challenges in an evolving market. The time is ripe to take stock of the current framework to ensure that it meets California's needs going forward.

2.2. The EM&V Methodological Framework

Two documents contain the Commission's methods and best practices to date: the California Evaluation Framework (Evaluation Framework)[9] and the California Energy Efficiency Protocols (Protocols).[10] The Evaluation Framework was developed though the collaborative work of the IOUs, Energy Division and TecMarket Works, a team of professional evaluators~~. It~~ offered recommendations for consistent methods and best practices for a wide range of evaluation questions~~. It~~ outlined options for a cyclical approach to planning and conducting evaluations of energy efficiency programs. The Protocols were initially adopted by Administrative Law Judge (ALJ) ruling in April of 2006 as a follow up to the Evaluation Framework and were offered as a more prescriptive guide for conducting evaluation and allocating resources. Minor updates were adopted by ruling in January 2007.[11] The Protocols were developed by TecMarket Works specifically to guide evaluation of the 2006-2008 IOU energy efficiency program cycles. The Protocols specify in detail acceptable approaches and procedures for the evaluation of IOU energy efficiency portfolios. The content of these documents has remained largely unchanged since 2006.

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[9] ftp://ftp.cpuc.ca.gov/Egy_Efficiency/CaliforniaEvaluationFrameworkSept2004.doc.

[10] ftp://ftp.cpuc.ca.gov/puc/energy/electric/energy+efficiency/em+and+v/EvaluatorsProtocols_Final_AdoptedviaRuling_06-19-2006.doc.

[11] http://docs.cpuc.ca.gov/efile/RULINGS/63294.pdf.

2.3. The 2006-2008 Energy Efficiency Evaluation Report

On July 8, 2010, Energy Division issued a Energy Efficiency Evaluation Report for program years 2006-2008 (06-08 Evaluation Report).[12] In the 06-08 Evaluation Report the previously discussed policy and methodological frameworks are combined to measure and verify energy savings, test the cost-effectiveness of IOU portfolios, and evaluate whether energy savings program goals were achieved. The completion of this energy efficiency EM&V effort is a remarkable accomplishment as it is the largest energy efficiency EM&V effort ever undertaken.

The 06-08 Evaluation Report finds that between 2006 and 2008, IOU programs saved 4,093 gigawatt-hours and 44 million therms, and reduced peak electric load by 779 megawatts. The number of tons of carbon dioxide reduced, 2.6 million, is also significant. Overall, the 2006-2008 portfolios were found to be cost-effective. The 06-08 Evaluation Report also includes recommendations for improving future EM&V. One recommendation speaks to changes that have occurred in California's energy efficiency policy framework and implications for future EM&V:

> The Commission should consider evaluation priorities for future program cycles that recognize expanded program and policy objectives for energy efficiency. The evaluation framework for 2006-2008 may not address the multiple and diverse evaluation needs for meeting AB32, the California

[12] http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/EM+and+V/2006-2008+Energy+Efficiency+Evaluation+Report.htm.

Strategic Plan for Energy Efficiency, and Long-Term Procurement Plan objectives.[13]

This recommendation is being implemented through D.10-04-029 and the execution of EM&V for the 2010-2012 program cycle and will continue through the 2013-2015 cycle. The challenges and opportunities posed by this recommendation are central to the EM&V review addressed in this decision.

2.4. EM&V Review Procedural Background

D.09-09-047 identified the need for a comprehensive review of the Commission's existing energy efficiency EM&V practices. The Commission explained that the purpose of the review was to "set a course to develop effective EM&V going forward, post-2012."[14] On November 20, 2009 the Commission approved an Order Initiating Rulemaking (OIR), that initiated Rulemaking (R.) 09-11-014. The OIR included within the rulemaking a "review and streamlining of our EM&V protocols and processes."[15] On March 18, 2010 the Commission held a Pre-Hearing Conference (PHC) to begin considering several issues within R.09-11-014, including the comprehensive EM&V review ordered by D.09-09-047. The Division of Ratepayer Advocates (DRA), Marin Energy Authority (MEA), PG&E, SCE, SoCalGas and SDG&E (Joint Parties), The Utility Reform Network (TURN), and Women's Energy Matters (WEM) filed PHC Statements. The same parties, as well as the City and County of San Francisco (CCSF) and Natural Resources Defense Council (NRDC), filed Reply PHC Statements.

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[13] 06-08 Evaluation Report at 125.

[14] D.09-09-047, at 302.

[15] Order Initiating Rulemaking, November 20, 2009, at 3.

On May 21, 2010 the Assigned Commissioner issued a Ruling and Scoping Memo (May 21st ACR) that continued our EM&V review. The ruling provided background on the Commission's existing EM&V methodological and policy framework, described in detail the impetus for the review, outlined the process by which the review would be conducted, identified the issues within scope, and called for party input.[16] Through comments and reply comments, input was received from CCSF, DRA, PG&E, SCE, Joint Parties, TURN, WEM, and OPOWER.[17] A second ACR seeking additional party input was issued on July 2, 2010 (July 2nd ACR). In addition to the parties above, the CEC and Efficiency 2.0 filed comments and reply comments responding to the July 2nd ACR.

The May 21st ACR and July 2nd ACR sought party input on six key questions, which can be paraphrased as follows:

a. Should the Commission's EM&V objectives, as defined in D.09-09-047 be amended and if so, how?
b. Should the Commission's established EM&V Protocols and Evaluation Framework be amended or expanded and, if so, how?[18]
c. What are the merits of and challenges associated with:
    i. Macro Consumption Metrics,[19]

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[16] Assigned Commissioner's Ruling and Scoping Memo, Phase I. May 21, 2010.

[17] Comments and Reply Comments were filed on June 4 and 18, 2010, respectively.

[18] See California Energy Efficiency Evaluation Protocols (ftp://ftp.cpuc.ca.gov/puc/energy/electric/energy+efficiency/em+and+v/Evaluators Protocols_Final_AdoptedviaRuling_06-19-2006.doc) and The California Energy Efficiency Evaluation Framework (ftp://ftp.cpuc.ca.gov/Egy_Efficiency/CaliforniaEvaluationFrameworkSept2004.doc).

ii. Experimental Design,[20] and

iii. Market Transformation Metrics?[21]

d. What should California learn from other regions and states, including successful models for collaborative forums, to enable more effective EM&V?

e. What technological innovations may be brought to bear to support more effective EM&V?

f. How can the Commission's EM&V efforts better support related needs of other state agencies, including the California Air Resources Board (CARB) and the CEC, as well as Publicly Owned Utilities (POUs)?

3. Party Positions

3.1. General Areas of Agreement

Three themes emerge from party comments. First, while suggestions about how to improve the Commission's energy efficiency EM&V vary substantially, parties agree the status quo will not be sufficient to effectively

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[19] Macro Consumption Metrics are tools of evaluation that use econometric models to assess the aggregate impact of energy efficiency policy on energy consumption. These metrics are distinguished from other methods of impact evaluation because they do not rely on the sum of a series of more granular studies.

[20] Experimental Design is a research method used to determine net energy savings by comparing the energy consumption of treatment and non-treatment (control) groups.

[21] D.09-09-047 defines Market Transformation as "long-lasting, sustainable changes in the structure or functioning of a market achieved by reducing barriers to the adoption of energy efficiency measures to the point where continuation of the same publicly-funded intervention is no longer appropriate in that specific market. Market transformation includes promoting one set of efficient technologies, processes or building design approaches until they are adopted into codes and standards (or otherwise substantially adopted by the market), while also moving forward to bring the next generation of even more efficient technologies, processes or design solutions to the market." Market Transformation Metrics are measures of the change in the structure or functioning of a market for energy efficiency products or services caused by a specific market intervention.

evaluate future energy efficiency programs in California's dynamic and evolving energy efficiency market. Parties support the Commission's efforts to take stock of its current approach to EM&V and ensure that it meets California's needs going forward. In expressing its support for this EM&V review, NRDC reminds us "effective and coordinated evaluation methodology is critical to meet California's energy and climate objectives."[22] DRA describes the goals of the EM&V review as "laudable," a characterization with which PG&E "whole-heartedly" agrees.[23] In short, key stakeholders with widely varying perspectives agree that there is a need to identify the challenges facing energy efficiency EM&V and address them head on.

Second, parties agree that preparing the Commission's energy efficiency EM&V for post-2012 programs requires a dedicated effort supported by independent facilitators and technical expertise. In response to the May 21st ACR, SCE states:

> [t]he frameworks used in other cited regions were developed by thoughtful, collaborative processes to fit the unique circumstances of those regions and were developed over a significant period of time. It is time for California and the parties in this proceeding to do the same.[24]

Similarly DRA urges the Commission to explore EM&V challenges "through a transparent stakeholder process, including workshops, that allows

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[22] NRDC Opening Comments, June 4, 2010, at 2.

[23] DRA Opening Comments, June 4, 2010, at 2; PG&E Opening Comments, June 4, 2010, at 1.

[24] SCE Opening Comments, June 3, 2010, at 2.

discussion of issues and potential program models."[25] NRDC suggests an "informal collaborative format" with "clear objectives, a clear process for meetings and follow-up to action items, and committed participation from energy agency representatives, utilities (ideally including representatives from the publicly-owned utilities), and energy and evaluation experts (both from California and beyond)."[26] Alternatively, Joint Parties suggest the formation of a specific committee tasked with advising the Commission on EM&V and propose that participation be exclusive.[27] Numerous parties call for the Commission to direct our Energy Division to bring expert consultants on board to support its consideration of the identified EM&V challenges. While parties offer different perspectives on format and who should be included in the process, there is general agreement that the Commission should facilitate and provide resources to support further exploration of the existing EM&V system, the challenges facing that system, and potential solutions.

Third, parties agree that applying new EM&V metrics, including Macro Consumption Metrics and Market Transformation Metrics, as well as expanding the use of Experimental Design, may help the Commission better assess progress in achieving the carbon emission reductions required by AB 32 and the Strategic Plan. However, nearly all parties recommend the Commission proceed cautiously in applying these metrics, and in some cases, test them before they are used to assess post-2012 energy efficiency programs. In particular, parties recommend: 1) that post-2012 EM&V plans be informed by the results of the

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[25] DRA Opening Comments, June 4, 2010, at 2.

[26] NRDC Opening Comments, July 16, 2010, at 5-6.

[27] Joint Parties Opening Comments, July 16, 2010, at 3.

"total energy consumption pilot study" from the Joint Energy Division/IOU EM&V Plan for 2010-2012;[28] 2) further consideration of the Northwest Energy Efficiency Alliance's (NEEA) Market Transformation Metrics;[29] and 3) additional study of the scalability of Experimental Design to new programmatic initiatives.[30]

3.2. Specific Party Positions

In addition to the general areas of agreement described above, parties provided the following positions on specific questions.

3.2.1. Should the Commission's EM&V Objectives be Amended and, If So, How?

With one exception, parties find the EM&V objectives adopted by D.09-09-047 to be well suited to guide future EM&V efforts. The exception debated by parties was how the Commission's Market Assessment objective could be better aligned with the objectives of the Strategic Plan. In particular, several parties suggest the Market Assessment objective be modified to include an explicit reference to the Strategic Plan's goal of market transformation.[31] The Market Assessment objective adopted by D.09-09-047 provides that:

> In a constantly evolving environment, market assessments are an essential EM&V product needed to

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[28] See TURN, Opening Comments, June 4, 2010, at 5; NRDC Reply Comments, June 18, 2010, at 3. The Total Energy Consumption Pilot Study (D.10-04-029, Attachment 1, at 29) will assess the reduction in energy consumption resulting from the various energy efficiency programs and efforts in California.

[29] DRA Comments June 4 and July 16, 2010.

[30] OPOWER Opening Comments, June 4, 2010; Efficiency 2.0 Opening Comments July 16, 2010.

[31] See DRA June 4, 2010 Comments, at 5; SCE June 4, 2010 Comments, at 5; TURN June 4, 2010 Comments, at 2; and NRDC June 4, 2010 Comments, at 3.

> set the baseline for strategic design and improvement of programs and portfolios. Saturation studies, surveys of emerging technologies and other such analyses which inform estimates of remaining program potential and forward-looking goal-setting are key aspects of market assessment.[32]

In comments filed July 16, 2010 DRA suggests the following sentence be added to the Commission's adopted Market Assessment objective:

> The goal of market assessment in the EE [energy efficiency] portfolio planning process is to identify a common set of market transformation criteria/definitions based on PUC [Commission] assigned market indicators, which will allow the PUC to determine when programs no longer need subsidies.[33]

For the most part, TURN agrees with DRA's suggestion.[34]

SCE, PG&E, Joint Parties, and NRDC do not support the suggestions made by DRA and TURN. In particular, SCE contends that "[w]hile the Division of Ratepayer Advocates (DRA) proposal cited above is far too narrow, it does identify part of a broad set of issues not clearly addressed by the description of Market Assessment in D.09-09-047." To broaden the definition SCE suggests the Commission expand the objective to include the following underlined text:

> The goal of market assessment in the EE portfolio planning process is to identify a common set of market transformation criteria/definitions based on PUC assigned market indicators, which will allow PUC to determine when programs no longer need subsidies. Additional key aspects include: identifying and

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[32] D.09-09-047 at 297.

[33] DRA, July 16, 2010 Comments, at 3.

[34] TURN July 16, 2010 Opening Comments at 2.

> tracking appropriate metrics of market change, progress toward market transformation, and potential achievement of market transformation, particularly including tracking progress towards meeting the goals of the California Long-Term EE Strategic Plan; and guiding updates to the Strategic Plan by providing new information about what market changes are feasible and cost-effective.[35]

PG&E and Joint Parties generally support SCE's proposal.

3.2.2. Should the Commission's Established EM&V Protocols and Framework be Amended or Expanded and, If So, How?

The May 21st ACR asked if the Commission's adopted EM&V Protocols and Framework are capable of, and the best tools for, measuring program impacts in what will be an increasingly dynamic energy efficiency environment. Parties' responses to this question varied significantly. PG&E asserts that the "new landscape of energy efficiency" will require new protocols. SCE suggests improvements to the Protocols and Evaluation Framework should not be a priority for the Commission at this time.[36] Joint Parties find the existing protocols provide "optimum flexibility" for EM&V studies.[37] NRDC suggests new protocols are needed to improve savings attribution and market transformation.[38] DRA argues that new protocols are needed to measure market effects and transformation.[39] OPOWER advocates for increased application of

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[35] SCE Opening Comments, July 16, 2010 at 5.

[36] SCE Opening Comments, June 4, 2010 at 4.

[37] Joint Party Opening Comments, June 4, 2010 at 2.

[38] NRDC Reply Comments, June 18, 2010 at 2.

[39] DRA Opening Comments, June 4, 2010 at 6.

experimental design, a methodology that "uses regression analysis to determine the net energy savings resulting from its products as measured by the average difference in energy consumption between the treatment and control groups."[40] Efficiency 2.0 offers specific suggestions which would expand the Protocols to include further guidance on how to establish an acceptable control group for use in experimental and quasi-experimental design.[41]

3.2.3. What Are the Merits of and Challenges Facing Use of the Following EM&V Metrics?

3.2.3.1. Macro Consumption Metrics Which Assess the Aggregate Impact of Energy Efficiency Programs on Energy Consumption

In general, parties support the concept of Macro Consumption Metrics. In this proceeding parties reviewed a specific Macro Consumption Metric, an approach which relies on longitudinal or panel statistical analyses of entire populations or subpopulations of energy consumers to determine macro-level, aggregate impacts of energy efficiency programs.[42] TURN finds the development and application of such metrics to be an imperative step in improving the Commission's accounting of GHG reductions caused by energy efficiency programs.[43] DRA and PG&E agree.[44] PG&E also suggests effective,

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[40] OPOWER Opening Comments, June 4, 2010 at 2.

[41] Efficiency 2.0 Opening Comments, July 16, 2010 at 5.

[42] "Measuring the savings from energy efficiency policies: a step beyond program evaluation." Horowitz, M.J. April 2010. (http://www.springerlink.com/content/120908/?Content+Status=Accepted).

[43] TURN Opening, Comments, June 4, 2010 at 7.

[44] PG&E Opening Comments, July 16, 2010 at 4.; DRA Opening Comments, July 16, 2010 at 4.

accurate Macro Consumption Metrics may eliminate the need for controversial Net-to-Gross ratios.[45]

Just as parties share this support for Macro Consumption Metrics, they express a need for caution in the selection and application of new techniques. PG&E asserts that "the inherent limitation of such a metric is that factors outside of the energy efficiency arena could skew the perceived effect of the energy efficiency programs themselves."[46] Other parties agree that it will be difficult to control for factors beyond energy efficiency policy when assessing the impact of energy efficiency programs on energy consumption.

In light of these reservations, Joint Parties suggest a "trial run" on a pilot basis[47] and NRDC "supports and encourages exploration of aggregate-level energy metrics to supplement, but not replace the current energy and demand saving metrics."[48] As noted above, parties join in suggesting that post-2012 program EM&V plans be informed by the results of the "total energy consumption pilot study" from the Joint Energy Division/IOU EM&V Plan for 2010-2012. The CEC recommends the development of such metrics be a joint effort between the CEC and the Commission.[49]

3.2.3.2. Experimental Design

In its opening comments, OPOWER advocates for increased application of Experimental Design. Experimental Design is a research method

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[45] PG&E Opening Comment, June 4, 2010 at 12.

[46] PG&E Opening Comment, June 4, 2010 at 12.

[47] Joint Party Comments, July 16, 2010 at 2.

[48] NRDC Opening Comments, June 4, 2010 at 2.

[49] Letter to Commissioner Dian Grueneich, July 16, 2010.

used to determine net energy savings by comparing the energy consumption of treatment and non-treatment (control) groups. An effectively designed control group shows the researcher what untreated members of the research population would do on their own accord. The study can then observe the differences between the control group and the treatment group and deduce that actions taken by members of the treatment group, but not by members of the control group, were a result of the treatment. For example, if a member of a properly designed control group buys the same efficiency service as a member of the treatment group, the study can conclude that at least some of the energy savings resulting from that treatment are not attributable to the treatment.

OPOWER asserts that Experimental Design may reduce controversy in energy efficiency program evaluation by controlling for free ridership.[50] OPOWER acknowledges that Experimental Design cannot be used for every energy efficiency initiative, but argues that it should be used when practical.[51] The feasibility of Experimental Design was explored in the July 2nd ACR which asked parties to comment on the scalability of Experimental Design to determine whether it may be an effective tool in evaluating statewide energy efficiency programs and initiatives. Responses from SCE, PG&E, and Joint Parties expressed doubt that Experimental Design could be effectively used to evaluate statewide energy efficiency programs. In their July 16, 2010 comments, the Joint Parties summarize their concerns as follows:

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[50] As used here free ridership refers to energy savings claimed by program administrators based on evaluations that suggest those savings would have occurred regardless of the administrator's actions.

[51] OPOWER Comments, June 4, 2010 at 2.

> Experiments that have well-defined treatment and control groups are often the preferred scientific method. However, there are many other considerations (cost, difficulty of defining treatment and control groups, contamination by previous or contemporaneous treatments, etc.) that make experiments difficult or impossible to use effectively in many cases. Finding exact control groups is often impossible for many large programs.

PG&E suggests that these difficulties have given rise to the alternative evaluation approaches more frequently applied to energy efficiency programs in California.[52]

Efficiency 2.0 filed comments supporting further application of Experimental Design and quasi-Experimental Design. In order to expand the use of Experimental Design, Efficiency 2.0 suggests the Commission adopt standardized approaches to identify appropriate control groups for customers who opt into energy efficiency program and proposes several approaches that could be applied.[53] TURN supports expanded use of Experimental Design and suggests that Experimental Design be applied to the Whole House Retrofit Program approved in D.09-09-047.[54] NRDC agrees that Experimental Design could be more effectively applied to California energy efficiency programs, but calls for "expertise from evaluation contractors to determine whether and how to update the EM&V protocols as needed."[55]

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[52] PG&E Opening Comments, July 16, 2010 at 9.

[53] Efficiency 2.0 Opening Comments, July 16, 2010 at 3.

[54] TURN Opening Comments, July 16, 2010 at 7.

[55] NRDC Opening Comments, July 16, 2010 at 6.

3.2.3.3. Market Transformation Metrics

In its opening comments DRA suggests that the market transformation protocols employed by the NEEA may be used by California to measure its progress in achieving the goals of the Strategic Plan.[56] NEEA is a non-profit organization funded by Northwest utilities, the Bonneville Power Administration and the Energy Trust of Oregon. NEEA works to accelerate the market adoption of energy-efficient products, technologies and practices within homes, business and industry. NEEA relies on a suite of Market Transformation Metrics to measure its success in accelerating energy efficiency markets, including, for example, market share, consumer satisfaction, and retail "shelf space" of efficient products.[57] The July 2nd ACR asked parties to identify best practices from NEEA and discuss the merits and challenges of applying those metrics in California. Responses were generally positive, but reserved. PG&E's response reflects sentiments expressed by several parties, including CCSF, NRDC, and SCE:

> DRA's presentation regarding NEEA's metrics raises some interesting questions, but provides no definitive answers regarding the determination that a market is transformed, how to determine whether additional market intervention is required, or how the NEEA metrics fit within California's regulatory scheme. These concepts may be worthy of further discussion with evaluation experts and NEEA representatives in a workshop setting.[58]

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[56] DRA Opening Comments, June 4, 2010 at 7.

[57] NEEA's suite of evaluation metrics are more completely demonstrated at http://www.nwalliance.org/research/evaluationreports.aspx.

[58] PG&E Reply Comments, July 23, 2010 at 8.

TURN believes it is reasonable to adopt NEEA Market Transformation Metrics.[59]

3.2.4. What Can California Learn From Other Regions and States Regarding Successful Models for Collaborative Forums to Enable More Effective EM&V?

The May 21st ACR asked parties to look beyond the borders of California to consider how California's application of EM&V could be more collaborative. Parties generally supported the idea of drawing new, best practices in EM&V from other regions. The comments showed support for establishing a California EM&V forum through which stakeholders could work collaboratively to improve energy efficiency EM&V on an ongoing basis. Parties identified collaborative efforts in New York, the Northwest, and the Northeast.

The July 2nd ACR asked parties to detail their suggestions regarding an EM&V working group. In particular, what responsibilities would be delegated to the group, who would lead the effort, what relationship the forum would have with the Commission, and how would the Commission consider the group's output was explored. As described above, parties offer varying perspectives on how such a working group should be structured, who should be included, and what responsibilities it should be given. Despite these differences, there is general agreement that the Commission should facilitate and staff a process for the on-going improvement of the Commission's existing EM&V rules and processes.

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[59] TURN Opening Comments, July 16, 2010 at 8.

3.2.5. What Technological Innovations May Be Brought to Support More Effective EM&V?

The May 21st ACR asked parties to consider how technological innovations, especially Advanced Metering Infrastructure (AMI), may be leveraged to advance California's EM&V methodologies. SCE asserts that "there are exciting new opportunities for more precision in studies with more detailed data available at far lower cost than before."[60] In its opening comments PG&E contends that AMI "…may reduce the need for onsite EM&V efforts…" and that as Home Area Network standards are developed and customers adopt such networks, on-site end-use measurements of efficient appliances will be enabled.[61] However, parties generally refrain from stating exactly how the increased availability of energy usage data may improve energy efficiency EM&V. Instead, parties recommend the Commission consult technical experts to address this question as it hones its approach to post-2012 EM&V.

3.2.6. How Can the Commission's EM&V Efforts Better Support the Related Needs of Other State Agencies, Including the CARB, the CEC, and POUs?

The May 21st ACR asked parties to consider the EM&V needs of the CEC, CARB, and POUs and suggest what changes should be made to the Commission's EM&V framework to accommodate those needs. Parties offered broad support for ensuring the Commission's energy efficiency EM&V meets the needs of these stakeholders.

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[60] SCE Opening Comments, June 4, 2010 at 9.

[61] PG&E Opening Comments, June 4 2010 at 17.

In a July 16, 2010 letter to the Assigned Commissioner, the CEC made the following suggestions:

- The Commission should coordinate with the CEC to develop aggregate macro-consumption metrics.
- EM&V activities should be broadened to encompass Total Market Gross mechanisms and metrics.
- Existing saturation survey activities should be substantially enhanced and should serve as a keystone for assessing Total Market Gross impacts and factors affecting energy demand in general.
- An EM&V study should be conducted to construct a longitudinal record of historical energy efficiency accomplishments and to facilitate such tracking in the future.
- The Commission should devote EM&V resources to studying the implications of cumulative savings metrics.
- EM&V resources should be made available for IOUs to employ in improving their efforts to quantify integrated demand-side resource impacts, including energy efficiency, in demand forecasts.

To facilitate these suggestions, the CEC also "urges continued cooperation and increased collaboration between the two Commissions directly on matters related to forecasting and demand side resources."[62] The CEC's suggestions are generally supported by parties.

[62] July 16 Letter, at 8.

4. Discussion

4.1. Overview

As stated in the May 21st ACR, the Commission's objective for this EM&V review is to prepare for the 2013-2015 energy efficiency program cycle by updating our energy efficiency EM&V and ensuring effective EM&V of resource objectives and progress in achieving the goals of the Strategic Plan. When this objective is achieved, the Commission's energy efficiency EM&V will provide a better value to ratepayers, produce results in a more timely fashion, and achieve broad consensus on methodologies and results among the stakeholders.

As described in detail above, the energy efficiency landscape has changed drastically since the original 2005 EM&V decision. The Commission's current approach to energy efficiency EM&V was developed over five years ago with little experience in conducting a complex EM&V program. The Commission has since implemented this approach for the 2006-2008 program cycles and in the process gained considerable knowledge of the costs and benefits of our approach.

Our current EM&V policy and methodological framework should be updated to reflect both the lessons learned from the 2006-2008 cycle and evolution in the regulatory and market landscapes. To that end, we here establish the Commission's energy efficiency EM&V objectives for post-2012 programs, identify challenges that must be addressed before those programs begin, and launch a series of workshops designed to address those challenges collaboratively and transparently.

4.2. EM&V Objectives

D.09-09-047 adopted several objectives to guide the EM&V of the Commission's 2010-2012 energy efficiency programs. In this proceeding we consider whether and how those adopted objectives should be clarified and

amended to guide the EM&V of post-2012 programs. Parties suggest an expansion of the adopted Market Assessment objective.[63] In response to party input we adopt the following changes (underlined below) to that objective:

> In a constantly evolving environment, market assessments are an essential EM&V product needed to set the baseline for strategic design and improvement of programs and portfolios, to identify and track appropriate metrics of market change, and to measure progress toward achieving the goals of the California Long-Term Energy Efficiency Strategic Plan. Saturation studies, surveys of emerging technologies, market transformation metrics, and other such analyses which inform estimates of remaining program potential, forward-looking goal-setting, and program planning are key aspects of market assessment. (Underlined text are additions to original objective adopted in D.09-09-047.)

This amendment to the Market Assessment objective balances party suggestions and recognizes the key role Market Assessments play in measuring the progress of programs toward the Strategic Plan objectives.

In addition to the revised Market Assessment objective adopted here, Appendix A to this decision clarifies and affirms the EM&V objectives adopted in D.09-09-047.

4.3. Identifying Challenges Facing Future EM&V

4.3.1. Matching EM&V to New, Diverse, and Dynamic Objectives

A central challenge facing EM&V is to match the Commission's energy efficiency objectives and goals regarding ratepayer-supported efficiency initiatives with appropriate metrics and methods of evaluation. As described

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[63] *See* DRA Comments, at 5; SCE Comments, at 5; and TURN Comments, at 2.

more completely in the Background section of this decision, the Commission's energy efficiency programs are expected to serve new, diverse, and dynamic objectives. The EM&V applied to the IOU 2006-2008 programs focused on measuring energy savings for the purpose of offsetting or deferring the need for new resource procurement. Today's energy efficiency objectives still include measuring energy savings, however, post-2012 portfolios must be assessed relative to additional factors, including a) Total Market Gross goals instead of simply "net" or "gross" energy savings, b) GHG reductions consistent with AB 32, c) Market Transformation objectives set forth in the Strategic Plan and any successor updates, and d) possible additional considerations such as target reductions in total energy consumption.

While we recognize and applaud the progress towards these goals that has already been made in evaluating and measuring the achievements of the 2010-12 portfolios, additional changes are needed to fully accommodate the new and wider-ranging objectives. The workshop series initiated by this decision and described below, will match the Commission's energy efficiency objectives with appropriate metrics and methods of evaluation.

4.3.2. Attributing Energy Savings to Specific Interventions

As PG&E observes:

> California's [energy efficiency] efforts are reinforced by many other influences . . . Together, these influences have led to a worldwide contextual change in how major businesses position themselves in markets and customers focus on energy efficiency…The California Evaluation Protocols and Framework cannot ignore these market dynamics and societal context. The current protocols and framework were developed for application to a simpler societal context where

> attribution to specific interventions was easier to evaluate.[64]

We agree with PG&E's assertion that attributing energy savings to specific interventions has grown increasingly difficult. Nevertheless, existing Commission policies require that our EM&V program attribute savings as effectively as possible. For example, satisfying the data needs of the Commission's current energy efficiency portfolio cost-effectiveness tests and RRIM require the most accurate attribution we can reasonably achieve. This decision focuses on meeting that need.

Going forward the Commission must further balance the benefits of and need for more accurate attribution with the need for timely and cost-effective EM&V results. Our current approach measures and verifies energy savings down to the kilowatt-hour. It is reasonable to question the benefits and costs of achieving this level of precision. Furthermore, our current approach of relying on impact evaluations to determine precise savings, measured against discretely defined numerical goals, does not acknowledge uncertainty in the accuracy of EM&V results~~; there are no plus or minus bands or confidence intervals to guide the interpretation of our precise measurements~~. In the uncertain science of measuring energy use that did not occur due to a certain intervention, it may be necessary to reform cost~~-~~-effectiveness tests and the RRIM to acknowledge that results may be fairly accurate, but not exact. Going forward energy efficiency policies must rely on realistic expectations of what EM&V can achieve in terms of attribution and appropriately tailor defined objectives to balance cost, benefits, and uncertainty of results.

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[64] PG&E Opening Comments, June 4, 2010 at 8.

4.3.3. Leveraging the Value of AMI to Improve EM&V

The quality of the measurement and verification of savings is only as good as the data they are based upon. A near cottage industry exists in California of professionals who support our data hungry EM&V efforts. The roll-out of advanced meters across the IOU service territories is scheduled to be completed within the 2010-2012 program cycle. Data collected by utilities via this advanced infrastructure investment could supplant data currently collected "by hand."

Support among parties for use of AMI to improve EM&V processes is clear even if the detail is lacking as to exactly how to best use the data. Later, we discuss a process to illuminate what EM&V methods could best make use of improved data access to better support the EM&V objectives.

4.3.4. Alignment of EM&V with Load Forecasts to More Effectively Offset Procurement Needs

In D.07-12-052 we recognized the importance of the CEC's demand forecasts and Integrated Energy Policy Report (IEPR) process for purposes of long-term procurement.[65] It is important that IOUs are able to contribute meaningfully to our efforts to quantify and incorporate energy efficiency impacts (both historical and projected) into demand forecasts prepared as part of the biennial IEPR process. For example, as the cumulative impacts of actual programmatic activities increase, the issues of measure decay and replacement grow larger. Although we have adopted limits on the program years that goals cover, and deemed 50% of measure decay as replaced for purposes of compliance with our goals,[66] the resource planning perspective that the IEPR uses for

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[65] D.07-12-052, December 20, 2007. http://162.15.7.24/PUBLISHED/FINAL_DECISION/76979.htm.

[66] D.09-09-047, at 38-39.

demand forecasts must grapple with capturing the realities of decay and replacement for all years. In the OIR initiating R.08-02-074 we emphasized the need to "develop standardized resource planning practices, assumptions and techniques, based on an integrated resource planning framework." [67] EM&V activities that enable the Commission and the IOUs to improve their assessment of energy efficiency impacts for use in demand forecasting (and ultimately procurement) should be undertaken by the Commission. This decision acknowledges the importance of EM&V and related activities that accurately reflect impacts on demand, ensure that efficiency will displace conventional generation, and will be used as the first resource in California's "loading order."

4.4. The EM&V Workshop Series and 2013-2015 Energy Efficiency EM&V Plan

Several parties to this proceeding submit that effectively preparing the Commission's energy efficiency EM&V for post-2012 energy efficiency programs requires a dedicated effort supported by independent facilitators and technical expertise. We agree with these suggestions and direct the Commission's Policy and Planning Division (PPD) to facilitate a workshop series that will address the issues articulated above.

In addition, this decision directs the Energy Division, working with PPD to prepare the 2013-2015 Energy Efficiency EM&V Plan. The EM&V workshop series should be the vehicle through which stakeholders collaboratively prepare the 2013-2015 Energy Efficiency EM&V Plan. The 2013-2015 Energy Efficiency EM&V Plan should explain in detail how each of the

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[67] OIR initiating R.08-02-007, February 14, 2008. http://docs.cpuc.ca.gov/proceedings/R0802007.htm.

programs for which administrators seek ratepayer funding will be evaluated, measured, and verified~~, and identify areas of disagreement with the plan~~. Energy Division shall serve the 2013-2015 Energy Efficiency Plan at the same time IOUs file their 2013-2015 Portfolio Applications.

The remainder of this Decision describes in detail the objectives of the EM&V workshop series, and the Commission's expectations for the 2013-2015 Energy Efficiency EM&V Plan, and provides guidance on how the workshop series should be staffed and supported by technical experts.

4.4.1. Explore, Test, and Assess the Viability of Macro Consumption Metrics

The value of individual energy efficiency efforts is uncertain without a measure of performance of the whole system that links the energy efficiency efforts to the actual reduction in energy consumption. Macro Consumption Metrics may allow the Commission to accurately measure the impact of the Commission's energy efficiency efforts on overall energy consumption and provide a more direct account of aggregate reductions in GHG emissions. As an added benefit, because Macro Consumption Metrics rely on existing energy usage data and relatively simple statistical analysis, they can be developed quickly and at a reasonable cost to ratepayers. These metrics offer substantial benefits to the Commission's EM&V portfolio and can be delivered quickly at a reasonable cost. We therefore support the examination of Macro Consumption Metrics to assess the aggregate impact of the 2013-2015 energy efficiency programs on energy consumption.

In D.10-04-029 we authorized the 2010-2012 Joint Energy Division/IOU EM&V Plan. That plan includes a "total energy consumption

pilot" designed to "assess the reduction in energy consumption resulting from the various energy efficiency programs and efforts in California."[68] This pilot is a readily available vehicle through which the Energy Division can explore, test, and assess the viability of a Macro Consumption Metric.

We now expand on the direction provided in D.10-04-029 and direct the Energy Division to contract with one or more consultants to expedite the Total Energy Consumption Pilot. Key activities to be initiated as part of the near-term pilot (and, where successful, incorporated into any permanent EM&V activities) include compilation of a historical record of program impacts, exploration of methodologies for developing enhanced saturation studies that leverage advanced metering data with onsite information, and longitudinal analyses to study energy use and energy efficiency in buildings over time. The IOUs are ordered to cooperate fully with these activities and the development of this metric, including the timely provision of any energy usage data Energy Division deems necessary. The metric should be developed in coordination with CEC staff so as to maximize the potential benefits to the CEC's demand forecasting efforts and, if feasible, included in the 2013-2015 Energy Efficiency EM&V Plan.

4.4.2. Explore, Test, and Assess the Scalability of Experimental Design

Several parties to this proceeding support the increased use of Experimental Design to determine ex post energy savings resulting from energy efficiency programs. Experimental Design is a well documented quantitative research method which relies on the use of a control group to isolate the program

[68] D.10-04-029. Attachment 1: 2010-2012 Energy Division/IOU Joint EM&V Plan, at 30.

impacts from other factors which influence energy use. Applied effectively, Experimental Design offers substantial benefits to energy efficiency program EM&V. For example, the use of a control group avoids the need to estimate controversial net-to-gross effects such as free ridership. All actions taken by the treatment group can be compared to the control group, giving a clear picture of how the treatment impacted energy use.

SCE, PG&E, and the Joint Parties point out that Experimental Design has not been applied recently to energy efficiency programs. They note several challenges facing evaluators in effectively applying Experimental Design, including establishing an unbiased control group in a state where influences on energy use are multitudinous, the cost and time required to execute effective Experimental Design, and the risk of temporarily withholding service to control group participants. While the Commission recognizes these challenges, we believe the approach warrants further exploration. In the Strategic Plan and in D.09-09-047 we directed that subsequent energy efficiency programs will focus less on upstream, diffused subsidization of efficient product markets and more on targeted, comprehensive energy savings through treatments that transform the energy usage of an entire building. While identifying an unbiased control group for an upstream lighting program that treats a diffuse, anonymous population may, as the IOUs argue, be highly unlikely, doing the same for targeted whole house retrofit program is substantially more manageable. Given the previously identified advantages of Experimental Design, we commit to exploring its application in the 2013-2015 program cycle.

In D.10-04-029 we directed Energy Division to develop a protocol to measure and count savings from comparative usage programs using the Experimental Design methodologies found in the EM&V Protocols. That

directive is being implemented through the Joint Energy Division/IOU Evaluation Plan for 2010-2012, which includes a review of best practices in this area and the development of a protocol and method for application to behavior based programs.[69] We now direct the Energy Division to prioritize these activities such that the 2013-2015 Energy Efficiency EM&V Plan can benefit from the results. We further direct the Energy Division to assess how Experimental Design can be used for the EM&V of California's Whole House Retrofit Program, including the Prescriptive Whole House Program, as suggested by TURN.[70]

Energy Division shall provide stakeholders with regular updates on its review of Experimental Design best practices, its development of a protocol and method for application to behavior based programs, and its application of Experimental Design to the Whole House Retrofit Program. These updates should be delivered through the EM&V workshop series. Where practical, the 2013-2015 Energy Efficiency EM&V Plan should rely on Experimental Design to determine program ex post savings.

4.4.3. Explore, Test, and Assess the Application of Market Transformation Metrics

In D.09-09-047 we defined Market Transformation as:

> [L]ong-lasting, sustainable changes in the structure or functioning of a market achieved by reducing barriers to the adoption of energy efficiency measures to the point where continuation of the same publicly-funded intervention is no longer appropriate in that specific market. Market transformation includes promoting one set of efficient technologies, processes or building

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[69] Joint Energy Division/IOU Evaluation Plan for 2010-2012, at 14.

[70] TURN Opening Comments, July 16, 2010 at 7.

> design approaches until they are adopted into codes and standards (or otherwise substantially adopted by the market), while also moving forward to bring the next generation of even more efficient technologies, processes or design solutions to the market. (D.09-09-047 at 87.)

Market transformation is a fundamental objective of the Strategic Plan and effective measurement of our progress toward achieving this objective is essential.

NEEA has developed EM&V metrics designed to assess the impact of its energy efficiency market transformation strategies. DRA and TURN urge the Commission to use NEEA's metrics as a starting point for effectively measuring our own market transformation objectives.

In D.09-09-047 we directed IOUs to develop Program Performance Metrics (PPMs) to serve as objective, quantitative indicators of the progress of a program toward the Strategic Plan's short and long-term market transformation goals and objectives.[71] The development of those metrics is ongoing. On May 28, 2010 the IOUs submitted a joint advice letter proposing various PPMs. Those PPMs are currently under review by Commission staff. We expect that the Commission's review of the IOUs' proposal will result in the application of PPMs to 2010-2012 programs, as directed by D.09-09-047. We therefore decline to adopt NEEA's market transformation metrics at this time. Given the extensive effort that has been invested by IOUs and Commission staff to develop the PPMs, we are confident that process will result in metrics that can be efficiently

[71] D.09-09-047, at 89.

brought to bear to assess our progress toward the market transformation objectives detailed in the Strategic Plan.

However, we also recognize the merits of exploring alternatives and see benefit in directing PPD to include within the EM&V workshop series a review of NEEA's market transformation metrics for potential application to California's 2013-2015 program cycle as appropriate. Given that the record of this proceeding does not include an in depth analysis of specific metrics employed by NEEA, PPD should endeavor to include representatives of NEEA in the discussion. In particular, the workshop should seek to determine how NEEA's approach to measuring market transformation compares with the PPMs currently being reviewed by Energy Division. The EM&V Plan should address whether and how NEEA's experience can be leveraged to enhance our own PPMs.

4.4.4. Explore and Assess the Opportunities for the Use of Data Collected by AMI

Nearly all parties who commented on the question of what benefits AMI could bring to EM&V processes and practices described an opportunity for more precise and lower cost impact evaluation. Utilities are currently implementing the roll out of AMI across California and have already begun to collect more granular customer data. We understand that the data will improve even further as the network is completed. PG&E noted that as communications protocols are standardized for Home Area Networks the measurement and verification of savings could be isolated at the end user level whereas with smart meters alone, only the building's consumption data is currently available.

As with most technology-enabling infrastructure development, all the potential uses are not entirely clear at the outset. We discussed this characteristic of the AMI when we considered each utility's AMI Application.

(D.06-07-027, D.07-04-043, D.08-09-039, and D.10-04-027.) In these Applications a significant amount of the known and unknown benefits from AMI was expected to come from improved customer access to information. As was the case with customers, the benefits to our EM&V processes are both known and unknown and depend on access to information.

The workshop series shall explore the potential uses of the granular data collected by the unfolding AMI network for strengthening, simplifying, and reducing the cost to ratepayers of EM&V. We further direct that the best uses for AMI-collected data in EM&V be explored during the workshop series. Energy Division shall present the results of the AMI-EM&V focused workshop in a report to the Director of the Energy Division no later than 120 days after the date of the workshop and incorporate these results in the EM&V Plan. Working collaboratively with IOUs, the report should develop a cost-effective format for transmitting AMI-collected data to Energy Division and its consultants for use in EM&V for the 2010-2012 and future program cycles, and should provide recommendations on how access to AMI generated data can improve the EM&V processes currently used for EM&V in 2013 and beyond.

4.4.5. Expand EM&V Activities that Facilitate Load Forecasting and Understanding of Total Market Gross Load Impacts

Adoption of energy efficiency goals based on the Total Market Gross perspective[72] and mandating that they be used in resource procurement and planning activities[73] requires that EM&V activities expand to encompass a greater range of energy efficiency delivery mechanisms. The 2008 goal setting

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[72] D.08-07-047, Ordering Paragraph 1.

decision (D.08-07-047) effectively relies upon non-IOU program delivery mechanisms for the majority of the 2020 Total Market Gross impacts. Even if we wished to keep EM&V activities focused on IOU programs, it is not possible to understand or quantify the effects of IOU energy efficiency programs in a vacuum. The load impacts from IOU programs are better understood in the context of overall energy use, and other factors that affect demand including, among other things, societal trends, codes and standards, and energy prices. Undertaking research to enhance our understanding of these drivers of energy use will likely make a substantial contribution to our efforts to quantify load impacts from IOU programs.[74]

In addition, there are at least three ways in which load impact assessment might be expanded to address effects arising from sources other than IOU programs: (1) tracking efforts of other agencies, (2) augmenting the efforts of other agencies, and (3) developing methodologies, approaches, and data suited to analyses of integrated demand-side resource effects and influences. In each instance above we have to engage with the principal entities that are sponsoring energy efficiency and other demand-side programs to coordinate our efforts to assess load impacts.

We direct PPD to ensure that the EM&V workshop series directs significant attention to EM&V efforts that facilitate assessment of demand-side impacts from programs, policies and activities that affect the understanding and

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[73] Ibid, Ordering Paragraph 3.

[74] It will also be necessary to implement enhanced saturation studies that leverage advanced metering data with onsite information, and longitudinal analyses to study energy use and energy efficiency in buildings over time.

quantification of load impacts from sources other than IOU energy efficiency programs. This directive recognizes that the effects of energy efficiency programs must be understood in the context of overall demand, and the effects of other demand-side activities, especially in light of the Commission's new requirements with regard to Total Market Gross energy efficiency goals.

4.4.6. Provide a Forum for the Airing of Additional EM&V Issues as Necessary

Comments and workshops in this proceeding may not have identified all relevant EM&V issues that need to be addressed in preparing the 2013-2015 Energy Efficiency EM&V Plan. We authorize PPD to utilize the EM&V workshop series to identify and address issues which require further stakeholder consideration. PPD should limit the scope of the workshop series to issues which must be considered for successful development of the 2013-2015 Energy Efficiency EM&V Plan.

4.4.7. Workshop Series Staffing and Technical Support

The PPD is directed to lead the EM&V workshop series. PPD is authorized to contract with a qualified facilitator and/or technical experts, as necessary. Funding for support provided under contract to PPD should be drawn from the 2010-2012 EM&V budget authorized in D.10-04-029. To the extent the Energy Division's EM&V contractors are available to support PPD's workshop efforts, those resources should be leveraged appropriately. The Commission requires that PPD coordinate with the Energy Division in leading workshops; likewise, Energy Division should collaborate with PPD in developing the 2013-2015 Energy Efficiency EM&V Plan.

The Commission envisions regularly scheduled workshops as needed. PPD shall develop a more defined workshop schedule in consultation

with the ALJ and Assigned Commissioner in this proceeding for issuance in a future ACR. All workshops should be open to the public and publicly noticed consistent with Commission rules.

5. Categorization and Need for Hearing

In initiating the subject rulemaking, we initially categorized this proceeding as quasi-legislative, and determined that hearings would not be necessary. We affirm these findings here.

6. Comments on Proposed Decision

The proposed decision of the Commissioner in this matter was mailed to the parties in accordance with Section 311 of the Public Utilities Code and comments were allowed under Rule 14.3 of the Commission's Rules of Practice and Procedure. Comments were filed on ~~_____~~October 18, 2010, and reply comments were filed on ~~_____ by _____~~October 28, 2010, by DRA, Efficiency 2.0, Joint Parties, PG&E, OPower, SCE, TURN and WEM. We have considered the comments in our final order.

7. Assignment of Proceeding

Dian M. Grueneich is the assigned Commissioner and Darwin E. Farrar is the assigned ALJ in this proceeding.

Findings of Fact

1. The objective for this EM&V review is to prepare for the 2013-2015 energy efficiency program cycle by updating our energy efficiency EM&V and ensuring effective EM&V for the purpose of resource procurement and measuring progress toward achieving the goals of the Strategic Plan.

2. The policy framework underlying energy efficiency has undergone significant transformation since its conception more than five years ago.

3. The current EM&V framework is not sufficient to effectively evaluate future energy efficiency programs in California's dynamic and evolving energy efficiency market.

4. Our current EM&V policy and methodological framework should be updated to reflect both the lessons learned from the 2006-2008 cycle and evolution in the regulatory and market landscapes.

5. Going forward the Commission must further balance the benefits of and need for more accurate attribution with the need for timely and cost-effective EM&V results.

6. Energy efficiency policies must rely on realistic expectations of what EM&V can achieve in terms of attribution and appropriately tailor defined objectives to balance cost, benefits, and uncertainty of results.

7. EM&V activities that enable the Commission and the IOUs to improve their assessment of energy efficiency impacts for use in demand forecasting (and ultimately procurement) should be undertaken by the Commission.

8. EM&V and related activities that accurately reflect impacts on demand ensure that efficiency will displace conventional generation and will be used as the first resource in California's "loading order."

9. Data collected by utilities via advanced meters could supplant data currently collected "by hand."

10. Developing new EM&V metrics, including Macro Consumption Metrics and Market Transformation Metrics, and being able to use Experimental Design, may help the Commission assess progress in achieving the carbon emission reductions required by AB 32 and the Strategic Plan.

11. Macro Consumption Metrics may allow us to accurately measure the impact of our energy efficiency efforts on overall energy consumption and provide a more direct account of aggregate reductions in GHG emissions.

12. Because Macro Consumption Metrics rely on existing energy usage data and relatively simple statistical analysis, it should be possible to develop them quickly and at a reasonable cost to ratepayers.

13. Experimental Design is a well documented quantitative research method which relies on the use of a control group to isolate the program impacts from other factors which influence energy use.

14. Effective Experimental Design may offer substantial benefits to energy efficiency program EM&V.

15. Adopting energy efficiency goals based on the Total Market Gross perspective and mandating that they be used in resource procurement and planning activities requires that EM&V activities expand to encompass a greater range of energy efficiency delivery mechanisms.

16. Preparing the Commission's energy efficiency EM&V for post-2012 energy efficiency programs requires a dedicated effort supported by independent facilitators and technical expertise.

Conclusions of Law

1. Post-2012 EM&V objectives include GHG reductions consistent with CARB's AB 32 Scoping Memo and measuring the market transformation goals in the Strategic Plan.

2. Commission policies require that our EM&V attribute savings as effectively as possible.

3. The EM&V workshop series should be the vehicle through which stakeholders prepare the 2013-2015 Energy Efficiency EM&V Plan.

4. In D.10-04-029 we authorized the 2010-2012 Joint Energy Division/IOU EM&V Plan. That plan includes a total energy consumption pilot designed to assess the reduction in energy consumption resulting from the various energy efficiency programs and efforts in California.

5. In light of the Commission's new requirements with regard to Total Market Gross energy efficiency goals, the effects of energy efficiency programs must be understood in the context of overall demand, and the effects of other demand-side activities.

6. Comments and workshops in this proceeding may not have identified all relevant EM&V issues that need to be addressed in preparing the 2013-2015 Energy Efficiency EM&V plan.

7. Funding for consultant services provided under contract to the PPD to support the workshops ordered herein should be drawn from the 2010-2012 EM&V budget authorized in D.10-04-029.

8. It is reasonable for PPD to utilize the EM&V workshop series ordered herein to identify and address issues which require further stakeholder consideration.

O R D E R

IT IS ORDERED that:

1. There is no need for evidentiary hearings in this proceeding.

2. Consistent with Decision 09-09-047 and the discussion herein, the objectives in Appendix A are adopted.

3. The Commission's Energy Division shall contract with one or more consultants to expedite the Total Energy Consumption Pilot.

4. Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas & Electric Company, and Southern California Gas Company shall cooperate fully with Energy Division's efforts to expedite the Total Energy Consumption Pilot and shall timely provide any energy usage data Energy Division deems necessary.

5. The 2013-2015 Energy Efficiency Evaluation, Measurement and Verification Plan must be developed in collaboration with program administrators.

6. The Commission's Policy and Planning Division shall lead Evaluation, Measurement, and Verification workshops in this proceeding dedicated to preparing the Commission's Energy Efficiency Evaluation, Measurement and Verification Plan for the 2013 – 2015 energy efficiency program cycle.

7. The Commission's Policy and Planning Division may contract with a qualified facilitator and/or technical experts, as necessary, with funding from the 2010-2012 Evaluation, Measurement, and Verification budget authorized in Decision 10-04-029.

8. Through the Evaluation, Measurement, and Verification Workshops, the Commission's Energy Division shall develop the 2013-2015 Energy Efficiency Evaluation, Measurement, and Verification Plan for submission in this proceeding, to be used to evaluate, measure, and effectively verify the 2013 - 2015 energy efficiency programs.

9. Energy Division shall develop the Total Energy Consumption Pilot metric in coordination with California Energy Commission staff so as to maximize the potential benefits to the California Energy Commission's demand forecasting efforts and shall include the metric shall in the 2013-2015 Energy Efficiency Evaluation, Measurement and Verification Plan.

10. The Commission's Energy Division shall present the results of the Advanced Metering Infrastructure-Evaluation, Measurement and Verification focused workshop in a report to the Director of the Energy Division no later than 120 days after the date of the workshop and incorporate these results into the 2013-2015 Energy Efficiency Evaluation, Measurement and Verification Plan.

11. Energy Division shall serve the 2013-2015 energy Efficiency Plan at the same time IOUs file their 2013-2015 portfolio application.

This order is effective today.

Dated _____, at San Francisco, California.

Appendix A

Core Objectives of Energy Efficiency Evaluation, Measurement, and Verification (EM&V)

1. *Savings Measurement and Verification* - Measurement and verification of savings resulting from energy efficiency measures, programs, and portfolios serve the fundamental purpose of developing estimates of reliable load impacts delivered through ratepayer-funded efficiency efforts. Measurement and verification work should reflect a reasonable balance of accuracy and precision, cost, and certainty, and be designed for incorporation in procurement planning activities.

2. *Program Evaluation* - Evaluation of program-specific qualitative and quantitative measures, such as the program performance metrics and process evaluations, serves a key role in providing feedback for the purposes of improving performance and supporting forward-looking corrections to utility programs and portfolios. In order to maximize return on ratepayer dollars, program evaluations must be completed on a timeline which informs mid-course corrections and/or program planning for the following cycle.

3. *Market Assessment* – In a constantly evolving environment, market assessments are an essential EM&V product needed to set the baseline for strategic design and improvement of programs and portfolios, identify and track appropriate metrics of market change, and measure progress toward achieving the goals of the California Long-Term Energy Efficiency Strategic Plan. Saturation studies, surveys of emerging technologies, market transformation metrics, and other such analyses which inform estimates of remaining program potential, forward-looking goal-setting, and program planning are key aspects of market assessment.

4. *Policy and planning support* - Consistent with prior program cycles, it is essential to reserve funding to support overarching studies and advisory roles which support Commission policy goals. Over the last program cycle this has been inclusive of potential and goals studies, maintenance of the Database for Energy Efficiency Resources, developing databases of best practices for program design and delivery, program design mix, and other means which support the Commission's oversight role, but do not fall under the core EM&V categories described above.

5. *Financial and Management audit* – Supporting the Commission's oversight function of ensuring the efficient and effective expenditures of ratepayer funds within the utilities' energy efficiency portfolios is another objective of EM&V activities. Rigorous financial and management audits overseen by Commission staff will be critical in ensuring that the utilities' general and administrative costs, and other program expenditures are prudent and reasonable.

(END OF APPENDIX A)

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