

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI**

**In the Matter of the Integrated Resource)
Plan of Kansas City Power & Light Company)**

File No. EO-2012-0323

**MISSOURI DEPARTMENT OF NATURAL RESOURCES,
DIVISION OF ENERGY COMMENTS IN RESPONSE TO
KANSAS CITY POWER AND LIGHT'S
INTEGRATED RESOURCE PLAN FILING**

Filed September 6, 2012

PUBLIC VERSION

****DENOTES HIGHLY CONFIDENTIAL INFORMATION****

Table of Contents

| | |
|--|------------|
| Table of Tables..... | iii |
| Table of Figures | iii |
| Introduction | 1 |
| General Concerns..... | 3 |
| Concern #1. KCP&L did not request waivers for its DSM analysis or Combined Plan Analysis..... | 3 |
| Deficiencies and Concerns for 4 CSR 240-22.030 | 5 |
| Deficiency #1. Inadequate model specification in load analysis and load forecasting. | 5 |
| Deficiency #2. Overly optimistic forecast of household growth. | 5 |
| Deficiency #3. Improper model specification of the weather normalization regression models. | 6 |
| Deficiencies and Concerns for 4 CSR 240-22.040..... | 7 |
| Deficiency #4. Estimates of natural gas prices were used in the fuel price forecasts are consistently high. | 7 |
| Concern #2. Compliance with alternative Missouri renewable energy standard..... | 9 |
| Concern #3. Inadequate exploration of distributed generation technologies in screening supply-side resources. | 10 |
| Deficiencies and Concerns for 4 CSR 240-22.050..... | 11 |
| Deficiency #5. No clear analysis of interactive factors in assessing DSM program cost-effectiveness.. | 11 |
| Deficiency #6. No identification of DSM portfolios that address “maximum achievable potential” and “realistic achievable potential.” | 12 |
| Concern #4. The 1% DSM portfolio agreed upon in Stipulation to EE-2008-0034 is not identified. .. | 13 |
| Deficiency #7. Key metrics for the “aggressive” and “very aggressive” DSM portfolios are not provided. | 14 |
| Deficiency #8. Savings estimates for “Aggressive” and “Very Aggressive” DSM portfolios are simple extrapolations from a common base case..... | 15 |

| | |
|--|-----------|
| Deficiencies and Concerns for 4 CSR 240-22.060..... | 18 |
| Deficiency #9. Documentation of the screening of critical uncertain factors is inadequate. | 18 |
| Deficiency #10. Inadequate number of “subject matter experts” consulted in the assessment of critical uncertain factors. | 19 |
| Deficiency #11. No “aggressive renewable energy resource plan.” | 20 |
| Deficiency #12. Performance measures for Combined Company Plans are not provided..... | 21 |
| Deficiencies and Concerns for 4 CSR 240-22.070..... | 22 |
| Concern #5. KCP&L did not select the lowest-cost plan as its preferred plan. | 22 |
| Deficiency #13. Questionable methodology for allocating combined plans. | 26 |
| Deficiency #14. Missing Analysis of Critical Uncertain Factors for KCP&L Preferred Plan. | 29 |
| Concern #6. Federal renewable/clean energy standard as a critical uncertain factor | 30 |
| Deficiencies and Concerns for 4 CSR 240-22.080..... | 30 |
| Deficiency #15. Inadequate analysis of combined plan..... | 30 |
| Deficiency #16. KPC&L requests acknowledgement of the combined company methodology rather than a preferred plan or resource acquisition strategy..... | 31 |
| Special Contemporary Issues | 33 |
| Deficiency #17. Special Contemporary Issue B: Energy savings requirements for Special Contemporary Issue B have not been met. | 33 |
| Deficiency #18. Special Contemporary Issue C: Energy savings requirements for Special Contemporary Issue C have not been met. | 34 |
| Concern #7. Special Contemporary Issue H: Response to Special Contemporary Issue H does not address the “demand-side investment mechanisms necessary to implement” an aggressive DSM portfolio. | 37 |
| Deficiency #19. Special Contemporary Issues I and J: KCP&L has not analyzed distributed generation, DSM programs, and combined heat and power projects in collaboration with municipalities and in the agricultural sector. | 38 |
| Deficiency #20. Special Contemporary Issue K: Customer Information and Behavioral Modification programs not considered..... | 39 |
| Deficiency #21. Special Contemporary Issue L: The Environmental Impact of Plan ABEK6 has not been analyzed; the requirements of Special Contemporary Issue L have not been met..... | 39 |

Table of Tables

| | |
|---|----|
| Table 1: Natural Gas Price Forecasts, KCP&L vs. AEO2011 (HC) | 9 |
| Table 2: Minimum and Maximum Incremental Savings by KCP&L DSM Portfolio | 13 |
| Table 3: KCP&L staff experts ranking uncertain factors (HC)..... | 20 |
| Table 4: Comparison of KCP&L Low-Cost Plans | 22 |
| Table 5: Incremental Energy Savings for KCP&L Portfolios DSM A and DSM D..... | 25 |
| Table 6: Preferred plans from Combined Analysis, KCP&L and GMO plans | 27 |
| Table 7: Incremental Energy Savings from KCP&L DSM Portfolio “E” | 36 |

Table of Figures

| | |
|--|----|
| Figure 1: Comparison of ABEK6 to Missouri Renewable Energy Standard (MO RES), All Renewables | 34 |
|--|----|

Introduction

The Missouri Department of Natural Resources (MDNR), acting as an intervener in File No. EO-2012-0323, submits the attached comments on Kansas City Power and Light's (KCP&L) Integrated Resource Planning (IRP) compliance filing dated April 15, 2012. KCP&L's filing was submitted pursuant to requirements of 4 CSR 240-22.

MDNR submits these comments pursuant to 4 CSR 240-22.080(6) and (8), which provide that: "...within one hundred twenty (120) days after an electric utility's compliance filing... any intervener may file a report or comments based on a limited review that identify any deficiencies in the electric utility's compliance with the provisions of this chapter, any deficiencies in the methodologies or analyses required to be performed by this chapter, and any other deficiencies which...the intervener believes would cause the utility's resource acquisition strategy to fail to meet the requirements identified in 4 CSR 240-22.010(2)(A)–(C)... [The parties] shall work with the electric utility...to reach, within forty-five (45) days of the date that the report or comments were submitted, a joint agreement on a plan to remedy the identified deficiencies."

In MDNR's view, the process established by 4 CSR 240-22.080(6) - (8) should provide an opportunity for comprehensive review of the utility's resource planning process and resource acquisition strategy.

MDNR prepared these comments with the assistance of the consulting firm GDS Associates, Inc. (GDS). GDS provided a report on KCP&L's IRP filing which focuses on issues related to load forecast, weather normalized energy sales, potential double counting of DSM impacts, the combined KCP&L and /KCP&L-Greater Missouri Operations (GMO) planning approach, fuel prices, consideration of natural disasters, the relationship between power plant capacity factors and renewable resources in the preferred plan, and various issues regarding wind resources. The consultant's report is being filed simultaneously with MDNR's report and is referenced herein as the "GDS report."

The compliance filing materials submitted by KCP&L on April 15 consist of nine volumes and numerous appendices. MDNR's comments focus on deficiencies and concerns with respect to KCP&L's load forecasting, its supply side analysis, its demand side analysis, the construction and analysis of its alternative resource plans, and its use of a combined-company planning approach. Finally, this report discusses the deficiencies and concerns in KCP&L's analysis of selected special contemporary issues established in File No. EO-2012-0041.

Issues that MDNR classifies as “concerns” are not necessarily less significant than issues that MDNR classifies as “deficiencies.” MDNR classified issues as “deficiencies” or “concerns” primarily on the basis of how explicitly the issues are tied to specific provisions of the Chapter 22 rules.

In making its comments, MDNR reviewed the following sources of information:

- The nine primary narrative volumes and appendices included in KCP&L’s April 15, 2012 Integrated Resource Plan (IRP) filing, references by the volume or appendix number assigned by KCP&L;
- Accompanying workpapers distributed to MDNR by KCP&L as part of its April 15, 2012 filing, referenced by the file name assigned by KCP&L;
- KCP&L responses to MDNR data requests, referenced by data request number; and
- Stipulation and Agreement to File No. EE-2008-0034, KCP&L’s 2008 IRP.

MDNR staff participated in stakeholder meetings that KCP&L convened on December 19, 2011, May 11, 2012 and July 27, 2012. Subject matter experts from GDS participated in portions of these meetings. MDNR wishes to emphasize that while its comments have been informed by these meetings, they are based on the contents of the documents filed in File No. EO-2012-0323 and the documents listed above.

MDNR proposes remedies for each of the deficiencies and concerns listed in this report. The proposed remedies are offered for consideration by the parties during the 45-day review period provided by 4 CSR 240-22.080(8). The majority of the remedies request that KCP&L provide the analyses required by the Chapter 22 rules, particularly with respect to the combined company planning effort used to determine KCP&L’s preferred plan. Although MDNR is not proposing a specific stakeholder process at this time, several of MDNR’s proposed remedies refer to consultation with stakeholders on the assumption that stakeholder meetings will occur in the context of the upcoming annual review of KCP&L’s planning effort.

General Concerns

Concern #1. KCP&L did not request waivers for its DSM analysis or Combined Plan Analysis.

KCP&L did not request waivers to address omissions in its DSM analysis or to address the use of a combined company planning process.

Rule Citation

4 CSR 240-22.080(13)

Discussion

The current IRP rules provide a mechanism for a utility to request waivers from various rule requirements:

Upon written application made at least twelve (12) months prior to a triennial compliance filing, and after notice and an opportunity for hearing, the commission may waive or grant a variance from a provision of 4 CSR 240-22.030–4 CSR 240-22.080 for good cause shown. (4 CSR 240-22.080(13))

KCP&L did not request any waivers in the current case. Review of the submitted volumes indicates that there was “good cause” to request waivers in at least two areas, the background analyses of demand-side resources in Volume 5, and the assessment of critical uncertain factors and contingency planning using “combined company plans” in Volumes 6 and 7.

With regard to the analysis of demand-side resources in Volume 5, many of the required analyses were postponed pending the completion of KPC&L/GMO’s Market Potential Study, scheduled for completion in January, 2013. KCP&L and GMO proposed conducting a market potential study well before the preparation of the current IRP plan. The Company was aware that the anticipated completion date of its market potential study was after the filing date of its 2012 IRP. In Volume 5 of its plan, KCP&L cites the signed statement of work for the potential study (appendix 5a navigant_sow_signed_01162012.pdf) multiple times as explanation for missing DSM analyses required by the rules. For example, the statement of work for the market potential study is cited in response to 4 CSR 22.050 (1) (E) 2, 4 CSR 22.050 (3) (G)3, 4 CSR 22.050 (3)(G)5B, 4 CSR 22.050 (3) (I), 4 CSR 22.050 (4)(D), and 4 CSR 22.050 (6)(C). The Company was aware that the background analysis necessary to complete Volume 5 would not be available. Nevertheless, the Company did not request waivers for the rules cited above. The consequence is that important requirements of the rules, for example, the specification of “maximum achievable potential” and “realistic achievable potential” (see 4 CSR 240-22.020(40),

4 CSR 240-22.020(49), 4 CSR 240-22.050(2), 4 CSR 240-22.050(3)(G)5.B, 4 CSR 240-22.050(4)(D)5.A, 4 CSR 240-22.050 (6)(C)1) was not completed.

Another area where a waiver request would have been appropriate was the Company's decision to estimate 14 alternative resource plans that combine KCP&L and GMO's supply side resources on a company-wide basis.¹ The Company based its assessment of critical uncertain factors and its contingency planning in Volume 7 using the two combined plans with the lowest NPVRR. In Volume 7, KCP&L describes its preferred plan as:

For KCPL the Preferred Plan and the Contingency Plan are the allocated components of the lowest-cost and contingency plans from the combined company study. KCPL Preferred Plan AGEK9 is the KCPL allocated portion of combined company plan AJDC2. KCPL Contingency Plan AAAK9 is the KCPL allocated portion of combined company plan AGDC2. Complete descriptions of the KCPL plans are located in the response to Rule 240-22.060(3) in Volume 6 of this filing. Complete descriptions of the combined company plans are located in the response to Rule 240-22.060(3)8 in Volume 6 of this filing. (20)

KCP&L's decision to engage in a combined planning process and to base its selection of a company-specific preferred plan and contingency plan through allocation, rather than direct estimation are sufficiently different from the rules to require waivers documenting both the construction of the combined plans and allocation process.

In both cases, MDNR is concerned that important analyses have not been conducted by the Company and these omissions limit our ability to fairly assess KCP&L's planning process.

¹ It is important to note that the sixteen "combined" plans listed in Tables 6 and 7 of Volume 6 (pp.15-16) combine supply-side resources only. These combined plans include one DSM Portfolio, "DSM A", which is described as "'DSM A' consists of a suite of twelve Energy Efficiency and two Demand Response programs that KCP&L considers the capacity and energy estimated from these programs comprise realistically achievable levels. On February 17, 2012, KCP&L filed to withdraw the MEEIA filing, File No. EO-2012-0008, made on December 22, 2012 due to the lagging economic environment, declines in weather-normalized retail demand, softness in the wholesale energy market due to low natural gas prices, and no current need for capacity. However, the DSM proposed in the MEEIA filing was used to develop the 'DSM A' by assuming the programs begin in 2014. For 2012 and 2013, the DSM A consists of Persistence DSM and contractually obligated Demand Response." (Volume 6, p. 6)

Deficiencies and Concerns for 4 CSR 240-22.030

Deficiency #1. Inadequate model specification in load analysis and load forecasting.

In estimating the effect of weather on electric loads, the functional form of the models was not specified and neither were the goodness of fit measures reported for statistical models.

Rule Citation

4 CSR 240-22.030(2)(C)3 and 4 CSR 240-22.030(3)(B)

Discussion

4 CSR 240-22.030(2)(C)3 and 4 CSR 240-22.030(3)(B) require the utility to document the model specification when estimating the effect of weather on electric loads. These models are provided on pages 8 to 12 of Volume 3. The Company failed to fully specify the form of the models used to weather normalize its load forecast. It is unclear if the functional form the models is exponential, cubic or something else. While the results show the coefficients, standard errors, t-statistics and coefficient P-value, measures of model goodness of fit, such as R-squared values are not included in the results. Without knowledge of the model specification, it is very difficult to understand the relationship between the explanatory variables and the dependent variable. Further, without knowledge of goodness of fit measures, it is not practical to determine if the model fits the data accurately. In evaluating most of the weather normalization models, variables assessing trends in energy use are not statistically significant at the 95% level, therefore, one cannot be confident about their contributions to the model. Also, see GDS' comments (Concern #2) regarding the reliability of KCP&L's weather normalization models.

Potential Remedy

In its annual update, KCP&L should elaborate on the assumptions, functional form used in the equations to estimate the effect of weather on system loads and report the R-squared statistic and other goodness of fit measures to comply with the rule. KCP&L should investigate if there are any other variables that can better explain the weather trends or consider using non-linear models as an estimation technique.

Deficiency #2. Overly optimistic forecast of household growth.

Moody's forecast of economic activity may overestimate the growth in the number of households in the Kansas City metropolitan area.

Rule Citation

4 CSR 240-22.030(3)(A)

Discussion

4 CSR 240-22.030(3)(A) requires the utility to identify appropriate explanatory variables as predictors of the number of units for each major class and KCP&L chose households as a unit.

GDS' analysis, cited in Concern #1 of the GDS report, suggests that the estimates of the number of households used by KCP&L may be problematic. In particular, the growth rate in the number of households may be too high, given the long effects of the current economic situation.

Potential Remedy

In its annual update, KCP&L should recalibrate its forecast of the number of households to reflect the existing economic situation.

Deficiency #3. Improper model specification of the weather normalization regression models.

The weather normalization regression models used are not properly specified. No rationale provided for the choice of autoregressive models or the inclusion of specific month dummy variables.

Rule Citation

4 CSR 240-22.030(3)(A) and 4 CSR 240-22.030(3)(B)

Discussion

4 CSR 240-22.030(3)(A) and 4 CSR 240-22.030(3)(B) requires the utility to identify and document the explanatory variables used in its weather normalization regression models. The models estimated employ autoregressive trend variables and dummy variables. The trend variables apparently account for previous months' energy consumption. The dummy variables control for energy use in specific months and years of the time period.

The Company provided no explanation of its choice of model form or its decision to control for energy usage in specific months. No rationale is provided for the choice of autoregressive models, and it is unclear whether the Company tested the fit of second-order and third-order autoregressive models before deciding on the model's form. There is no indication that other

models, such as autoregressive moving average models or autoregressive integrated moving average models were tested.

Finally, there's no explanation for the inclusion of specific month dummy variables in the regression models. These dummies likely control for unique monthly conditions, for example, a variable controlling for energy use in December, 2006 is included in several models. However, there is no rationale provided for controlling for energy use in some months versus others.

Potential Remedy

In its annual update, KCP&L needs to provide a rationale for the use of first-order autoregressive models, specify the model and explain why autoregressive moving average or autoregressive integrated moving average models were not used, especially in the wake of using time-series models. Use of specific monthly variables need to be justified in the modeling process and any tests results for serial correlation and stationarity need to be reported.

Deficiencies and Concerns for 4 CSR 240-22.040

Deficiency #4. Estimates of natural gas prices were used in the fuel price forecasts are consistently high.

Natural gas prices used in fuel price forecasts are consistently high.

Rule Citation

4 CSR 240-22.040(5)(A)

Discussion

4 CSR 240-22.040(5)(A) requires the utility to develop a fuel price forecast for coal, natural gas, fuel oil and uranium. The natural gas prices used for this analysis were consistently higher than the base case forecast for natural gas prices published in the United States Department of Energy's Annual Energy Outlook for 2011(AEO2011). Table 1 (HC) compares the forecast natural gas prices at the Henry Hub from the AEO2011 to the forecast values used by GMO. The "Mid" and "High" forecasts used by GMO were higher than the AEO2011 base case in each year of the IRP forecast. The "Low" forecast used by GMO is higher than the AEO2011 base case for the seven years between 2012 and 2019.

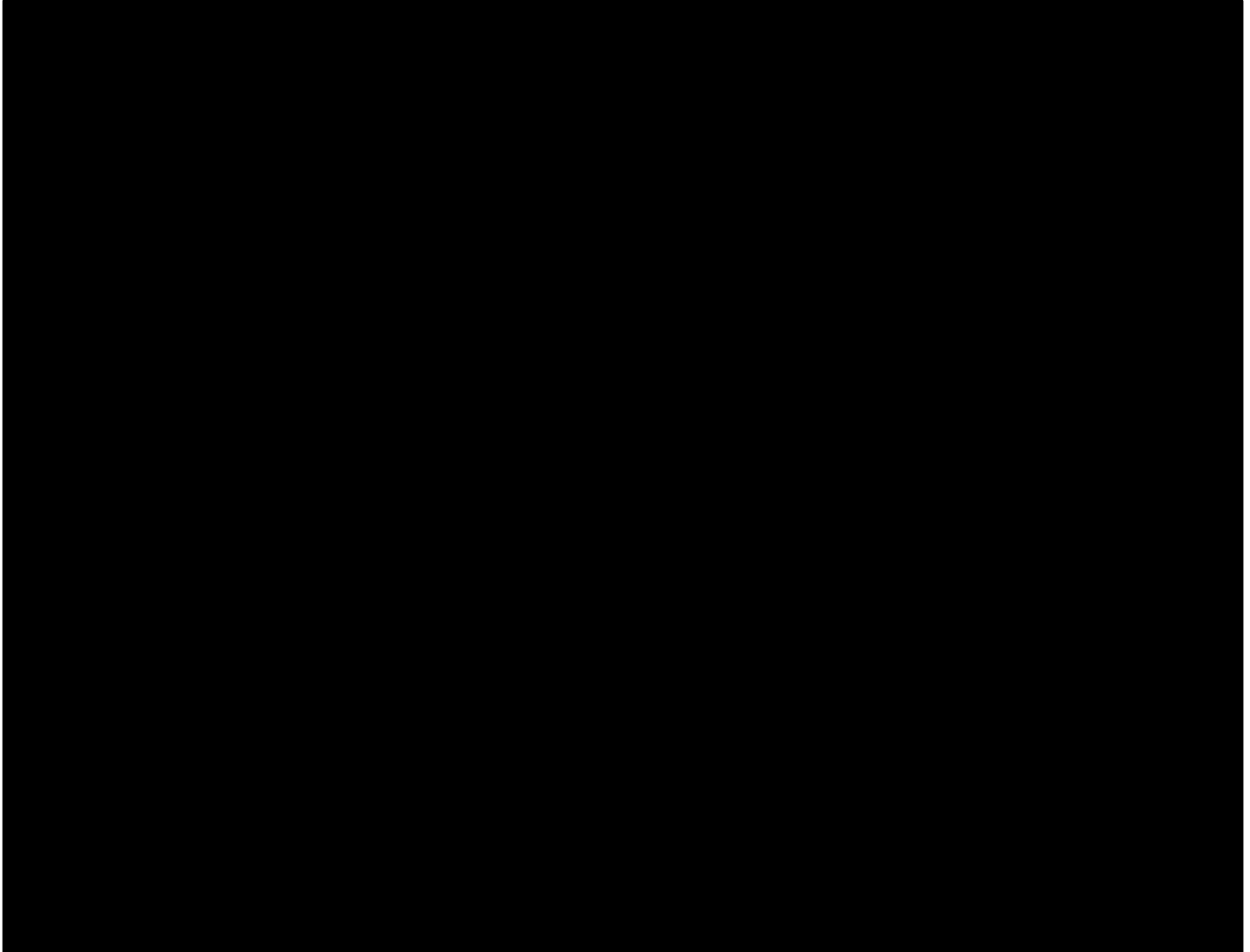
Natural gas prices have dropped sharply owing to the hydraulic fracturing and development activity in several shale formations in the country. The utility forecasted the prices of natural gas to be very high starting in 2012 and increasing over time.

Potential Remedy

In view of the projected price of natural gas estimated by the Annual Energy Outlook, KCP&L might consider adjusting the prices downward to represent the market price and more accurately forecast the natural gas prices.

Table 1: Natural Gas Price Forecasts, KCP&L vs. AEO2011 (HC)

**



**

Concern #2. Compliance with alternative Missouri renewable energy standard.

KCP&L addressed its attempts to comply with the current Missouri renewable energy standard (RES) or Proposition C. However, the IRP does not discuss the compliance with the potentially modified or newly proposed renewable energy standard.

Rule Citation

4 CSR 240-22.010, 4 CSR 240-22.020(28), 4 CSR 240-22.060(5)

Discussion

In its IRP analysis, KCP&L considers a number of renewable options, in particular solar and wind, as a separate group in the supply side analysis. In order to meet RES requirement, some renewable options would be passed onto the integrated resource analysis regardless of their costs. Over past few years, a number of legislative bills had been introduced in the state capitol to either modify the existing RES law or propose a new RES. In addition, a new ballot initiative was proposed by Renew Missouri early this year to change several provisions in the current RES. Although all efforts so far have failed due to various reasons, it is still likely that the current RES law may be changed sometime in the IRP planning horizon. As one of an array of uncertain factors, future potential changes in the RES, such as changes in the definition eligible renewable energy resources, percentage requirements of particular energy resources and geographical sourcing, will have significant impacts on renewable energy resources selection and acquisition with the associated costs. That will also affect the selection of preferred plan and contingent plan in the integrated resource planning even though KCP&L separates renewable energy technologies from other supply-side resource options.

Potential remedy

KCP&L should investigate the impact of at least one alternative RES by modeling the scenario based on the recent Missouri legislative proposals or Renew Missouri's 2012 ballot initiative.

Concern #3. Inadequate exploration of distributed generation technologies in screening supply-side resources.

KCP&L inadequately analyzes the role of distributed generation technologies, in particular combined heat and power (CHP), in its screening analysis of potential supply-side resources.

Rule Citation

4 CSR 240-22.020(15), 4 CSR 240-22.040(1), 4 CSR 240-22.040(4)

Discussion

As the advancement of distribution technologies accelerates, they may play a more visible role in resource resources acquisition during the 20-year planning horizon. While KCP&L explained that it will use the results from its SmartGrid Demonstration Project and subsequent benefit cost analyses to determine its cost effectiveness in its response to MDNR DR 20, limited documentation exists that demonstrates KCP&L adequately considered distributed generation, as defined in 4 CSR 240-22.020(15), in its screening analysis of potential supply side resources. KCP&L investigated residential and commercial solar, but it did not include other types of distribution technologies in its assessment. Multiple distributed technologies exist at both commercial and near-commercial stages, such as small wind, microturbines, and internal combustion engines. Considering the future price of natural gas, more natural gas fuelled microturbines and internal combustion engines might be cost-effective at the commercial and institutional levels. In particular, the feasibility of combined heat and power (CHP) installations,

using either fossil fuels (most likely natural gas) or renewables (solid biomass or biogas from wastewater treatment facilities) should be analyzed more fully, especially in its additional role as a demand side resource.

Potential remedy

In its annual update, KCP&L should provide a more detailed analysis of the market status of a number of distribution technologies as well as their potential impacts. KCP&L should also explore more opportunities with customer-side CHP.

Deficiencies and Concerns for 4 CSR 240-22.050

Deficiency #5. No clear analysis of interactive factors in assessing DSM program cost-effectiveness.

Analysis of the interactive effects of efficiency measures was not performed in the estimation of program cost-effectiveness.

Rule Citation

4 CSR 240-22.050(3)(G)2

Discussion

4 CSR 240-22.050 (3)(G)2 requires KCP&L to provide “An assessment of how the interactions between end-use measures, when bundled with other end-use measures in the potential demand-side program, would affect the stand-alone end-use measure impact estimates.” The rules indicate that this analysis should be conducted for the twenty-year planning horizon and inform the cost-effectiveness of each potential demand-side program.

There is no indication that any interactive effects have been addressed in the assessment of the cost-effectiveness of individual programs in either Volume 5 or “KCPL_Program Cost-Effectiveness_HC 240-22.050.xlsx” in the workpapers. In Volume 5 “interactive effects” are discussed with respect to a single appliance, the purchase of an Energy Star refrigerator (see pp. 63-64).

Additionally, KCP&L’s response to MDNR DR 27, which asked the Company to “identify those for which the KCP&L analysis reflects ‘interactive effects’ and describe and document the specific interactive effects that were incorporated into the analysis”, noted that “[i]nteractive effects are not directly incorporated into the analysis.”

Potential Remedy

Interactive effects of efficiency measures are a common feature of utility and statewide technical resource manuals. For example, the Mid-Atlantic Technical Reference Manual (Version 2.0, July 2011, pages 16 and 17) presents waste heat factor calculations showing the impact of installation of efficient lighting on heating and cooling costs. Such values are publicly available and could have been used in assessing the cost-effectiveness of programs that combine lighting retrofits with cooling retrofits, such as the Home Performance with Energy Star or C&I Prescriptive programs.

These interactive effects should be included in the assessment of future programs. The program-level cost-effectiveness measures should be recalculated after the completion of the market potential study.

Deficiency #6. No identification of DSM portfolios that address “maximum achievable potential” and “realistic achievable potential.”

KCP&L has deferred all estimation and analysis of “maximum achievable potential” and “realistic achievable potential” to the completion of its market potential study.

Rule Citations

4 CSR 240-22.020(40), 4 CSR 240-22.020(49), 4 CSR 240-22.050(2), 4 CSR 240-22.050(3)(G)5.B, 4 CSR 240-22.050(4)(D)5.A, 4 CSR 240-22.050 (6)(C)1

Discussion

The rules cited above require that DSM portfolios meet specific characteristics. KCP&L has chosen not to specify DSM portfolios that meet the requirements of either the “maximum achievable potential” or “realistic achievable potential” as defined in 4 CSR 240-22.020(40) and 4 CSR 240-22.020(49). Instead, it cites the work plan for its upcoming market potential study. While this work plan does specify the creation of scenarios that meet these savings criteria, there no guarantee that the required analysis of these additional portfolios, as specified in 4 CSR 240-22.060 and 4 CSR 420-22.070, will be performed.

In Volume 5, KCP&L describes one of its DSM portfolios, “DSM A”, as follows:

“DSM A” consists of a suite of twelve Energy Efficiency and two Demand Response programs that KCP&L considers the capacity and energy estimated from these programs comprise realistically achievable levels. (6)

This might be interpreted to meet the definition of “realistic achievable potential,” but there is no analysis to show this is the case. In particular, there is no analysis to show the difference between the “maximum achievable potential” defined in 4 CSR 240-22.020(40), “DSM A” and the more aggressive portfolios analyzed in Volume 8 to meet Special Contemporary Issues C and H.

Potential Remedy

DSM portfolios meeting the definitions of “maximum achievable potential” and “realistic achievable potential” should be estimated, placed into alternative resource plans, analyzed according to the requirements of 4 CSR 240-22.060 and 4 CSR 420-22.070. This analysis should be completed as soon as practical after the completion of KCP&L’s market potential study.

Concern #4. The 1% DSM portfolio agreed upon in Stipulation to EE-2008-0034 is not identified.

The required DSM portfolio from the Stipulation and Agreement to File No. EE-2008-0034, KCP&L’s 2008 IRP, has not been identified among the three DSM portfolios presented by the Company.

Citation

Stipulation and Agreement, Case No. EE-2008-0034, DNR Deficiency #2

Discussion

As part of the Stipulation and Agreement to File No. EE-2008-0034 KCP&L agreed to the following:

“Include at least one alternative resource plan that demonstrates energy reductions from demand-side resources of at least 1% of the projected retail energy requirements per year over the 20-year planning horizon, assuming a net-to-gross ratio of 1.0.”
(KCP&L Stipulation, DNR Deficiency #2)

None of the proposed DSM portfolios presented by KCP&L (“DSM A”, “DSM D” or “DSM E”) are identified as meeting this stipulation. Although portfolio “DSM E” exceeds the requirements of the stipulation, i.e., the incremental energy savings levels are consistently above 1% of forecast energy sales, this portfolio has been created to meet the requirements of Special Contemporary Issue C (see Volume 8: p. 10).

Table 2: Minimum and Maximum Incremental Savings by KCP&L DSM Portfolio

| | Minimum Percentage of Forecast | | Maximum Percentage of Forecast | |
|--|--------------------------------|------|--------------------------------|------|
| | Value | Year | Value | Year |
| DSM A | | | | |
| Energy | 0.00% | 2013 | 0.33% | 2015 |
| Demand | 0.00% | 2013 | 2.15% | 2014 |
| | | | | |
| DSM D | | | | |
| Energy | 0.51% | 2015 | 0.68% | 2013 |
| Demand | 0.59% | 2014 | 1.09% | 2017 |
| | | | | |
| DSM E | | | | |
| Energy | 1.02% | 2015 | 1.37% | 2013 |
| Demand | 1.26% | 2014 | 2.27% | 2017 |
| Source: KCPL DSM Plans A E R Powell Mar 27 2012 Vol 6(4)B1245.xlsx | | | | |

Table 2 lists the minimum and maximum savings values by KCP&L DSM portfolio. The incremental savings levels for “DSM E” are greater than 1.0%. Nevertheless, KCP&L has not attempted to use this analysis to fulfill its agreement in Case No. EE-2008-0034.

Potential Remedy

A DSM portfolio specifically meeting the requirements of the Stipulation and Agreement in Case No. EE-2008-0034 should be estimated, placed into alternative resource plans, analyzed according to the requirements of 4 CSR 240-22.060 and 4 CSR 420-22.070.

Deficiency #7. Key metrics for the “aggressive” and “very aggressive” DSM portfolios are not provided.

Required data on number of participants, incentive payments and administrative costs are not provided for the “aggressive” and “very aggressive” DSM portfolios.

Rule Citation

4 CSR 240-22.050(4)(G)

Discussion

Rule 4 CSR 240-22.050(G) specifies the required metrics for each DSM program. These metrics include, among other things, estimates of the “incremental and cumulative number of program

participants” (4 CSR 240-22.050(4)(G)(3)), estimates of the “costs of incentives paid by utility customers” (4 CSR 240-22.050(4)(G)(5).B), and estimates of “the cost to administer the potential demand-side program.” (4 CSR 240-22.050(4)(G)(5).D). KCP&L provided this information in its workpapers (“KCPL_DSM_Plan 240-22.050.xlsx”) for its “DSM A” portfolio, but did not provide these metrics for its two alternative DSM portfolios, its “aggressive” portfolio (“DSM D”) and its “very aggressive” portfolio (“DSM E”). Understanding how the higher level of savings in these alternative portfolios is achieved, whether through increasing participation by changing program incentives, or by introducing a new set of measures, is necessary to assess whether these portfolios are realistic.

KCP&L provided savings data for each of its DSM portfolios in its workpapers (“KCPL DSM Plans A E R Powell Mar 27 2012 Vol 6(4)B1245.xlsx”) and overall expense data in response to data request MDNR-01e (“KCPL DSM Plans - MIDAS Annual Expenditures DR 1e.xlsx”). But it has not provided participation data or disaggregated program costs for either the “DSM D” or the “DSM E” portfolios.

In its selection of a preferred plan, KCP&L rejected the two lowest cost plans, which utilized the “DSM D” portfolio, claiming that these plans were “not considered to be realistically achievable.” (Volume 7, p. 3) The background data necessary to support KCP&L’s decision, i.e., to show that more aggressive savings than those specified in “DSM A” is not achievable, has not been provided.

Potential Remedy

In its annual update KCP&L should provide the program metrics described in 4 CSR 240-22.050(G) for each of its DSM portfolios.

Deficiency #8. Savings estimates for “Aggressive” and “Very Aggressive” DSM portfolios are simple extrapolations from a common base case.

Savings estimates of the “aggressive” (DSM D) and “very aggressive” (DSM E) DSM portfolios are simple extrapolations from a common base case.

Rule Citation

4 CSR 240-22.050(6)(A)

Discussion

Cumulative energy and demand savings estimates for each KCP&L DSM portfolio are provided in “KCPL DSM Plans A E R Powell Mar 27 2012 Vol 6(4)B1245.xlsx” in the MDNR workpapers.

This workbook lists the cumulative savings by program over the 20 year planning horizon for each DSM portfolio. The worksheets for DSM portfolios “DSM D” (the “aggressive” portfolio) and “DSM E” (the “very aggressive” portfolio, see Volume 1, Page 15) each contain columns indicating savings derived from some unknown future technology. For the DSM D portfolio, this column is labeled “Technology X”. For the DSM E portfolio, this column is labeled “Technology Y”.

Examination of these two portfolios indicates that they are based on a common level of savings and that “Technology X” and “Technology Y” extrapolates the sum of the base program savings to produce the increased savings levels. “Technology X” is equal to the sum of the program-specific savings, so the savings level for the DSM D portfolio is twice the base savings. “Technology Y” is equal to three times the sum of the program-specific savings, so the savings level for the DSM E portfolio is four times the base savings. These extrapolations apply to both energy and demand savings (see Sheet “Deficiency 9” in the “MDNR EO-2012-0323 Workpapers (HC)AB.xls” workbook).

This approach to estimating aggressive DSM cases, i.e., by postulating an undefined new technology that will achieve high levels of savings, was rejected by parties in GMO’s 2009 IRP (File No. EE-2009-0237). In GMO’s *Revised Integrated Analysis Report* (Dated October 7, 2010) it noted the following:

Paragraph 33 and 42: 2% DSM Option

In order to satisfy the targets of 1% and 2% energy efficiency, the Company will rely on Technology X to arrive at the levels of DSM required by these targets. This Technology X-enhanced option is labeled the “2% Target” and is included in the original Sibley 3 retirement alternatives.

33. Staff’s Deficiency 5 states: GMO did not meet the requirements of 4 CSR240-22.060(1), because GMO did not design its alternative resource plans to satisfy at least the objectives and priorities identified in 4 CSR 240-22.010(2). Specifically, the requirement of 4 CSR 240-22.010(2)(A) to consider and analyze demand-side efficiency and energy management measures on an equivalent basis with supply-side alternatives in the resource planning process is not satisfied – 4 CSR 240-22.060(1). This deficiency is resolved with GMO’s agreement to work within the stakeholder process as described in Appendix 1, to expand the DSM portfolio in incremental steps to account for the development of new technologies not currently known or defined.

42. Staff’s Deficiency 6 states: GMO has failed to meet the requirements of 4 CSR 240-22.070(6)(A) in that the preferred resource plan does not “strike an appropriate balance between the

various planning objectives specified in 4 CSR 240-22.010(2), more specifically 4 CSR 240-22.010(2)(A). This deficiency is resolved by GMO's agreement to work within the stakeholder process as described in Appendix 1, to expand the DSM portfolio in incremental steps to account for the development of new technologies not currently known or defined.

However in subsequent discussions with stakeholders, it was decided that the Company [would] only include alternatives that could be adopted as an executable plan. The requirement would preclude any alternative that utilized the 2% DSM target. (Emphasis Added, p.14)

MDNR notes that the use of undefined, un-executable alternatives such as "Technology X" and "Technology Y" was rejected in the 2009 GMO IRP case. Although the concerns of parties in the GMO case differ from those of the current KCP&L plan, it is troubling that KCP&L is using a similar methodology to create its aggressive DSM planning portfolios. The insertion of such undefined technologies into an existing plan tends to preclude alternative program formulations, such as new program designs, expanded marketing efforts, or changes in the structure of customer incentives that could increase the participation and penetration of high-efficiency measures, to produce additional savings.

Potential Remedy

KCP&L should reconsider its program design when estimating its aggressive DSM planning cases rather than relying on "technologies not known or defined."

Deficiencies and Concerns for 4 CSR 240-22.060

Deficiency #9. Documentation of the screening of critical uncertain factors is inadequate.

Details of the screening process of critical uncertain factors have not been provided.

Rule Citation

4 CSR 240-22.060(5), 4 CSR 240-22.060(6), and 4 CSR 240-22.060(7)

Discussion

In Volume 6, KCP&L conducted a screening process to determine the critical uncertain factors to be used in its risk analysis. This process included querying its subject matter experts about the risks associated with the uncertain factors listed in Table 79 (p. 151). These risks were assigned a subjective probability and assessed with CapEx to determine which risk factors would have a critical impact on KCP&L's costs. After its analysis, KCP&L identified three critical uncertain factors: load growth, natural gas prices and CO2 credit prices.

The quantitative details of this analysis were not provided in either Volume 6 or the workpapers. Specifically, KCP&L did not provide a quantitative description of the outcomes of the company experts' scoring, the final subjective probability, or the final probability tree. Although KCP&L's analysis tested for interactive effects, as specified in 4 CSR 240-22.060(6), the basic statistical model shown in Table 80 (p. 160) did not specify the dependent variable or describe the ranges of the variables in the model. Finally, there was no discussion of the numeric outcomes used to determine the critical uncertain factors.

Potential Remedy

Quantitative details describing the screening and selection process should be provided in either Volume 6 or in the workpapers. KCP&L should make this information available.

Deficiency #10. Inadequate number of “subject matter experts” consulted in the assessment of critical uncertain factors.

The number of “subject matter experts” consulted by KCP&L is inadequate to establish subjective probabilities necessary to assess critical uncertain factors.

Rule Citation

4 CSR 240-22.060(7)

Discussion

In Volume 6, KCP&L states:

The Company compiled information concerning the risks listed in 22.070 (5) from subject matter experts within the company. The experts were requested to provide mid, high and low scenario forecasts for their particular risk. The mid, high and low scenarios were also assigned a subjective probability by the subject matter experts. (Volume 6, p 163)

A list of the subject matter experts consulted was not provided in the filing. KCP&L provided a list of subject matter experts who provided their subjective assessment of each uncertain factor in response to MDNR DR 31. This list, reproduced in Table 3 below (HC), indicates that a single KCP&L staff member was consulted for each uncertain factor. While these individuals are the acknowledged experts employed by KCP&L, relying on a single individual’s opinion in a process based on a probability distribution is inadequate. A single person’s opinion, regardless of his or her experience and knowledge, is inadequate to quantify a probability.

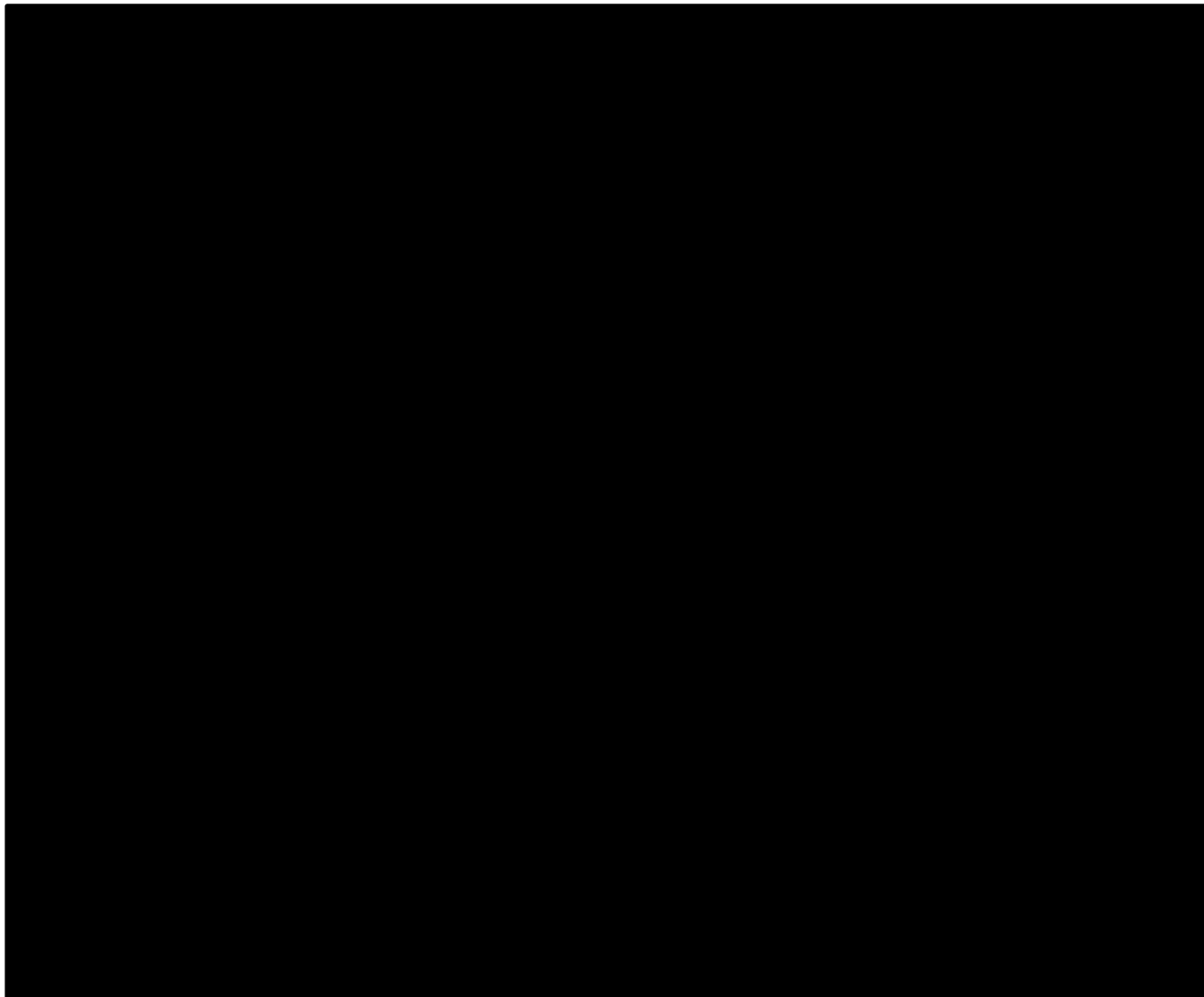
According to Table 3, the 13 uncertain factors were assessed by 5 people. It does not appear that a sufficient number of “subject matter experts” were consulted in the assessment of uncertain factors and in the selection of factors deemed “critical.” The limited number of experts consulted leads MDNR to question the validity of the analysis and selection process for critical uncertain factors described in Volume 6.

Potential Remedy

KCP&L should consult with a larger pool of experts in its analysis of uncertain factors in its next IRP filing.

Table 3: KCP&L staff experts ranking uncertain factors (HC)

**



**

Deficiency #11. No “aggressive renewable energy resource plan.”

An alternative resource plan that utilizes only renewable energy resources has not been included in KCP&L’s suite of plans.

Rule Citation

4 CSR 240-22.060(3)(A)2

Discussion

Rule 4 CSR 240-22.060(3)(A)2 specifies a planning case that

Utilize only renewable energy resources, up to the maximum potential capability of renewable resources in each year of the planning horizon, if that results in more renewable energy resources than the minimally compliant plan. This constitutes the aggressive renewable energy resource plan for planning purposes;

In Volume 6, KCP&L presents 22 alternative resource plans based on KCP&L resources (See Tables 1 through 3) and 14 plans based on combined KCP&L and GMO resources (see Tables 6 and 7). Each plan features a specific DSM portfolio, a standard set of wind and solar resources, and a variety of supply-side resources. Some plans anticipate the retirement of one or more supply side resources.

KCP&L cites one plan, Plan ABEK6, that meets the requirements of rule 4 CSR 240-22.060(3)(A)2 (Volume 6, p. 11). This plan features 820 MW of renewable resources (800 MW of wind and 20 MW of solar). This is an increase in the standard 420 MW of renewables seen in the other plans (400 MW of wind and 20 MW of solar). Plan ABEK6 also adds two 154 MW combustion turbines, presumably to account for the planned retirement of Montrose units 1 and 2 in 2016.

The inclusion of the combustion turbines, two supply-side resources, suggests that Plan ABEK6 does not meet the requirements of 4 CSR 240-22.060(3)(A)2, which state clearly that the plan should “utilize only renewable energy resources.”

Potential Remedy

In its annual update, KCP&L should create and analyze an alternative resource plan that meets the requirements of 4 CSR 240-22.060(3)(A)2.

Deficiency #12. Performance measures for Combined Company Plans are not provided.

Performance measures specified in 4 CSR 240-22.060(2) are not provided for the combined company plans.

Rule Citation

4 CSR 240-22.060(2)

Discussion

Rule 4 CSR 240-22.060(2) specifies a set of performance measures to be provided for each plan. The KCP&L plan estimated 14 “combined company” plans. However, Volume 6, Table 8 lists

only the NPVRR values (in millions of dollars) for the combined company plans. No other performance measures, as defined in 4 CSR 240-22.0606(2), are provided in any plan volume or the workpapers provided by the Company. Without this information it is not possible to fully assess the economic impact of the various plans.

Potential Remedy

In its annual update, KCP&L should provide the required performance measures for the combined company plans.

Deficiencies and Concerns for 4 CSR 240-22.070

Concern #5. KCP&L did not select the lowest-cost plan as its preferred plan.

KCP&L's preferred plan does not have the lowest NPVRR value.

Rule Citation

4 CSR 240-22.010(2), 4 CSR 240-22.070(1)

Discussion

KCP&L's preferred plan (AGEK9) does not have the lowest NPVRR value, as shown in Volume 6, Table 34. In discussion of its plan selection, KCP&L states:

The Preferred Plan was not the lowest cost plan from a Net Present Value of Revenue Requirement (NPVRR) perspective. Alternative Resource Plan DBEK1 had the lowest expected NPVRR of all modeled plans. This plan included the "D" level of DSM which was developed to satisfy the requirement of Special Contemporary Issue H. stated in Order EO-2012-0041, "Analyze and document aggressive DSM portfolios without constraints". This "Aggressive" D-level of DSM is not considered to be realistically achievable. The plan producing the next lowest expected value of NPVRR was chosen as the Preferred Plan. (Volume 7, Page 3).

According to Volume 6, Table 34, plan AGEK9 has the third lowest cost plan. Two plans, plan DCEK1 and DBEK1, have lower NPVRR values. The primary features of each plan are outlined in Table 4, below.

Table 4: Comparison of KCP&L Low-Cost Plans

| Plan | Plan Rank in terms of NPVRR | NPVRR (\$MM) | DSM Portfolio | Supply Side Retirements | Retirement Date | Supply Side Additions |
|--------|-----------------------------------|-----------------|-----------------------------|---|--------------------|--------------------------|
| DCEK1 | 1 | 20,722 | DSM D | Retirement of Montrose Units 1, 2 and 3 | January 1,2016 | CT- 154 MW |
| DBEK1 | 2 | 20,774 | DSM D | Retirement of Montrose Units 1 and 2 | January 1,2016 | CT- 154 MW |
| AGEK9 | 3 | 20,830 | DSM A | Retirement of Montrose Unit 1 | January 1,2016 | CC-150 MW* |
| Source | Volume 6. Table 34 | | Volume 6, Tables 1, 2 and 3 | | | |

* Part of 300 MW CC installation, specified in the combined plan , AJDC2

KCP&L explains its selection of AGEK9 as its preferred plan on the grounds that the two lower cost plans are “not considered to be realistically achievable.” Table 5 below shows the savings levels of the “DSM A” and “DSM D” portfolios as a percentage of forecast energy and demand sales. The overall savings levels for DSM A are 0.30% of forecast sales per year, while the overall savings for DSM D are 0.62% per year. While the savings for DSM D are an approximate doubling of the savings anticipated in DSM A, it is not clear that the savings levels in DSM D are beyond what is “realistically achievable.” For example, the incremental energy savings levels from KCP&L’s MEEIA plan (outlined in EO-2012-0008 and, according to the IRP, the basis for DSM A) were 0.50% per year for three years, while the incremental savings for DSM D top out at 0.62%.

A 2011 benchmarking study of utility energy efficiency found “[t]he top 10 utilities all reported achieving single-year energy savings equal to 1 percent or more of their annual electricity sales”.² MDNR analysis of these results indicates that the average incremental savings from the 50 electric utilities cited in this study is 0.58% while the median savings is 0.45%.³ Given these statistics, it is difficult to believe KCP&L’s statement that 0.62% savings are not realistically achievable.

Potential Remedy

² M.J. Bradley and Associates, 2011. Benchmarking Electric Utility Energy Efficiency Portfolios in the U.S. http://www.mjbradley.com/sites/default/files/MJBA-Ceres_Benchmarking-EE-2011.pdf. See Schedule MDNR-1.

³ See the “MJB Utility Comparison” sheet in the “MDNR EO-2012-0323 Workpapers (HC) AB.xlsx” workbook.

A more complete estimation of achievable savings is necessary to justify the selection of a higher-cost alternative resource plan. KCP&L's analysis of its alternative resource plans shows again that the lowest-cost plan is one with a moderately aggressive DSM portfolio. A more detailed explanation of why one of these more aggressive plans should not be selected appears to be necessary.

Table 5: Incremental Energy Savings for KCP&L Portfolios DSM A and DSM D

| Year | Gross Energy, Net System Input (GWh) | Gross Energy, Net System Input (MWh) | DSM A | | | DSM D | | |
|------|--------------------------------------|--------------------------------------|---------------------------|--------------------------|---|---------------------------|--------------------------|---|
| | | | Energy (MWh) (Cumulative) | Incremental Energy (MWh) | Incremental Energy Savings of Gross Energy Forecast | Energy (MWh) (Cumulative) | Incremental Energy (MWh) | Incremental Energy Savings of Gross Energy Forecast |
| 2012 | 16,126 | 16,126,000 | 186,156 | 186,156 | 1.15% | 432,741 | 432,741 | 2.68% |
| 2013 | 16,282 | 16,282,000 | 186,938 | 782 | 0.00% | 544,034 | 111,293 | 0.68% |
| 2014 | 16,476 | 16,476,000 | 216,371 | 29,433 | 0.18% | 640,990 | 96,955 | 0.59% |
| 2015 | 16,618 | 16,618,000 | 272,017 | 55,646 | 0.33% | 725,596 | 84,607 | 0.51% |
| 2016 | 16,798 | 16,798,000 | 320,495 | 48,478 | 0.29% | 819,027 | 93,431 | 0.56% |
| 2017 | 16,899 | 16,899,000 | 362,798 | 42,303 | 0.25% | 921,377 | 102,350 | 0.61% |
| 2018 | 17,058 | 17,058,000 | 409,514 | 46,716 | 0.27% | 1,025,133 | 103,756 | 0.61% |
| 2019 | 17,229 | 17,229,000 | 460,689 | 51,175 | 0.30% | 1,130,324 | 105,191 | 0.61% |
| 2020 | 17,440 | 17,440,000 | 512,567 | 51,878 | 0.30% | 1,236,910 | 106,586 | 0.61% |
| 2021 | 17,571 | 17,571,000 | 565,162 | 52,595 | 0.30% | 1,344,850 | 107,940 | 0.61% |
| 2022 | 17,749 | 17,749,000 | 618,455 | 53,293 | 0.30% | 1,454,165 | 109,314 | 0.62% |
| 2023 | 17,930 | 17,930,000 | 672,425 | 53,970 | 0.30% | 1,564,894 | 110,729 | 0.62% |
| 2024 | 18,170 | 18,170,000 | 727,082 | 54,657 | 0.30% | 1,677,113 | 112,219 | 0.62% |
| 2025 | 18,332 | 18,332,000 | 782,447 | 55,365 | 0.30% | 1,790,882 | 113,769 | 0.62% |
| 2026 | 18,549 | 18,549,000 | 838,557 | 56,110 | 0.30% | 1,906,268 | 115,386 | 0.62% |
| 2027 | 18,785 | 18,785,000 | 895,441 | 56,885 | 0.30% | 2,023,327 | 117,059 | 0.62% |
| 2028 | 19,077 | 19,077,000 | 953,134 | 57,693 | 0.30% | 2,142,095 | 118,768 | 0.62% |
| 2029 | 19,280 | 19,280,000 | 1,011,663 | 58,529 | 0.30% | 2,262,560 | 120,465 | 0.62% |
| 2030 | 19,540 | 19,540,000 | 1,071,047 | 59,384 | 0.30% | 2,384,721 | 122,161 | 0.63% |
| 2031 | 19,797 | 19,797,000 | 1,131,280 | 60,233 | 0.30% | 2,508,020 | 123,299 | 0.62% |

Source Volume 1 Table 3: KCP&L Energy with and without DSM Impacts (GWh)

KCPL DSM Plans A E R Powell Mar 27 2012 Vol 6(4)B1245.xlsx

Deficiency #13. Questionable methodology for allocating combined plans.

There does not appear to be any underlying methodology for allocating the resources in the combined company plans. Rather, the combined plans appear to be constructed from previously identified company-specific resources.

Rule Citation

4 CSR 240-22.010(2)(B), 4 CSR 240-22.020(7), 4 CSR 240-22.020(46), 4 CSR 240-22.070(1), 4 CSR 240-22.070(2), 4 CSR 240-22.070(4)

Discussion

KCP&L introduces 36 alternative resource plans in Volume 6, 22 company-specific plans and 14 “combined company” plans. The KCP&L plans utilize KCP&L demand side, supply-side and renewable resources, while the combined company plans utilize supply side and renewable resources from each company. One notable difference between these two sets of plans is the range of DSM portfolios used in each case. The KCP&L plans utilize three DSM portfolios, “DSM A”, “DSM D” and “DSM E”⁴, while the combined plans only utilize one DSM portfolio, a combined “DSM A”. The energy and demand impacts for the combined “DSM A” portfolio are not analyzed in either the plan volumes or in the workpapers.

In its filing, KCP&L used its company-specific plans and the combined company plans for different purposes. The analysis of the company-specific plans was conducted to satisfy requirements of the Commission’s Special Contemporary Issues case (EO-2012-0041), while the analysis of the combined company plans was used to select the preferred plan (see Volume 6, p. 16 for the specification of the two “lowest cost” combined plans and the KCP&L versions, and Volume 7, pp. 2-4 for a discussion of the KCP&L preferred plan).

The quantitative basis for allocating combined company resources to KCP&L is not discussed. The KCP&L plans are notable for their consistency. There are standard portfolios of DSM resources deployed, a standard level of solar installation, a standard level of wind installation, a standard set of potential retirements, and a standard set of supply side choices. The two KCP&L plans identified from the combined plan, AGEK9 and AAK9, do not differ substantially from the other KCP&L specific plans.

For example, with the exception of plans ABK1 and EBK1, both of which are estimated in response to a particular Special Contemporary Issue, all of the KCP&L specific plans (including plans AGEK9 and AAK9) install the same amount of solar and wind resources on the same schedule. If resources were truly shared between the two companies, one might expect to see

⁴ The specifics of these plans are discussed in Concern 4, above.

greater variety in the allocations of resources. For example, the size and schedule of wind installations would be expected to vary between the companies and not be treated as discrete company-specific blocks. Table 6 illustrates this by comparing the lowest costs combined company plan (as identified in KCP&L Volume 6, Table 8) with the identified preferred plan from each company's individual filing.

By keeping resources in the combined plans discrete, the advantages of a combined plan, i.e., sharing of resources to lower operating costs, are lost. In its discussion of its combined plans, KCP&L does not provide any methodology for either the combination of resources or the allocation of capacity to each company. For example, Table 6 compares the resources from the preferred plans from the combined company analysis to the preferred plans from KCP&L and GMO. With one exception, the proposed installation of a 300 MW combined-cycle resource in 2028, each installed resource is allocated to each company discretely.

Table 6: Preferred plans from Combined Analysis, KCP&L and GMO plans

| | Combined Plans | KCP&L Preferred Plan | GMO Preferred Plan |
|----------------|--------------------------------|-----------------------------------|------------------------------|
| Resource | Plan AJDC2 | Plan AGEK9 | Plan ACCG9 |
| DSM | DSM A | DSM A | MEEIA DSM |
| Solar | 21 MW in 2018 | 11 MW in 2018 | 10 MW in 2018 |
| Solar | 12 MW in 2021 | 6 MW in 2021 | 6 MW in 2021 |
| Solar | 6 MW in 2023 | 3 MW in 2023 | 3 MW in 2023 |
| Wind | 100 MW in 2016 | 100 MW in 2016 | |
| Wind | 150 MW in 2019 | | 150MW in 2019 |
| Wind | 200 MW in 2020 | 200 MW in 2020 | |
| Wind | 100 MW in 2021 | | 100 MW in 2021 |
| Wind | 100 MW in 2023 | 100 MW in 2023 | |
| Wind | 100 MW in 2024 | | 100 MW in 2024 |
| Coal Retire | 170 MW in 2016 | 170 MW in 2016 (M1) | |
| Coal Retire | 99 MW in 2017 | | 99 MW in 2017 (S 1-2) |
| Combined Cycle | 300 MW in 2021 | | 300 MW in 2021 |
| Combined Cycle | 300 MW in 2028 | 150 MW in 2028 | 150MW in 2028 |
| Source | KCP&L Volume 6, Tables 6 and 7 | KCP&L Volume 6, Tables 1, 2 and 3 | GMO Volume 6, Tables 1 and 2 |

While the combined company plan selected as the preferred plan (AJDC2) is the lowest cost plan, the company-specific plans selected as the preferred plans are not. In the KCP&L case, the preferred plan (AGEK9) is the third lowest cost plan in terms of NPVRR values provided in Volume 6, Table 34.

In response to MDNR DR 35, the Company describes the allocation of renewable resources, DSM resources, supply side retirements and supply side additions in terms of “Company need.” Some of these components are specified by statute. For example, the renewable resources necessary to meet the company-specific RES requirements are merely added together in the combined plan. The DSM portfolio is artificially constrained to “DSM A”, which provides the same level of savings (0.5% energy savings per year) for each company. All company-specific retirements are also included in the combined plan. This leaves supply side additions as the only component of the plans that can vary. Once the preferred supply side addition was determined, adding two 300 MW combined cycle plants between 2021 and 2028, their allocation is accomplished purely on a per-company basis. The 2021 combined cycle plant is dedicated to GMO, while the 2028 combined cycle plant is evenly divided between KCP&L and GMO.

KCP&L and GMO convened a stakeholder meeting on July 27, 2012 to discuss its combined planning approach. While this meeting provided an opportunity for the Company to describe its combined planning approach, it also highlighted its limited approach to sharing of resources between KCP&L and GMO.

It appears that the range of outcomes and additions considered in estimation of the combined plan are overly constrained. Given these constraints, KCP&L’s use of the combined planning approach is questionable. The constraints placed on the levels of renewable resources and the DSM portfolios are especially troubling. As mentioned above, the difference between KCP&L’s “DSM A” portfolio and its “DSM D” portfolio is a 0.12% reduction in energy sales per year. Including a “DSM D” portfolio in the combined plans may produce a preferred plan with more than the \$8 million savings over the stand-alone KCP&L preferred plan.

Potential Remedy

In its annual update, KCP&L should provide a complete description of its approach to constructing combined plans and its allocation procedures. If the Company uses a combined planning approach in the future, the combined plan should include an articulated methodology for sharing demand side, supply side and renewable resources between companies.

Deficiency #14. Missing Analysis of Critical Uncertain Factors for KCP&L Preferred Plan.

KCP&L did not analyze the impacts of critical uncertain factors on its preferred plan.

Rule Citation

4 CSR 240-22.070(2), 4 CSR 240-22.070(4)

Discussion

4 CSR 240-22.070(2) and 4 CSR 240-22.070(4) specify the requirements of the critical uncertain factors to be used to determine when a preferred plan is no longer appropriate and a contingency plan should be considered. KCP&L presents the results of a contingency analysis for the combined company plan in Volume 7, pp. 9-16. This analysis considers the impact of six critical uncertain factors on the performance of the two lowest cost combined plans (AJDC2 and AGDC2):

1. CO₂ Price Uncertainty,
2. Load Growth Uncertainty,
3. Natural Gas Price Uncertainty,
4. Capital and Construction Cost Uncertainty,
5. Implementation of a Federal Energy Efficiency Standard, and
6. Loss of load

However, there is no similar analysis of KCP&L's allocated preferred plan (AGEK9). The combined plans contain a combination of resources from each company. While the contingency analysis shows the impacts of each critical uncertain factor on the joint resources in AJDC2, there is no analysis showing the impacts of the critical uncertain factors on the preferred plan for KCP&L specifically. Given that the Company has not provided a methodology for allocating the resources in the combined plan to each individual utility, it is not possible to allocate the impacts of the critical uncertain factors.

Possible Remedy

The analysis required by 4 CSR 240-22.070(2) and 4 CSR 240-22.070(4) should be conducted for KCP&L plan AGEK9 as part of KCP&L's annual update.

Concern #6. Federal renewable/clean energy standard as a critical uncertain factor

A potential federal renewable energy standard (RES) or clean energy standard (CES) will have significant impacts on renewable electricity generation and/or acquisition as well as associated costs. KCP&L's IRP plan is largely silent on a plan to address this issue.

Rule Citation

4 CSR 240-22.020(8), 4 CSR 240-22.060(5), 4 CSR 240-22.070(2)

Discussion

A number of bills have been introduced in the Congress within the past few years in order to enact a federal renewable energy standard or clean energy standard. The uncertainty of those federal policies will have more or less impacts on KCP&L's IRP process depending on specific provisions in those regulations. For example, Clean Energy Standard Act of 2012 (S.2146) introduced this year includes natural gas, nuclear, carbon capture and combined heat and power (CHP) in the definition of "clean energy". Apparently, these potential policies will affect KCP&L's decision greatly on supply side resources development and acquisition. It will also affect the rankings of potential supply side resources and eventually the integrated resource planning analysis. The IRP process could be further complicated since a national RES/CES will interact with other critical uncertain factors like fuel price and carbon policy. A preliminary analysis of a national RES/CES scenario is needed for a 20-year planning horizon.

Potential Remedy

KCP&L should investigate the impact of a RES and/or CES as a critical uncertain factor by modeling the scenario based on the recent legislative proposals.

Deficiencies and Concerns for 4 CSR 240-22.080

Deficiency #15. Inadequate analysis of combined plan

KCP&L and GMO conducted a combined planning exercise that estimated 14 combined-company plans, selected a combined preferred plan, identified contingency plans, and allocated the preferred plan back to each individual company. In completing the combined analysis, the Company neglected to meet the analysis and filing requirements described in the Chapter 22 rules.

Rule Citation

4 CSR 240-22.080(2)(C)2, 4 CSR 240-22.080(2)(D), 4 CSR 240-22.060(2)

Discussion

The filing requirements for integrated resource plans are described in 4 CSR 240-22.080(2)(C)2. This rule states: “The technical volume(s) shall be organized by chapters corresponding to 4 CSR 240-22.030-4 CSR 240-22.070.” This requirement dictates that the company should file a separate set of combined-company volumes to correspond to sections 4 CSR 240-22.030-4 CSR 240-22.070 of the rule. Instead, KCP&L dedicated parts of Volume 6 and 7 to discussion of its combined planning effort.

Additionally, key portions of the required analysis for alternative resource plans have not been provided for the combined plans. As described in Deficiency 12 (referring to 4 CSR 240-22.060(2)), key performance measures for the combined plans have not been provided in either Volume 6 or the workpapers. The required capacity balance tables for the combined plans (as required by 4 CSR 240-22.080(2)(D)) have been omitted.

Potential Remedy

The filing, analytical and reporting requirements of the rule are clear. KCP&L should present a revised combined plan that meets requirements of the Chapter 22 rules.

Deficiency #16. KPC&L requests acknowledgement of the combined company methodology rather than a preferred plan or resource acquisition strategy.

KCP&L is requesting acknowledgement of its decision to analyze its alternative resource plans on a “combined company” basis.

Rule Citation

4 CSR 240-22.080(17)

Discussion

Rule 4 CSR 240-22.080(17) states that

If the commission finds that the filing achieves substantial compliance with the requirements outlined in (16), the commission may acknowledge KCP&L’s preferred resource plan or resource acquisition strategy as reasonable at a specific date. The commission may acknowledge the preferred resource plan or resource acquisition strategy in whole, in part, with exceptions, or not at all.

The scope of commission “acknowledgement” is clearly limited to KCP&L’s “preferred resource plan or resource acquisition strategy.”

In Volume 8, p. 25, KCP&L makes the following request:

KCP&L requests Commission acknowledgement that it is *reasonable for KCP&L and GMO to perform resource planning on a joint company basis as evidenced by the significant savings to retail customers from such planning*. The results of resource analysis assuming a combined-company basis is that KCP&L benefitted by \$8 Million on a 20-year NPVRR basis in savings in comparison to the plan that would be selected for KCP&L on a stand-alone basis. This savings is due to increased capacity sales and the opportunity to share with GMO a smaller portion of a new combined cycle facility that would be built in 2021 under a combined-company scenario. (Emphasis added)

In making its acknowledgement request, KCP&L is asking the Commission to acknowledge its use of combined company planning approach in this plan and in the allocation methods used to create a KCP&L-specific preferred plan from its combined planning effort.

MDNR maintains that KCP&L's request for acknowledgement is not appropriate. KCP&L is not requesting acknowledgement of its preferred plan or its resource acquisition strategy. Rather, KCP&L is asking for acknowledgement of its methodology for conducting a combined company analysis. As highlighted in Deficiency 13 above, KCP&L has not described the methodology it used to allocate resources to the different companies. Instead, the combined company plans are simple combinations of discrete resources from each company. The overall revenue requirement for the combined plans is then calculated and the individual resources are allocated back to their original companies. There is no evidence of extensive resource sharing between the companies, and no detailed examination of the true savings that could occur by sharing resources. As it is, the methodology described above accounts for only small savings, on the order of \$8 million in a \$33 million combined plan.

The combined company plans are remarkable for including a single DSM portfolio, one based on each company's original MEEIA filings (in EO-2012-0008 and EO-2012-0009), rather than testing the other "very aggressive" ("DSM D") and "extremely aggressive" ("DSM E") portfolios that are common to both company's plans.

Once the two lowest-cost plans were identified, KCP&L relied on these plans for its contingency analysis, completely ignoring the circumstances that could cause KCP&L to adopt a different resource acquisition strategy independent of the actions of GMO.

These comments suggest that KCP&L plans have not met the Commission's threshold for acknowledgement, and that acknowledgement of KCP&L's planning methodology is not appropriate. It appears that KCP&L conducted a combined analysis without consulting the stakeholders or asking the Commission for an appropriate waiver, and is seeking to use the

acknowledgement provisions in the rule to request endorsement of its planning decisions after the fact.

Potential Remedy

KCP&L should comply with the rules as it conducts its plans and use the waiver process to justify major deviations from the standards for integrated resource planning, as specified in the Chapter 22 rules.

Special Contemporary Issues

Deficiency #17. Special Contemporary Issue B: Energy savings requirements for Special Contemporary Issue B have not been met.

The requirements for Special Contemporary Issue B have not been met.

Citation

Special Contemporary Issue B File No. EO-2012-0041.

Discussion

Special Contemporary Issue B File No. EO-2012-0041 states:

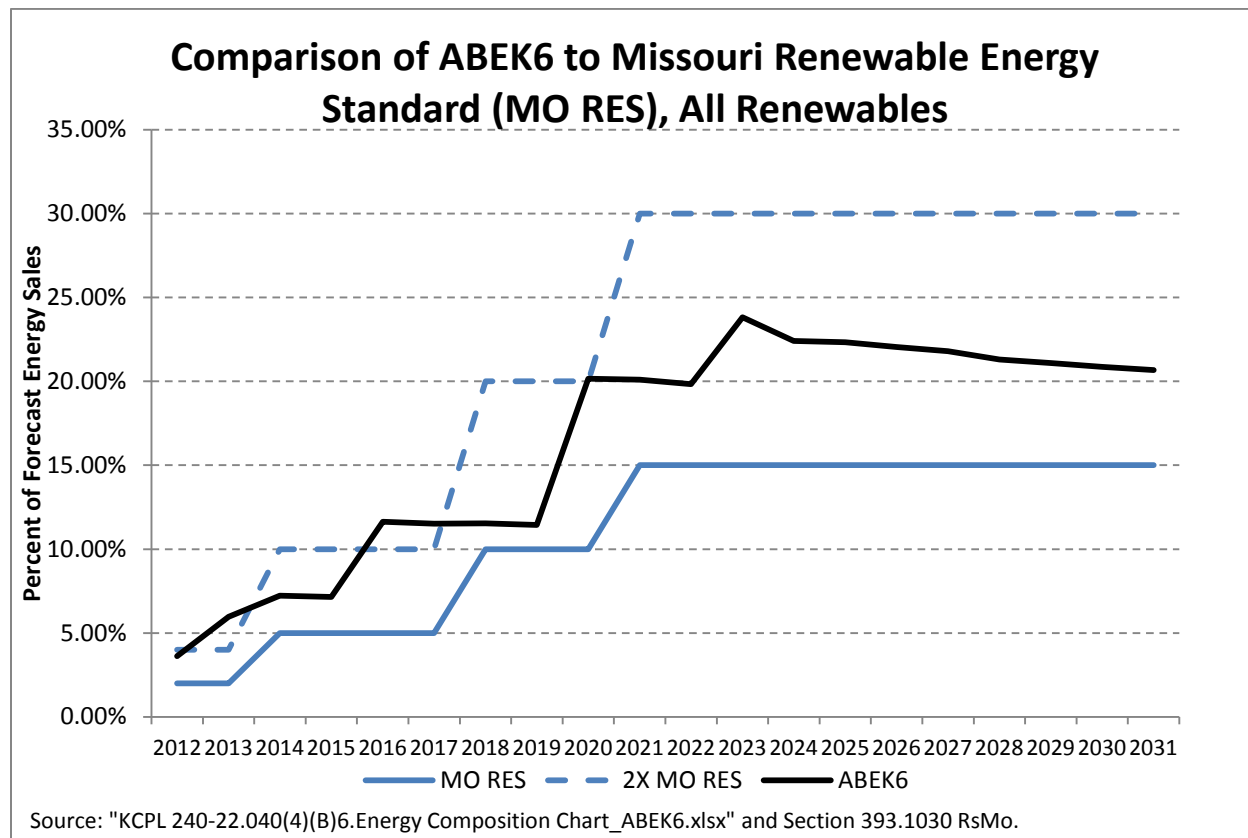
Investigate and document the impacts on KCP&L's preferred resource plan and contingency plans of a new much more aggressive renewable energy standard (e.g., at least double the current standard for Missouri) with no rate cap;

In Volume 8, KCP&L states "Alternative Resource Plan ABEK6 complies with this section." (Volume 8, p. 10). Analysis of the "Adjusted GWh" values (defined as "Wtd_GenGWh" in the energy composition workpapers) of the renewable energy resources (Wind, Solar and Hydro) for plan ABEK6 (as presented in workpaper "KCPL 240-22.040(4)(B)6.Energy Composition Chart_ABEK6.xlsx") shows that the renewable energy resources meet or exceed the performance levels specified in Special Contemporary Issue C ("at least double the current standard for Missouri") in only four of the twenty years of the plan (see Figure 1). This is despite the planned installation of 800 MW of wind resources between 2016 and 2023, a doubling of the wind resources installed in the other KCP&L plans (see Volume 6, Tables 1-3). While Volume 6, Table 1 indicates a doubling of wind capacity in plan ABEK6, relative to the other KCP&L plans, the energy produced by the additional capacity does not meet the standard specified in Special Contemporary Issue B.

Potential Remedy

The analysis for Special Contemporary Issue B should be repeated using a renewable portfolio that meets the requirements of the issue.

Figure 1: Comparison of ABEK6 to Missouri Renewable Energy Standard (MO RES), All Renewables



Deficiency #18. Special Contemporary Issue C: Energy savings requirements for Special Contemporary Issue C have not been met.

The requirements for Special Contemporary Issue C have not been met.

Citation

Special Contemporary Issue C File No. EO-2012-0041.

Discussion

Special Contemporary Issue C File No.EO-2012-0041 states:

Investigate and document the impacts on KCP&L's preferred resource plan and contingency plans of a very aggressive energy efficiency resource standard (e.g., annual energy savings of 1.5% each year for 20 years and annual demand savings of 1.0% each

year for 20 years from electric utility demand-side programs) with no rate cap in Missouri;

In Volume 8, KCP&L states “Alternative Resource Plan EBEK1 complies with this section.” (Volume 8, p. 10). Alternative resource plan “EBEK1” utilizes DSM Portfolio “E”, which has been defined by KCP&L as the “very aggressive DSM” case (see Volume 6, pp. 9, 29 and 149), however MDNR analysis of the incremental energy and demand savings from DSM Portfolio E relative to the energy forecast from Table 3 of Volume 1 shows that this portfolio does not meet the requirements of Special Contemporary Issue C.

Table 7 shows the incremental energy savings from Portfolio E for the 20 year planning horizon between 2012 and 2031. In no year do the incremental savings reach the 1.5% level specified in Special Contemporary Issue C. Savings levels range between 1.367% in 2013 and 1.018% in 2015. For the majority of the years in the planning horizon, the savings level is between 1.2115 and 1.250% of forecast energy sales.

In response to MDNR DR 32, KCP&L claims that DSM Portfolio E represents a 2% reduction in sales. As seen in Table 6, Portfolio E does not reach the less aggressive standards (1.5% annual savings each year) in Contemporary Issue C, much less the 2% annual savings claimed by the Company.

Table 7: Incremental Energy Savings from KCP&L DSM Portfolio “E”

| Year | Gross Energy, Net System Input (GWh) | Gross Energy, Net System Input (MWh) | Energy (MWh) (Cumulative) | Energy (MWh) (Incremental) | Incremental Energy Savings as a percentage of the of Gross Energy Forecast |
|------|---|--|---------------------------------|----------------------------------|--|
| 2012 | 16,126 | 16,126,000 | 865,482.96 | 865,482.96 | |
| 2013 | 16,282 | 16,282,000 | 1,088,068.41 | 222,585.46 | 1.37% |
| 2014 | 16,476 | 16,476,000 | 1,281,979.02 | 193,910.61 | 1.18% |
| 2015 | 16,618 | 16,618,000 | 1,451,192.23 | 169,213.21 | 1.02% |
| 2016 | 16,798 | 16,798,000 | 1,638,054.93 | 186,862.70 | 1.11% |
| 2017 | 16,899 | 16,899,000 | 1,842,754.80 | 204,699.87 | 1.21% |
| 2018 | 17,058 | 17,058,000 | 2,050,266.90 | 207,512.10 | 1.22% |
| 2019 | 17,229 | 17,229,000 | 2,260,648.31 | 210,381.41 | 1.22% |
| 2020 | 17,440 | 17,440,000 | 2,473,820.49 | 213,172.18 | 1.22% |
| 2021 | 17,571 | 17,571,000 | 2,689,700.80 | 215,880.31 | 1.23% |
| 2022 | 17,749 | 17,749,000 | 2,908,329.04 | 218,628.24 | 1.23% |
| 2023 | 17,930 | 17,930,000 | 3,129,787.80 | 221,458.75 | 1.24% |
| 2024 | 18,170 | 18,170,000 | 3,354,226.79 | 224,439.00 | 1.24% |
| 2025 | 18,332 | 18,332,000 | 3,581,764.95 | 227,538.16 | 1.24% |
| 2026 | 18,549 | 18,549,000 | 3,812,536.41 | 230,771.46 | 1.24% |
| 2027 | 18,785 | 18,785,000 | 4,046,653.57 | 234,117.16 | 1.25% |
| 2028 | 19,077 | 19,077,000 | 4,284,189.62 | 237,536.05 | 1.25% |
| 2029 | 19,280 | 19,280,000 | 4,525,119.63 | 240,930.00 | 1.25% |
| 2030 | 19,540 | 19,540,000 | 4,769,441.30 | 244,321.67 | 1.25% |
| 2031 | 19,797 | 19,797,000 | 5,016,039.56 | 246,598.27 | 1.25% |

Source Volume 1 Table 3: KCP&L Energy with and without DSM Impacts (GWh) KCPL DSM Plans A E R Powell Mar 27 2012 Vol 6(4)B1245.xlsx

Potential Remedy

The analysis for Special Contemporary Issue C should be repeated using a DSM portfolio that meets the requirements of the issue.

Concern #7. Special Contemporary Issue H: Response to Special Contemporary Issue H does not address the “demand-side investment mechanisms necessary to implement” an aggressive DSM portfolio.

The response to Special Contemporary Issue H does not analyze or document the demand-side investment mechanisms necessary to implement an aggressive DSM portfolio.

Citation

Special Contemporary Issue H File No. EO-2012-0041.

Discussion

Special Contemporary Issue H File No. EO-2012-0041 states:

Analyze and document aggressive DSM portfolios without constraints. Include analysis and documentation of demand-side investment mechanisms necessary to implement each DSM portfolio.

In Volume 8, KCP&L states “Alternative Resource Plans DBEK1 and DCEK1 comply with this section.

The necessary demand-side investment mechanism is described in case number EO-2012-0009 for Kansas City Power & Light’s Greater Missouri Operations.” (Volume 8, p. 12).

Discussion

While the DSM portions of plans of plans DBEK1 and DCEK1 (i.e., DSM Portfolio D) are more aggressive than the proposed MEEIA portfolio (DSM Portfolio A), there is no discussion of the Demand Side Investment Mechanism (DSIM) KCP&L would have to receive before it could implement a DSM plan to achieve this level of savings. The materials cited, the DSIM provisions for GMO’s MEEIA case (from EO-2012-0009) are not directly applicable to KCP&L, given the prohibition on riders and other rate adjustments agreed to by KCP&L in File No. EO-2005-0329. Additionally, the discussion of the DSIM in GMO’s MEEIA case anticipates implementation of GMO’s version of DSM portfolio A. There is no consideration of the additional program costs, incentive values, throughput disincentive recovery or program designs necessary to implement a more aggressive DSM portfolio.

Potential Remedy

In its annual update, KCP&L should provide an analysis showing the structure of a DSIM sufficiently robust to allow the implementation of KCP&L DSM Portfolio D.

Deficiency #19. Special Contemporary Issues I and J: KCP&L has not analyzed distributed generation, DSM programs, and combined heat and power projects in collaboration with municipalities and in the agricultural sector.

KCP&L has not conducted any analysis of programs targeted to the municipal or agricultural sectors.

Citation

Special Contemporary Issues I and J, File No. EO-2012-0041.

Discussion

Special Contemporary Issue I File No.EO-2012-0041 states:

Analyze and document the impacts of opportunities to implement distributed generation, DSM programs, and combined heat and power projects in collaboration with municipal water treatment plants and other local waste or agricultural/industrial processes with on-site electrical and thermal load requirements, especially in targeted areas where there may be transmission or distribution line constraints.

Special Contemporary Issue J File No.EO-2012-0041 states:

Analyze and document analysis of DSM programs targeted to achieve energy efficiency savings in the agricultural sector.

KCP&L did not present any analysis of the opportunities available in the agricultural or municipal sectors. In response to these two issues, KCPL cites its potential study statement of work in both Volume 5 and in its reply to MDNR DR 29.

In its reply to MDNR DR 29, KCP&L states: “However, KCP&L plans to file the results of this DSM Study in its required annual IRP update. *The annual update will include an analysis and documentation and programs, if appropriate, to achieve energy savings in the agricultural sector.*” (Emphasis added) However, these sectors are not addressed specifically as focus areas for the potential study analysis (see appendix 5a navigant_sow_signed_01162012.pdf). There is no indication that KCPL has done anything to consider opportunities in these two sectors.

Potential Remedy

An analysis of the opportunities and challenges of working in the agricultural and municipal sectors should be provided in KCP&L’s annual update.

Deficiency #20. Special Contemporary Issue K: Customer Information and Behavioral Modification programs not considered.

Customer information and behavior modification mentioned in Special Contemporary Issue K were not considered by KCP&L

Citation

Special Contemporary Issue K, File No. EO-2012-0041.

Discussion

Special Contemporary Issue K File No.EO-2012-0041 states:

Analyze and document alternative customer information/behavior modification program options to increase customer awareness and encourage more efficient use of energy.

Discussion

While KCP&L mentions tariff language for its “Residential Energy Reports Pilot Program”, part of its withdrawn MEEIA application, KCP&L has not considered or proposed any behavioral energy savings programs. The background document cited in its response to this issue (Appendix 5G 2011-01-5 KCPL_SmG_DOE_ProjKickOff_.ppt) is a presentation about KCP&L’s Smart Grid project and does not discuss behavioral programs.

KCP&L proposed a behavioral program in its MEEIA application; it has withdrawn its application and is not implementing its program in the KCP&L service territory. There has been no discussion indicating that this program will be considered in the future.

Potential Remedy

KCP&L should conduct a thorough program review of behavioral approaches to energy efficiency and customer conservation programs. This review should be presented to and discussed with KCP&L’s DSM collaborative. The Company should use the results to this review to design a pilot program using customer information and behavioral prompts to encourage customers to reduce their energy use.

Deficiency #21. Special Contemporary Issue L: The Environmental Impact of Plan ABEK6 has not been analyzed; the requirements of Special Contemporary Issue L have not been met.

The requirements of Special Contemporary Issue L have not been met.

Citation

Special Contemporary Issue L, File No. EO-2012-0041.

Discussion

Special Contemporary Issue L File No.EO-2012-0041 states:

Analyze potential or proposed changes in state or federal environmental or renewable energy standards and report how those changes would affect KCP&L's plans for compliance with those standards.

In Volume 8, KCP&L states "Alternative Resource Plan ABEK6 complies with this section." (Volume 8, p. 14). Plan ABEK6 provides a more aggressive renewable portfolio than the standard renewable portfolio (see the discussion of Deficiency 11 above). However, KCP&L offers no discussion of how the implementation of this plan will impact KCP&L's plans for compliance with environmental standards.

Potential Remedy

The analysis for Special Contemporary Issue L should be repeated using a renewable portfolio that meets the requirements the issue in KCP&L's annual update.

Schedule MDNR-1: M.J. Bradley and Associates, 2011. Benchmarking Electric Utility Energy Efficiency Portfolios in the U.S.

Benchmarking Electric Utility Energy Efficiency Portfolios in the U.S.

M.J. Bradley & Associates, LLC

November 2011

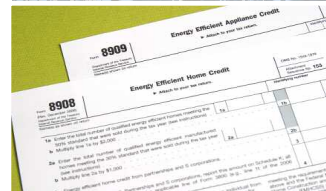


Table of Contents

| | |
|--|----|
| Acknowledgements | 3 |
| Foreword | 4 |
| Preface | 5 |
| Executive Summary | 6 |
| Introduction | 8 |
| Energy Efficiency: State of the Market | 9 |
| Purpose of Benchmarking | 11 |
| Benchmarking Challenges | 13 |
| Utility Selection | 17 |
| Benchmarking Electric Energy Efficiency Portfolios | 21 |
| Expenditures | 21 |
| Impacts | 24 |
| Cost-Effectiveness | 27 |
| State Policies | 27 |
| Regional Updates | 32 |
| Northeast | 32 |
| Southeast | 32 |
| Midwest | 33 |
| Mid-Atlantic | 33 |
| Mountain West | 33 |
| West | 34 |
| Southwest | 34 |
| Data Sources, Issues, and Quality | 35 |
| Sources | 35 |
| Issues | 36 |
| Quality | 37 |
| Benchmarking Metrics | 38 |
| Spending | 38 |
| Impacts | 39 |
| Cost-Effectiveness | 40 |
| Data Recommendations | 41 |
| Endnotes | 42 |

Acknowledgements

This report was funded by a grant from the Energy Foundation. We would like to acknowledge and thank the following people who made this report possible.

REPORT AUTHORS

Brian Jones, MJB&A (M.J. Bradley & Associates, LLC)
Lily Hoffman-Andrews, MJB&A
Isaac Liberman, MJB&A
Lea Reynolds, MJB&A
Austin Whitman, MJB&A

REPORT REVIEWERS AND CONTRIBUTORS

David Wooley, Energy Foundation
Dan Mullen, Ceres
Dan Bakal, Ceres
Devra Wang, NRDC
Ralph Cavanagh, NRDC
Dan York, ACEEE
Derek Murrow, ENE (Environment Northeast)
Sam Krasnow, ENE
Steven Schiller, Schiller Consulting
Chris James, RAP
Niko Dietsch, US EPA
Joe Bryson, US EPA
Jeff Brown, US EPA

Report photo images are from PhotoDisc and iStock.

Foreword

In these uncertain economic times, making smart investments in energy is of paramount importance. Our country faces a critical need for jobs, energy security, and cleaner ways to power our economy. Investing in energy efficiency has the potential to help address each of these challenges.

Utilities are at the center of the energy efficiency opportunity. They manage millions of customer relationships, hold data on energy use patterns across their service territories, and have the ability to assist utility commissions by displacing generation with sound energy efficiency policies.

Twenty-six states have recognized that energy efficiency is the cheapest way to meet new and existing demand, and have implemented some form of energy efficiency resource standard. Many utility regulators have established rules that require utilities, such as National Grid, to invest in cost-effective energy efficiency before investing in new power plants.

The rationale for this is clear. Cost-effective energy efficiency measures allow us to provide customers with one kilowatt-hour of energy savings for between three and five cents. In comparison, customers around the United States pay between 6.5 cents and 16.5 cents for their electricity, depending on where they live. As a result, investing in energy efficiency can typically produce three to four dollars of savings for each dollar invested. In 2012, our total savings through new energy efficiency investment in Massachusetts is expected to be over one million megawatt-hours—as much electricity as 92,000 typical homes would use in a year.

At the same time as it is saving us money and reducing emissions, energy efficiency is helping our economy. Energy efficiency projects yield positive returns for our customers, create local jobs for thousands of workers, and save millions of megawatt-hours of electricity. We managed to grow our economy in Massachusetts by nearly four percent per year from 1999 through 2009, even while the state's electricity consumption grew less than one percent per year. Decreasing energy intensity in this way provides significant competitive advantage to Massachusetts and to our entire country.

National Grid welcomes this MJB&A report as a clear assessment of the status quo. It evaluates utility-sponsored energy efficiency programs and improves our ability to understand their reach, identify their strengths, and fix their weaknesses. We hope that this report will in fact be followed by others, and that the industry will in turn benefit by gaining access to industry-wide metrics that help us be smarter and more effective with our programs.

Edward White, Jr.
Vice President, Energy Products
National Grid

Preface

The goal of this report is to highlight the importance—and the challenges—of benchmarking electric utility energy efficiency portfolios, and to initiate a benchmarking process that will continue to evolve over time. Benchmarking allows for direct comparison of spending and energy savings across electric utility energy efficiency portfolios. This report discusses the difficulties involved in benchmarking energy efficiency portfolios, evaluates and recommends a suite of metrics, and demonstrates these metrics using a diverse set of electric utilities.

Many energy efficiency reports evaluate state-level policies and aggregate results or highlight individual programs of leading utilities. This report is different in that it provides a top down analysis of electric utility energy efficiency portfolios—something that is not routinely provided publicly today. This has not been done to date not because no one has thought of it, but rather because existing datasets are challenging to compare given the different approaches to portfolio design, implementation and accounting for energy savings that exist from jurisdiction to jurisdiction and hence from utility to utility.

Data on U.S. ratepayer-funded energy efficiency portfolios are available to the public through databases maintained by federal agencies. Electric power industry participants in the United States are required to report demand side management spending and energy savings data to the Energy Information Administration (EIA) through form EIA-861. Other sources of data include public utility commissions, which often require utilities to file program planning documents, independent evaluation, monitoring and verification reports (EM&V), and annual spending and energy savings information on their energy efficiency programs, and industry data gathering efforts such as that of the Consortium for Energy Efficiency (CEE). This report is based on 2009 utility level data publicly available from EIA.

Ideally, benchmarking should serve as a key component of the effort to increase deployment of energy efficiency by broadly identifying the best-performing portfolios. This could potentially lead to greater cooperation around the industry over successful program implementation and helping regulators set targets and appropriate budgets. While the benchmarking is not perfect, it illustrates the relative magnitude of energy efficiency spending and energy savings.

Benchmarking utility energy efficiency programs is becoming increasingly important as ratepayer funded budgets grow and as state and federal policymakers evaluate policies to address energy and environmental issues. This inaugural report does not include efficiency programs in natural gas and fuel oil nor does it include efficiency programs administered by third parties, as EIA does not require the reporting of this information. These are likely to be included in future reports if any when these data become widely available.

The report is available in PDF format on the Internet at <http://www.mjbradley.com>. For questions or comments about this report, please contact:

MJB&A

47 Junction Square Drive

Concord, MA 01742

Telephone: (978) 369-5533

Executive Summary

This report examines and compares the energy efficiency expenditures and energy savings of a diverse set of electric utility ratepayer-funded energy efficiency portfolios in the United States while highlighting the challenges that face this and similar efforts. Given the current shortcomings of publicly available data, this report should be viewed as an opening statement in an ongoing dialogue over the importance of comparing energy efficiency portfolios and the process for doing so.

Table ES-1 lists the 50 electric utilities featured in this report ranked by total electricity sales. These utilities include public and private entities that together account for nearly one third of retail electricity sales and over two thirds of electric energy efficiency spending reported to the Energy Information Administration (EIA) through form EIA-861 in the 2009 data year.

The list includes 37 investor-owned utilities, four municipal utilities, five utilities controlled by states or political subdivisions, three electric cooperatives, and one federal utility. These utilities were selected to reflect a diverse and representative sampling of distribution companies throughout the U.S. that administer energy efficiency portfolios for the benefit of their customers. The utilities were selected based on data availability to represent a wide range of spending, savings, region of operation, electricity prices, and a variety of other factors.

Table ES-1: Selected Utilities by Total Retail Electricity Sales

| Utility Name | Parent Company Name | 2009 MWh (millions) | Utility Name | Parent Company Name | 2009 MWh (millions) |
|-----------------------------------|----------------------------|---------------------|---------------------------------------|---------------------------------|---------------------|
| Florida Power & Light | NextEra Energy | 102.8 | City of San Antonio | CPS Energy | 20.0 |
| Pacific Gas & Electric | PG&E | 86.0 | Entergy Arkansas | Entergy | 19.9 |
| Southern California Edison | Edison International | 85.8 | Duke Energy Ohio | Duke | 19.6 |
| Georgia Power | Southern | 81.3 | Long Island Power Authority | Long Island Power Authority | 19.3 |
| PacifiCorp | MidAmerican | 52.8 | Southwestern Electric Power | AEP | 16.1 |
| Alabama Power | Southern | 51.0 | Interstate Power & Light | Alliant Energy | 14.9 |
| Progress Energy Florida | Progress Energy | 37.8 | Indianapolis Power & Light | AES | 14.1 |
| Consumers Energy | CMS Energy | 35.4 | Idaho Power | IDACORP | 13.9 |
| Union Electric | Ameren | 35.1 | Metropolitan Edison | FirstEnergy | 13.5 |
| Northern States Power - Minnesota | Xcel | 34.7 | Austin Energy | Austin Energy | 12.0 |
| Baltimore Gas & Electric | Constellation | 31.6 | Sacramento Municipal Utility District | SMUD | 10.7 |
| Tennessee Valley Authority | Tennessee Valley Authority | 30.2 | Santee Cooper | Santee Cooper | 10.2 |
| Arizona Public Service | Pinnacle West | 28.2 | Omaha Public Power District | Omaha Public Power District | 10.1 |
| Public Service of Colorado | Xcel | 27.4 | Seattle City Light | Seattle City Light | 9.7 |
| Potomac Electric Power | Pepco Holdings | 26.5 | Mississippi Power | Southern | 9.3 |
| Duke Energy Indiana | Duke | 26.2 | Avista | Avista | 9.0 |
| Salt River Project | Salt River Project | 26.2 | Public Service of New Mexico | PNM Resources | 8.9 |
| Wisconsin Power & Light | Alliant Energy | 9.9 | Public Service of New Hampshire | Northeast Utilities | 7.7 |
| Ohio Power | AEP | 24.9 | Narragansett Electric | National Grid | 7.6 |
| Puget Sound Energy | Puget Holdings | 23.9 | El Paso Electric | El Paso Electric | 7.1 |
| Ohio Edison | FirstEnergy | 22.9 | Western Massachusetts Electric | Northeast Utilities | 3.6 |
| Connecticut Light & Power | Northeast Utilities | 22.3 | Lee County Electric Cooperative | Lee County Electric Cooperative | 3.5 |
| Nevada Power | NV Energy | 21.4 | Lincoln Electric System | Lincoln Electric System | 3.1 |
| Massachusetts Electric | National Grid | 21.0 | United Electric Coop Service | United Electric Coop Service | 1.8 |
| MidAmerican Energy | MidAmerican | 20.4 | Fairfield Electric Cooperative | Fairfield Electric Cooperative | 0.6 |

The selected utilities are benchmarked on energy efficiency spending and savings reported to EIA. Specifically, the utilities are ranked based on the following metrics:

- Total energy efficiency expenditures;
- Efficiency expenditures per megawatt-hour of retail sales (relative spending);
- Total incremental savings (savings from measures implemented during the reporting year); and
- Incremental savings as a percentage of megawatt-hours delivered (relative savings).

These metrics were chosen because they provide a relatively fair assessment of both the absolute and relative status of utility-administered energy efficiency portfolios, based on available data reported by the utilities to EIA. Issues with data availability prevented the inclusion of metrics tracking changes in spending and savings over time, or calculating cost-effectiveness.

The selected utilities varied considerably in their levels of annual energy efficiency portfolio spending and savings achieved.

- Reported energy efficiency expenditures of the selected utilities ranged from under \$100,000 (Fairfield Electric Cooperative) to nearly \$410 million (Pacific Gas & Electric).
- Normalized for retail electricity sales, reported energy efficiency expenditures ranged from about \$0.02 per megawatt-hour of retail electricity sales (Ohio Edison) to about \$4.80 per megawatt-hour of retail electricity sales (Pacific Gas & Electric).
- Reported annualized energy savings from new energy efficiency measures ranged from about 500 (Ohio Edison) to nearly 1.6 million megawatt-hours (Southern California Edison and Pacific Gas & Electric).
- As a percentage of total retail sales, the selected utilities reported energy savings from under 0.1 percent to nearly 2 percent.
- The top 10 utilities all reported achieving single-year energy savings equal to 1 percent or more of their annual electricity sales.

Larger and more successful programs tend to coincide with stable multiyear budgets, clear energy savings goals, and mechanisms that align utility financial incentives with delivery of effective energy efficiency portfolios.

State policies and political support for energy efficiency are major drivers of utility spending, particularly for regulated, investor-owned utilities. Through an appropriate mix of policies, states can remove the disincentives traditional regulation created for a utility to aggressively pursue cost-effective energy efficiency.¹ Not surprisingly, larger and more successful programs tend to coincide with stable multiyear budgets, clear energy savings goals, and mechanisms that align utility financial incentives with delivery of effective energy efficiency portfolios (for example, decoupling of utility revenues from electricity sales and shareholder incentives to achieve savings from consumer energy efficiency programs).

The extent to which programs differ by region indicates the importance of variations in state policy and climatic zones, customer composition, utility experience, and the evaluation, measurement, and verification provisions in place.

A major obstacle to benchmarking ratepayer-funded energy efficiency portfolios is the availability, quality, and comparability of data. Currently, there is no comprehensive data source that collects and publicly releases all the data necessary to conduct a robust benchmarking of energy efficiency programs. While comprehensive national data are not available, state utility commissions generally provide rigorous oversight of energy efficiency program plans, spending and energy savings and require that significant resources be dedicated to evaluation, measurement, and verification. The data shortcomings that impact national benchmarking are largely due to the lack of current federal reporting programs' lack of rigorous, standardized definitions; quality assurance and quality control; and needed authority and financial resources for EIA.

Introduction

This report provides a discussion of benchmarking ratepayer-funded electric utility energy efficiency portfolios in the United States. Measuring and comparing energy efficiency portfolios is becoming increasingly important as energy efficiency begins to play a larger role in our nation's energy mix, and utility energy efficiency budgets increase.² The goal of this report is to highlight the importance—and the challenges—of benchmarking electric energy efficiency portfolios, and to initiate a benchmarking process that will continue to evolve over time.

This report focuses solely on utility-administered electric energy efficiency portfolios. Although efficiency programs exist for natural gas and other fuels, there are insufficient data available at this time to allow benchmarking of these programs. Similarly, due to data and comparability issues, third-party administrators, which manage some or all efficiency programs in certain states, are not included in this report.

While electric utility companies are currently benchmarked against their peers on a variety of issues, ranging from reliability and customer satisfaction to air emissions and sustainability, there is currently no comprehensive ranking of the industry's energy efficiency portfolios by utility. This is a gap that should be addressed in order to provide better information for stakeholders and improve the quality and performance of efficiency programs. A benchmarking analysis can provide tremendous value for stakeholders and regulators who want to compare the magnitude of energy efficiency portfolio budgets and energy savings between electric utility companies, recognize best practices, and perhaps most importantly, discover where utilities are lagging behind and identify opportunities for action.

As with any benchmarking process, the main challenge in ranking energy efficiency portfolios is to establish an informative set of comparative metrics, based on data that is available, consistent, and reliable. This report discusses the difficulties involved in benchmarking energy efficiency portfolios, evaluates and recommends a suite of metrics, and demonstrates these metrics using a diverse set of electric utilities.

Many energy efficiency reports aggregate energy efficiency programs at a state or national level, or highlight individual programs as best practices. This report is different in that it provides a top-down analysis of a diverse mix of energy efficiency portfolios administered by individual electric utilities across the United States. This type of analysis has not been conducted to date due to the unique challenges it poses. Currently, publicly available data on utility energy efficiency programs have numerous issues with quality and comparability. As such, any initial attempt to benchmark utilities using these data will necessarily be flawed. This report will serve to illustrate the relative magnitude of energy efficiency expenditures and energy savings between selected utilities, and to highlight the work that still needs to be done in providing publicly available, quality-assured, and comparable data.

The main challenge in ranking energy efficiency portfolios is to establish an informative set of comparative metrics, based on data that is available, consistent, and reliable.

Energy Efficiency: State of the Market

Policymakers, electric utilities, and other stakeholders broadly agree that energy efficiency is a proven, least-cost energy resource that should play a foundational role in the nation's energy strategy. Energy efficiency lowers bills for customers, enhances grid reliability, offsets the need for new generation and transmission capacity, reduces air pollution and other supply-side environmental impacts, creates jobs, and expands markets for energy-efficient technologies and services.

New EPA rules regulating air emissions from fossil fuel power plants will require electric utilities to deploy a wide range of pollution-control technologies, new power plants with relatively low emissions, and demand-side measures to reduce air emissions from electricity production.

Investments in energy efficiency create construction and manufacturing jobs and redirect spending from energy—which creates very few jobs per dollar spent—to more employment-intensive industries. For example, one study found that California's energy efficiency policies from 1972-2006 drove a net increase of 1.5 million full-time equivalent jobs, and saved households \$56 billion on their energy bills.³

In its widely-cited market survey, McKinsey & Company estimates that total 2008 efficiency market spending was on the order of \$10 to \$12 billion: \$2.5 billion through utility programs, \$3.5 billion through Energy Service Companies (ESCOs), and \$4 to \$6 billion on "insulation and devices."⁴ This excludes expenditures of \$8 to \$10 billion on energy-saving equipment and services mandated by building codes.⁵

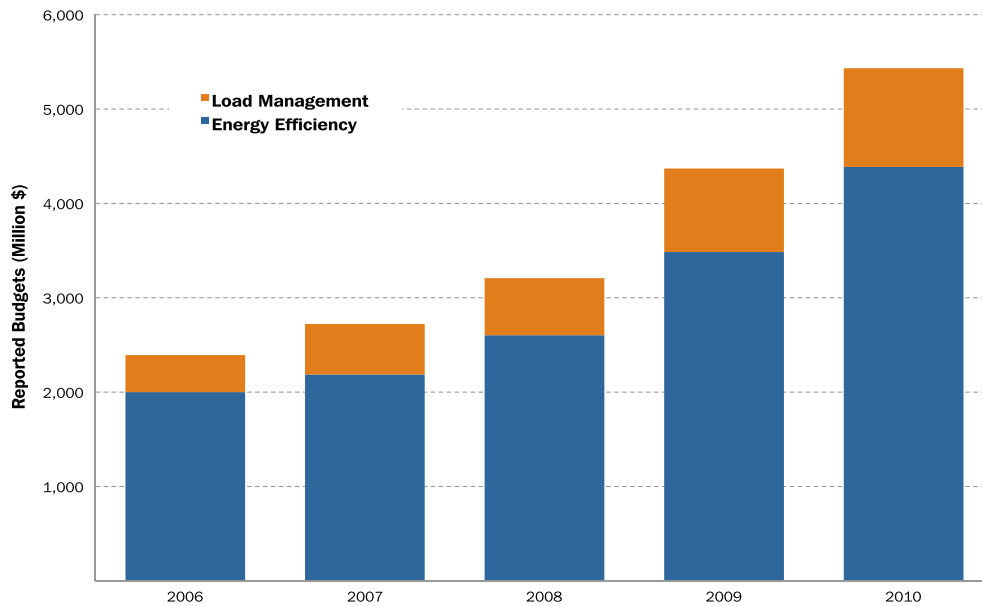
Support for energy efficiency has expanded significantly in recent years. For instance, the American Recovery and Reinvestment Act of 2009 (Recovery Act) included the largest single investment in energy efficiency in U.S. history. Approximately \$30 billion was allocated for energy efficiency programs, about \$12 billion of which went directly to states.⁶ For some states, these funds constituted their first significant investments in energy efficiency and introduced consumers and policy-makers to the benefits of energy efficiency.

As states gain more experience with energy efficiency programs, multiyear funding plans have become more commonplace. Such plans are critical to ensure successful ongoing implementation of efficiency measures, as they provide certainty for consumers, utilities, and third-party contractors while allowing for better long-term planning and increased administrative efficiency. While states in the Northeast, California, and the Pacific Northwest have traditionally led the way, policy support for efficiency has grown fastest in Midwestern and Mid-Atlantic states over recent years.⁷

According to the Consortium for Energy Efficiency's (CEE) most recent survey, ratepayer-funded efficiency programs (including both utilities and third-party administrators) budgeted over \$5.4 billion in demand-side management spending for 2010. This represents a 24 percent increase over reported 2009 budgets of nearly \$4.4 billion.⁸ *Figure 1* illustrates this rapid growth in DSM budgets, with energy efficiency leading the way.

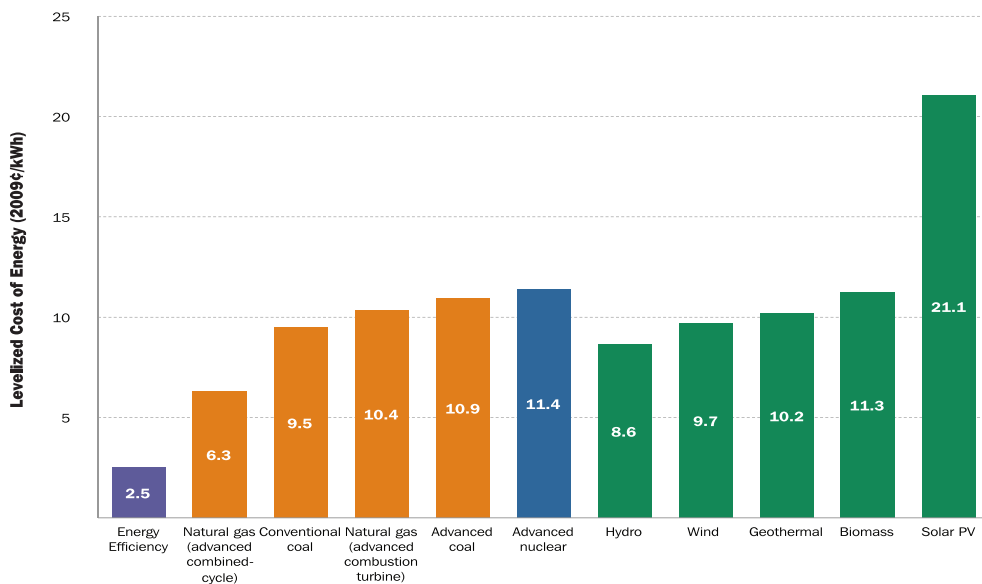


According to the Consortium for Energy Efficiency's most recent survey, ratepayer-funded efficiency programs budgeted over \$5.4 billion in demand-side management spending for 2010. This represents a 24 percent increase over reported 2009 budgets of nearly \$4.4 billion.

Figure 1: Growth of Reported Energy Efficiency Budgets (2006—2010)

Source: Consortium for Energy Efficiency

Although budgets for ratepayer-funded electric energy efficiency programs have increased substantially in recent years, these expenditures comprise just a small fraction of total electric sector spending. In 2009 ratepayer-funded electric efficiency programs totaled \$4.4 billion, but by comparison, consumers spent nearly \$360 billion on electricity.⁹ In the same year, power producers brought over 23 gigawatts of new generating capacity online for an estimated cost of about \$34.5 billion.^{10,11} This new generation is significantly more expensive than energy efficiency; many researchers and utilities have conducted detailed evaluations of energy efficiency costs relative to generation and consistently find that supply-side resources cost at least three times as much as energy efficiency on a kilowatt-hour basis. *Figure 2* compares EIA's projections of the cost of various types of new generation in 2016 with the average cost of energy efficiency.^{12,13}

Figure 2: Cost of Energy Efficiency vs. Levelized Cost of New Generation (2016)

Source: EIA Annual Energy Outlook 2011 and ACEEE

Purpose of Benchmarking

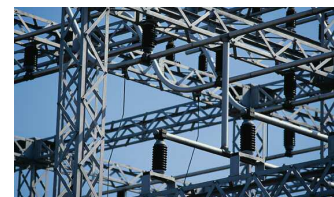
Transparent information on ratepayer-funded energy efficiency portfolios is useful to a wide range of decision-makers, including electric companies, financial analysts, investors, policymakers, and consumers.

For electric utilities, the provision of transparent information supports corporate self-evaluation and business planning by allowing companies to assess their performance relative to key competitors, prior years, and industry benchmarks. By understanding and tracking their performance, companies can evaluate how different business decisions may affect performance over time, and how they may more appropriately consider energy supply and demand issues in their corporate policies and business planning.

The financial community and investors in the electric utility industry need accurate information concerning energy efficiency investments and outcomes in order to evaluate how utilities are adjusting their business models to focus on demand-side resources. Energy savings information is material to investors and can be an important indicator of how well a company is maintaining resource diversity and managing customer costs and risks such as future environmental regulation and fuel price volatility. Furthermore, the increasing prevalence of incentives for utilities that achieve or surpass savings targets represents an emerging opportunity for shareholders to benefit from successful efficiency programs.

Information on energy efficiency rankings is also useful to state and federal policymakers who are working to develop long-term solutions to energy and environmental issues. Information about energy efficiency helps policymakers by indicating which regulatory policies have been effective, where opportunities may exist for improvements, and where policy action is required to encourage further energy efficiency gains.

Finally, benchmarking information is valuable to electricity consumers. Accurate information on the costs and impacts of energy efficiency investments builds public awareness of energy and environmental issues and the fact that efficiency remains a plentiful resource with lower costs than supply-side investments. A straightforward, public comparison of efficiency programs allows consumers to judge how well their utility uses ratepayer dollars to deploy energy efficiency relative to others across the country, and the efficacy of the programs the utility implements. This knowledge enables consumers to hold companies accountable for decisions and activities that affect their electricity bills and rates, as well as the environment and public health.



Accurate information on the costs and impacts of energy efficiency investments builds public awareness of energy and environmental issues and the fact that efficiency remains a plentiful resource with lower costs than supply-side investments.

Benchmarking efficiency portfolios can also help the public verify that companies are meeting their energy reduction and environmental commitments. For example, some electric companies are establishing voluntary energy and emissions reduction goals; other companies are required by statute to make such reductions. Public information is necessary to verify the energy and emission reduction claims made by utilities. Public awareness of companies' environmental performance supports informed public policymaking by promoting understanding of the economic and environmental tradeoffs of different energy supply and demand-side options and policy approaches.

Benchmarking is not a new concept for the electric utility sector. In fact, electric utilities are routinely benchmarked or benchmark themselves on a wide range of business and operational issues including, but not limited to, the following:

- Compensation packages of top level executives;
- Customer satisfaction;
- Reliability performance;
- Safety records;
- Air pollution and greenhouse gas emissions;
- Climate change-related risks and opportunities; and
- Sustainability efforts.

In the future, robust benchmarking of efficiency programs should aim to fill the current void and create a comprehensive comparison of efficiency programs to support greater stakeholder involvement.

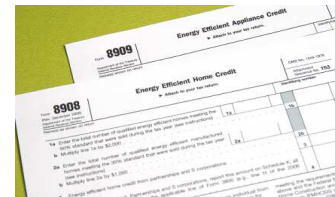
Benchmarking Challenges

Currently, the greatest obstacles to benchmarking electric energy efficiency portfolios are data availability and comparability. Publicly available data on efficiency portfolios are limited, contain gaps, and lack quality assurance. For a detailed discussion of these problems, see the “Data Sources, Quality, and Problems” section of this report.

Even with improved data, comparing efficiency portfolios of utilities that operate under different circumstances and policy regimes would present considerable challenges. Factors that tend to confound comparisons between utility efficiency portfolios include, among others, differences in measuring and accounting for energy savings; regulatory structures; geographic region of operation; customer composition; electricity rates; and utility experience. Below is a brief overview of several ways which two utilities may differ and how these differences can affect the comparison of energy efficiency portfolios.

Evaluation, Measurement & Verification Standards

Evaluation, measurement, & verification (EM&V) protocols are used to estimate savings from individual efficiency projects, programs, and portfolios. Differences in EM&V standards for efficiency programs across jurisdictions raise considerable concerns over the comparability of program results. State public utility commissions (PUCs) or other regulatory authorities are typically responsible for establishing EM&V requirements for the efficiency programs under their jurisdiction. According to a recent report released by the Lawrence Berkeley National Laboratory, nearly 20 states have created or are in the process of creating their own EM&V protocols or guidelines for energy efficiency efforts.¹⁴ As such, the definition and measurement of a megawatt-hour saved may vary from state-to-state. For example, utilities in Minnesota, Iowa, and Maine report gross savings while those in other states, such as California and Vermont, perform net-to-gross analysis and report verified net savings. Some states use “stipulated” savings values (based on standard assumptions of the energy savings provided by particular projects), while others conduct considerably more on-site analysis. Which data are reported to regulatory bodies can vary as well: some utilities may report ex ante expectations of savings, while others may report ex post savings values that have been subjected to verification and review. Several organizations are currently working to increase the consistency of EM&V across the industry at either the regional or national level, including:



Factors that tend to confound comparisons between utility efficiency portfolios include, among others, differences in measuring and accounting for energy savings; regulatory structures; geographic region of operation; customer composition; electricity rates; and utility experience.

- The Northwest Regional Technical Forum (RTF) serves as a model for developing common regional EM&V protocols.¹⁵
- The Northeast Energy Efficiency Partnership manages the Evaluation, Measurement, and Verification Forum (EM&V Forum). The EM&V Forum is a multi-year project to support the development and use of consistent EM&V protocols, and in the reporting of savings impacts and costs for energy efficiency and demand-side resources.¹⁶
- The North American Energy Standards Board has begun a process that may lead to the development of M&V standards that would apply to both wholesale and retail energy efficiency markets.¹⁷
- The State and Local Energy Efficiency Action Network (SEE Action) is a state and local effort facilitated by the federal government that helps states, utilities, and other local stakeholders take energy efficiency to scale and achieve all cost-effective energy efficiency by 2020. The EM&V Working Group leads the SEE Action efforts to improve energy efficiency management by increasing the accuracy, credibility, and timeliness of EM&V results.¹⁸

Despite these efforts, there is currently no national standard for how program-level EM&V is conducted. There is also a lack of consistency in what gets reported by program administrators to EIA. In other words, there are two key areas for uncertainty: one is the differences in measurement practices by utilities as directed by their utility commissions, and the other is the decision of what values are reported to EIA. Therefore, even when savings data are available and appear reasonably sound, they may not be directly comparable to savings reported by a utility in a different state.

Regulatory and Policy Differences

Electric utilities charge their customers based on the quantity of electricity they consume. These volumetric charges are used to pay for fixed costs such as the cost of owning, operating and maintaining transmission and distribution equipment. However, under a regulatory model in which utility revenues are tied to the volume of energy sales, energy efficiency leads to lower revenues by reducing demand or demand growth. Traditional regulation is therefore often a major obstacle to maximizing investment in low cost energy efficiency programs.

Regulators in many states have taken action to eliminate the disincentives present for energy efficiency in the volume model through mechanisms that align utility financial incentives with delivery of effective energy efficiency programs. One method is “decoupling,” in which utilities’ revenues do not depend on the volume of electricity sales.

Increasingly, states have also created performance incentives that offer investor-owned utilities an opportunity to earn a profit on energy efficiency, to help level the playing field with investments in generation. In many states, utilities can share in the overall bill savings the efficiency programs provide to customers, encouraging utilities to maximize energy savings while minimizing the costs of programs. In other states, utilities can earn bonuses for exceeding energy efficiency targets such as those required by a state’s EERS, or can earn a rate on return on efficiency investments as they would on supply-side investments. Such shareholder incentives have proven to be correlated with higher utility investment in energy efficiency programs.¹⁹

Increasingly, states have also created performance incentives that offer investor-owned utilities an opportunity to earn a profit on energy efficiency, to help level the playing field with investments in generation.

Another policy aimed at expanding efficiency efforts is an Energy Efficiency Resource Standard (EERS). These policies, currently only enacted at the state level, require electric distribution companies to meet energy savings goals. As of December 2010, 30 states had adopted or had a pending EERS or energy savings target—more than double the number of states in 2006.²⁰ Some states, including several Northeast states and California, take an “efficiency procurement” or “loading order” approach to energy efficiency policies, in which state policy requires utilities to invest in all cost-effective energy efficiency that is cheaper than supply resources.

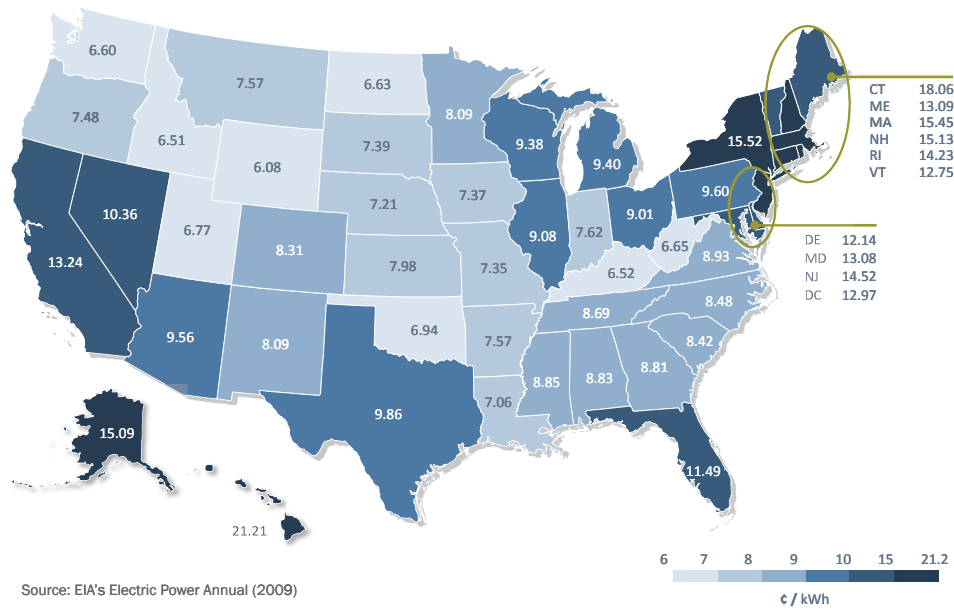
An additional policy variable that can influence energy efficiency programs is the use of codes and standards. Many states and local governments have adopted building codes for energy efficient construction, and standards also exist in many jurisdictions for appliances and equipment that achieve a certain level of efficiency. Some jurisdictions provide utility programs credit for their involvement in passing and helping to implement codes. Often, energy efficiency programs and codes work together synergistically, as efficiency programs provide an incentive for the development of emerging efficiency technologies, and once these technologies are established they become incorporated into codes.²¹

Customer Composition

A utility’s customer composition is another factor that varies from one utility to another and presents challenges for comparing energy efficiency programs. For example, a utility that serves numerous industrial customers would likely need to customize energy efficiency projects to serve each customer. Marketing costs of these programs would generally be lower, since individual outreach would be the most effective way to encourage enrollment. Alternatively, a utility with mostly residential customers may need to spend significantly more resources on marketing in order to reach its ratepayers, but the programs the utility offers may be relatively straightforward. Furthermore, participation among urban, suburban, and rural ratepayers can vary considerably. In urban areas, where renting apartments is more common, participation may suffer due to split incentives, or the “Principal-Agent” problem—landlords are less inclined to invest in energy efficiency because tenants pay energy bills, and tenants are hesitant to make improvements because they do not own the property and may not receive the full term of benefits from a project. Numerous other ratepayer composition factors can also influence program participation.

Electricity Rates

Energy efficiency is a least-cost energy resource. However, the precise economic benefit to ratepayers of a specific project or program depends on where it is implemented, due to regional differences in electricity prices, which can affect project participation. The rate that customers pay for electricity is dependent on a variety of factors, including the age and fuel sources of the generation mix associated with delivered electricity. *Figure 3* presents the average 2009 electricity rate in each state across all utilities and customer classes. As *Figure 3* demonstrates, the economic impact for customers of saving a kilowatt-hour in New York is not the same as saving a kilowatt-hour in Georgia. While an energy efficiency project or program may reduce a similar amount of electricity in both locations, the net economic benefits to the electricity consumer are different. This may influence participation in utility energy efficiency programs. However, the avoided costs for utilities from implementing energy efficiency are less variable.

Figure 3: 2009 Average State Electricity Rates, All Customer Classes (¢/kWh)

The economic impact for customers of saving a kilowatt-hour in New York is not the same as saving a kilowatt-hour in Georgia. While an energy efficiency project or program may reduce a similar amount of electricity in both locations, the net economic benefits to the electricity consumer are different.

Utility Experience with Efficiency Programs

Electric utilities in the U.S. are at various stages of energy efficiency program design and implementation. While several utilities have sophisticated energy efficiency program offerings targeting every customer class, others have just begun offering programs to their customers. Despite efforts to publicize best practices and learn from experiences of other utilities, there is still a considerable learning curve that utilities undergo when they begin administering efficiency programs, and older programs may be more successful overall.

Utility Selection

For any benchmarking exercise, establishing the universe of companies to compare is the first crucial step. Since it would be overly cumbersome to evaluate all utilities in the country that report to EIA, narrowing the field to a reasonable size is necessary.

For the purposes of this report, a sample of utilities was selected with an eye to diversity. Utilities were chosen that represented a broad cross-section of the nation's utilities with regard to a number of qualities, including:

- Geographic region (census region, climatic zone)
- Population density of service territory (population/square mile)
- Total electricity deliveries (megawatt-hours)
- Electricity rates (average ¢/kWh)
- Distribution of customers by ratepayer class (residential, commercial, or industrial)
- Distribution of sales by ratepayer class
- Ownership type (investor-owned utility, municipal, cooperative, etc.)
- Regulatory structure (vertically-integrated or deregulated)

In addition to describing a wide range of relevant utility operating characteristics, many of these criteria are likely to have a significant impact on the structure, funding, and effectiveness of electric energy efficiency programs.

The utilities that resulted from this selection process are listed in *Table 1*, and *Figure 4* (pages 19 and 20) displays the service territories of these utilities.

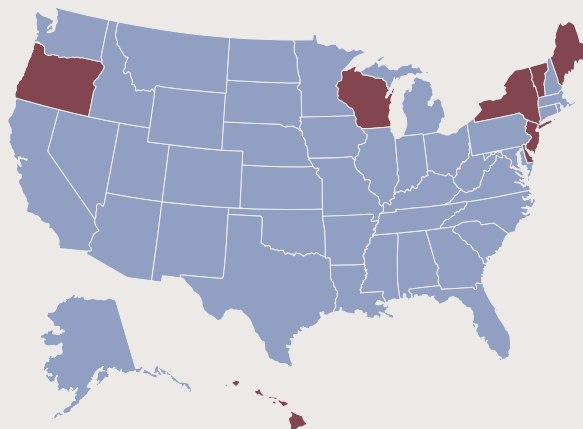
It is important to note that a few of these utilities operate in states where efficiency programs are also administered by third-party administrators. Nine states, including New York, Oregon, and Wisconsin, have third-party administrators that administer energy efficiency programs either instead of or alongside utilities. In these states, generally speaking, a system benefit surcharge is added to all utility bills; the utility then passes on the funding collected through the surcharge to the efficiency administrator, who uses it to administer energy efficiency programs to utility ratepayers. These third-party administrators, in the states that have them, often take the place of utilities in administering energy efficiency programs, and are generally funded by ratepayers through a surcharge on their electric bills. (See box on page 18.)

Because these administrators do not report data to EIA, they were not included in our benchmarking; nonetheless, they do account for a substantial volume of the ratepayer-funded energy efficiency programs in the United States. The Consortium for Energy Efficiency reports that \$436 million was spent by third-party ratepayer-funded energy efficiency administrators in 2009, with \$588 million budgeted for 2010.²²



Third-Party Administrators

Nine states have some form of third-party administrator that administers energy efficiency programs using ratepayer funds, either instead of or alongside utilities. In these states, generally speaking, a system benefit charge (SBC) is added to all utility bills; these funds are then passed on to the efficiency administrator, who uses it to administer energy efficiency programs to utility ratepayers. These administrators are also often the recipient of federal stimulus funds or funding from programs such as the Regional Greenhouse Gas Initiative in the Northeast.



Vermont—Efficiency Vermont is run by a non-profit corporation, the Vermont Energy Investment Corporation, under appointment by the Vermont Public Service Board. It is funded by an energy efficiency charge on utility bills and administers efficiency programs in the state in place of utilities.

Maine—Efficiency Maine Trust is overseen by the state's Public Utility Commission, funded by an SBC, and administers efficiency programs in the state in place of utilities.

Hawaii—Hawaii Energy is Hawaii's conservation and efficiency administrator, and is funded by a public benefits charge on customer bills under contract with the state's Public Utility Commission.

Oregon—Energy Trust of Oregon serves the customers of Portland General Electric, Pacific Power, NW Natural and Cascade Natural Gas; is funded by an SBC assessed to those customers; and is overseen by the PUC.

New York—NYSERDA, a state agency, administers an SBC-funded set of programs called New York Energy \$mart; utilities in the state also administer their own programs.

New Jersey—Energy efficiency funds are collected by utilities through an SBC, which is then paid to the New Jersey Clean Energy Program, overseen by the Board of Public Utilities. This money is then paid to third-party contractors to administer efficiency programs.

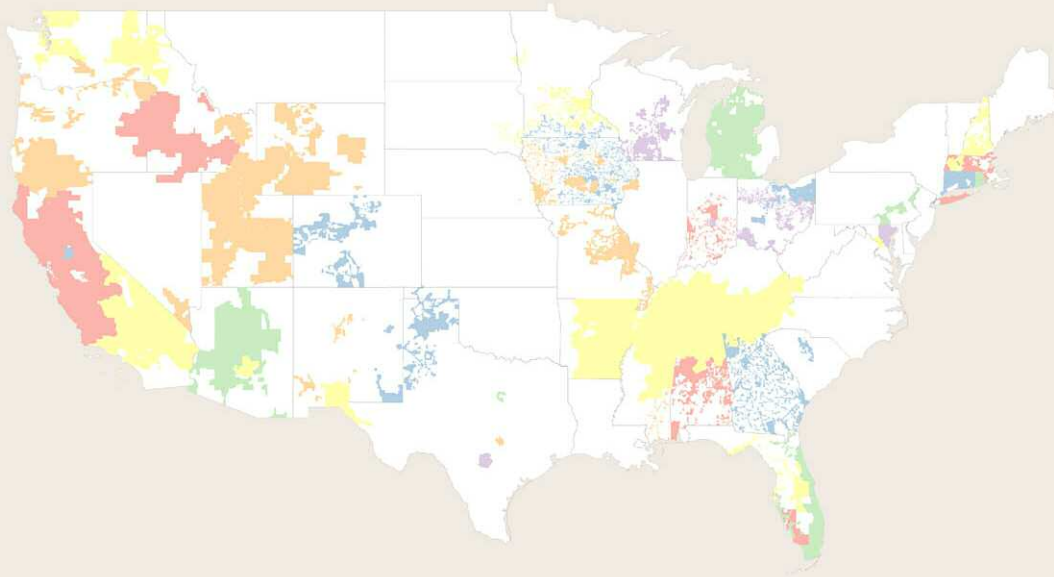
Wisconsin—Regulated utilities in Wisconsin fund and administer energy efficiency programs through the nonprofit Focus on Energy, overseen by the Public Service Commission. Municipal and cooperative utilities can choose to opt out of Focus on Energy and administer their own programs, and some investor-owned utilities additionally administer voluntary programs.

Delaware—Energy efficiency programs in the state are operated by the Delaware Sustainable Energy Utility, as well as by utilities. The Sustainable Energy Utility is a nonprofit under contract with the Delaware Energy Office, and its programs are funded by federal stimulus grants, sales of renewable energy credits, tax-exempt bonds, and other sources.

District of Columbia—Washington, D.C.'s Sustainable Energy Utility administers efficiency programs in the District, supported by the Sustainable Energy Trust Fund, which is funded by ratepayers through a systems benefit charge. Programs are also administered by PEPCO, the District's only regulated distribution utility.

Table 1: Utilities Selected for Energy Efficiency Program Benchmarking

| Utility Name | Parent Company/ Common Name | Ownership Type | States of Operation | Census Region | Electricity Deliveries (MWh) | Energy Efficiency Spending (Thousand \$) | Incremental Savings (MWh) |
|---------------------------------------|---------------------------------|-----------------------|------------------------|------------------|------------------------------------|--|---------------------------------|
| Florida Power & Light | NextEra Energy | Investor Owned | FL | South | 102,762,272 | 79,201 | 154,120 |
| Pacific Gas & Electric | PG&E | Investor Owned | CA | West | 85,989,274 | 409,636 | 1,592,746 |
| Southern California Edison | Edison International | Investor Owned | CA | West | 85,848,831 | 229,591 | 1,596,177 |
| Georgia Power | Southern | Investor Owned | GA | South | 81,346,510 | 6,116 | 44,992 |
| PacifiCorp | MidAmerican | Investor Owned | CA, ID, OR, UT, WA, WY | West | 52,785,005 | 57,063 | 304,574 |
| Alabama Power | Southern | Investor Owned | AL | South | 51,030,063 | 1,877 | 19,665 |
| Progress Energy Florida | Progress Energy | Investor Owned | FL | South | 37,824,252 | 26,678 | 87,049 |
| Consumers Energy | CMS Energy | Investor Owned | MI | Midwest | 35,352,060 | 22,157 | 133,480 |
| Union Electric | Ameren | Investor Owned | MO | Midwest | 35,098,274 | 13,246 | 40,030 |
| Northern States Power - Minnesota | Xcel | Investor Owned | MN | Midwest | 34,663,593 | 46,411 | 319,747 |
| Baltimore Gas & Electric | Constellation | Investor Owned | MD | South | 31,576,197 | 25,513 | 91,281 |
| Tennessee Valley Authority | Tennessee Valley Authority | Federal | AL, KY, MS, NC, TN | South | 30,206,805 | 22,490 | 208,222 |
| Arizona Public Service | Pinnacle West | Investor Owned | AZ | West | 28,173,296 | 25,562 | 208,917 |
| Public Service of Colorado | Xcel | Investor Owned | CO | West | 27,359,238 | 30,257 | 149,009 |
| Potomac Electric Power | Pepco Holdings | Investor Owned | DC, MD | South | 26,549,416 | 3,077 | 54,389 |
| Duke Energy Indiana | Duke | Investor Owned | IN | Midwest | 26,215,892 | 2,910 | 13,486 |
| Salt River Project | Salt River Project | Political Subdivision | AZ | West | 26,181,333 | 20,908 | 291,887 |
| Wisconsin Power & Light | Alliant Energy | Investor Owned | WI | Midwest | 9,858,145 | 12,837 | 61,894 |
| Ohio Power | AEP | Investor Owned | OH | Midwest | 24,936,379 | 6,907 | 132,200 |
| Puget Sound Energy | Puget Holdings | Investor Owned | WA | West | 23,896,559 | 69,621 | 307,888 |
| Ohio Edison | FirstEnergy | Investor Owned | OH | Midwest | 22,856,647 | 548 | 515 |
| Connecticut Light & Power | Northeast Utilities | Investor Owned | CT | Northeast | 22,265,846 | 47,413 | 161,469 |
| Nevada Power | NV Energy | Investor Owned | NV | West | 21,436,142 | 32,354 | 332,424 |
| Massachusetts Electric | National Grid | Investor Owned | MA | Northeast | 20,952,516 | 90,051 | 239,815 |
| MidAmerican Energy | MidAmerican | Investor Owned | IA, IL, SD, TX | Midwest | 20,424,386 | 28,834 | 220,689 |
| City of San Antonio | CPS Energy | Municipal | TX | South | 20,026,721 | 19,970 | 85,362 |
| Entergy Arkansas | Entergy | Investor Owned | AR | South | 19,926,337 | 4,936 | 48,050 |
| Duke Energy Ohio | Duke | Investor Owned | OH | Midwest | 19,633,388 | 10,134 | 63,872 |
| Long Island Power Authority | Long Island Power Authority | State | NY | Northeast | 19,271,142 | 45,953 | 125,588 |
| Southwestern Electric Power | AEP | Investor Owned | TX | South | 16,086,255 | 3,347 | 23,786 |
| Interstate Power & Light | Alliant Energy | Investor Owned | IA, MN | Midwest | 14,876,474 | 33,011 | 161,646 |
| Indianapolis Power & Light | AES | Investor Owned | IN | Midwest | 14,085,842 | 785 | 958 |
| Idaho Power | IDACORP | Investor Owned | ID, OR | West | 13,948,280 | 20,797 | 147,540 |
| Metropolitan Edison | FirstEnergy | Investor Owned | PA | Northeast | 13,488,679 | 2,693 | 3,105 |
| Austin Energy | Austin Energy | Municipal | TX | South | 12,035,686 | 14,864 | 102,274 |
| Sacramento Municipal Utility District | SMUD | Political Subdivision | CA | West | 10,691,907 | 33,060 | 148,360 |
| Santee Cooper | Santee Cooper | State | SC | South | 10,205,326 | 5,006 | 14,154 |
| Omaha Public Power District | Omaha Public Power District | Political Subdivision | NE | Midwest | 10,148,466 | 1,454 | 23,056 |
| Seattle City Light | Seattle City Light | Municipal | WA | West | 9,693,426 | 30,502 | 97,594 |
| Mississippi Power | Southern | Investor Owned | MS | South | 9,311,852 | 2,547 | 2,867 |
| Avista | Avista | Investor Owned | ID, MT, WA | West | 8,954,984 | 17,557 | 80,830 |
| Public Service of New Mexico | PNM Resources | Investor Owned | NM | West | 8,867,533 | 6,173 | 38,729 |
| Public Service of New Hampshire | Northeast Utilities | Investor Owned | NH | Northeast | 7,749,877 | 14,929 | 47,811 |
| Narragansett Electric | National Grid | Investor Owned | RI | Northeast | 7,556,300 | 27,011 | 79,102 |
| El Paso Electric | El Paso Electric | Investor Owned | NM, TX | South | 7,119,683 | 3,646 | 19,097 |
| Western Massachusetts Electric | Northeast Utilities | Investor Owned | MA | Northeast | 3,643,762 | 12,430 | 33,340 |
| Lee County Electric Cooperative | Lee County Electric Cooperative | Cooperative | FL | South | 3,517,697 | 2,522 | 4,784 |
| Lincoln Electric System | Lincoln Electric System | Municipal | NE | Midwest | 3,054,073 | 1,083 | 5,224 |
| United Electric Coop Service | United Electric Coop Service | Cooperative | TX | South | 1,837,820 | 108 | 1,757 |
| Fairfield Electric Cooperative | Fairfield Electric Cooperative | Cooperative | SC | South | 603,049 | 80 | 1,826 |

Figure 4: Service Territories of Selected Utilities

Source: Ventyx

The selected utilities serve geographically diverse regions and consist of 37 investor-owned utilities, four municipal utilities, five utilities controlled by states or political subdivisions, three electric cooperatives, and one federal utility.

Benchmarking Electric Energy Efficiency Portfolios

This report benchmarks selected utilities on energy efficiency spending and savings achieved. Specifically, the utilities are ranked based on the following metrics:

- Total energy efficiency expenditures;
- Efficiency expenditures per megawatt-hour of retail sales (relative spending);
- Total incremental savings (i.e., savings from measures implemented during the reporting year); and
- Incremental savings as a percentage of megawatt-hours delivered (relative savings).

These metrics were chosen because they provide a relatively fair assessment of both the absolute and relative status of utility-administered energy efficiency programs, based on available data. In addition, this section discusses the importance of cost-effectiveness as a measure of program success, although currently available data preclude calculating a meaningful cost-effectiveness metric at this time. A detailed description and explanation of the metrics used to benchmark the selected utilities can be found in the “Benchmarking Metrics” section of this report.

The selected utilities are also compared based on the regulatory and policy landscape in which they operate. Utilities do not directly control these factors, but they are critical in determining how aggressively a utility pursues energy efficiency. Such a comparison may be useful in evaluating the relative importance of certain policies for producing robust energy efficiency programs.

Expenditures

One of the most straightforward ways to benchmark energy efficiency programs is to rank budget levels and expenditures by utilities. While it does not capture many of the aspects that are most essential about energy efficiency programs—such as effectiveness—it can provide a gross indicator of program activity. The comparison of total expenditures on energy efficiency is relatively straightforward, and there is general confidence in the accuracy of the data among stakeholders. Simply put, energy efficiency expenditures are the amount of money a utility spends to implement energy efficiency measures, including direct installations and construction, incentives paid to customers, advertising and outreach campaigns, and administrative costs. Although quantity of spending is more or less straightforward to determine, complexities arise in how costs are allocated to different program categories, and when the activities of third-party administrators are considered. See the “Data Quality and Issues” section of this report for a discussion of the issues surrounding allocation of program expenditures.

The metrics calculated and compared in this section are:

- Total efficiency expenditures; and
- Efficiency expenditures per megawatt-hour of retail sales (relative spending).

Table 2 and *Figure 6* compare the 2009 energy efficiency programs of the selected utilities on these spending metrics.

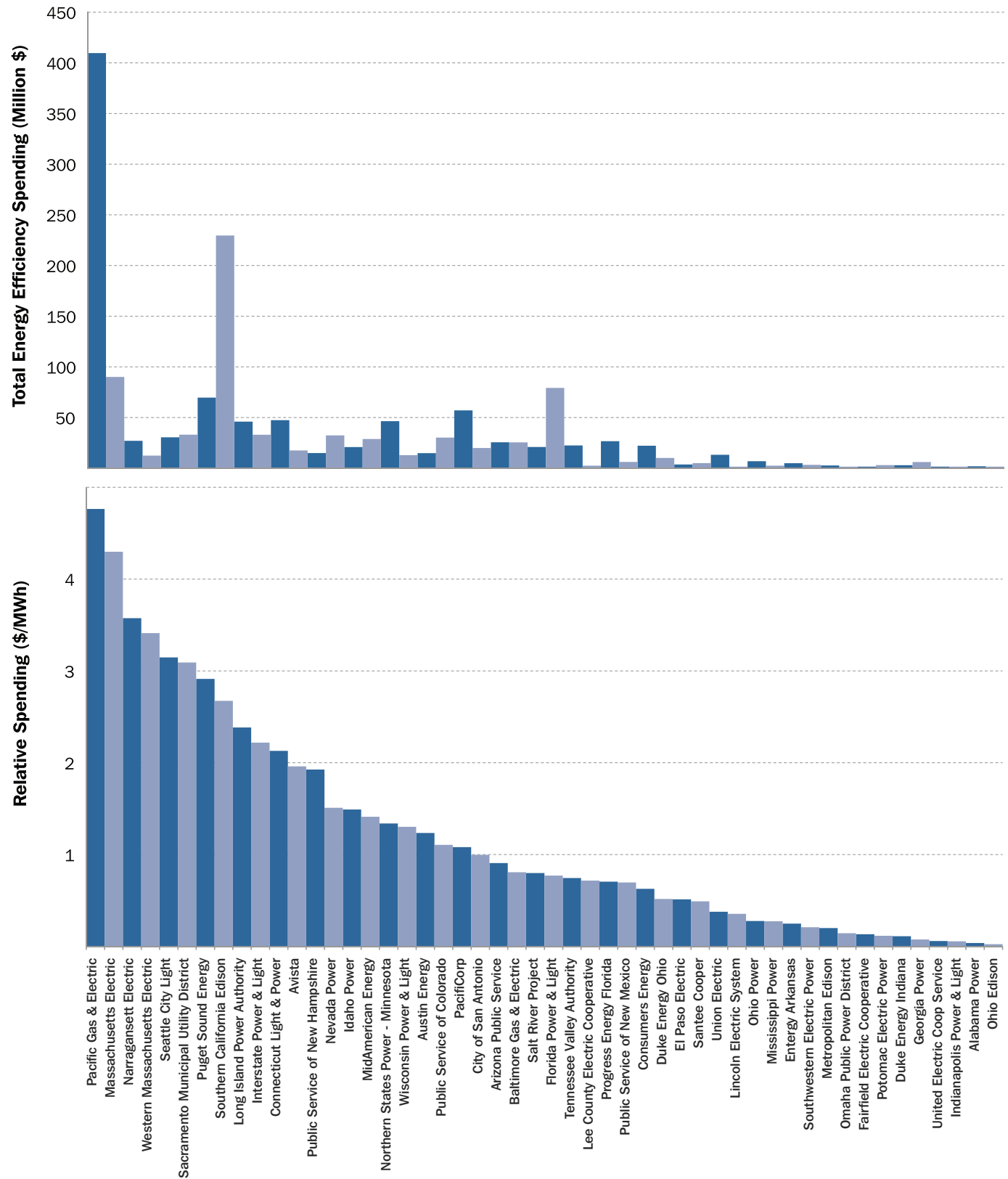


Table 2: Comparison of Energy Efficiency Spending by Selected Utilities, 2009

| Utility Name | Parent Company/Common Name | Relative Spending Rank | Spending Rank | Electricity Deliveries (MWh) | Energy Efficiency Spending (Thousand \$) | Relative Spending (\$/MWh)* |
|---------------------------------------|---------------------------------|------------------------|---------------|------------------------------|--|-----------------------------|
| Pacific Gas & Electric | PG&E | 1 | 1 | 85,989,274 | 409,636 | \$4.76 |
| Massachusetts Electric | National Grid | 2 | 3 | 20,952,516 | 90,051 | \$4.30 |
| Narragansett Electric | National Grid | 3 | 16 | 7,556,300 | 27,011 | \$3.57 |
| Western Massachusetts Electric | Northeast Utilities | 4 | 30 | 3,643,762 | 12,430 | \$3.41 |
| Seattle City Light | Seattle City Light | 5 | 13 | 9,693,426 | 30,502 | \$3.15 |
| Sacramento Municipal Utility District | SMUD | 6 | 10 | 10,691,907 | 33,060 | \$3.09 |
| Puget Sound Energy | Puget Holdings | 7 | 5 | 23,896,559 | 69,621 | \$2.91 |
| Southern California Edison | Edison International | 8 | 2 | 85,848,831 | 229,591 | \$2.67 |
| Long Island Power Authority | Long Island Power Authority | 9 | 9 | 19,271,142 | 45,953 | \$2.38 |
| Interstate Power & Light | Alliant Energy | 10 | 11 | 14,876,474 | 33,011 | \$2.22 |
| Connecticut Light & Power | Northeast Utilities | 11 | 7 | 22,265,846 | 47,413 | \$2.13 |
| Avista | Avista | 12 | 25 | 8,954,984 | 17,557 | \$1.96 |
| Public Service of New Hampshire | Northeast Utilities | 13 | 26 | 7,749,877 | 14,929 | \$1.93 |
| Nevada Power | NV Energy | 14 | 12 | 21,436,142 | 32,354 | \$1.51 |
| Idaho Power | IDACORP | 15 | 23 | 13,948,280 | 20,797 | \$1.49 |
| MidAmerican Energy | MidAmerican | 16 | 15 | 20,424,386 | 28,834 | \$1.41 |
| Northern States Power - Minnesota | Xcel | 17 | 8 | 34,663,593 | 46,411 | \$1.34 |
| Wisconsin Power & Light | Alliant Energy | 18 | 29 | 9,858,145 | 12,837 | \$1.30 |
| Austin Energy | Austin Energy | 19 | 27 | 12,035,686 | 14,864 | \$1.24 |
| Public Service of Colorado | Xcel | 20 | 14 | 27,359,238 | 30,257 | \$1.11 |
| PacifiCorp | MidAmerican | 21 | 6 | 52,785,005 | 57,063 | \$1.08 |
| City of San Antonio | CPS Energy | 22 | 24 | 20,026,721 | 19,970 | \$1.00 |
| Arizona Public Service | Pinnacle West | 23 | 18 | 28,173,296 | 25,562 | \$0.91 |
| Baltimore Gas & Electric | Constellation | 24 | 19 | 31,576,197 | 25,513 | \$0.81 |
| Salt River Project | Salt River Project | 25 | 22 | 26,181,333 | 20,908 | \$0.80 |
| Florida Power & Light | NextEra Energy | 26 | 4 | 102,762,272 | 79,201 | \$0.77 |
| Tennessee Valley Authority | Tennessee Valley Authority | 27 | 20 | 30,206,805 | 22,490 | \$0.74 |
| Lee County Electric Cooperative | Lee County Electric Cooperative | 28 | 43 | 3,517,697 | 2,522 | \$0.72 |
| Progress Energy Florida | Progress Energy | 29 | 17 | 37,824,252 | 26,678 | \$0.71 |
| Public Service of New Mexico | PNM Resources | 30 | 33 | 8,867,533 | 6,173 | \$0.70 |
| Consumers Energy | CMS Energy | 31 | 21 | 35,352,060 | 22,157 | \$0.63 |
| Duke Energy Ohio | Duke | 32 | 31 | 19,633,388 | 10,134 | \$0.52 |
| El Paso Electric | El Paso Electric | 33 | 37 | 7,119,683 | 3,646 | \$0.51 |
| Santee Cooper | Santee Cooper | 34 | 35 | 10,205,326 | 5,006 | \$0.49 |
| Union Electric | Ameren | 35 | 28 | 35,098,274 | 13,246 | \$0.38 |
| Lincoln Electric System | Lincoln Electric System | 36 | 46 | 3,054,073 | 1,083 | \$0.35 |
| Ohio Power | AEP | 37 | 32 | 24,936,379 | 6,907 | \$0.28 |
| Mississippi Power | Southern | 38 | 42 | 9,311,852 | 2,547 | \$0.27 |
| Entergy Arkansas | Entergy | 39 | 36 | 19,926,337 | 4,936 | \$0.25 |
| Southwestern Electric Power | AEP | 40 | 38 | 16,086,255 | 3,347 | \$0.21 |
| Metropolitan Edison | FirstEnergy | 41 | 41 | 13,488,679 | 2,693 | \$0.20 |
| Omaha Public Power District | Omaha Public Power District | 42 | 45 | 10,148,466 | 1,454 | \$0.14 |
| Fairfield Electric Cooperative | Fairfield Electric Cooperative | 43 | 50 | 603,049 | 80 | \$0.13 |
| Potomac Electric Power | Pepco Holdings | 44 | 39 | 26,549,416 | 3,077 | \$0.12 |
| Duke Energy Indiana | Duke | 45 | 40 | 26,215,892 | 2,910 | \$0.11 |
| Georgia Power | Southern | 46 | 34 | 81,346,510 | 6,116 | \$0.08 |
| United Electric Coop Service | United Electric Coop Service | 47 | 49 | 1,837,820 | 108 | \$0.06 |
| Indianapolis Power & Light | AES | 48 | 47 | 14,085,842 | 785 | \$0.06 |
| Alabama Power | Southern | 49 | 44 | 51,030,063 | 1,877 | \$0.04 |
| Ohio Edison | FirstEnergy | 50 | 48 | 22,856,647 | 548 | \$0.02 |

* Relative spending is calculated as the dollars spent by a utility on energy efficiency per megawatt-hour of electricity delivered to customers and does NOT refer to or imply the cost-effectiveness of a utility's energy efficiency portfolio.

Figure 6: Selected Utilities by Relative Spending



Impacts

The overall goal of energy efficiency programs is to reduce the quantity of electricity consumed by end-use consumers in order to reduce energy bills, generate associated economic benefits, and reduce emissions of greenhouse gas and other air pollutants. Therefore, comparing efficiency programs based on how much electricity they save is a critical component of the benchmarking process. At a high level, ranking efficiency programs based on their energy savings identifies the most successful programs and policies, and can also highlight effective savings measures, program approaches, and generally promote identification and adoption of industry best practices. Furthermore, quantifying energy savings enables analysis of the economic and environmental benefits achieved through bill savings and emission reductions. Ultimately, these are the impacts that matter when evaluating efficiency programs as an energy resource.

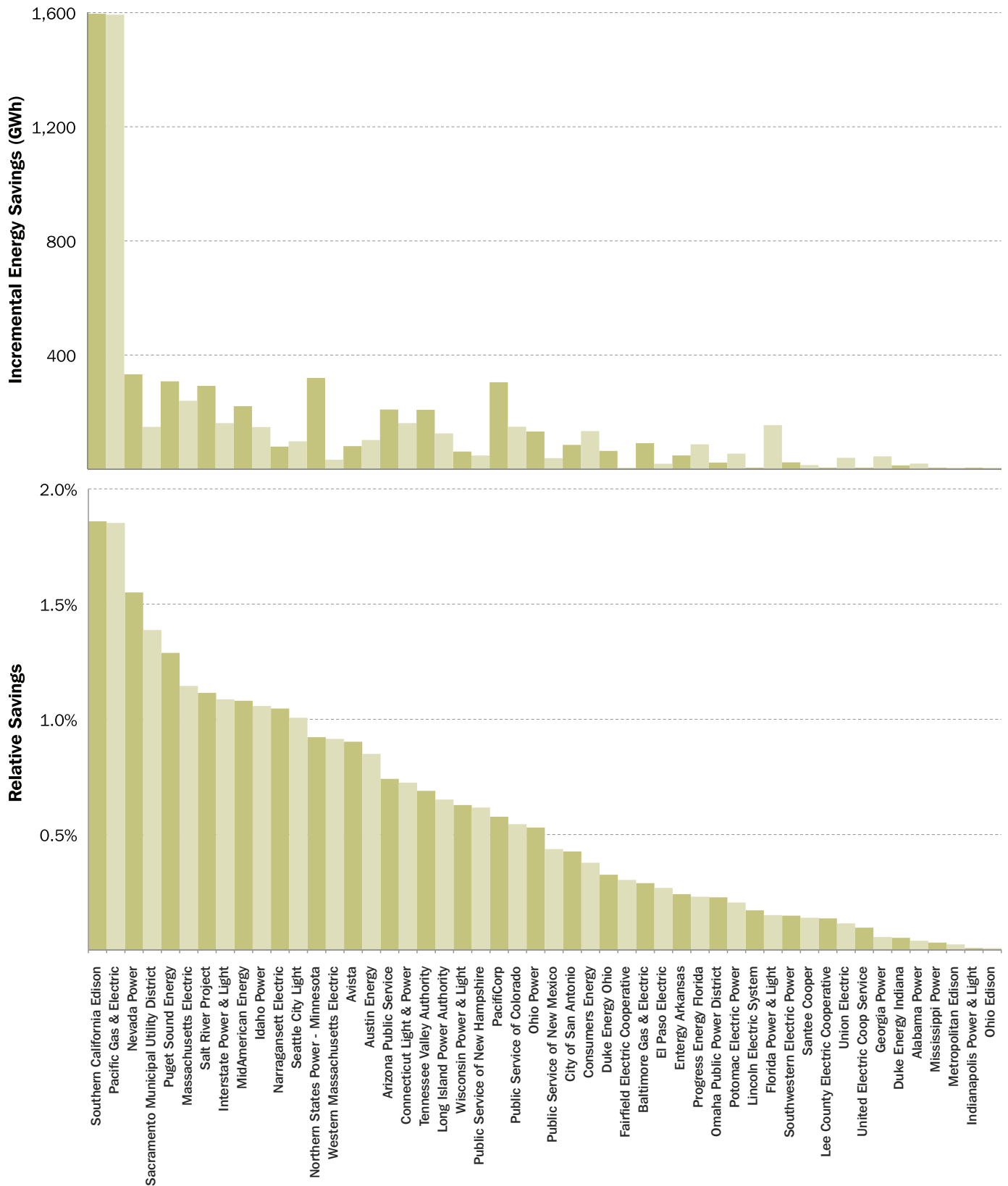
The metrics calculated and compared in this section are:

- Savings achieved by energy efficiency programs (incremental savings); and
- Incremental savings as a percent of retail electric sales (relative savings).

Table 3 and *Figure 7* compare the 2009 energy savings achieved by selected utilities.

Table 3: Comparison of Energy Savings by Selected Utilities, EIA 2009

| Utility Name | Parent Company/Common Name | Relative Savings Rank | Savings Rank | Electricity Deliveries (MWh) | Incremental Savings (MWh) | Relative Savings (%) |
|---------------------------------------|---------------------------------|-----------------------|--------------|------------------------------|---------------------------|----------------------|
| Southern California Edison | Edison International | 1 | 1 | 85,848,831 | 1,596,177 | 1.9% |
| Pacific Gas & Electric | PG&E | 2 | 2 | 85,989,274 | 1,592,746 | 1.9% |
| Nevada Power | NV Energy | 3 | 3 | 21,436,142 | 332,424 | 1.6% |
| Sacramento Municipal Utility District | SMUD | 4 | 16 | 10,691,907 | 148,360 | 1.4% |
| Puget Sound Energy | Puget Holdings | 5 | 5 | 23,896,559 | 307,888 | 1.3% |
| Massachusetts Electric | National Grid | 6 | 8 | 20,952,516 | 239,815 | 1.1% |
| Salt River Project | Salt River Project | 7 | 7 | 26,181,333 | 291,887 | 1.1% |
| Interstate Power & Light | Alliant Energy | 8 | 12 | 14,876,474 | 161,646 | 1.1% |
| MidAmerican Energy | MidAmerican | 9 | 9 | 20,424,386 | 220,689 | 1.1% |
| Idaho Power | IDACORP | 10 | 17 | 13,948,280 | 147,540 | 1.1% |
| Narragansett Electric | National Grid | 11 | 27 | 7,556,300 | 79,102 | 1.0% |
| Seattle City Light | Seattle City Light | 12 | 22 | 9,693,426 | 97,594 | 1.0% |
| Northern States Power - Minnesota | Xcel | 13 | 4 | 34,663,593 | 319,747 | 0.9% |
| Western Massachusetts Electric | Northeast Utilities | 14 | 36 | 3,643,762 | 33,340 | 0.9% |
| Avista | Avista | 15 | 26 | 8,954,984 | 80,830 | 0.9% |
| Austin Energy | Austin Energy | 16 | 21 | 12,035,686 | 102,274 | 0.8% |
| Arizona Public Service | Pinnacle West | 17 | 10 | 28,173,296 | 208,917 | 0.7% |
| Connecticut Light & Power | Northeast Utilities | 18 | 13 | 22,265,846 | 161,469 | 0.7% |
| Tennessee Valley Authority | Tennessee Valley Authority | 19 | 11 | 30,206,805 | 208,222 | 0.7% |
| Long Island Power Authority | Long Island Power Authority | 20 | 20 | 19,271,142 | 125,588 | 0.7% |
| Wisconsin Power & Light | Alliant Energy | 21 | 29 | 9,858,145 | 61,894 | 0.6% |
| Public Service of New Hampshire | Northeast Utilities | 22 | 32 | 7,749,877 | 47,811 | 0.6% |
| PacifiCorp | MidAmerican | 23 | 6 | 52,785,005 | 304,574 | 0.6% |
| Public Service of Colorado | Xcel | 24 | 15 | 27,359,238 | 149,009 | 0.5% |
| Ohio Power | AEP | 25 | 19 | 24,936,379 | 132,200 | 0.5% |
| Public Service of New Mexico | PNM Resources | 26 | 35 | 8,867,533 | 38,729 | 0.4% |
| City of San Antonio | CPS Energy | 27 | 25 | 20,026,721 | 85,362 | 0.4% |
| Consumers Energy | CMS Energy | 28 | 18 | 35,352,060 | 133,480 | 0.4% |
| Duke Energy Ohio | Duke | 29 | 28 | 19,633,388 | 63,872 | 0.3% |
| Fairfield Electric Cooperative | Fairfield Electric Cooperative | 30 | 47 | 603,049 | 1,826 | 0.3% |
| Baltimore Gas & Electric | Constellation | 31 | 23 | 31,576,197 | 91,281 | 0.3% |
| El Paso Electric | El Paso Electric | 32 | 40 | 7,119,683 | 19,097 | 0.3% |
| Entergy Arkansas | Entergy | 33 | 31 | 19,926,337 | 48,050 | 0.2% |
| Progress Energy Florida | Progress Energy | 34 | 24 | 37,824,252 | 87,049 | 0.2% |
| Omaha Public Power District | Omaha Public Power District | 35 | 38 | 10,148,466 | 23,056 | 0.2% |
| Potomac Electric Power | Pepco Holdings | 36 | 30 | 26,549,416 | 54,389 | 0.2% |
| Lincoln Electric System | Lincoln Electric System | 37 | 43 | 3,054,073 | 5,224 | 0.2% |
| Florida Power & Light | NextEra Energy | 38 | 14 | 102,762,272 | 154,120 | 0.1% |
| Southwestern Electric Power | AEP | 39 | 37 | 16,086,255 | 23,786 | 0.1% |
| Santee Cooper | Santee Cooper | 40 | 41 | 10,205,326 | 14,154 | 0.1% |
| Lee County Electric Cooperative | Lee County Electric Cooperative | 41 | 44 | 3,517,697 | 4,784 | 0.1% |
| Union Electric | Ameren | 42 | 34 | 35,098,274 | 40,030 | 0.1% |
| United Electric Coop Service | United Electric Coop Service | 43 | 48 | 1,837,820 | 1,757 | 0.1% |
| Georgia Power | Southern | 44 | 33 | 81,346,510 | 44,992 | 0.1% |
| Duke Energy Indiana | Duke | 45 | 42 | 26,215,892 | 13,486 | 0.1% |
| Alabama Power | Southern | 46 | 39 | 51,030,063 | 19,665 | 0.0% |
| Mississippi Power | Southern | 47 | 46 | 9,311,852 | 2,867 | 0.0% |
| Metropolitan Edison | FirstEnergy | 48 | 45 | 13,488,679 | 3,105 | 0.0% |
| Indianapolis Power & Light | AES | 49 | 49 | 14,085,842 | 958 | 0.0% |
| Ohio Edison | FirstEnergy | 50 | 50 | 22,856,647 | 515 | 0.0% |

Figure 7: Selected Utilities by Relative Savings

Cost-Effectiveness

Cost-effectiveness is another important measure to compare the results of energy efficiency efforts. For individual efficiency measures, the quantity of electricity saved over the useful life of the project, per dollar spent, demonstrates how long it takes to recoup the capital investment in the measure and determines whether or not the investment makes economic sense. At a portfolio level, calculating cost-effectiveness allows comparison between administrators to determine which are achieving savings at the lowest cost and obtaining the most net economic benefits for their customers, as well as cost comparisons between efficiency programs and supply-side resources.

Benchmarking cost-effectiveness is necessary to identify best practices, as well as to identify programs that are not achieving benefits commensurate with their expenditures. However, there is currently no comprehensive, publicly available dataset that contains the necessary information for calculating cost-effectiveness. Because energy efficiency spending results in savings that are realized over the course of multiple years, the most important component for calculating a meaningful cost-effectiveness metric for efficiency programs would be an estimate of the projected lifecycle savings of all the measures implemented in a given year.

While a relative cost-effectiveness metric may be calculated using the quantity of spending and savings in a given year, concerns with the accuracy of the energy savings data further reduce confidence in the results of any cost-effectiveness calculations from this data source.

State Policies

Without policy changes directed at supporting energy efficiency, utilities are unlikely to invest significant resources in energy efficiency, due to the inherent disincentives created by the classic utility business model. Therefore, state policies are a major driving force behind the expansion of cost-saving utility energy efficiency programs. This report considers the following policies for each selected utility and for each state in which it operates:

- Decoupling of electricity revenues from sales, or similar mechanisms, to remove throughput disincentives;
- Shareholder incentives for utilities that successfully implement efficiency programs; and
- Mandatory savings targets (e.g. EERS).

Importantly, many of the states that have achieved the highest savings with utility efficiency programs, such as California and Massachusetts, have established all three policies—revenue decoupling, a binding efficiency savings goal, and performance incentives.

Table 4: Utility Incentives Scoring Methodology

| Criteria | Available Points |
|---|------------------|
| Decoupling has been implemented for at least one electric utility. | 1 |
| Performance incentives have been implemented for at least one utility. | 1 |
| Decoupling has been authorized but not implemented. | 0.5 |
| Performance incentives have been authorized but not implemented. | 0.5 |
| Alternative lost revenue recovery mechanism has been authorized or implemented. | 0.5 |

Table 5: Energy Savings Targets Scoring Methodology

| Percent Savings Target | Score |
|----------------------------|-------|
| 1.5% or greater | 4 |
| 1% - 1.49% | 3 |
| 0.5% - 0.99% | 2 |
| 0.1% - 0.49% | 1 |
| First Resource Requirement | 1 |
| Less than 0.1% | 0 |

Tables 4 and 5 describe how each state was scored based on the policies in place in 2009 according to ACEEE's 2009 State Energy Efficiency Scorecard. The scoring methodologies were also derived from ACEEE's Scorecard, but were altered to apply only to electric utility policies. Based on these methodologies, states can earn a maximum score of six (6).

Table 6 compiles information on utility policies that were in place by state in 2009, including those that were authorized by the state's legislature or PUC, but were not yet implemented for any utilities. Although the table may not accurately reflect the exact policy landscape for each utility in this report, it is intended to illustrate the policies available by state that might influence energy efficiency investments by electric utilities. *Table 7* ranks the selected utilities based on the average score received by each of the states in which the utility operates, weighted by the electricity deliveries by state.

Figures 8 and 9 below chart the relationship between the weighted average policy score for the selected utilities and relative spending and savings, respectively, while highlighting top performers in both spending and savings. Figure 8 identifies utilities with relative spending of \$2.00 per megawatt-hour of deliveries or greater. Figure 9 identifies utilities with relative savings of at least 1.0 percent of deliveries.

Figures 8 and 9 indicate that there is a relationship between the efficiency policy regime under which a utility operates and both the level of energy efficiency investment and reported savings. The charts show that as the weighted average policy score of a utility rises, the relative spending by that utility and the relative savings achieved tend to rise as well. States with the most supportive policy regimes have put these policies in place over many years, and states just starting out will gradually and selectively implement energy efficiency policies over time. But these data show that significant energy efficiency savings are possible even with relatively modest policy regimes. However, additional statistical analysis would be required in order to determine the strength of the relationship of spending and savings to policies and what other variables might also help explain the data.

Table 6: 2009 State Utility Policy Scores

| State | Policy Score | Decoupling (or similar) | Performance Incentives | Average Annual Savings Target |
|----------------------|--------------|-------------------------|------------------------|--------------------------------|
| Alaska | 0 | No | No | None |
| Alabama | 0 | No | No | None |
| Arkansas | 0 | No | No | None |
| Arizona | 1 | No | Yes | None |
| California | 5 | Yes | Yes | 0.9% |
| Colorado | 4 | No | Yes | 1.0% |
| Connecticut | 4.5 | Authorized | Yes | 1.0% |
| District of Columbia | 1.5 | Yes | Authorized | None |
| Delaware | 4.5 | Authorized | No | 2.5% |
| Florida | 0.5 | No | Authorized | None |
| Georgia | 1.5 | LRR* | Yes | None |
| Hawaii | 4.5 | Authorized | Yes | 1.0% |
| Iowa | 4 | No | No | 1.5% |
| Idaho | 2 | Yes | Yes | None |
| Illinois | 3 | No | No | 1.2% |
| Indiana | 0.5 | No | Authorized | None |
| Kansas | 0.5 | No | Authorized | None |
| Kentucky | 1.5 | LRR* | Yes | None |
| Louisiana | 0 | No | No | None |
| Massachusetts | 5.5 | Authorized | Yes | 2.4% |
| Maryland | 4 | Yes | No | 1.5 - 1.8% |
| Maine | 2 | Authorized | Authorized | First Resource ^ |
| Michigan | 3 | Authorized | Authorized | 0.3%, increasing to 1% in 2012 |
| Minnesota | 5.5 | Authorized | Yes | 1 - 1.5% |
| Missouri | 0.5 | No | Authorized | None |
| Mississippi | 0 | No | No | None |
| Montana | 1 | LRR* | Authorized | None |
| North Carolina | 2.5 | LRR* | Yes | Up to 0.25% in 2012 |
| North Dakota | 0 | No | No | None |
| Nebraska | 0 | No | No | None |
| New Hampshire | 1 | No | Yes | None |
| New Jersey | 0 | No | No | None |
| New Mexico | 3 | Authorized | Authorized | 0.7% |
| Nevada | 3.5 | LRR* | Yes | 0.6% |
| New York | 6 | Yes | Yes | 1.9% |
| Ohio | 3.5 | LRR* | Yes | 1.3% |
| Oklahoma | 1.5 | LRR* | Yes | None |
| Oregon | 1 | Yes | No | None |
| Pennsylvania | 3 | No | No | 1.0% |
| Rhode Island | 4 | No | Yes | 1.05% |
| South Carolina | 1.5 | LRR* | Yes | None |
| South Dakota | 1 | No | Yes | None |
| Tennessee | 0 | No | No | None |
| Texas | 2 | No | Yes | 0.3% |
| Utah | 1 | Authorized | Authorized | None |
| Virginia | 0.5 | No | Authorized | None |
| Vermont | 6 | Yes | Yes | 2.0% |
| Washington | 3 | No | Yes | 1.0% |
| Wisconsin | 2 | Yes | Yes | None |
| West Virginia | 0 | No | No | None |

* LRR—Alternative lost revenue recovery mechanism in place rather than decoupling.

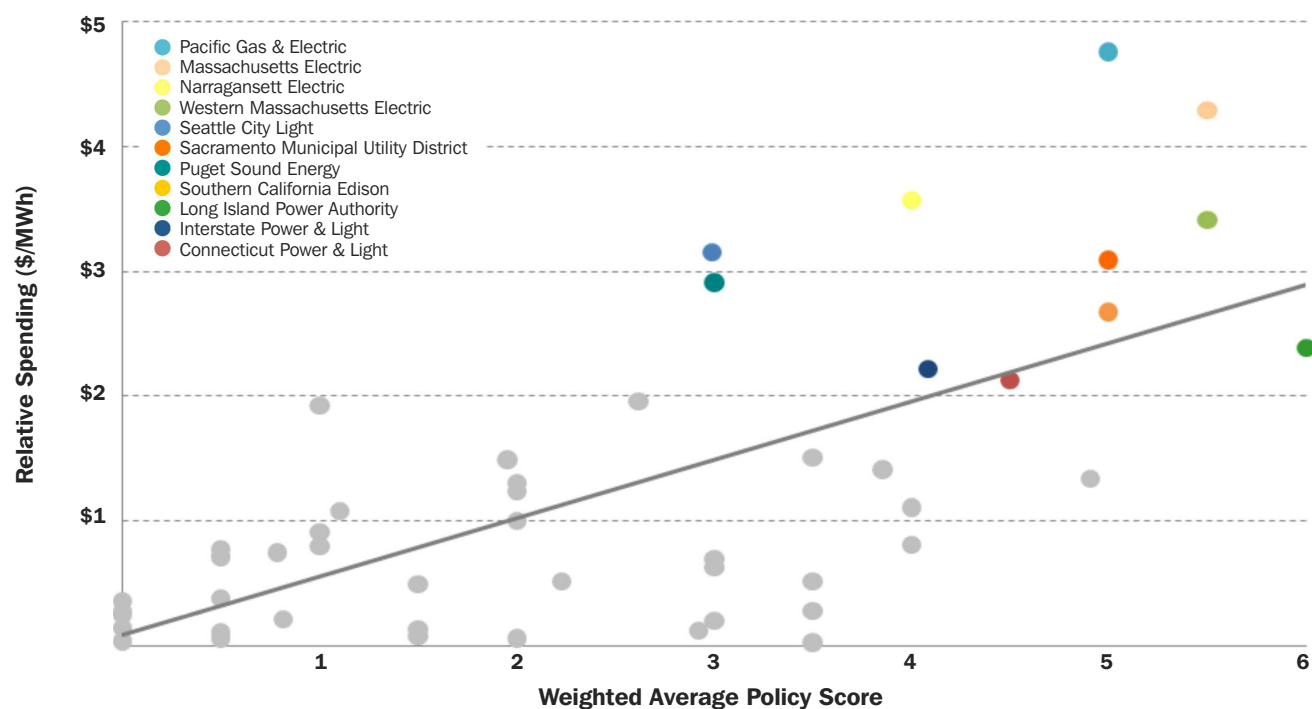
^ First Resource—Requirement for energy efficiency to serve as the first priority resource in utility planning.

Source: American Council for an Energy-Efficient Economy, "The 2009 State Energy Efficiency Scorecard." October 2009. Note: Adjustments were made to ACEEE's 2009 Scorecard. See Appendix for details.

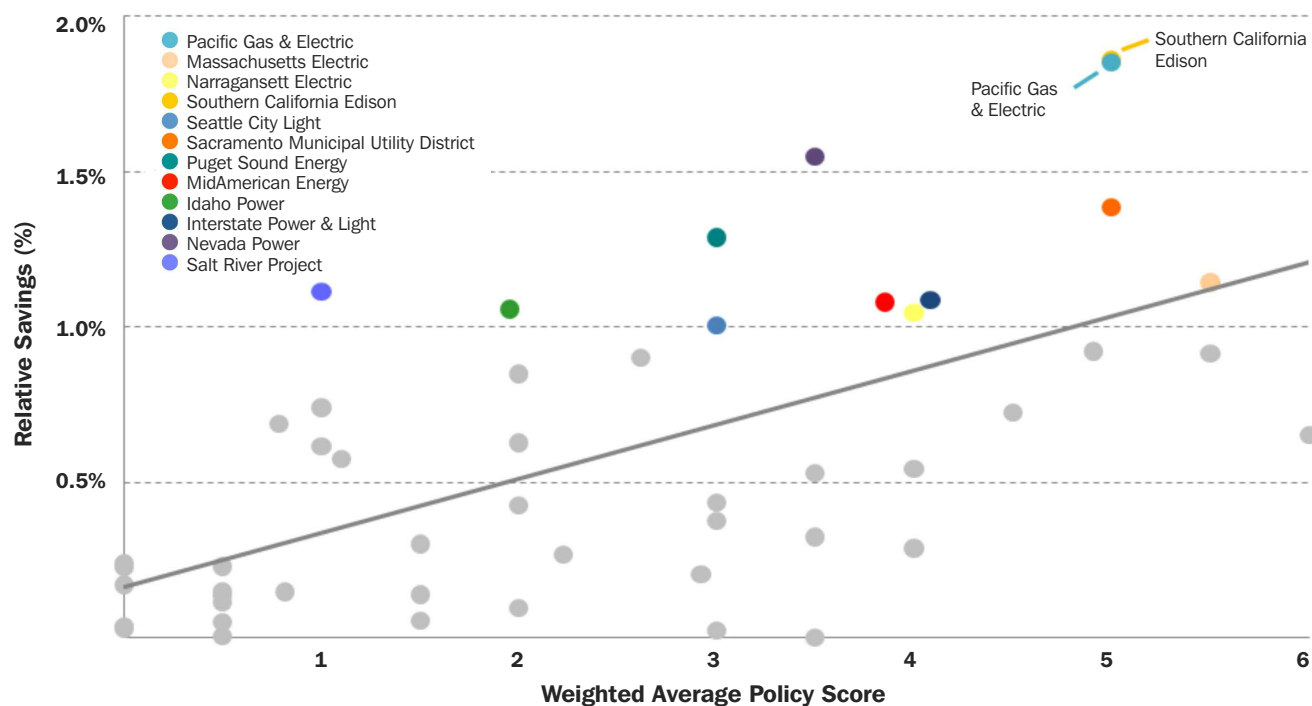
Table 6 compiles information on utility policies that were in place by state in 2009, including those that were authorized by the state's legislature or PUC, but were not yet implemented for any utilities. Although the table may not accurately reflect the exact policy landscape for each utility in this report, it is intended to illustrate the policies available by state that might influence energy efficiency investments by electric utilities.

Table 7: Selected Utilities by 2009 Weighted Average Policy Score

| Utility | Parent Company/Common Name | Ownership Type | Census Region | Weighted Policy Score | Relative Spending (\$/MWh) | Relative Savings (%) |
|---------------------------------------|---------------------------------|-----------------------|---------------|-----------------------|----------------------------|----------------------|
| Long Island Power Authority | Long Island Power Authority | State | Northeast | 6.0 | \$2.38 | 0.65% |
| Massachusetts Electric | National Grid | Investor Owned | Northeast | 5.5 | \$4.30 | 1.14% |
| Western Massachusetts Electric | Northeast Utilities | Investor Owned | Northeast | 5.5 | \$3.41 | 0.91% |
| Pacific Gas & Electric | PG&E | Investor Owned | West | 5.0 | \$4.76 | 1.85% |
| Sacramento Municipal Utility District | SMUD | Political Subdivision | West | 5.0 | \$3.09 | 1.39% |
| Southern California Edison | Edison International | Investor Owned | West | 5.0 | \$2.67 | 1.86% |
| Northern States Power - Minnesota | Xcel | Investor Owned | Midwest | 4.9 | \$1.34 | 0.92% |
| Connecticut Light & Power | Northeast Utilities | Investor Owned | Northeast | 4.5 | \$2.13 | 0.73% |
| Interstate Power & Light | Alliant Energy | Investor Owned | Midwest | 4.1 | \$2.22 | 1.09% |
| Narragansett Electric | National Grid | Investor Owned | Northeast | 4.0 | \$3.57 | 1.05% |
| Public Service of Colorado | Xcel | Investor Owned | West | 4.0 | \$1.11 | 0.54% |
| Baltimore Gas & Electric | Constellation | Investor Owned | South | 4.0 | \$0.81 | 0.29% |
| MidAmerican Energy | MidAmerican | Investor Owned | Midwest | 3.9 | \$1.41 | 1.08% |
| Nevada Power | NV Energy | Investor Owned | West | 3.5 | \$1.51 | 1.55% |
| Duke Energy Ohio | Duke | Investor Owned | Midwest | 3.5 | \$0.52 | 0.33% |
| Ohio Power | AEP | Investor Owned | Midwest | 3.5 | \$0.28 | 0.53% |
| Ohio Edison | FirstEnergy | Investor Owned | Midwest | 3.5 | \$0.02 | 0.00% |
| Seattle City Light | Seattle City Light | Municipal | West | 3.0 | \$3.15 | 1.01% |
| Puget Sound Energy | Puget Holdings | Investor Owned | West | 3.0 | \$2.91 | 1.29% |
| Public Service of New Mexico | PNM Resources | Investor Owned | West | 3.0 | \$0.70 | 0.44% |
| Consumers Energy | CMS Energy | Investor Owned | Midwest | 3.0 | \$0.63 | 0.38% |
| Metropolitan Edison | FirstEnergy | Investor Owned | Northeast | 3.0 | \$0.20 | 0.02% |
| Potomac Electric Power | Pepco Holdings | Investor Owned | South | 2.9 | \$0.12 | 0.20% |
| Avista | Avista | Investor Owned | West | 2.6 | \$1.96 | 0.90% |
| El Paso Electric | El Paso Electric | Investor Owned | South | 2.2 | \$0.51 | 0.27% |
| Wisconsin Power & Light | Alliant Energy | Investor Owned | Midwest | 2.0 | \$1.30 | 0.63% |
| Austin Energy | Austin Energy | Municipal | South | 2.0 | \$1.24 | 0.85% |
| City of San Antonio | CPS Energy | Municipal | South | 2.0 | \$1.00 | 0.43% |
| United Electric Coop Service | United Electric Coop Service | Cooperative | South | 2.0 | \$0.06 | 0.10% |
| Idaho Power | IDACORP | Investor Owned | West | 2.0 | \$1.49 | 1.06% |
| Santee Cooper | Santee Cooper | State | South | 1.5 | \$0.49 | 0.14% |
| Fairfield Electric Cooperative | Fairfield Electric Cooperative | Cooperative | South | 1.5 | \$0.13 | 0.30% |
| Georgia Power | Southern | Investor Owned | South | 1.5 | \$0.08 | 0.06% |
| PacifiCorp | MidAmerican | Investor Owned | West | 1.1 | \$1.08 | 0.58% |
| Public Service of New Hampshire | Northeast Utilities | Investor Owned | Northeast | 1.0 | \$1.93 | 0.62% |
| Arizona Public Service | Pinnacle West | Investor Owned | West | 1.0 | \$0.91 | 0.74% |
| Salt River Project | Salt River Project | Political Subdivision | West | 1.0 | \$0.80 | 1.11% |
| Southwestern Electric Power | AEP | Investor Owned | South | 0.8 | \$0.21 | 0.15% |
| Tennessee Valley Authority | Tennessee Valley Authority | Federal | South | 0.8 | \$0.74 | 0.69% |
| Florida Power & Light | NextEra Energy | Investor Owned | South | 0.5 | \$0.77 | 0.15% |
| Lee County Electric Cooperative | Lee County Electric Cooperative | Cooperative | South | 0.5 | \$0.72 | 0.14% |
| Progress Energy Florida | Progress Energy | Investor Owned | South | 0.5 | \$0.71 | 0.23% |
| Union Electric | Ameren | Investor Owned | Midwest | 0.5 | \$0.38 | 0.11% |
| Duke Energy Indiana | Duke | Investor Owned | Midwest | 0.5 | \$0.11 | 0.05% |
| Indianapolis Power & Light | AES | Investor Owned | Midwest | 0.5 | \$0.06 | 0.01% |
| Lincoln Electric System | Lincoln Electric System | Municipal | Midwest | 0.0 | \$0.35 | 0.17% |
| Mississippi Power | Southern | Investor Owned | South | 0.0 | \$0.27 | 0.03% |
| Entergy Arkansas | Entergy | Investor Owned | South | 0.0 | \$0.25 | 0.24% |
| Omaha Public Power District | Omaha Public Power District | Political Subdivision | Midwest | 0.0 | \$0.14 | 0.23% |
| Alabama Power | Southern | Investor Owned | South | 0.0 | \$0.04 | 0.04% |

Figure 8: Policy Score Comparison by Relative Spending

Note: Figure 8 identifies utilities with relative spending of \$2.00 per megawatt-hour or greater.

Figure 9: Policy Score Comparison by Relative Savings

Note: Figure 9 identifies utilities with relative savings of 1.0% or greater.

Regional Updates

Total ratepayer-funded energy efficiency program spending in the U.S. is projected to increase from \$5.4 billion in 2009 to \$12.4 billion per year in 2020. Much of this increase will be focused in states that have historically been minor participants in energy efficiency initiatives and where new policies are being enacted to support this growth.²³ As a result of this rapid ramp-up in energy efficiency programs, the time lag in EIA data excludes a significant portion of utility energy efficiency spending and savings. Following are several examples of utilities that have recently launched programs or made long-term plans that are not reflected in EIA's 2009 dataset.

Northeast

Since 2009, the Northeast, a well-established efficiency leader, has taken several leaps forward towards aggressive investment in low-cost efficiency resources. Massachusetts' electric utilities, including NSTAR (which did not report energy efficiency data to EIA in 2009), National Grid, Western Massachusetts Electric (a Northeast Utilities subsidiary), and the municipal aggregator the Cape Light Compact, will invest more than \$8.00 per MWh of retail electricity sales in efficiency (a new utility program investment high-water mark) and achieve single year savings of 2.4 percent of annual electricity sales in 2012. In Rhode Island, Narragansett Electric (a National Grid subsidiary) will achieve single year savings of 2.1 percent and 2.5 percent of annual electric efficiency program savings in 2013 and 2014 respectively. Connecticut has also established pioneering efficiency policies, including all cost-effective procurement requirements for electric and natural gas efficiency, and Connecticut Light & Power has preliminarily proposed saving 2 percent of annual electric energy consumption through their efficiency programs in 2012.

Southeast

TVA has pledged to become a leader in energy efficiency in the Southeast, recently committing to achieve 3.5 percent of sales in energy efficiency savings by 2015. Achievements in FY10 toward the new goal resulted in 211 GWh of energy savings. In FY11, TVA plans to save 550 GWh, more than twice the savings reported the Authority reported to EIA in 2009.²⁴ Georgia Power's 2010 integrated resource plan also includes a more prominent role for demand side management and energy efficiency with spending in 2012 ramping up to \$21.2 million, and in 2013, spending would increase to \$27.8 million. Arkansas' Public Service Commission passed a Sustainable Energy Resource Action Plan in December 2010. The plan establishes electric energy efficiency targets relative to 2010 sales of 0.25 percent in 2011, 0.5 percent in 2012, and 0.75 percent in 2013. The plan also includes natural gas reduction targets. In North Carolina and South Carolina, both Duke Energy and Progress Energy reported better-than-expected results from energy efficiency programs in 2010, achieving higher energy savings at lower costs while collectively reducing customers' electricity usage by more than 700 million kWh.



Midwest

In 2008, the Ohio General Assembly passed Amended Substitute SB 221, an omnibus energy bill which included an energy efficiency standard that ramps up to 1 percent annual savings by 2014 and 2 percent by 2019. This new law has led Ohio utilities, which have traditionally had limited energy efficiency portfolios, to significantly increase their investment and achievement in energy efficiency. Ohio Power and Duke Energy Ohio both surpassed the 2010 benchmark of 0.5%, achieving annualized savings of 167 GWh²⁵ (0.7%) and 311 GWh²⁶ (1.4%), respectively. Ohio Edison, however, saved only 59 GWh (0.3%) in 2010²⁷, below its statutory benchmark, although the Commission lowered the benchmark requirements for the company provided that it meet a three-year cumulative savings requirement of 2 percent from 2010-2012. Illinois utilities Commonwealth Edison and Ameren have been ramping up energy efficiency efforts since 2008 and will likely achieve 0.8 percent of annual electricity savings in 2011. Michigan established an energy efficiency target in 2008 that ramps up to 1 percent annual savings which the state's electric utilities, including Consumers Energy and Detroit Edison, have successfully met. With a new energy efficiency standard approved by the Indiana Utility Regulatory Commission that ramps up to 2% annual savings, Indiana will begin administering energy efficiency programs in 2012 supplemented by programs from electric utilities such as Vectren, Duke Energy, Indianapolis Power and Light, NIPSCO, and AEP.

Metropolitan Edison reported gross savings of 176 GWh in its second program year (June 2010 to May 2011), an enormous increase over its 2009 EIA-reported savings of only 3 GWh.

Mid-Atlantic

Pennsylvania utilities have made enormous strides in energy efficiency implementation due to Act 129, which sets energy targets for the state's electric utilities. Metropolitan Edison reported gross savings of 176 GWh in its second program year (June 2010 to May 2011), an enormous increase over its 2009 EIA-reported savings of only 3 GWh.²⁸

Mountain West

PacifiCorp has completed a new Integrated Resource Plan (IRP) for its multi-state service area that includes Utah and Wyoming. The new IRP contains considerably greater energy efficiency and load management resources than PacifiCorp's previous IRP.²⁹ Also, beginning January 1, 2009, PacifiCorp received approval from the Wyoming Public Service Commission to implement six DSM programs for residential, commercial and industrial customers over four years. PacifiCorp anticipates spending about \$25 million on these programs and saving 138 GWh per year by 2013.³⁰ Additionally, under a settlement agreement with the Colorado Public Utilities Commission and other interested parties, Public Service Colorado (Xcel) will be spending up to \$196 million on its demand-side management programs through 2013.³¹

West

A number of states in this region have made significant policy commitments to energy efficiency as a resource, which are reflected in their utilities' resource plans, and several states are encouraging their utilities to ramp up energy efficiency programs.³² Pacific Gas and Electric (PG&E's) 2009-2011 energy efficiency plan provides for an aggressive ramp-up of multifaceted programs in the residential, commercial, and industrial markets, with a proposed total portfolio budget for years 2009-2011 of \$1.8 billion. PG&E's projected savings between 2009 and 2011 includes a cumulative target of 4,941 GWh in energy savings.³³ In November 2010, the Oregon Public Utility Commission approved Portland Gas and Electric's (PGE) 2009 Integrated Resource Plan, which includes 214 average megawatts of energy efficiency measures, which PGE expects will offset nearly half its load growth through 2020.³⁴ As of August 2006, four utilities in the Western U.S. (PSE, PG&E, SCE, and SDG&E), proposed energy-efficiency programs in their resource plans that projected to offset more than 70 percent of their forecasted energy load growth between 2004 and 2013. Specifically, Avista projected an 83 percent decline in projected load growth from energy-efficiency programs.

As of August 2006, four utilities in the Western U.S. (PSE, PG&E, SCE, and SDG&E), proposed energy-efficiency programs in their resource plans that projected to offset more than 70 percent of their forecasted energy load growth between 2004 and 2013.

Southwest

In May 2011, the Public Utilities Commission of Nevada approved about \$58 million in local energy-efficiency program costs for NV Energy (of which Nevada Power Company is a subsidiary), allowing the company to invest in promoting power-conservation measures at homes and businesses.³⁵ Nevada's recently amended renewable energy portfolio standard allows energy efficiency to be used in partial fulfillment of its portfolio requirements. In addition, The Salt River Project Board of Directors unanimously approved revisions to their Sustainable Portfolio Principles (SPPs). The revised SPPs establish annual energy efficiency savings targets of 1.5 percent (FY 2012-2014), 1.75 percent (FY 2015-2017), and 2.0 percent (FY 2018-2020).³⁶

Data Sources, Issues, and Quality

Data on U.S. ratepayer-funded energy efficiency programs are available to the public through the Energy Information Administration (EIA), various regulatory filings with state authorities, and voluntary industry and company reporting. Each of these sources comes with its own set of shortcomings, pitfalls, and caveats.

Sources

EIA-861

Form EIA-861 collects information on the entities involved in transmission, distribution, and marketing of electricity in the United States. The data collected on this form are used to monitor the current status and trends of the electric power industry and to evaluate the future of the industry.³⁷ EIA-861 includes data on utility-administered demand-side management (DSM) programs.

The DSM data from EIA-861 include program expenditures and effects (energy savings) associated with utility programs. DSM program expenditures are broken down into direct utility costs, incentive payments to customers, and indirect costs (administration, marketing, monitoring and evaluation, and utility-earned incentives).

EIA reporting is mandatory, and as such, these data are fairly comprehensive in terms of scope. However, EIA-861 data take time to be submitted, compiled and released; as such, the most recent data available at any given time date to the year before the previous year. Because energy efficiency programs are rapidly developing across the nation, this prevents comparing the latest in energy efficiency programs.

The issues with EIA-861 have been noted and discussed by multiple observers.^{38,39} Nonetheless, the EIA-861 survey remains the most suitable data source for benchmarking electric utility efficiency programs, and stakeholders such as the State and Local Energy Efficiency Action Network EM&V Working Group have offered suggestions for improving it, including: revising certain definitions to conform with industry standards, improving the clarity and simplicity of the reporting process, and supporting independent verification of reported data.

CONSORTIUM FOR ENERGY EFFICIENCY

The Consortium for Energy Efficiency (CEE) collects data on energy efficiency programs through a voluntary annual survey of its member utilities. The survey solicits information on program spending, future budgets, and savings achieved. CEE partly remedies the time lag problem inherent in the EIA-861 by collecting data on both past year spending and subsequent year budgets, allowing a more up-to-date look at program expenditures. On the other hand, based on a comparison of CEE-reported budgets for 2009 and the actual spending data reported the next year by CEE, actual expenditures sometimes vary from reported budgets, indicating that budgets are not always a reliable way to benchmark utilities.

Although CEE's members have expanded in recent years, along with response rates to the annual survey, this remains a voluntary effort. Therefore, CEE data cover fewer utilities than EIA. Furthermore, CEE does not publicly release data on energy savings on an individual utility level, which limits the usefulness of this resource for benchmarking purposes.



REGULATORY FILINGS

Regulated utilities that recover the costs of administering energy efficiency programs through rates must report their expenditures to the public utility commission (PUC) that determines their rates, in order to “true up” their expenditures with the amount of money they collect from customers. Utilities are also often required to file future budgets for PUC approval or for rate-setting purposes. In addition, utilities subject to regulatory requirements for energy efficiency programs, whether in regulated or deregulated states, must report data to regulatory bodies to verify compliance. Many municipal or cooperative utilities that are not subject to state-based rate oversight or efficiency requirements report energy efficiency data voluntarily in other types of reports. However, regulatory filings and other reports are often difficult to track down, and have issues with comparability—many utilities report their spending over a fiscal year that does not match the calendar year, for example, in addition to the EM&V issue discussed in the “Benchmarking Challenges” section.

Issues

SPENDING

A significant problem with EIA spending data is the way costs are apportioned to energy efficiency and load management. While direct and incentive costs are reported separately for energy efficiency and load management, the category “indirect costs” merges indirect costs for both, making it difficult to accurately distinguish total costs between energy efficiency and load management. In order to assign a portion of indirect spending to efficiency programs, this report allocates indirect costs proportionally between energy efficiency and load management efforts based on total direct spending in these categories.

Furthermore, EIA does not provide clear guidance on how program costs should be allocated among direct and indirect measures. Utilities vary considerably in what they report as indirect versus direct spending, depending on the guidelines in each state. This is confirmed through data checks of selected utilities.

IMPACTS

Form 861, EIA collects data on the incremental and annual energy savings and peak load impacts of utility-administered DSM programs, but the definitions of these data elements limit their usefulness for benchmarking. EIA defines incremental energy effects as the change in megawatt-hours of energy consumption that results from new participants in existing programs and all participants in new programs that began during the reporting year. Utilities are instructed to annualize these impacts in order to estimate the savings that would have occurred if all measures had been implemented on January 1 of the reporting year.

Annual savings are defined as the total change in megawatt-hour energy use from all participants in both new and existing programs. EIA instructs utilities to consider the useful life of efficiency measures “to the extent possible,” but provides no further guidance on this issue. Additionally, Form 861 requests that utilities use actual savings achieved by new participants and program, rather than the annualized estimates included for incremental savings, if possible, but the database does indicate whether utilities reported real or projected annualized savings.

Importantly, annual savings should not be confused with, and are not a proxy for, estimates of “lifecycle” savings from the efficiency measures implemented in the reporting year. Annual savings are heavily dependent on the duration of a utility’s energy efficiency program, in addition to funding levels and effectiveness. In contrast, lifecycle savings can be defined as the total reduction in energy consumption achieved by an energy efficiency measure over the entire useful life of that measure.

Although EIA's definitions, such as that of "annual savings," are not well recognized throughout the energy efficiency industry, this report relies on them to avoid confusion.

In addition to the definitional problems discussed above, there is a great deal of fundamental uncertainty about the energy savings reported by utilities. EIA provides little guidance on how to estimate the impacts of DSM programs for Form-861. Therefore, utilities may rely on a variety of methodologies for evaluating energy savings, which raises significant issues about the comparability of data submitted to EIA.

COST-EFFECTIVENESS

The data necessary for calculating cost-effectiveness, as well as actual calculations of cost-effectiveness tests, frequently appear in regulatory filings and other company reports. However, EIA-861 does not include lifecycle savings, which are required to calculate the true cost of energy saved. Energy savings arising from an efficiency measure are not realized all at once; up-front spending leads to savings that are realized over the course of multiple years.

It would be possible to calculate the cost of energy saved in the first year of a program being implemented by dividing energy efficiency expenditures by incremental savings, which, at least in theory, represent the annualized savings resulting from the expenditures in the program year. But because these savings do not represent the total energy saved over the lifetime of a program, this would not result in a true measure of the cost spent to save a unit of energy. Additionally, concerns with the accuracy of the energy savings data further reduce confidence in the results of any cost-effectiveness calculations from this data source.

Quality

To determine the accuracy of EIA's spending and impacts data, efforts were made to cross-check figures with state regulatory filings and public reports. Spending figures were also compared to CEE data for utilities that responded to the annual survey. CEE collects but does not publicly release data on an energy savings achieved. Results of this data-checking effort were mixed.

Although CEE spending figures were generally close to those reported to EIA, this was not always the case. In some cases, this was due to utilities using a different reporting year for CEE as opposed to EIA (which uses the calendar year), but in others, the reason for the disparity was unclear.

PUC filings and other public reports—which were available for approximately 65 percent of the selected utilities in various forms—presented numerous comparability issues. First, the reporting year over which expenditures were measured varied even more widely for PUC filings and company reports than in CEE data. For example, Metropolitan Edison reported data for "Program Year 1," which ran from June 2009 to May 2010, and Austin Energy reported over a fiscal year from October 2009 to September 2010. Second, many utilities, including Entergy Arkansas, provided spending figures that included efficiency and load management in a single sum, making it impossible to determine how much spending went towards energy efficiency alone.

Comparability was also an issue when verifying savings data. About half of the filings and reports contained savings estimates for the reporting year that were within 10 percent of the incremental figure included in EIA-861. The remaining reports typically contained only estimates of lifecycle energy savings. Additionally, as with program spending, some utilities file their annual reports for activity over a fiscal year or other time period, which caused several inconsistencies.

These issues did not account for the total variation in figures between company reports and EIA data, however, indicating that there may be errors in the EIA data, or potentially just that accounting practices vary between how utilities report their spending to regulatory bodies and to EIA.

Benchmarking Metrics

This section discusses a number of potential metrics for benchmarking energy efficiency programs based on spending, impacts, and cost-effectiveness, along with the advantages and disadvantages of each. Many of the best metrics for comparing energy efficiency programs could not be calculated using available data. Therefore, the metrics that were selected for this initial round of benchmarking are not necessarily those that should be used going forward, once data quality is improved.

Spending

Total spending can demonstrate the gross magnitude of energy efficiency program expenditures. Because spending on energy efficiency varies based on the resources available to the utility, it is also useful to compare spending using metrics that account for utility size. The following are three possible ways to normalize utility spending by size:

1. ***Efficiency spending per customer***—This metric normalizes for size to an extent, but can also be distorted by utilities that primarily serve large industrial customers (these utilities have high revenues and energy sales, but low customer counts).
2. ***Efficiency spending per electric revenues***—This metric shows the percent of a utility's revenues that it spends on energy efficiency, and has the advantage of comparing the same unit (dollars to dollars). However, due to wide variation in electric rates across the nation, some utilities of similar size have very different revenues, distorting this metric.
3. ***Efficiency spending per electric sales***—This metric is perhaps the least biased of the three, and the one we use in our analysis, although varying electricity consumption between utility territories, due to climatic or other factors, will affect this variable.

There are a number of spending metrics that would also be informative, but for which data are currently not widely or accurately available. For instance:

1. ***Customer contribution and total resource cost***—Although utilities sometimes pay for the entirety of an energy efficiency measure, more often, consumers must pay their own way with some assistance from the utility. Including customer contribution gives a better idea of the total volume of efficiency activity, and comparing it to utility contribution demonstrates to what degree the program depends on customer spending. In addition, total resource cost (customer contribution and utility contribution combined) is an ideal metric for determining cost-effectiveness, because it takes into account the entire cost of a measure. This information is not collected by EIA or CEE, but is sometimes included in PUC filings or other reports.



2. ***Spending by category***—Spending on energy efficiency can generally be divided into money directly paid to customers as incentives, money directly paid to construct or install energy efficiency measures, and other costs such as marketing and outreach and administrative overhead. Comparing these categories can show whether programs are putting most of their funding towards actual implementation of energy efficiency measures, or whether it is being spent mainly on administration or marketing. EIA breaks down costs into direct and incentive costs for both efficiency and load management, and has a category for indirect costs that includes both efficiency and load management. However, the guidance EIA gives on how to apportion costs into these categories is not extensive, and it is likely that utilities use varying methods to allocate their spending. Because of the perceived inaccuracy of this metric, we elected not to include it in our report.
3. ***Spending by customer class***—Efficiency programs are usually designed to target a specific type of customer class: generally either residential, commercial or industrial. Many utilities also target programs specifically to low-income customers. These metrics can identify the breadth of programs offered, and identify where programs are lagging in targeting certain customer opportunities. CEE provides breakdowns of spending into residential, commercial and industrial, low-income, and other, and also includes what percent of spending is used for evaluation, measurement, and verification (EM&V)—but as previously mentioned, the utilities we intended to measure were not all included in CEE’s data.

Impacts

Below are two potential metrics that could be used to compare the impacts of existing energy efficiency programs:

1. ***Annual savings as a percent of sales***—This metric can serve as a proxy for the percentage of a utility’s load that is met using energy efficiency. This percentage might also be interpreted as the contribution of energy efficiency to a utility’s overall resource mix. While this metric controls for utility size, there is considerable uncertainty over the baseline year used by utilities. Furthermore, differences in accounting and assumptions over the useful life of efficiency measures could skew the results.
2. ***Incremental savings as a percent of sales***—Calculating incremental savings as a percent of total sales provides a better snapshot of a utility’s current efficiency programs. This metric may be interpreted as a proxy for reductions in load growth. EERS programs often define utility requirements in terms of some sort of incremental savings goal. Incremental savings percent is the least biased metric that is calculable using the EIA-861.

Several additional impacts measures and metrics would enhance the effort to benchmarking efficiency programs, but limited or unreliable data prevent their use. These include:

1. ***Lifecycle savings***—An estimate of the lifecycle savings from energy efficiency measures implemented in the reporting year would significantly enhance the power of benchmarking these programs. Estimates of the full lifetime impact of efficiency measures are necessary for calculating the true cost of energy efficiency per kilowatt-hour saved. The cost of lifecycle savings would serve as a measure of cost-effectiveness and allow for more accurate comparisons to supply-side resources.

2. ***Savings per program participant***—Energy savings per program participant is a measure of effectiveness. It disregards the size of utilities and focuses on the benefits to the consumers that take advantage of energy efficiency programs.
3. ***Energy bill savings***—Energy bill savings can be estimated using annual savings and average electric utility rates by customer class. However, this metric would be skewed towards larger utilities with long-standing programs and relatively high rates.
4. ***Energy or bill savings per customer***—Calculating energy or bill savings per customer seeks to control for the size of utilities when comparing impacts. However, as with spending, this metric would favor utilities that serve primarily large industrial customers. Furthermore, calculating bill savings per customer would be biased towards utilities with high rates, similar to the measure of total bill savings.
5. ***Emissions savings***—One co-benefit of energy efficiency that is receiving increased state and federal attention is the potential environmental co-benefits of energy efficiency, including emission reductions. In some states, utilities estimate the emissions savings as a component of annual reports on their efficiency programs. Another potential application of such data is use in State Implementation Plans (SIPs) that are submitted to EPA for compliance with air quality regulations. EPA recently issued preliminary guidance to assist states in quantifying the emissions impacts of renewable energy and energy efficiency for inclusion in SIPs.⁴⁰

Cost-Effectiveness

There are three main approaches to determining cost-effectiveness of energy efficiency programs: cost of saved energy, cost-benefit ratio, and net benefits. Cost of saved energy measures the amount of money spent (by the utility, the consumer, or both) to save a unit of energy. This metric allows comparison of utilities to one another, as well as comparison of the cost of saved energy to the costs of supply-side resources. Cost of saved energy can be calculated by dividing the cost of implementing an energy efficiency measure or program by the lifecycle energy savings realized by that program.⁴¹

Cost-benefit ratio compares the cost of an energy efficiency measure (again, to the utility, the consumer, or both) to the monetary value of the benefits to the ratepayer, utility, and/or society realized by implementing it. “Net benefits” is a similar metric, and is calculated by subtracting the total cost of a program from its monetized benefits. These metrics allow stakeholders to determine whether the monetary benefits of an energy efficiency program outweigh the costs, and the quantity of benefits they are providing to the consumer.

Data Recommendations

Publicly available energy efficiency data do not currently meet the needs of stakeholders seeking to compare utilities by spending, energy savings, or cost-effectiveness. Either EIA or CEE could readily fill this data void through a few simple but fundamental changes to their existing data collection framework. A more robust, comprehensive, and public dataset would facilitate future benchmarking efforts and provide stakeholders with more useful information regarding the effectiveness of energy efficiency programs.

The recommendations below are meant to assist future data collection efforts, by EIA, CEE, or other organizations. Adhering to these guidelines and recommendations would address many of the issues confronted during the development of this report and facilitate greater engagement among stakeholders.

- ① ***Provide clear guidelines on cost apportionment, and separate efficiency and load management.*** If project costs are divided into categories such as direct, incentive, and indirect, clear guidance should be given as to what expenditures belong in what category. No costs for efficiency and load management programs should be listed together, if possible, and spending on electric and natural gas programs should also be separate.
- ② ***Include detailed spending information.*** Including spending by customer class, spending on low-income programs, and customer spending would allow a deeper understanding of utility programs, better cost-effectiveness comparisons, and easier identification of undeveloped opportunities.
- ③ ***Require reporting of future budgets.*** Given that utility energy efficiency programs are rapidly ramping up across the nation, inclusion of future budgets would allow comparison of utilities that have not yet begun programs, or whose programs are scheduled to change dramatically in the future.
- ④ ***Provide clear guidance for estimating efficiency savings.*** Clear guidance for how to estimate energy savings from efficiency measures would ensure that comparisons between utilities are valid.
- ⑤ ***Include estimates of lifecycle savings.*** Lifecycle savings from energy efficiency are critical for determining the full impact of measures and programs. While lifecycle estimates for current year efforts necessarily depend on a range of assumptions, clear guidance on estimation methods would ensure a consistent approach and improve comparability. Guidelines on lifecycle estimates could be included in a broader effort to update reporting requirements.
- ⑥ ***Require utilities to report the number of program participants by class.*** While less integral than other recommendations, this would facilitate more in-depth analysis of program effectiveness and consumer benefits.
- ⑦ ***Collect data on third-party administrators.*** Collecting detailed data on programs administered by third parties, including which utilities' customers are served and funding provided by each utility, would enable more direct comparisons between third-party and utility-administered programs.
- ⑧ ***Publicly release all administrator-level data.*** In order to increase transparency and facilitate stakeholder involvement, all administrator-level data should be publicly released. This would allow stakeholders to conduct independent analyses of the data and draw conclusions to move the policy discussion forward.

Endnotes

- 1 For more information on energy efficiency policies see www.epa.gov/eeactionplan and <http://www1.eere.energy.gov/seeaction/>
- 2 Caracino J, Nevius M, Fesler L. *The State of the Efficiency Program Industry: 2009 Expenditures, Impacts & 2010 Budgets*. Consortium for Energy Efficiency, December 10, 2010. <http://www.cee1.org/ee-pe/2010AIR.php3>.
- 3 David Roland-Horst (2008), *Energy Efficiency, Innovation, and Job Creation in California*
- 4 McKinsey & Company. 2009, *Unlocking Energy Efficiency in the U.S. Economy*. http://www.mckinsey.com/en/Client_Service/Electric_Power_and_Natural_Gas/Latest_thinking/Unlocking_energy_efficiency_in_the_US_economy.aspx
- 5 McKinsey & Company. 2009, *Unlocking Energy Efficiency in the U.S. Economy*. http://www.mckinsey.com/en/Client_Service/Electric_Power_and_Natural_Gas/Latest_thinking/Unlocking_energy_efficiency_in_the_US_economy.aspx
- 6 American Council for an Energy Efficient Economy (ACEEE). *2010 State Energy Efficiency Scorecard*. Research Report E107. October 13, 2010. <http://www.aceee.org/research-report/e107>
- 7 Barbose G, Goldman C, Schlegel J. 2009. *The Shifting Landscape of Ratepayer-Funded Energy Efficiency in the U.S.* Lawrence Berkeley National Laboratory report LBNL-2258E, October 2009.
- 8 Caracino J, Nevius M, Fesler L. *The State of the Efficiency Program Industry: 2009 Expenditures, Impacts & 2010 Budgets*. Consortium for Energy Efficiency, December 10, 2010. <http://www.cee1.org/ee-pe/2010AIR.php3>.
- 9 Energy Information Administration. 2009. *Annual Electric Utility Data 2009 (Form EIA-861)*. <http://www.eia.doe.gov/cneaf/electricity/page/eia861.html>
- 10 Energy Information Administration. 2009. *Annual Electric Generator Report 2009 (Form EIA-860)*. <http://www.eia.doe.gov/cneaf/electricity/page/eia860.html>
- 11 Capital costs for new generating capacity were estimated using data from the National Renewable Energy Laboratory: <http://www.nrel.gov/analysis/costs.html>
- 12 Friedrich K, Eldridge M, York D, Witte P, and Kushler M. *Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved through Utility-Sector Energy Efficiency Programs*. ACEEE Research Report U092, September 2009. <http://www.aceee.org/research-report/u092>
- 13 Energy Information Administration. 2011. *Levelized Cost of New Generation Resources in the Annual Energy Outlook 2011*. http://www.eia.gov/oiaf/aeo/pdf/2016levelized_costs_aeo2011.pdf
- 14 Schiller S, Goldman C, Galawish E. *National Energy Efficiency Evaluation, Measurement, and Verification (EM&V) Standard: Scoping Study of Issues and Implementation Requirements*. April 2011. Lawrence Berkeley National Laboratory Report LBNL-4265E. April 2011. <http://eetd.lbl.gov/ea/emp/reports/lbnl-4265e.pdf>
- 15 For more information on the RTF see <http://www.nwccouncil.org/energy/rtf/Default.htm>
- 16 For more information on the NEEP EM&V Forum see <http://www.neep.org/emv-forum>
- 17 For more information on NAESB see <http://www.naesb.org/dsm-ee.asp>
- 18 For more information on SEE Action see <http://www1.eere.energy.gov/seeaction/evaluation.html>
- 19 American Council for an Energy Efficiency Economy (ACEEE). *Carrots for Utilities: Providing Financial Returns for Utility Investments in Energy Efficiency*. ACEEE Research Report U111. January 24, 2011. <http://www.aceee.org/research-report/u111>
- 20 American Council for an Energy Efficiency Economy (ACEEE). *State Energy Efficiency Resource Standard (EERS) Fact Sheet: Updated December 2010*. ACEEE Fact Sheet. December 20, 2010. <http://www.aceee.org/fact-sheet/state-energy-efficiency-resource-standard-eers-fact-sheet-u>
- 21 Institute for Electric Efficiency, *Integrating Codes and Standards into Electric Utility Energy Efficiency Portfolios*, IEE Whitepaper August 2011. http://www.edisonfoundation.net/iee/reports/IEE_IntegratingC&SintoEEPortfolios_final.pdf

- 22 CEE, 2010. Figure is the sum of Efficiency Maine, Efficiency Vermont, Energy Trust of Oregon, Focus on Energy (Wisconsin), Hawaii Energy Efficiency Program, NJ Clean Energy Program, Northwest Energy Efficiency Alliance, NYSERDA, Public Interest Energy Research of Energy Services.
- 23 Barbose G, Goldman C, and Schlegel J. 2009. *The Shifting Landscape of Ratepayer-Funded Energy Efficiency in the U.S.* Lawrence Berkeley National Laboratory Report, October 2009. <http://eetd.lbl.gov/ea/ems/reports/lbnl-2258e.pdf>.
- 24 Tennessee Valley Authority. 2011. Integrated Resource Plan, Appendix C—Energy Efficiency and Demand Response. http://www.tva.gov/environment/reports/irp/pdf/Final_IRP_complete.pdf
- 25 <http://dis.puc.state.oh.us/TiffToPDF/A1001001A11C16B01033E02752.pdf>
- 26 <http://dis.puc.state.oh.us/TiffToPDF/A1001001A11C15B62659C48525.pdf>
- 27 FirstEnergy Ohio. 2011. Report of the Status of 2010 Energy Efficiency and Peak Demand Reduction Benchmarks. <http://dis.puc.state.oh.us/DocumentRecord.aspx?DocID=88b2f213-51e0-4d11-a14f-7f6d42ee614c>
- 28 Metropolitan Edison. 2011. Annual Report to the Pennsylvania Public Utility Commission (Program Year 2). <http://www.puc.state.pa.us/pcdocs/1140182.pdf>
- 29 PacifiCorp. http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2011IRP/2011IRP-MainDocFinal_Vol1-FINAL.pdf
- 30 Southwest Energy Efficiency Project. Wyoming, Utility Energy Efficiency Programs. <http://www.swenergy.org/programs/utilities/wyoming.htm>
- 31 Southwest Energy Efficiency Project. Colorado, Utility Energy Efficiency Programs. <http://www.swenergy.org/programs/utilities/colorado.htm>
- 32 Lawrence Berkeley National Laboratory. Energy Efficiency in Western Utility Resource Plans: Impacts on Regional Resource Assessment and Support for WGA Policies. August 2006. <http://eetd.lbl.gov/ea/ems/reports/58271.pdf>
- 33 California Public Utilities Commission. Amended Application Of Pacific Gas And Electric Company For Approval Of The 2009-2011 Energy Efficiency Programs And Budget. March 2, 2009. https://www.pge.com/regulation/EnergyEfficiency2009-2011-Portfolio/Pleadings/PGE/2009/EnergyEfficiency2009-2011-Portfolio_Plea_PGE_20090302-01.pdf
- 34 Portland General Electric, Issues in Perspective: Integrated Resource Plan. November 2009. http://www.portlandgeneral.com/our_company/news_issues/current_issues/docs/ip_irp.pdf
- 35 Nevada Public Utility Commission. Docket No. 10-10024. Application of Nevada Power Company d/b/a NV Energy to establish interim base energy efficiency program rates and base energy efficiency implementation rates pursuant to NRS 704.785 and the Order issued in Docket No. 09-07016. June 29, 2011, and Robison, Jennifer. “NV Energy Wins Rate Increase.” *Las Vegas Review Journal*. May 24, 2011. <http://www.lvrj.com/business/nv-energy-wins-rate-increase-122460789.html>
- 36 Draft Resolution Of The Board Of Directors Of The Salt River Project Agricultural Improvement And Power District Regarding Revisions To Sustainable Portfolio Principles. May 23, 2011. <http://www.srpnet.com/environment/earthwise/pdfx/spp/May23/FinalDraftResolution.pdf>
- 37 Energy Information Administration, 2009. *Annual Electric Utility Data 2009 (Form EIA-861)*. <http://www.eia.doe.gov/cneaf/electricity/page/eia861.html>.
- 38 Michael Reid. 2009. “Using U.S. Energy Information Administration Data to Benchmark Electric Utility DSM Portfolios.” Paper presented at the 2009 International Energy Efficiency Program Evaluation Conference, June 2009, Portland, OR. <http://www.iepec.org/2009PapersTOC/papers/036.pdf#page=1>
- 39 American Council for an Energy Efficiency Economy (ACEEE). *Where Have All the Data Gone? The Crisis of Missing Energy Efficiency Data*. Research Report E101. February 1, 2010. <http://www.aceee.org/research-report/e101>
- 40 US EPA, *Quantifying Emission Impacts of Clean Energy Initiatives*, <http://epatechforum.org/documents/2010-2011/2010-2011.html>
- 41 See 2009 ACEEE report for CSE formula: <http://www.aceee.org/research-report/u092>