

BEFORE

THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of Protocols for the)
Measurement and Verification of Energy) Case No. 09-512-GE-UNC
Efficiency and Peak Demand Reduction)
Measures.)

ENTRY

The Commission finds:

- (1) Ohio Power Company; Columbus Southern Power Company; Duke Energy of Ohio, Inc.; the Dayton Power and Light Company; the Toledo Edison Company; Ohio Edison Company; and the Cleveland Electric Illuminating Company (collectively, electric utilities) are public utilities, as defined in Section 4905.02, Revised Code, and, as such, are subject to the jurisdiction and general supervision of the Commission, in accordance with Sections 4905.04, 4905.05, and 4905.06, Revised Code.
- (2) Columbia Gas of Ohio, Inc.; the East Ohio Gas Company d/b/a Dominion East Ohio; Vectren Energy Delivery of Ohio, Inc.; and Duke Energy of Ohio, Inc., (collectively, gas utilities) are public utilities, as defined in Section 4905.02, Revised Code, and, as such, are subject to the jurisdiction and general supervision of the Commission, in accordance with Sections 4905.04, 4905.05, and 4905.06, Revised Code.
- (3) On April 23, 2008, the Ohio legislature adopted Amended Substitute Senate Bill No. 221 (SB 221), which became effective on July 31, 2008. Among the provisions of SB 221 was the requirement in Section 4928.66, Revised Code, for the Commission to take certain actions related to the implementation of energy efficiency and peak-demand reduction programs by the electric utilities. Section 4928.66(B), Revised Code, requires the Commission to verify the annual levels of energy efficiency and peak-demand reduction achieved by each electric utility. Further, Section 4928.66(A)(2)(c), Revised Code, specifically provides that mercantile customers of the electric utilities may be exempted from payment of a mechanism that recovers the cost of energy efficiency and peak-demand reduction programs, if the

Commission determines that such an exemption reasonably encourages those customers to commit their demand response or other customer-sited capabilities for integration into the electric utility's demand response, energy efficiency, or peak-demand reduction programs.

- (4) The Commission has adopted or, in one case, is considering a cost recovery mechanism for demand-side management programs for each gas and electric utility, each of which mechanisms will require Commission supervision and regulation. *In the Matter of the Application of Columbia Gas of Ohio, Inc. for Authority to Amend Filed Tariffs to Increase the Rates and Charges for Gas Distribution Service*, Case No. 08-72 et al., Opinion and Order (December 3, 2008); *In the Matter of the Application of The East Ohio Gas Company d/b/a Dominion East Ohio for Authority to Increase Rates for its Gas Distribution Service*, Case No. 07-829-GA-AIR et al., Opinion and Order (October 15, 2008); *In the Matter of the Application of Duke Energy Ohio, Inc. for an Increase in Rates*, Case No. 07-589-GA-AIR et al., Opinion and Order (May 28, 2008); *In the Matter of the Application of Vectren Energy Delivery of Ohio, Inc. for Authority to Amend its Filed Tariffs to Increase the Rates and Charges for Gas Services and Related Matters*, Case No. 07-1080-GA-AIR et al., Opinion and Order (January 7, 2009); *In the Matter of the Application of Duke Energy Ohio, Inc., for Approval of an Electric Security Plan*, Case No. 08-920-EL-SSO et al., Opinion and Order (December 17, 2008); *In the Matter of the Application of Columbus Southern Power Company for Approval of an Electric Security Plan; an Amendment to its Corporate Separation Plan; and the Sale or Transfer of Certain Generating Assets*, Case No. 08-917-EL-SSO et al., Opinion and Order (March 18, 2009); *In the Matter of the Application of Ohio Edison Company, The Cleveland Electric Illuminating Company, and The Toledo Edison Company for Authority to Establish a Standard Service Offer Pursuant to Section 4928.143, Revised Code in the Form of an Electric Security Plan*, Case No. 08-935-EL-SSO et al., Second Opinion and Order (March 25, 2009); *In the Matter of the Application of The Dayton Power and Light Company for Approval of Its Electric Security Plan*, Case No. 08-1094-EL-SSO et al. (under consideration).
- (5) The Commission must be in a position to be able to determine, with reasonable certainty, the energy savings and demand reductions attributable to the energy efficiency programs

undertaken by gas and electric utilities, including mercantile customers, in order (a) to verify each electric utility's achievement of energy and peak-demand reduction requirements, pursuant to Section 4928.66(B), Revised Code; (b) to consider exempting mercantile customers from cost recovery mechanisms pursuant to Section 4928.66(A)(2)(c), Revised Code; and (c) to review cost recovery mechanisms for energy efficiency and/or peak-demand reduction programs implemented by the electric or gas utilities. In order to provide guidance regarding how the Commission will determine energy savings and/or peak-demand reductions, the Commission intends to establish protocols for the measurement and verification of energy efficiency and peak-demand reduction measures, which will be incorporated into a Technical Reference Manual (TRM). The Commission's intent is that the TRM would provide predictability and consistency for the benefit of the electric and gas utilities, customers, and the Commission itself.

- (6) In many instances, the savings and/or reductions achieved by implementing a particular measure can be predicted, *ex ante*, with such certainty that the savings and/or reductions can be assumed, without any *ex post* evaluation other than to verify proper installation and operation of the measure. In other instances, energy savings and/or peak-demand reductions will be able to be determined through the application of specific engineering calculations that have been previously defined. In some instances, the set of measures installed at a customer's facility may be unique or complex, thus requiring the savings and/or reductions to be calculated on a case-by-case basis for each measure or representative sample of measures. Further, in some cases, *ex ante* estimates may need to be modified based on statistical analysis of billing data to reflect the impact on overall program results of additional factors, including variations in baseline energy use, free ridership, and spillover effects.
- (7) Therefore, the TRM will include the following information:
 - (a) Predetermined energy savings and demand reduction values and calculation assumptions for specific electricity and gas efficiency deemed measures and deemed calculated measures, when

such values can be defined with a reasonable level of certainty, including applicability conditions.

- (b) Custom measure protocols consisting of standard engineering calculations and/or other methods that are used for determining energy savings and/or peak-demand reductions for electricity and gas efficiency measures that do not have applicable predetermined savings values.
 - (c) Verification procedures that electric and gas utilities will utilize to confirm both baseline conditions, when appropriate, and the proper installation of energy efficiency measures for which energy savings and/or peak-demand reductions claims will be made.
 - (d) Protocols and assumptions for determining cost effectiveness parameters, other than energy savings and demand reductions, used in the total resource cost (TRC) test for calculating the cost effectiveness of energy efficiency programs undertaken by the electric and gas utilities.
- (8) The Commission recognizes that the TRM will likely continue to evolve as measures and protocols are added, refined, and updated over time. As such, part of the development of the TRM will be the establishment of transparent and participatory procedures to populate the TRM with predetermined values for additional measures or updated values, as well as updated protocols and assumptions, on an ongoing basis.
- (9) The Commission believes that it is appropriate to allow interested parties to participate in the development of the TRM. The consideration of policies and protocols in a single proceeding will allow interested parties to conserve their resources, will increase the likelihood that relevant and available information will be before the Commission in its decision-making process, and will ensure that energy savings and demand reduction values are determined in a complete, transparent, and consistent manner, with a proper balance between the certainty of the values and the cost required to

achieve such certainty. Therefore, we will proceed along several lines. We will allow for comments to be filed with regard to the policy considerations that will ultimately be addressed by the Commission. We will request industry input on the identification of energy efficiency measures. We will allow for comments to be filed with regard to the format in which input will be provided on the values for the measures. Following the issuance of Commission guidance as to policy issues, we will receive industry input on the values to be assigned or protocols to be followed in setting values for the various measures. We intend to hire a consultant, the cost of which will be paid by the electric and gas utilities, to assist with the review of the various proposed values and protocols and the determination of initial values and protocols, for use in the preparation of program portfolio plans. After the consultant's filing of a draft of the 2010 TRM, we currently expect to allow for the filing of objections to the consultant's draft of the 2010 TRM, followed by a full hearing on the issues raised in the objections, if and to the extent necessary. Each of these steps will be detailed below.

- (10) Underlying policy considerations will, of necessity, shape the protocols, assumptions, and values included in the TRM. The Commission has identified and described several of these policy issues in Appendix A. A technical conference presenting an overview of these policy questions, as well as potential resolutions of those questions, will be held on July 8, 2009, at 9:00 A.M., in Hearing Room 11-D, 11th floor, at the Commission's offices at 180 East Broad Street, Columbus, Ohio 43215. Interested parties who wish to comment on these potential policy determinations or suggest other policy considerations may then file comments in this docket, no later than July 24, 2009. Such comments should indicate parties' perspectives on the issues identified in Appendix A and should identify and comment on other policy considerations that relate specifically to the development of the TRM and/or generally to the overall process of evaluation, measurement, and verification of program impacts.
- (11) The Commission believes that the appropriate first step in creating a list of energy efficiency measures is for the electric and gas utilities, with the participation of mercantile customers, to advise the Commission of the following items:

- (a) Measures that are in current use.
 - (b) Measures that are intended by the electric utilities to be proposed within their initial submissions of program portfolio plans.
 - (c) Measures that are used or intended to be used by any mercantile customer intending to seek an exemption from a cost recovery mechanism.
- (12) Therefore, the Commission directs the electric and gas utilities to collaborate and attempt to reach consensus, initially, on a detailed itemization of such measures. Such collaboration and consensus should be accomplished separately for the electric and gas industries. The electric and gas utilities shall also include any other interested parties, including mercantile customers, in the development of their consensus positions. The electric and gas utilities shall submit to the Commission a single composite list for each industry, listing all measures identified by the industry groups, no later than August 3, 2009. To the extent that the electric and gas industries were unable to reach consensus, the filing shall indicate any areas of disagreement.
- (13) In order to begin to assess, and subsequently to update, energy savings and demand reduction values for deemed measures and deemed calculated measures, the Commission has prepared a format, attached as Appendix B, for the submission of data that may be required for setting values and protocols for various measures. The data requirements for various energy efficiency measures are included in Tables 1 and 2. Appendix B also includes categories of information (e.g., measure cost) that will be required to determine TRC test results. Interested parties who wish to comment on the information in Appendix B should file comments in this docket no later than July 15, 2009.
- (14) Staff is directed to review any comments that are filed with regard to Appendix B and to modify Appendix B as staff deems appropriate. The information in Appendix B will be, after any necessary modification, posted on the Commission's website.
- (15) After developing the lists of measures identified by the groups, the electric and gas utilities shall continue their efforts,

attempting to reach consensus with regard to the items described in finding 7, for inclusion in the TRM, on a measure-by-measure basis.

- (16) The electric and gas utilities are also encouraged to review and consider the TRMs and protocols developed by other states and regional entities for energy efficiency programs, such as the Pennsylvania TRM, as possible models and sources of data (corrected for Ohio climate and other factors, as appropriate).
- (17) The electric and gas utilities shall submit to the Commission, no later than September 15, 2009, actual proposed predetermined values and proposed protocols, as set forth in finding 7. All recommendations shall be submitted in the format provided by staff. Such format will be based on the proposal set forth in Appendix B, as modified and posted on the Commission's website. The electric and gas utilities shall submit to the Commission a single list of proposed predetermined values and protocols, for each industry. To the extent that the electric and gas industries were unable to reach consensus, the filing shall indicate any areas of disagreement.
- (18) To assist the Commission with the evaluation and initial determination of values and protocols, the Commission will issue a request for proposal (RFP) for engineering consulting services. The intention is for a selected consultant to begin providing technical assistance on the TRM by September 2009. The Commission expects to issue the RFP shortly. We anticipate that the consultant will file a framework TRM, no later than November 11, 2009. The Commission anticipates that the consultant will file a draft of the 2010 TRM by the end of the second quarter of 2010. After such filing, a schedule will be established for the review and adoption of the 2010 TRM.
- (19) Although the schedule will not allow for the Commission to review the framework TRM prior to the January 1, 2010, filing date for the electric utilities' program portfolio plans pursuant to adopted rule 4901:1-39-04, as set forth in Case No. 08-888-EL-ORD, the consultant's framework TRM should be used by the electric utilities in the preparation of their program portfolio plans that are to be filed by January 1, 2010.

- (20) Each electric and gas utility will be ordered to directly contract for and bear a share of the cost of the engineering consulting services of the contractor chosen by the Commission. The companies' contracts shall be filed in this docket. The Commission will determine, in a subsequent entry, the appropriate sharing methodology for such costs. Costs expended for these services may be recovered through each electric or gas utility's energy efficiency cost recovery mechanism, so long as any cost so expended has been approved by the Commission prior to payment.
- (21) The Commission shall select and solely direct the work of the consultant. Staff will review and approve for payment, as appropriate, invoices submitted by the consultant.
- (22) The following is a summary of the procedural schedule to be followed in this proceeding, as previously described in more detail:

July 8, 2009	Workshop concerning policy issues
July 15, 2009	Deadline for filing of comments regarding Appendix B
July 24, 2009	Deadline for filing of comments regarding Appendix A
August 3, 2009	Deadline for filing of lists of proposed measures
September 15, 2009	Deadline for filing of proposed values and protocols
November 11, 2009	Expected deadline for filing of framework TRM

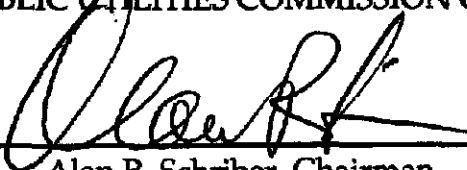
It is therefore,

ORDERED, That the electric and gas utilities shall observe the requirements set forth in this entry. It is, further,

ORDERED, That a copy of this entry be served upon Ohio Power Company; Columbus Southern Power Company; Duke Energy of Ohio, Inc.; the Dayton Power and Light Company; the Toledo Edison Company; Ohio Edison Company; the Cleveland


Electric Illuminating Company, Columbia Gas of Ohio, Inc.; the East Ohio Gas Company d/b/a Dominion East Ohio; Vectren Energy Delivery of Ohio, Inc.; Duke Energy of Ohio, Inc., and all other parties of record in Case No. 08-888-EL-ORD.

THE PUBLIC UTILITIES COMMISSION OF OHIO


Alan R. Schriber, Chairman

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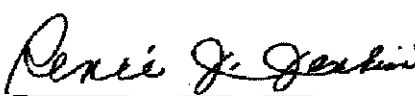

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Appendix A
Policy Issues that May Affect the Approach and Scope
of a Technical Reference Manual

This appendix identifies five major issues where policy guidance is needed in order to proceed with the development of an Ohio Technical Reference Manual and the determination of energy saving and demand reductions. For each issue, a brief description is provided followed by a "provisional" recommendation on that issue that the Commission is considering and solicits input from various parties.

1. Should the Commission evaluate performance of utility programs on the basis of achieved gross or net savings, or both?

This policy choice focuses primarily on the question of whether the efficiency measures installed through utility programs would have been installed without the programs, that is, are ratepayer funds being used prudently to achieve additional savings beyond normal market activity?

The gross energy impact is the change in energy consumption and/or demand that results directly from program-related actions taken by energy consumers that are exposed to the program, regardless of the extent or nature of program influence on these actions. This is the physical change in energy use after taking into account factors beyond the customer or sponsor's control (e.g. weather). Estimates of gross energy impacts always involve a comparison of changes in energy use over time among customers who installed measures and some baseline level of usage. Baselines may be developed from energy use measurements in comparable facilities, codes and standards, direct observation of conditions in buildings not addressed by the program, or facility conditions prior to program participation.

The net energy impact is that percentage of gross energy impact attributable to the program. Estimating net energy impacts typically involves assessing free ridership and spillover, although additional considerations may be included. Free ridership refers to the portion of energy (and demand) savings that participants would have achieved in the absence of the program through their own initiatives and expenditures. "Spillover" refers to the program-induced adoption of measures by non-participants and participants who did not claim financial or technical assistance for additional installations of measures supported by the program. For programs in which participation is not well defined, the concepts of free ridership and spillover are less useful. Estimating net energy impacts for these kinds of programs generally required

the analysis of sales or market share data in order to estimate net levels of measure adoption.¹

Provisional Recommendation. Based on experience in other states, quantifying attribution of energy savings and demand reductions, and thus net savings and reductions, can be a complex and a non-exact process. Moreover, the Commission believes that because Ohio does not have a history of significant ratepayer-funded energy efficiency programs and because electricity prices have been relatively low in Ohio, there is a high probability that energy efficiency programs proposed by utilities in their first three-year plan will have a high net to gross savings ratio if these programs are well-designed. Therefore, we propose that gross savings/reductions should be used as the metric for tracking utility and customer progress toward state goals and for the calculation of total resource cost-effectiveness. Use of gross savings is consistent with the Commission's adoption of the Total Resource Cost (TRC) test. TRC considers all costs and all benefits, regardless of how they are distributed among participants, non-participants and the utility. As utilities gain greater experience with the delivery of efficiency programs, the Commission would transition to the use of net savings measurement to more completely track the impacts of efficiency programs.

The Commission also believes that it is important to ensure that program expenditures are focused on energy efficiency measures that are less likely to occur absent the program. Consequently, careful consideration should be given to the utility program designs, existing and forecast market penetration of efficiency measures, baselines, technologies and practices assumed in the calculation of gross energy savings in order to reduce the likelihood that programs are redundant with current or reasonably anticipated market conditions (see "Baseline" issue). Second, in designing their programs, utilities should not provide incentives for measures that have a payback period of one year or less to customers (which is one strategy to minimize "free riders").

Third, the Commission plans to revisit this issue of net and gross savings in the future and will consider revising net-to-gross ratios at the measure, program, or portfolio level in future years depending on the results of program evaluations and market assessments.

2. How should baseline efficiency and market penetration be defined for determining energy savings and demand reductions?

Energy savings and demand reductions are determined by comparing energy consumption and demand after measure adoption with what would have occurred

¹ The description of gross and net savings, and other background materials, is from the National Action Plan for Energy Efficiency (2007). *Model Energy Efficiency Program Impact Evaluation Guide*, prepared by Steven R. Schiller, Schiller Consulting, Inc. <www.epa.gov/eeactionplan>

without the program activity (i.e. the baseline). The baseline defines the conditions, including energy consumption and related demand, which would have occurred without the subject program. Baseline definitions consist of site-specific issues and broader, policy-oriented considerations.

Site-specific issues include the characteristics of equipment in place before an efficiency measure is implemented and how and when the affected equipment/systems are operated. For example, for an energy-efficient lighting retrofit, the baseline decisions include the type of lighting equipment that was replaced, the power consumption (watts/fixture) of the replaced equipment, and how many hours the lights would have operated. The broader baseline policy issues involve ensuring that the energy and savings and demand reductions are "additional" to any that which would otherwise occur due, for example, to federal or state energy standards.

When defining the baseline, it is also important to consider where in the lifecycle of the existing equipment or systems that the new equipment is installed. The possible situations are (a) "early replacement" of equipment that had not reached the end of its useful life; (b) new, energy-efficient equipment installed for failed equipment or equipment that otherwise needs to be replaced; or (c) new construction. For each of these situations, the two generic approaches to defining baselines are the project-specific and the performance standard procedure.

Under the project-specific procedure, the baseline is defined by a specific technology or practice that would have been pursued, at the site of individual projects, if the program had not been implemented. There are three basic options for establishing the project-specific, baseline efficiency for individual products or equipment (e.g., air conditioner SEER, gas furnace AFUE, etc.) or annual energy use of systems (lighting, HVAC). The first option is to use the "as found" condition and the second option is to use applicable federal standard or state code, and the third option is to use standard practice for new purchases in the region. For example, under the first option, savings are calculated based on the difference between the efficiency of an existing motor and the efficiency of the proposed efficient motor. The second option essentially uses a baseline that reflects the efficiency a product or measure would have to achieve if it were replaced without the program. For example, savings are calculated based on the difference in efficiency between a motor meeting current federal standards (the only option available for new motor purchases) and the proposed high-efficiency motor. The third option uses a baseline that reflects the equipment which likely would have been used in the absence of the program. For example, where appliance sales data are available, this option might identify the baseline based on the efficiency of the most commonly purchased model.

The second approach to determining baselines is developing a performance standard, which provides an estimate of baseline energy and demand for all the projects in a program. By its nature the performance standard is a "net" savings determination including consideration of baseline market penetration of the measures. Under the performance standard procedure, baseline energy and demand are estimated by calculating an average (or better-than-average) consumption rate (or efficiency) for a blend of alternative technologies or practices. These standards are used in large-scale retrofit (early replacement) programs when the range of equipment being replaced and how it is operated cannot be individually determined. For example, this approach may be considered in a residential compact fluorescent incentive program where the types of lamps being replaced and their hours of operation cannot readily be determined for each home. Instead, studies are used to determine typical conditions. Again, as with the project-specific procedure, either existing practice or codes/standards can be used for defining the baseline.

In the case of new construction or new appliance or equipment purchases, the first policy option uses the minimum efficiency requirements of federal standards or state codes as the baseline. The second policy option uses the efficiency of standards or codes or the efficiency of "current market practice," which would result in a higher baseline. For example, under the first policy option, the baseline efficiency for new clothes washers would be set at a modified energy factor (MEF) of 1.26, which is the current federal standard. In contrast, under the second policy option, the baseline efficiency for new clothes washers would be set at a level that reflects current market practice. In this case, the MEF would be 1.65, which is the sales-weighted average efficiency of washers sold in 2007 (the most recent year for which data is available).

Provisional Recommendation. We propose that baseline used for calculating savings should be set at the minimum efficiency requirements of federal standards and state codes or current market practice, whichever is higher.² If the appliance, equipment, product or energy using system is not covered by standards or codes, then the average efficiency or performance of current market practice should be used as the baseline. In those cases where modifications to an existing energy using system (e.g., lighting, HVAC) would be required to meet the state code or federal standards, those requirements should serve as the baseline, unless current market practice is higher.

² An electric utility shall not count in meeting the statutory benchmark the adoption of measures that are required to comply with energy performance standards set by law or regulation, including but not limited to EISA Act of 2007 or an applicable building code. Rule 4901:1-39-05(D), Ohio Administrative Code (O.A.C.). Mercantile customers' energy savings shall be calculated by subtracting energy user and peak demand associated with the customer's project from the estimated energy use and peak demand that would have occurred if the customer had used industry standard new equipment or practices to perform the same functions in the industry which the mercantile customer operates. Rule 4901:1-39-08(B), O.A.C. Ohio rules that baselines for measures are codes/standards for utilities but can and should include "current market practices" for mercantile customers; hence our recommendation

For "early retirement" programs (e.g., refrigerator recycling) the difference between the energy use of the existing appliance or equipment and the high efficiency appliance or equipment may be used. However, once the remaining useful life of the existing equipment would have expired, the newly installed high-efficiency equipment is likely to have additional years of useful life. Thus, for this remaining useful life of the new high-efficiency equipment, the energy savings will be the difference in energy savings from new standard equipment and the new high-efficiency equipment. For example, if a utility replaces an existing refrigerator that has a remaining useful life of five-years, with a new high-efficiency refrigerator that has a measure life of fifteen-years, then the energy savings credited during the first five-years will be the difference between the usage of the existing refrigerator and the new high-efficiency refrigerator. For the remaining ten-years, the energy savings will be the difference between a new standard refrigerator and the new high-efficiency refrigerator, defined by code, standard or standard practice.³

3. Should reported energy savings and demand reduction use retroactive or prospective TRM values?

The estimated cost and savings from energy efficiency measures or programs are typically made both prior to measure installation or program implementation (i.e., *ex ante*) and post-measure installation or program implementation (i.e., *ex post*). *Ex post* cost and savings estimates have the advantage of being able to compare pre-measure installation use with post-measure use and estimated cost with actual cost. They also are better able to control for changes in program participant and comparison group behaviors over comparable periods. Therefore, *ex post* estimates of cost and savings are generally considered a more accurate representation of actual cost and savings.

The fact that *ex ante* savings estimates may differ from *ex post* savings estimates raises the issue of whether stipulated (i.e. deemed or deemed calculated) savings claims, based on values in an approved TRM, should be adjusted retroactively or only applied on a going forward basis. For example, if the use of TRM values developed in 2009 indicate that the savings from a utility program in 2010 indicate savings of 100 MWh, but an ex-post evaluation indicates that the values in the TRM were overly optimistic and the actual savings are 90 MWh, does the Commission credit the utility with 100 MWh of savings or only 90 MWh?

Provisional Recommendation. Cost and savings estimates in the TRM should be based on the best available information at the time these estimates and/or calculations are

³ *Implementation of the Alternative Energy Portfolio Standards Act of 2004: Standards for the Participation of Demand Side Management Resources – Technical Reference Manual Update, Docket No. M 00051865 (Pennsylvania Public Utility Commission, May 28, 2009).*

made. Therefore, if *ex post* cost and savings estimates for efficiency measures and programs vary from *ex ante* estimates of cost and savings, *ex post* estimates should be the preferred values for adopted for use in future programs. However, as a rule, deemed or deemed calculated savings claimed for prior measures or programs should not be adjusted retroactively for investments made in the current year. The Commission notes that it has yet to determine whether *ex post* or *ex ante* should be used for the remaining useful life of the current year investment. Adjustments to deemed or deemed calculated savings should only apply to future savings claims for such measures. Savings from custom projects or programs, where savings are determined *ex post* using agreed to protocols, should use these *ex post* values as the credited savings.

4. Should the cost-effectiveness test be applied at the measure, project, program or portfolio level?

The choice of where to apply the TRC cost-effectiveness test has a significant impact on the ultimate set of measures offered to customers. In general, there are four places to evaluate the cost-effectiveness test: at the "measure," "project," "program," and "portfolio" level.⁴ The Commission has recently adopted language to be codified as Rule 4901:1-39-04(B), Ohio Administrative Code, which states that the calculation of cost-effectiveness is to be done at the portfolio level.⁵ However, the Commission also noted that, in general, while not all measures in a program must be cost-effective, it anticipates that most programs will pass the TRC cost-effectiveness test. For those programs that are not cost-effective, utilities must demonstrate that these programs provide substantial non-energy benefits.

For those projects and programs that do not have substantial non-energy benefits, applying TRC cost-effectiveness tests at the program level potentially allows some non-cost-effective measures to be offered as long as their shortfall is more than offset by cost-effective measures. From an economic perspective, it is theoretically best that cost-effectiveness be determined at the measure level, since this maximizes the efficient use of capital. However, considering cost-effectiveness at the program level can be justified because of:

⁴ A *project* is an activity or course of action involving one or multiple energy efficiency measures, at a single facility or site. A *program* is a group of projects, with similar characteristics and installed in similar applications. Individual programs include those that involve encouraging and/or incenting the installation of equipment or practices associated with new-construction and retrofit energy efficiency projects. The *Portfolio* consists of all the programs in the residential and commercial/industrial sectors.

⁵ In the Matter of the Adoption of Rules for Alternative and Renewable Energy Technology, Resources, and Climate Regulations, and Review of Chapters 4901:5-1, 4901:5-5, and 4901:5-7 of Ohio Administrative Code, Pursuant to Chapter 4928.66, Revised Code, as Amended by Amended Substitute Senate Bill No. 221, Case No. 08-888-EL-ORD, Entry on Rehearing (June 17, 2009).

- The desire to achieve other policy goals, such as broad program participation and minimizing lost opportunities by having comprehensive projects. For example, the addition of a currently "non-cost effective" measure to a program offering might significantly increase market participation;
- A policy goal to recognize the non-energy benefits of certain energy efficiency measures that may be difficult to quantify;
- The ability to improve program efficacy by reducing program marketing cost. For example adding another measure might reduce marketing cost per unit savings and result in lower overall levelized cost of savings. Programs might also include non-cost effective measures under the expectation that increasing the market share or contractor familiarity of these measures will reduce their cost sufficiently to make them cost-effective at the "measure level;" and
- The inability to isolate the savings from an individual measure.

Provisional Recommendation. The Commission will approve reasonable individual programs and overall portfolios for each utility that are cost-effective as defined by the TRC test. Applying the TRC test at the portfolio level will permit utilities the flexibility to experiment with different implementation strategies and to encourage the deployment of emerging technologies and market transformation programs as well as support low-income programs. Additionally, the Commission may approve programs that provide significant non-energy benefits and do not pass the TRC test.

When non-cost effective measures are proposed for inclusion in a program, utilities are required to provide the rationale for offering such measures. Justification may be based on one or more of the following:

- Broaden program participation/market penetration
- Increase persistence of savings
- Improve quality assurance
- Enhance system reliability
- Reduce per unit marketing and/or administrative cost
- Reduce measure cost (i.e., program has market transformation goal)
- Support for an emerging technology or practice
- Reduce greenhouse gas and regulated air emissions, water consumption, and use of natural resources to the extent not fully reflected in costs savings
- Advance any of the state policies enumerated in section 4928.02 of the Revised Code

5. What expectations should the Commission establish for energy savings and demand reduction determination certainty?

While establishing the level of rigor and setting acceptable confidence/precision levels for savings determination is to some degree a technical issue, it is fundamentally a policy choice: how much money and effort should be allocated to have an acceptable level of confidence that the claimed savings from energy efficiency programs are what we think they are?

Perhaps the greatest challenge in evaluating energy efficiency programs is the impossibility of direct measurement of the primary end results—energy savings and demand reductions. These are the reduction from a level of energy use and demand that did not happen. What can be measured is actual energy consumption and demand after, and sometimes before, the energy efficiency actions. Consequently, the difference between: (a) actual energy consumption/demand and (b) what energy consumption/demand would have been had the energy efficiency measures not been installed is an estimate of energy and demand savings. Since program evaluations seek to reliably determine energy and demand savings with reasonable accuracy, the value of the estimates as a basis for decision-making can be called into question if the sources and estimated level of uncertainty of reported values are not described. Therefore, guidelines and perhaps requirements for establishing the rigor of evaluation activities and the confidence and precision of reported results are needed.

Provisional Recommendation. The Commission requires the utilities and Independent Program Evaluator, in order to address systematic errors, to use "best practices", to establish quality assurance and quality control procedures that include field site inspections, and to provide full documentation of analyses. Furthermore the Commission sets a requirement, for addressing random errors, that any evaluation sampling provide results at a 90 percent confidence level with 10 percent precision.

Appendix B
Technical Reference Manual
Deemed Measure and Deemed Calculated Measure Data Matrix

This Appendix B provides categories of data that should be included in a technical reference manual (TRM) for deemed measures and deemed calculated measures for determining energy savings, demand reductions, and cost-effectiveness per the total resource cost (TRC) test.

Deemed Measures: For simple efficiency measures whose performance characteristics and use conditions are well known and consistent, a deemed savings approach may be appropriate. Since characteristics (values) are stipulated and, by agreement, fixed during the term of the evaluation, deemed savings can help alleviate some of the guesswork in program planning and design. However, deemed savings can result in over- or under-estimates of savings if the projects or products do not perform as expected (e.g., if high-efficiency lights fail earlier than expected compared to their useful measure life). Determining the savings from deemed measures may or may not involve site inspections.

Deemed Calculated Measures: A slightly more complex approach to estimating savings is to use simplified calculations which employ a combination of deemed or "default" input assumptions with some site-specific inputs. These calculations may require onsite verification of input assumptions such as lighting power density or the monitoring of one or two key parameters in an engineering calculation (e.g., in a high-efficiency motor program, actual operating hours are monitored over a full work cycle to arrive at a realistic estimate of savings).

The tables below list the major inputs required to assess the viability of using a deemed or deemed calculated approach as the basis for claiming savings for specific high-efficiency technologies, measures or practices. Table 1 shows data requirements for "deemed" measures. Work papers should be submitted to support and document each of these values proposed for use.

Table 2 sets forth the minimum data requirements and/or narrative requirements that must be submitted, along with work papers and/or proposed analytical tools that will be used to derive savings using standardized calculations based on site-specific inputs. A description of the rationale for determining which input assumptions will be assigned default values and which will be derived from data collected on site should also be provided.

Table 1 - Data Requirements for Deemed Savings Measures

Description of Efficiency Technology, Measure or Practice
Description of the Program Delivery Mechanism (e.g., direct install, retail rebate)
Applicability Conditions Required For Use of Values
Baseline Unit Efficiency/Use
Efficient Unit Efficiency/Use
Effective Measure Life
Annual Site Savings (kWh)
Annual Site Savings (therms)
Coincidence Factor (electric)
Electric Demand Savings (kW)
Gas Demand Savings (therms/day)
Incremental Capital Cost (\$/unit)
Incremental Annual O&M Cost (\$/unit)
Incremental Periodic Capital Replacement Cost & Schedule

Table 2 - Data Requirements for Deemed Calculated Measures

Description of Efficiency Technology, Measure or Practice
Description of the Program Delivery Mechanism (e.g., direct install, retail rebate)
Applicability Conditions Required For Use of Values and Calculations
Describe Method for Derivation of Baseline Unit Use
Describe Default Minimum Efficiency Requirements for Efficient Measure
Describe Method for Derivation of Efficient Unit Use
Default Effective Measure Life
List Site Specific Inputs Used to Compute Annual Site Savings (kWh/therms)
Default Coincidence Factor (electric)
Describe Method Deriving for Electric Demand Savings (kW)
Describe Method Deriving Gas Demand Savings (therms/day)
Describe Method for Derivation of Incremental Capital Cost (\$/unit)
Describe Method for Derivation of Incremental Annual O&M Cost (\$/unit)
Describe Method for Derivation of Incremental Periodic Capital Replacement Cost & Schedule

The Commission is also interested in soliciting input from parties on alternative approaches that should be used to characterize the electric demand savings from energy efficiency measures and included in the TRM. We raise this issue because utilities have both an obligation to report their aggregate peak demand benchmark (e.g. reduction in peak demand that an electric utility's system must achieve to comply with the Section 4928.66, Revised Code) which will be based on peak demand impacts achieved by participating customers in their programs and because utilities may have an interest in bidding in demand resources into the PJM capacity market, which requires them to demonstrate and verify demand reductions during specified time periods consistent with PJM's EM&V protocol.