Utility Energy Efficiency Programs:
Too Cheap to Meter?

A Policy Brief of the Electricity Consumers Resource Council

> *The danger of not even attempting to evaluate policies is that we perpetuate our ignorance in solving the problem, and thereby consign technological policy forever to the realm of ideology.*
>
> Adam B. Jaffe, Richard G. Newell and Robert N. Stavins [1]

Introduction

Record high energy prices, resistance to the siting of new generation and transmission facilities, and growing popular support for initiatives to address climate change have renewed interest in expanding utility energy efficiency (EE) programs. Some states are proposing to significantly increase ratepayer dollars committed to EE programs by making "cost-effective" energy efficiency the "highest priority procurement resource" or the "first fuel." These actions are based on the assumption that energy efficiency can be implemented at very low or negative cost and avoid the need for investments in new generation or transmission facilities and achieve significant net reductions in greenhouse gases (GHG) emissions. Such claims are reminiscent of the boast decades ago that nuclear power would be "too cheap to meter."

ELCON members are strong supporters of energy efficiency and are world-class practitioners of innovative technologies that reduce their energy use and costs. They need no reminder that using all resources more efficiently—labor, materials, capital and energy—is necessary to survive in competitive global markets.

This policy brief addresses ELCON's concern that consumer behavior, energy markets and macroeconomic forces are too complex and uncertain to warrant the leap of faith that promoting energy efficiency will result in net reductions in electricity consumption (kW and kWh) unless extra care and resources are committed to determining net energy and capacity savings. There are other concerns regarding cost allocation and recovery in rates, and compensation to utility shareholders. The likely outcome of imprudent EE program design, impact evaluation and cost recovery (including utility incentives) is that ratepayers will pay twice or more for the same resource capability or GHG reductions, and the long-term objectives of policies designed to promote energy efficiency will be undermined and discredited. This policy brief begins with a statement of ELCON overall position and recommendations for ensuring that expenditures committed to utility EE programs intended to produce net savings comparable to metered and dispatchable supply-side resources do indeed deliver verifiable net savings. This is followed by background material on the current problems with cost effectiveness determination, impact evaluation, and cost allocation and recovery practices that are in need of reform.

ELCON Position & Recommendations

Energy Efficiency Gap & EE Program Targets

- Utility EE programs are only one part of national (and future international) policies to promote energy efficiency. If one overarching objective of EE programs is to reduce carbon-intensive energy consumption, then EE programs must be designed to be cost effective in the context of the broader economy.
- The trend in some states to mandate EE programs as the "first fuel" creates the false impression that there is no need to build new supply-side generation. That is wrong. As long as electric utilities project positive growth in electric sales and number of customers there will be a need to add incremental supply-side resources regardless of the level of EE programs.

Standard Protocols Accredited in an ANSI-Approved Process Should Guide Impact Evaluation of EE Programs

- National standards and business practices should be developed for the impact evaluation and reporting of the net energy and capacity savings of utility EE programs directed at mass-market customers. Such standards and business practices ("protocols"), including common definitions, compliance measures and training requirements, should be vetted on an on-going basis by organizations such as the North American Energy Standards Board (NAESB) using procedures that have been accredited by the American National Standards Institute (ANSI).
- Standard protocols should be developed to accurately identify and quantify the net GHG emission reductions associated with avoided fuel combustion resulting from utility EE programs.
- Standard protocols should also be developed for so-called "deemed savings" approaches to impact evaluation. This effort should include criteria for calibrating deemed savings values to actually measured values, guidelines for updating savings values and determining region or climate zone specific deemed savings values. The use of dated average values is not sufficient for maintaining grid reliability unless the values are deeply discounted.
- The protocols should specify the minimum allowable methods and rigor used to measure, verify and report EE program impacts. The protocols should also require that all significant behavioral responses to EE programs (such as the rebound effect, free ridership, moral hazard and spillover effects) be accounted for, measured and verified.
- As long as a utility experiences positive increases in load and customer growth, ratepayers are exposed to the real risk that they will pay twice for incremental resources unless impact evaluation (including application of deemed savings) achieves the comparable degree of reliability as a metered, dispatchable resource.

EE Program Administration & Impact Evaluation

- There is no evidence that utility administration of EE programs is better or worse than third-party administration. Regulators' decisions to pick the appropriate administrator should be based on minimizing the total costs recovered from ratepayers for the programs.
- To ensure unbiased application of standard protocols, the responsibility for impact evaluation should be separated from the entity performing the program design and administration functions.

NERC Metrics for Quantifying Influence of Demand-Side Resources On the Reliability of the Bulk Electric System

- The North American Electric Reliability Corporation (NERC) should continue its efforts to develop and refine metrics for energy efficiency and demand response, and to require the reporting of such data to support NERC's long-term reliability assessments and standards.

Cost-Effectiveness of EE Program Impacts

- Cost-effectiveness determination requires accurate estimates of avoided costs. Unless proven otherwise, EE programs will at best only defer the need from some form of supply side resource.
- Avoided costs should not be based on deferring another resource (*e.g.,* nuclear) that has no practical feasibility of being sited and built during the planning horizon used to estimate such costs. In the short term, the next or marginal unit is often another EE program, demand response or a supply-side option fueled with natural gas or wind. It may also be removing an old generator from mothballed status.
- The best way to determine avoided costs is with the bid prices for incremental energy and capacity in the wholesale markets.
- The lowest costs must translate into the lowest possible rates and charges to customers. The lowest cost should not mean the lowest cost to the utility. Utility planning should be conducted to produce the lowest net present value revenue requirement (*i.e.,* levelized cost) per unit of energy supplied over the long-term planning horizon and given due consideration to risk.

Allocation & Recovery of EE Program Costs

- The measured and verified resource value of EE programs (in terms of actual fuel or capacity reduced) should be compensated and its costs allocated and recovered from ratepayers on the same basis as generation resources. Thus if generators sell capacity and energy under long-term contracts or purchased-power agreements at market-based rates, the resource value of EE programs should be eligible for the same form of compensation.
- If a utility rate-bases incremental supply-side resources and receives a return of and on the capital, EE program costs should be afforded the same treatment if the utility seeks a profit on EE program investments.
- No compensation from ratepayer rates should be provided for the resource value of energy efficiency improvements resulting from state or federal mandates (*e.g.,* new appliance efficiency standards or building codes).
- Ratepayers who make energy efficiency investments at their own expense should be eligible to opt-out from participation in utility programs.
- If higher costs can be avoided with EE programs (or with the decision to procure any other type of resource), the utility should not be allowed to recover any portion of those costs as a "profit" or "incentive" for administering EE. A fundamental feature of the utility business model must be the obligation to plan a least-cost resource mix regardless of the type of resource used. Every dollar given to a utility as an "incentive" for ordinary business behavior is a dollar that could have been spent on more energy efficiency.

Background

US electric utilities spent $14.7 billion on demand-side management (DSM) programs between 1989 and 1999 [2]. Most of this money was committed to energy efficiency (EE) programs. But it is not universally accepted that all that money was spent on cost-effective substitutes for traditional supply-side resources. The cost-effectiveness of the programs was often determined by program advocates or program administrators with a vested interest in the results, and there was little or no truly independent impact evaluation of the net savings with the rigor that warrants treatment as a substitute for iron in the ground. Those programs also focused on energy savings (kWh) and not capacity (kW) or other measured and verified metrics that actually make them useful and credible in the eyes of system planners and operators.

The resource value of utility EE programs is not as widely recognized or accepted as load management or demand response (DR) programs. DR can generally be measured directly with interval meters and dispatched, and utility operators are familiar with the resource based on past experience with large C&I customers served under interruptible rates, real-time pricing (RTP) or emergency load curtailment programs.

In principle, cost-effectiveness tests are used to determine which EE activities should be implemented. These activities then become subject to impact evaluation that includes the measurement and verification of net energy and capacity savings. These results become inputs to the resource procurement or IRP process, or compliance with climate change mitigation requirements. But there is little or no consistency among the states on how all this is actually achieved.

A. Program Targets & the Energy Efficiency Gap

It has long been recognized that an energy efficiency gap exists because consumers typically forego all technologically feasible investments in energy efficiency. Thus the gap is a measure of the difference between actual and optimal energy use. One might also hypothesize the existence of a health gap, housing gap, and education gap to reflect less than ideal investments in those competing consumer wants and needs. These gaps can be reduced or eliminated if there is no budget constraint and the investor has perfect information.

Despite some efforts to estimate the more realistic market potential for EE based on economic criteria and other factors of "achievability," states have begun to set arbitrary targets for EE resource acquisition such as "15-By-15" or "20-By-20," meaning to decrease forecasted demand by 15% by 2015, or by 20% by 2020, respectively.

Attempting to maximize energy efficiency to eliminate the gap (which may be implicit in an unrealistic target) comes at the expense of the efficient operation of the overall economy. Also, socializing DSM or EE program costs in rates will misprice the service resulting in non-optimal investment decisions in the larger markets that are beyond the ability of utilities (or their regulators) to control. For example, the bill savings from a "free" EE rebate program for a high-efficiency air conditioner may induce a rebound effect in which the rebate or savings induces the participant to purchase a large plasma television or plug-in vehicles. The true net effect may be a sizable increase in energy consumption and load. Investor/household decision making is complex and does not lend it selves to the fine-tuning implicit in utility's program objectives. This does not argue against utility EE programs, only against program designs that ignore the complexity.

The trend in some states to mandate EE programs as the "first fuel" also creates the false impression that there is no need to build new supply-side generation. That is wrong. As long as electric utilities project positive growth in electric sales and the number of customers there will be a need to add incremental supply-side resources regardless of the level of EE programs. Utility EE programs are only one part of national and perhaps future international policies to promote energy efficiency. If an overarching objective of EE programs is to reduce carbon-intensive electricity consumption, then EE programs must be designed to be efficient and cost effective in the context of the broader economy. If utility EE programs are inefficient, consumer expenditures for more efficient EE services outside the immediate control of utilities and their regulators will be reduced. Unrealistic mandatory targets may also be inefficient because the mandates will only encourage utilities to inflate the results of EE programs if the utility is both program administrator and evaluator.

B. Cost-Effectiveness Tests & Resource Planning

Historically, cost-effectiveness tests were used to defend EE programs where (1) the objective of the programs was to eliminate the so-called "energy efficiency gap," and (2) in so doing, there was an expectation that DSM or EE services had to be offered for free in order to maximize program participation. Program costs were socialized in rates and directly recovered from ratepayers. This is in sharp distinction from other resource investments, which are raised in capital markets and rate-based, providing shareholders with an opportunity for a return of and on the investments.

But EE programs have direct and indirect impacts that can adversely affect cost effectiveness and confound estimates of the programs' resource value. Behavioral responses to EE programs are:

1. Rebound effect results from the fact that efficiency and productivity make consumers richer so they can afford to consume more. It is also known as the takeback effect. Estimates of the rebound effect range from 10 to over 50% depending on the end-use application [3]. More typically the effect is assumed to be zero.

2. Free ridership reflects the fact that when an EE program is offered by utilities, it may be taken up not only by investors who would not have engaged in the EE measure in the absence of the program, but also by investors who would have taken up the measure regardless of the program. The presence of free ridership tends to overestimate the energy savings potential of EE programs. A European study estimates that nearly 50% of subsidy recipients in EE programs directed at businesses were free riders. Free ridership is also correlated with the level of financial incentives given to the participant. If incentives are too high and the participant is not expected to commit its own money to the effort, free ridership will increase and reduce the effectiveness of the program.

3. Moral hazard refers to the tendency of investors in any customer class to delay making investments at their own expense to take advantage of a pending government or utility-sponsored program that promises a subsidy. This problem differs from free ridership in that an overarching objective of utility-sponsored EE programs is to accelerate EE investment, not delay it.

4. Spillover effects are collateral energy savings of non-participants who are induced by utility programs to take such actions on their own. EE partisans attempt to downplay the roles of free riders and the rebound effects, and argue that spillover effects offset these other effects. Evidence of any significant spillover effects suggests that better information programs

should be the utility's primary EE objective. Some states assume on an *ex ante* basis that free ridership is cancelled out by spillover effects and therefore eliminate the need (and cost) of measuring and verifying either effect.

The real concern with rebound effect, free ridership and moral hazard is that, unless carefully accounted for, these behavioral reactions will encourage inefficient use of both EE and energy consumption, and refute claims that EE measures can be implemented at low or negative cost. Any inefficient use of resources results in costs being higher than necessary, and fewer of program objectives being met. This problem is magnified if the rates the customer sees are also inefficient. Because program participants do not have the correct incentives, there is no certainty that actual savings (*i.e.*, avoided cost) will exceed the cost of the EE measure.

Cost effectiveness determination requires accurate estimates of avoided costs. The dilemma with using EE programs as a substitute for generation is that positive growth in electric demand (resulting from population growth and a growing economy) will not eliminate the need for new iron in the ground. Cost-effective EE programs will only defer the need from some form of supply-side resource.

Avoided costs should not be based on deferring a generation type (*e.g.*, nuclear) that has no practical feasibility of being sited and built during the planning horizon used to estimate such costs. In the short term, the next or marginal unit is often another EE program, a demand response program or a supply-side resource fueled with natural gas or wind. Another supply-side resource may be removing an old generator from mothballed status or repowering an existing generating unit.

The lowest costs must translate into the lowest possible rates and charges to customers. The lowest cost should not mean the lowest cost to the utility, but lowest cost to customers. Utility planning should be conducted to produce the lowest net present value revenue requirement per unit of energy supplied given due consideration to risk.

The best way to determine avoided costs is with the bid prices for incremental energy and capacity in the wholesale markets. Energy efficiency load profiles should be used to differentiate savings by time of day, day of the week, and season.

If the net energy and capacity savings of EE programs are recognized as resources comparable to traditional generation supply—and subject to appropriate impact evaluation protocols—then such resources should be treated on a non-discriminatory basis in a utility's resource plan. There exist today four general approaches to resource planning by regulated electric utilities:

1. Demand-side planning ("first fuel" approach) – With this approach, a state typically mandates a load reduction target with an energy-efficiency portfolio standard (EEPS), which might include or be part of a 15-By-15/20-By-20 type mandate. The net savings results in the adjustment of the utility's load forecasts, which may fall within the forecast error or increase forecast error. The trend is for little or no *ex post* evaluation resulting in proposals to discount the capacity value after some period of time.
2. Command-and-control methods such as integrated resource planning (IRP) – Under this approach, demand-side and supply-side resources are simultaneously evaluated in the context of the long-term planning and operational needs of the utility. Such evaluations have planning horizons out to economic life of supply-side resources. IRP typically

internalizes forecast uncertainty by specifying requirements for ancillary services including an overall reserve margin subject to regulatory approval.

3. Market-based methods such as competitive bidding: In this approach, a utility's short- and long-term planning and operational needs are acquired through competitive solicitations or auctions. This approach is common in FERC-jurisdictional wholesale markets and in ERCOT, where the "utility" is an ISO or RTO.
4. Supply-side planning – Under this approach, a utility plans its next generator based on long-term load forecasts that usually internalize demand-side effects. This type of plan may have to be done after "demand-side planning," or as a stand-alone process.

While the intent of IRP and competitive bidding was to integrate supply-side and demand-side resources, many utilities retain a supply-side bias and do not actually treat all resources on a comparable or source-neutral basis. IRP or competitive bidding should be used to determine the optimal levels of each resource that is committed to the long-term resource plan based the long-term load forecast and on each resource's levelized costs. Thus the decision on how much EE (and demand response) to employ in the resource plan should be done in the integration process to ensure a least-cost resource mix and comparability in treatment with supply-side resources and in keeping with maximizing economic efficiency. This is in sharp contrast to the "first fuel" approach in which a target is set by regulatory or legislative fiat (*e.g.,* 15-By-15) without a formal "integrated" examination of the real long-term costs to ratepayers. While supply-side resources have high "first costs" because of they have long economic lives, they eventually become cheaper as fixed costs are depreciated and no longer recovered from ratepayers.

Competitive bidding with state or local regulatory oversight is a means of evaluating demand-side and supply-side offers on a comparable and integrated basis. It differs from IRP in that it may accomplish other important policy objectives such as market transformation. Competitive resource procurement is possible under any regulatory framework and works in areas with ISOs/RTOs and in areas without independent grid operation. Coupled with an independent evaluator, competitive procurement can also accommodate the "utility-build" option on a fair and non-discriminatory basis. The use of competition also helps produce a market-based price for resources that can be used to compensate both winning supply and demand-side resources and ensure an economically efficient outcome.

Efforts to integrate the net savings of EE programs with a utility or ISO/RTO's resource adequacy responsibilities are only just beginning. EE program impacts are not yet defined in terms of discrete, measurable time-based metrics that can be understood and used by system planners and operators. The North American Electric Reliability Corporation (NERC) only recognizes the resource value of EE programs that is implicit in utility long-term load forecasts [4]. NERC does recognize the resource values of demand response and pricing schemes or rate designs that have some degree of verifiable dispatchability. NERC should continue its efforts to develop and refine metrics for energy efficiency and demand response, and require the reporting of such data to support NERC's long-term reliability assessments and standards.

C. Impact Evaluation of EE Program Net Savings

Impact evaluation is performed to determine net savings directly associated with EE programs. It is a costly but necessary means of doing business, and it is an open question whether the results are always as reliable or accurate as metered and dispatchable generation or demand response.

Overly simplistic and under-funded measurement and verification (M&V) efforts used to support impact evaluation can greatly discredit EE programs.

Factors that must be rigorously estimated to give EE program results meter-like reliability are:

- Baseline is the change in overall energy consumption (kW and/or kWh) that would have occurred in the absence of the program. There is no way to directly measure this metric. It is usually estimated with complex engineering or statistical methods. These methods fail to account for the private costs of consumers and firms.
- Gross energy and demand savings are the changes in energy consumption and demand taken by program participants that result directly from the program, regardless of why they participated.
- The realization rate is the ratio of measured energy reduction to the claimed energy reduction. There is no agreement on the need for this metric.
- Attribution analysis is the process by which net savings of the EE program are isolated and estimated. Net-to-gross (NTG) ratio is an adjustment factor used to compute the net savings by accounting for such behavioral effects as rebound, free ridership, moral hazard and spillover.
- The persistence of an EE program is a measure of its net impact over the program's life cycle to account for measure retention and technical degradation. Rules of thumb are often employed to account for persistence such as the discounting of the capacity value in future years.
- The resource value of EE programs needs denomination in both energy (kWh) and capacity (kW). This requires estimation of an EE program's load shape and peak coincidence factors.
- Isolating the net savings of an EE program often has to deal with confounding market effects that exist, for example, when other publicly funded or private sector programs are targeting the same participant audience with the same, similar or complementary EE measure.
- Estimating non-energy impacts (NEI) (or non-energy benefits (NEB)) are attempts to identify "hard to measure benefits" of EE programs and factor these benefits in impact evaluation, often to the exclusion of hard to measure private costs.

Measuring and verifying all the relevant economic/behavioral effects of EE programs in any determination of net savings is very difficult and costly. For example, asking participants and non-participants what they would have done but for the program or because of the program and using their answers as the basis for estimating a program's resource value is a daunting task. But as long as a utility experiences net increases in load and customer growth, ratepayers are exposed to the real risk that they will pay twice for incremental resources unless M&V achieves the same degree of credibility as a metered resource.

Inconsistencies with the application of impact evaluation and M&V among the states that currently mandate utility EE programs are:

- Methods used for M&V vary in the degree of transparency and the level of statistical rigor.
- Level of funding for impact evaluation as a percent of total program costs greatly varies from state to state even for comparable programs.

- Baseline assumptions are not consistently defined.
- Adjustments to gross savings to account for behavioral effects differ or are not used at all.
- Deemed savings estimates with questionable accuracy are used as a shortcut to get around using the more costly M&V methodologies. Deemed savings are pre-determined estimates of energy and peak demand savings attributable to an energy efficiency measure in a particular type of application that a program evaluator uses instead of energy and peak demand savings determined through impact evaluation activities.
- Systematic bias adds uncertainty to baseline calculation, net savings attribution and market potential estimates. Systematic bias increases when the assumptions used in program design and evaluation reflect one point of view.

Large commercial and industrial ratepayers have long benefited from an internationally recognized protocol for estimating the net savings of EE measures as applied to a single facility or project. The International Performance Measurement & Verification Protocol (IPMVP), which is sponsored by the Efficiency Valuation Organization (EVO), is a product of EVO's commitment to "develop and promote standardized methods to quantify and manage the risks and benefits associated with business transactions on end-use energy efficiency, renewable energy and water efficiency" [5]. An equally credible protocol for mass-market EE programs needs to be developed and adopted. This will ensure that EE programs benefit from consistent and credible impact evaluation. The protocol should consist of national standards and business practices for the measurement, verification and reporting of the net energy and capacity savings of utility EE programs directed at mass-market customers. This should include common definitions, minimum allowable methods and statistical rigor, compliance measures and training requirements. The protocol should be vetted on an on-going basis by an organization such as the North American Energy Standards Board (NAESB) using procedures that have been accredited by the American National Standards Institute (ANSI). The role of a process that is ANSI certified is very important for ensuring near universal credibility. An ANSI certified process includes the following features:

- Consensus must be reached by representatives from materially affected and interested parties
- Standards are required to undergo public reviews and any member of the public may submit comments
- Comments from the consensus body and public must be responded to in good faith
- An appeals process is required [6].

Standard protocols should also be developed for so-called deemed savings approaches to impact evaluation. This effort should include criteria for calibrating deemed savings values to actually measured values, guidelines for updating savings values and determining region or climate zone specific deemed savings values. The use of dated average values is not sufficient for maintaining grid reliability unless the values are deeply discounted.

As long as a utility experiences positive increases in load and customer growth, ratepayers are exposed to the real risk that they will pay twice for incremental resources unless impact evaluation (including application of deemed savings) achieves the comparable degree of reliability as a metered, dispatchable resource.

The stated objectives of the protocols should be (1) the elimination of systematic bias associated with market potential estimates, baseline calculations and program attribution; (2) a set of metrics that reliably denominate the resource value of EE programs; and (3) to support GHG and other air emissions reduction claims and credits.

D. Pricing EE Services, Cost Allocation & Recovery

EE programs can be implemented or administered by the utility or outsourced to private or public sector agencies or contractors. When the utility is the implementer or administrator, certain rate designs and cost recovery mechanisms may create a conflict of interest with successful program implementation. The most well-known problem is under recovery of fixed costs if the utility's fixed costs are comingled in the variable component of retail rates, which has stimulated interest in revenue decoupling [7]. All else equal, utilities can disproportionately under-recover fixed costs due to the lost sales resulting from EE programs. But "all else equal" conditions never really exist. Except in the rarest of circumstances, electric utilities always experience positive growth in sales and number of customers regardless of the level of EE programs. New electrical appliances and technologies, a growing economy and population growth should sustain positive growth going forward, especially as the demand for plug-in vehicles increases.

If the encouragement of demand-side resources is to become a central feature of the utility business model going forward it becomes imperative to require rate designs such as straight fixed variable (SFV) that are compatible with the new business model.

If the measured and verified resource value of EE programs is competitively procured, it should be compensated and its costs allocated and recovered from ratepayers on the same basis as generation resources. Thus if generators sell capacity and energy under long-term contracts or purchased-power agreements at market-based rates, the resource values in terms of energy (kWh) and capacity (kW) of EE programs should be eligible for the same form of compensation. EE costs should be allocated and recovered from end-use customers using the same ratemaking methodologies (including cost of service studies) as employed for the allocation and recovery of generation costs.

If the resource value of EE programs is not competitively procured, the traditional ratemaking process should be used to review the dynamic nature of all revenues, expenses and investments, and to set appropriate base rates that provide utilities with a reasonable opportunity to earn a fair return under prudent management. Almost all state regulatory commissions provide a rate case process to evaluate and measure the appropriate overall cost of service where a balanced review of jurisdictional expenses, rate base investment, the cost of capital, and revenues at present rates are investigated at a common point in time (*i.e.*, the test period). The utility should bear the potential risks, and possible rewards, of sales variances from forecasted levels that include any EE program impacts. Utilities should not be given special riders or single-issue cost recovery methods to increase rates absent a showing that current ratemaking procedures have disadvantaged utilities in any way.

If higher costs can be avoided with EE programs (or with the decision to procure any other type of resource), the utility should not be allowed to recover any portion of those costs as a "profit" or "incentive" for administering EE. A fundamental feature of the utility business model must be the obligation to plan a least-cost resource mix regardless of the type of resource used. Every dollar given to a utility as an "incentive" for ordinary business behavior is a dollar that could have been spent on more energy efficiency.

The cost recovery of EE programs differs from traditional cost recovery of generation resources in that the costs are more explicitly assigned to specific ratepayers (program participants). This results from the fact that benefits are also more explicitly assigned to specific ratepayers, and not that EE program cost recovery follows less advantages rules than generation cost recovery. If a utility built a generator to serve only one of its ratepayers it would be prudent for that utility to file a cost recovery mechanism for that generator with its regulator that assigned the full costs to the single beneficiary.

No compensation from ratepayer rates should be provided for the resource value of energy efficiency improvements resulting from state or federal mandates such as new appliance efficiency standards.

Ratepayers who make energy efficiency investments at their own expense should be eligible to opt-out from participation in utility programs [8]. Finally, customers are going to be interested in what they will save on their bills, *i.e.*, the net effect of program participation and changes in rates over time due to the program. This information should be provided to ratepayers.

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[1] Jaffe, Adam B., Richard G. Newell and Robert N. Stavins, "A Tale of Two Market Failures: Technology and Environmental Policy," *Ecological Economics* 54 (2005) 164-174.

[2] Loughran, David S. and Kulick, Jonathan, "Demand-side Management and Energy Efficiency in the United State," *The Energy Journal*, January 2004.

[3] Frank Gottron, *Energy Efficiency and the Rebound Effect: Does Increasing Efficiency Decrease Demand?* CRS Report to Congress, Resources, Science and Industry Division, Congressional Research Service, July 30, 2001.

[4] North American Electric Reliability Corporation (NERC), *Data Collection for Demand-side Management for Qualifying Its Influence on Reliability: Results and Recommendations*, November 2007.

[5] Efficiency Valuation Organization, *International Performance Measurement and Verification Protocol: Concepts and Options for Determining Energy and Water Savings*, Volume 1, April 2007

[6] American National Standards Institute, ANSI Essential Requirements: Due Process Requirements for American National Standards, January 2008.

[7] For ELCON's position and recommendations regarding decoupling, *see Revenue Decoupling,* A Policy Brief of the Electricity Consumers Resource Council, January 2007.

[8] See *Financing Energy Efficiency Investments of Large Industrial Customers: What is the Role of Electric Utilities?* A Policy Brief of the Electricity Consumers Resource Council, December 2008.

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