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Finding Common Ground: Utilities & Regulators

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Due to our current analytic and political constructs, much of the potential for energy efficiency in the United States remains untapped. In order to optimize this potential, we must, quite simply, start thinking about energy efficiency as a resource, not unlike fossil fuels or renewable generation, even if it cannot be metered.

An optimal energy system is a mix of supply- and demand-side resources. Pursuing a strategy that contains a least-cost mix of these resources will produce a cost-effective, reliable, and environmentally responsible portfolio. However, this will also require a policy and regulatory structure that allows utilities to be indifferent between supply- and demand-side options for meeting resource needs.

As a resource, energy efficiency offers several advantages. It lowers costs, reduces fuel price risk, improves system reliability and energy security, creates jobs through direct and induced impacts, and offers a number of co-benefits such as increased property values. Perhaps the most important reason for pursuing energy efficiency is the reduction in greenhouse gases. Investing in energy-efficiency measures is cheaper per ton of carbon dioxide avoided than any other emission reduction alternative.

Despite its abundant benefits, current energy-efficiency policies and analytical frameworks have been punitive to energy efficiency in three fundamental areas:

- Cost-effectiveness approaches
- Measurement of impacts
- Regulatory treatment of fixed-cost recovery and lack of earnings potential

Energy policy in the United States stands at a critical historic juncture. We can radically alter the way we use energy or we can continue our reliance on fossil fuels. We need a combination of more favorable cost and revenue recovery mechanisms, an earnings mechanism for demand-side management (DSM) expenditures, balanced cost-effectiveness tests, and a less punitive evaluation paradigm.

There are many potential ways to increase the slow adoption of energy efficiency, not the least of which is making energy efficiency more attractive to investors and energy producers. Deployment of energy-efficient technologies has to yield the same earnings opportunity that power plants have offered in the past. Straightforward policy decisions are needed to drive energy efficiency and create demand for its deployment that is on par with that of other fuels. Institutions that have previously been at odds need to form partnerships, align their goals to everyone's benefit, and consider multiple perspectives as sources of creativity and innovation. Energy efficiency can be a common ground for this progress.

Cost-Effectiveness Approaches

In general, an action is cost-effective when its benefits exceed its costs; that is, when it has a benefit/cost ratio greater than 1.0. For energy efficiency, this entails: 1) the costs to implement an intervention, which are often incurred up front, 2) the benefits that result from such an intervention, which often occur over a long period of time, 3) a method to temporally align these benefits and costs, and 4) identification of the stakeholders impacted by the intervention.

A desirable property of any cost-effectiveness test is symmetry: the costs and the benefits reflect the same components. In our opinion, this property should be compulsory. In other words, if the cost side includes more than one stakeholder's contribution, the benefit side must also include those accruing to more than one contributor. If, for example, both the utility and the customer contribute to the energy-efficient purchase and costs for both are included in the calculation, then the benefit side must include benefits that accrue to both. These benefits need not be limited to energy.

The California Standard Practice Manual has been used widely for over three decades to guide how to conduct energy-efficiency screening tests. The manual has tests from five perspectives: the program participant, the program sponsor (the program administrator cost test [PACT], the ratepayers (rate impact measure [RIM] test, the program sponsor and its ratepayers combined (the total resource cost [TRC] test), and society at large (the societal cost test [SCT]). While nearly all jurisdictions in the United States require calculations of all perspectives' tests, more than 70% rely on the TRC as their primary test.

Despite its widespread use, several industry experts have argued that the TRC is not the appropriate test for energy-efficiency offerings. The National Efficiency Screening Project (NESP), a recently formed group of cost-effectiveness experts, introduced a set of principles and recommendations regarding the proper use of cost-effectiveness for energy-efficiency programs. The NESP encourages consistent application of energy-efficiency screening tests and has prepared The Resource Value Framework, which is intended to eventually provide the foundation for a new cost-effectiveness standard practice manual.

The NESP designed The Resource Value Framework to provide regulators in each state with the "flexibility to ensure that the test they use meets their state's distinct needs and interests, as provided in relevant energy policies and regulatory orders." The NESP calls for screening processes that serve the public interest and stated efficiency goals, and The Resource Value Framework is a transparent and symmetric approach. "Efficiency screening practices should ensure that tests are applied symmetrically, where both relevant costs and relevant benefits are included in the screening analysis. For example, a state that chooses to include participant costs in its screening test should also include participant benefits, including non-energy benefits, otherwise the test will be skewed against energy efficiency resources." [1]

Despite its widespread use, we do not recommend that utilities rely on the TRC test due to the following shortcomings:

- The TRC test is asymmetric, and therefore violates the basic rules of trade-off comparisons; it includes utility and participant costs while only accounting for utility benefits.
- The TRC test does not include non-energy benefits, significantly undervaluing the program's total benefits.
- Determining the inputs to the TRC test can be difficult. For example, incremental cost is difficult to determine and varies depending on whether the measure is installed at end of life or as an early replacement.

Ideally, cost-effectiveness would be determined by the SCT, which measures all of the costs and benefits of the investment from a broad societal view. However, it is difficult and contentious to accurately quantify incremental costs and non-energy benefits. For that reason, we recommend using the PACT because it captures much of the value of the SCT while avoiding the shortcomings of the TRC test and SCT in these ways:

- The PACT is symmetric, as it includes only utility costs and utility benefits.
- Although the PACT excludes non-energy benefits, the test's symmetry avoids imbalance.
- The PACT removes the incremental cost of the energy-efficient measure/project from the calculation.
- The PACT offers equal treatment to energy-efficiency and supply-side options, and, as such, it is most compatible with the integrated resource planning.

We agree with NESP's recommendations to use The Resource Value Framework, and against using the TRC. The Framework is extremely flexible and allows for a range of tests, including the PACT and SCT. The Framework also provides a level of refreshing transparency.

[1] National Home Performance Council. The Resource Value Framework, Reforming Energy Efficiency Cost-Effectiveness Screening. The National Efficiency Screening Project. March 28, 2014. http://www.synapse-energy.com/Downloads/SynapseReport.2014-03.0.Resource-Value-Framework.14-027.pdf.

Discount Rate

The choice of the discount rate is very difficult and has been debated in economic literature for decades. In the energy-efficiency world, the most common discount rate is based on the weighted average cost of capital (WACC), which is used for both the TRC test and the PACT. Jurisdictions that use the SCT have opted for a societal discount rate, which is often based on the 30-year U.S. Treasury Bill rate. When deciding on the appropriate discount rate, stakeholders must consider several issues.

Financial analysis textbooks maintain that discounting is a necessary component of any evaluation involving benefits and costs that occur at different times. This argument is based on the principle that a dollar today is not equal to a dollar tomorrow. The difference in value is caused by both the ability to invest and risk. Discounting renders benefits and costs that occur in different time periods comparable. Discounting also reflects a preference for today's consumption rather than tomorrow's.

Discount rates matter quite a bit. At a 10 percent discount rate, we are willing to spend 6 cents today to obtain a dollar's worth of benefits 30 years from now. At 3 percent, we are willing to spend 41 cents, and at 0 percent, a whole dollar. If the dollar in benefits were to occur 100 years from now, the same 10 percent and 3 percent discount rates would yield willingness to pay of 0.007 cents and 5.25 cents, respectively. In other words, over 75,000 percent more would be invested now to obtain benefits in 100 years under a 3 percent discount rate compared to a 10 percent discount rate. Obviously, the discount rate is extremely powerful in decreasing or increasing the value of benefits received in the future.[2]

To capture some of the benefits of the SCT, we suggest that utilities combine a risk-adjusted discount rate with the PACT. This approach would capture more of the value of a SCT perspective while continuing to avoid the issues of fully deploying the SCT.

Level of Risk

Today's electric industry faces significant investments. Our infrastructure is aging and requires upgrades in generation and delivery systems. At the same time, the rules for air quality are tightening. The outlook for fossil fuel generation is uncertain at best. Renewable and energy-efficiency resource options, along with distributed generation and Smart Grid, are changing the future outlook for utilities.

The NESP recommends that "states should account for risk mitigation benefits when screening energy efficiency. Risk benefits accrue to the utility system, and therefore should be included in any screening test. Risk benefits should be accounted for either in selecting a discount rate, in modeling avoided costs, or as an explicit benefit to be included in the cost-effectiveness analysis."

Different discount rates are used in cost-effectiveness analysis based on the perspective of the test. The WACC includes a utility's after-tax cost of debt and equity. WACC is frequently used for the TRC test, the RIM test, and the PACT, while the SCT often uses a U.S. Treasury Bill rate as proxy for society's cost of capital.

States That Use Non-WACC Discount Rates

AZ, IA, OR, ME, MA, MN, NY, WI, VT

New York uses a 5.5 percent (real) WACC discount rate, stating: "[t]his rate reflects the utilities' marginal cost of capital, excluding taxes. The primary rationale is that the energy-efficiency resources are considered to be viable options to supply-side alternatives."[3] Connecticut, Michigan, and Utah rely on the PACT, matching the WACC to the utility perspective.

Massachusetts and Wisconsin use a societal discount rate. Both states use modified TRC tests, which include non-energy benefits.

The Massachusetts Department of Public Utilities notes that the state's distribution companies recover their costs within the year they are spent through charges to distribution customers; thus, they experience little risk and carry few costs, unlike the costs associated with the distribution company's capital expenditures.

Faced with the large expected level of utility capital investment in infrastructure, it seems prudent for regulators to account for the risk of future cost uncertainty when providing guidance to utilities in their jurisdictions. Regulators ought to be concerned with keeping overall costs at a minimum over the long run.[4]

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[2] Some consider it irrational to discount the future at all. Many argue that benefits to future generations should have a higher value than those accruing in the present. This argument is not based entirely on moral grounds. A pure economic argument is that as resources dwindle in the future, their value will increase. This argument, at its extreme, calls for a negative discount rate.

[3] State of New York Public Service Commission. *Order Establishing Energy Efficiency Portfolio Standard and Approving Programs.* Case 07-M-0548. Effective June 23, 2008. http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7BD9F7E0DF-A518-4199-84CC-C2E03950A28D%7D.

[4] In the case of energy efficiency, the investment all occurs upfront and is not subject to any fuel cost fluctuation (i.e., it is less risky than supply-side options). Furthermore, well designed energy-efficiency portfolios can easily produce savings at levels below 3 cents/kWh. In other words, energy efficiency can reduce overall risk and lower overall cost.

Measurement of Impacts

Historically, evaluation, measurement, and verification (EM&V) of the costs and benefits of energy-efficiency programs has not been balanced. Examples are estimating freeridership, but not spillover or market transformation; estimating leakage out, but not leakage in; and, as discussed above, using the TRC versus the SCT or PACT.

Perhaps the largest source of imbalance is the treatment of the counterfactual—that is, what would have happened absent the energy-efficiency program. At issue is how much of the impact can be attributed to the program effort versus how much would have occurred regardless (naturally occurring efficiency). Components of this assessment—freeridership, spillover, and market effects—and the approaches to their estimation have been and continue to be debated within the evaluation community.

Freeridership refers to participants who would have taken the same or similar actions as those promoted by the program. The different levels of freeridership depend on the similarity of any actions that would have been taken compared to those taken through the program offerings. Pure freeriders would have done exactly what they did under the program in absence of the program. Partial freeriders would have partially adopted the measure(s), in terms of quantity, timing, efficiency, etc.

Spillover (both participant and nonparticipant) refers to additional impacts influenced by the program.

Market effects are structural changes in the energy-efficiency market caused by the program efforts (for example, increased stocking of energy-efficient equipment, increased awareness of energy efficiency among the general public, trained trade allies).

Historically, jurisdictions have expended significant effort to estimate freeridership. In fact, many jurisdictions define net savings as net of freeriders, while other jurisdictions consider spillover and market effects to be as prevalent as freeriders. In some jurisdictions (such as in Arizona and Iowa), the regulators have accepted the argument that spillover and market effects balance out freeriders.

Solely estimating freeridership is overly punitive; the same amount of time and effort ought to be expended on estimating spillover and market effects. Furthermore, these issues should be debated during program design. Once a program is designed and launched in good faith, it is only appropriate to use these estimates in a prospective way. We should not be launching programs that offer incentives for measures that most people are installing on their own initiative or for which the market has already transformed. Prospectively, we should use the best knowledge we have of customer behavior and market conditions to promote energy efficiency beyond what is happening naturally.

It is imperative that EM&V protocols be clearly identified at the beginning of a program. These protocols should specify how savings will be measured and how the measured savings will be used.[5]

Uncertainty is a significant deterrent of any investment. In energy efficiency, uncertainty may be greatly decreased by setting the ground rules up front. For example, the EM&V steps, the intermediate savings estimate of each step, and the use of each estimate can be clearly identified at the outset of launching an energy-efficiency effort. The results of each step of the following EM&V processes are used for separate and appropriate purposes:

- **Audited Savings** are examined through a desk review of the tracking system and are used to make corrections to a data collection effort.
- **Verified Savings** are assessed through site visits or phone surveys and are used to assess the program performance against stated goals.
- **Evaluated Savings** are the result of an assessment of actual savings, including hours of use, baseline conditions, weather, etc. These savings are used for future program design.
- **Net Savings** may be used for cost-effectiveness and revenue recovery.

[5] The U.S. Department of Energy's Uniform Methods Project is taking a strong step in the direction of developing a standardized framework and set of protocols to systematically determine the savings from energy-efficiency programs and standardize their application.

Regulatory Treatment

Electric utilities are in a unique position to engage in wide-scale deployment of energy efficiency because they have a clear advantage—gained through their relationship with customers, their size and scale, and their financial resources—to either directly deliver or participate in the delivery of energy efficiency.

Balanced policies toward resource acquisitions require mechanisms that allow leveling the playing fields between supply- and demand-side options. Energy-efficiency cost recovery must be addressed by:

- Recovery of delivery costs
- Recovery of lost margins
- Providing an earnings opportunity

Regulators, through balanced policies, are well positioned to create mechanisms to foster increased utility investments in energy efficiency.

Recovery of Delivery Costs

A utility should be able to recover all prudently incurred energy-efficiency program costs. This has not traditionally been a concern in energy-efficiency programs. The most common forms of cost recovery are to treat delivery costs as expenses, amortize over a negotiated period of time, or through contemporaneous recovery.

Expensing is the least favorable and most risky option to utilities, encourages decreases in spending between rate cases, and has largely been abandoned.

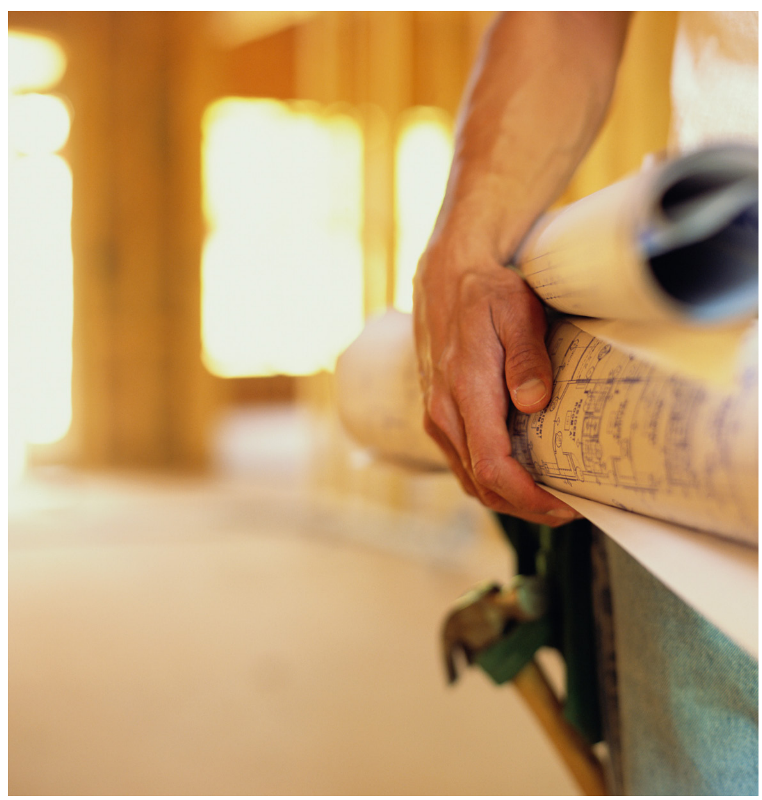
Deferred accounting allows utilities to capitalize on expenditures and amortize them into rates over a set time period. Deferred energy-efficiency expenditures, therefore, become a regulatory asset. The utility can not only recover the costs, but can earn a rate of return. Utilities have voiced concerns that changes in rate proceedings may endanger future recovery, because deferred energy-efficiency expenditures are not a firm asset. As such, this recovery mechanism has largely fallen out of favor.

Contemporaneous recovery is the most common, allowing utilities to recover costs through customer charges in the form of system benefit charges or line items (called a tariff rider) on the bill. An integrated resource planning process determines the optimal level of energy efficiency, given the DSM program costs compared with the supply-side resource costs. These expected costs are then spread across the utility's customers in the form of a line item on their bills. Each year, the utility adjusts the line item to recover the expected costs for the subsequent year plus any overruns or less any underspending from prior years. The utility proves the prudency of its investments through a third-party independent evaluation of its energy-efficiency efforts. Contemporaneous recovery has given assurance to utilities that costs will be recovered in the year they were incurred.

We believe, in order to level the playing fields between supply- and demand-side options, that regulators should pursue mechanisms based on contemporaneous recovery to avoid financial issues associated with accumulating a large regulatory asset on the utility's balance sheet. We discuss additional mechanisms to address potential earnings impacts below.

Recovery of Lost Margins

Recovery of expenses alone will not address the lost margin that utilities face due to the reduction in sales. Most often, utilities recover a portion of their fixed cost through a volumetric rate. Consequently, as sales decline, utilities will under-recover a portion of their authorized fixed costs. This can create a significant disincentive, especially when the utility's fixed costs are high (as they are in most cases).



Fixed-cost recovery can be improved through decoupling, revenue adjustments, and higher fixed charges. Decoupling addresses the issue that fixed costs do not vary with sales volume. Under decoupling, a utility's fixed costs are typically established on a per-customer basis. This cost is then recovered through the normal rates. At the end of each year, the utility makes a true-up adjustment such that it recovers neither more nor less than its authorized fixed costs.

An alternative is to recover fixed costs directly through a monthly charge, and recover the variable components through a volumetric per-unit component. The disadvantage of such a mechanism is that increasing the fixed monthly charge while decreasing the volumetric rate may reduce the customers' incentive to use less energy. So, although some lost margin mechanism needs to be in place to encourage utilities to invest in energy efficiency, it is not appropriate to shift all of the fixed costs into customer fixed charges.

Providing an Earnings Opportunity

Recovering program costs and lost margins removes the disincentive for utilities to invest in energy efficiency; however, it does not entirely level the playing field. Supply-side resources can provide earnings that are not matched by DSM expenditures. When firms' profits are tied to capital investments, there is a tendency to overinvest. This is known as the Averch–Johnson effect, or the tendency of regulated utilities to engage in excessive capital growth in order to increase revenue. This tendency can also create a disincentive for utilities to meet their resource needs using approaches that are less capital intensive, such as energy efficiency. A properly designed shareholder earnings mechanism for energy-efficiency investments can offset this effect and further balance the supply- and demand-side options.

Currently, shareholder earning mechanisms fall into three general categories. The utility can: 1) receive an incentive or face a penalty based on achievements relative to DSM goals; 2) receive a percentage share of the energy savings calculated as the avoided costs minus the efficiency investment; or 3) accumulate costs as regulatory assets, and later recover those costs via a rate case plus earnings. The accumulation of regulatory assets has largely fallen out of favor, and no state currently provides an enhanced return on energy-efficiency regulatory assets.

We recommend that a shareholder earnings mechanism be based on the following principles:

- Earnings should be based on expenditures in a manner that is comparable to equivalent supply-side investments.
- The criteria for how savings are estimated should be clearly outlined (e.g., based on prudently incurred expenditures, evaluated savings, verified savings).
- Bonus incentives for achieving certain targets, such as savings or cost-effectiveness, may be added to the earnings component to further encourage energy-efficiency expenditures.

A Balanced Future

An optimal energy system contains a mix of supply- and demand-side resources to create the most cost-effective, reliable, and environmentally responsible portfolio. At the present time, the United States has substantial energy-efficiency potential. Optimizing that potential within the utility's portfolio requires regulatory mechanisms that make investments in energy efficiency as attractive to utilities as investments in supply-side options.

Regulators must therefore evaluate energy efficiency using cost-effectiveness analyses that fully recognize the benefits and costs, assure cost recovery of prudent investments, provide a mechanism to offset the under-recovery of fixed costs, and allow utilities to earn profits on energy efficiency that are equivalent to the earnings potential of supply-side resources. Many states have adopted some or all of these mechanisms, providing evidence of their effectiveness in reducing the cost of energy.

We recommend that:

- Regulators open dockets to consider the appropriate cost-effectiveness testing methodology.
- Regulators adopt contemporaneous cost recovery for energy-efficiency expenditures.
- Regulators allow fixed-cost recovery through decoupling mechanisms.
- Regulators provide an earnings mechanism based on the utility's energy-efficiency expenditures that provides earnings on par with supply-side resources.
- Utilities undertake DSM potential studies to determine the cost and magnitude of energy-efficiency and demand-response potential within their service territories.

Further Reading

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