American Public Power Association

The Effect of Energy Efficiency Programs on Electric Utility Revenue Requirements

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Successful conservation and energy efficiency programs decrease sales, and since electric utility rates typically are based on sales volume, also decrease utility revenues. This potential for lower revenues gives utilities a disincentive to promote energy efficiency programs.

Most utility costs, including the majority of power supply costs, are variable, that is, they change in proportion to the amount of power sold. However, most distribution and customer service costs do not vary with the amount of kilowatt-hour (kWh) sales, even though these costs are recovered mainly through a per-kWh rate. A reduction in sales, therefore, leads to a greater reduction in revenues than in costs, and potentially can threaten a utility's financial health.

Some investor-owned utilities (IOUs) have addressed the potential problem of under-recovery of costs by implementing automatic adjustment mechanisms that separate or "decouple" sales from revenue. The goal is to ensure that IOUs recover their entire revenue requirement regardless of the effect of energy efficiency programs on total sales.

A public power utility, however, may not find it necessary to implement such decoupling mechanisms because the utility operates on a nonprofit basis and so has different goals and a different business model than an IOU. For example, unlike an IOU, a public power utility does not need to maximize returns to shareholders. In addition, a public power utility typically has more flexibility to adjust rates on a timely basis and can make changes to its rate structure if energy efficiency programs are limiting the utility's ability to recover costs. Key factors in gaining support for any necessary rate adjustments are a good working relationship with the local regulatory body and customer education.

Decoupling: the Investor-Owned Utility Experience

To encourage energy efficiency, some state public utility commissions have allowed investor-owned utilities to adopt rate mechanisms that break the link between sales and revenue. Typically, these decoupling mechanisms true up any under- (or over-) recovery of forecasted revenue on a regular basis. The utility's disincentive to promote energy efficiency is removed because the decoupling mechanism ensures full recovery of the utility's revenue requirement. Decoupling mechanisms often apply only to the delivery or distribution portion of the rate. This is because many IOUs already include power supply or fuel cost adjustment factors in their rates and because for utilities purchasing all of their power (such as those IOUs that no longer own generating resources), power supply costs change in proportion to sales.

At its most basic, the decoupling calculation compares the IOU's revenue requirement – as determined by the public utility commission in the most recent rate case – with the actual revenue collected by the utility for the subject period. The difference between the two is the amount of under (or over) recovery. This amount is divided by the kWhs sold by the utility to determine the per-kWh adjustment factor to be applied to utility rates during the next period. Generally, there is a separate calculation for each applicable rate class. This automatic rate adjustment occurs at the end of each period – monthly, quarterly or annually.

There are many variations of the basic decoupling mechanism, and typically these variations came about to address criticisms of decoupling. A major criticism is that the basic true-up mechanism results in rate adjustments regardless of the reason for the under- (or over-) recovery of revenue, and thereby insulate utilities from a wide variety of business risks.[1] Weather and economic conditions can each have a strong influence on utility sales, and these effects would also be captured and mitigated by the rate adjustments. Thus, one option is to limit guaranteed revenue recovery to only the amount of revenue lost as a result of the utility's energy efficiency programs. However, this lost revenue adjustment method is difficult to calculate on the part of the utility and difficult to oversee on the part of the commission. It gives utilities an incentive to overestimate savings from energy efficiency programs, but does not provide utilities any motivation to promote energy efficiency or implement effective programs.

Rather than try to measure the change in sales resulting from energy efficiency, a second option is to devise formulas that eliminate other factors that affect sales volume. Thus some commissions have approved decoupling formulas that calculate the rate adjustment factor based on sales in the subject period after they have been normalized for weather.

Another major issue centers on whether utilities should be allowed to recover the entire revenue shortfall (the difference between actual revenue and the utility's revenue requirement). An IOU's rates are designed to recover

1 Customer and public interest groups argue that since the basic decoupling mechanism guarantees that the utility will recover its entire revenue requirement – regardless of external conditions or utility management practices – there should also be a reduction in the utility's allowed rate of return to reflect the reduced risk.

operating costs (both variable and fixed), other fixed costs, such as depreciation, and a return to the utility's shareholders. Some argue that the utility should be allowed to recover only the amount of the revenue shortfall that covers fixed costs. This has been called fixed cost recovery or lost revenue margin recovery, and is calculated by multiplying the difference between expected kWhs sold and actual kWhs sold times the portion of the per-kWh rate that covers fixed costs.

IOUs argue that the basic per-kWh decoupling formula reduces a utility's ability to recover costs associated with growth in the customer base and eliminates any incentive to promote economic development in its territory. In response, commissions have adopted a per-customer decoupling formula. The per-customer target is set in the most recent rate case by dividing the allowed revenue requirement by the number of customers assumed in the rate case. Going forward, the utility multiplies the per-customer target by the actual number of customers served during the period to obtain the revenue requirement for the period. Actual revenue for the period is compared to the calculated revenue requirement to determine any under- (or over-) collection of revenue. The amount is divided by kWhs sold in the period to determine the per-kWh rate adjustment for the next period. The per-customer methodology can also be used with the fixed-cost recovery mechanism.

Another way of addressing fixed-cost recovery is to modify a utility's rate structure to collect all fixed costs in a per-customer charge. The per-kWh portion of the rate – which would cover all costs that vary with volume – would be reduced. While this method has the benefit of recovering costs in line with how they are incurred, there are major drawbacks. Typical IOU rates include a modest per-customer charge to cover billing and metering expenses; the per-customer charge would need to increase substantially to cover all fixed costs. Customers who use less power would pay significantly higher bills, while customers who use more power would see their bills reduced. This not only reduces incentives to conserve power, but also raises bills for low-income customers (who tend to use less power). While some commissions have approved higher per-customer charges for utilities, none have attempted to recover all fixed charges on a per-customer basis.

Regulators have used methods other than decoupling to encourage IOUs to invest in energy efficiency. In fact, IOUs and many promoters of conservation argue that while decoupling is a necessary step, it is not sufficient, because it only eliminates the utility's *disincentive* to promote energy efficiency programs. They argue that regulators should *also* approve positive financial incentives for utility investment in energy efficiency. Proposed incentives include rate of return adders on investments in energy efficiency programs; sharing the savings (between customers and shareholders) from energy efficiency programs; and earning a designated percentage of the avoided cost of new capacity (Duke's Save-a-Watt program). In some cases, state commissions have allowed utilities to earn positive financial incentives from investments in energy efficiency, but ruled that these incentives eliminate the need for a decoupling mechanism.

Provisions in 2009 Economic Stimulus Law

The American Recovery and Reinvestment Act (ARRA), enacted in February 2009, provides grants, loans and other financial incentives with the goal of creating new jobs, promoting economic recovery and assisting those most hurt by the current recession. Significant resources are aimed at investments in technology and energy infrastructure, and reducing the country's reliance on carbon-based fuels. Thus, several programs provide funding for renewable resources, energy efficiency and smart grid technology.

The Department of Energy's (DOE) State Energy Program receives $3.1 billion in funding under the ARRA. The funds can be spent on a wide variety of programs, including both energy efficiency and renewable energy programs. However, a state can receive the funding only if the state regulatory authority seeks to implement a "general policy that ensures that utility financial incentives are aligned with helping their customers use energy more efficiently and that provide timely cost recovery and a timely earnings opportunity for utilities.." (Section 410 of ARRA).

Implementation of the "general policy" would most likely apply only to utilities under the rate jurisdiction of the state regulatory authority, and so would affect the rate-setting practices of public power utilities only in the few states where the state regulates public power rates.[2] However, if a state commission does not meet the new law's requirement, the state – and all entities within a state – will not receive State Energy Program funds allocated under the ARRA.

There has been no formal interpretation of the Section 410 provision, but it appears that it does not mandate decoupling and that the language is broad enough to allow state regulatory commissions a choice of policy options.[3] Possibilities could include: changes in rate design (larger fixed charges or rates based on future projections); reducing regulatory lag through more frequent rate cases; use of a third part to implement energy efficiency programs; and increased incentives for energy efficiency investments.

What Makes Public Power Different?

Public power utilities are similar to IOUs in their concern that successful energy efficiency programs will result in both lower sales and lower revenues. However, there are also key differences. Most importantly, IOUs are for-profit companies and so seek to obtain the highest possible returns for their shareholders. IOUs have no incentive to invest in energy efficiency unless it benefits shareholders; conversely, they have a strong incentive to obtain regulatory treatments for energy

[2] The state public utility commission regulates public power utilities' rates in six states: Maine, Maryland, Rhode Island, Vermont, and Wisconsin, and in Indiana unless the utility removes itself from commission jurisdiction by ordinance or majority vote of citizens.

[3] See Kenneth Rose, "Addendum to the EISA PURPA Standards Manual", March 17, 2009, p. 4, available at: http://appanet.org/files/PDFs/ARRAcorrectiontoPURPAandnote.pdf.

efficiency investments that will increase their profits. Thus, some proposals to compensate IOUs for under-recovered revenue or provide other incentives for energy efficiency programs reflect IOUs' motivation to make these programs as profitable as possible for shareholders.

Public power utilities, on the other hand, are not-for-profit entities owned by their customers via state or local government. Since their customers and "shareholders" are one and the same, public power utilities do not need to satisfy two different constituencies. This means they do not need to earn a return on energy efficiency programs or collect from customers revenues in excess of costs. A public power utility that proposes rate adjustments to recover revenue shortfalls caused by successful energy efficiency programs is in a much less adversarial position with its regulator because the utility is concerned with recovering only that part of the revenue shortfall that represents unavoidable or fixed costs.

There is also a significant difference in how IOUs and most public power utilities are regulated. State public utility commissions approve IOU rates in "rate case" proceedings that establish revenue requirements, recoverable costs, and the utility's rate base and allowed rate of return. These proceedings are time-consuming and often adversarial, so, typically, an IOU prefers to wait several years between proceedings. One way to stretch out the period between rate cases is to include automatic adjustment mechanisms, such as fuel cost adjustments or revenue decoupling.

Most public power utilities have their rates regulated by a local governing body, such as a city council or independent utility board. Local governance and a less complex rate-setting process gives public power utilities greater flexibility in proposing rate adjustments on an as-needed basis. The national credit rating agencies regularly note that the ability of public power utilities to adjust rates on an as-needed basis is a major credit strength. For example, in its December 2008 utility outlook report, Fitch Ratings said the credit outlook for public power utilities was stable, and listed as an important driver "local control over rate-setting without state commission oversight and continued willingness to recover costs in rates on a timely basis."[4] And in response to a recent question on how public power utilities could protect their creditworthiness, Moody's Investors Service said utilities should "maintain strong relationships with their governing boards to make sure the types of decisions that are made protect the financial condition of the utility."[5]

In a recent report on the potential for energy efficiency, the Electric Power Research Institute estimated that efficiency programs could realistically reduce electricity demand from the Energy Information Administration's forecasted annual average rate of 1.07 percent per year through 2030 to 0.83 percent per year.[6] Under ideal conditions, the growth rate could fall to 0.68 percent per year. Thus, for a typical utility, sales will continue to grow, just at a slower rate. The utility develops its rate formula based on assumptions: about weather, economic activity, and now can add in expectations on how investments in energy efficiency will affect sales. These three factors behave in different ways: weather is unpredictable, economic conditions tend to change in a cyclical pattern, and energy efficiency reduces demand.

If energy efficiency programs result in greater revenue losses than expected and endanger the utility's financial health, the utility and governing body can work together to implement a rate adjustment to ensure that the utility can cover its fixed costs and meet its budget. To get the necessary support, the utility may need to educate city officials and the community. In regard to rate effects, the utility can show how investing in energy efficiency can result in lower utility bills in the longer term. Programs that reduce peak demand can reduce the utility's power supply costs and delay or eliminate the need for new generating resources. In addition, typically, the cost per kWh saved of effective energy efficiency measures is significantly less than the cost of building new generation or purchasing power in the market.

The utility can increase support for energy efficiency programs by providing city officials with information on how these programs promote economic development. Energy efficiency programs can provide jobs – weather-proofing houses; energy audits; installation of new technology or upgraded equipment; and over the long term, can lead to lower total costs than neighboring utilities because of lower reliance on high-cost power supplies. Industrial customers, in particular, want to keep electric costs low in order to stay competitive in their own industries. If the utility can help reduce a customer's electric bills, the customer is more likely to stay in business or consider expansion at that location rather than in another utility's territory.

The utility should also educate its customers on the distinction between rates and bills. For example, the utility may need to increase the per-kWh rate to collect sufficient revenue to cover its fixed costs. But customers that take advantage of the utility's energy efficiency programs – or implement their own energy-saving measures – may offset part or all of the rate increase through lower consumption. The utility should make sure its customers know that energy efficiency programs – both implementation costs and any rate adjustments to ensure fixed-cost recovery – account for only a small portion of total rates, especially when compared to power supply costs.

Many utilities are experiencing unanticipated demand reductions as a result of the current economic recession, and should be careful not to inappropriately attribute the decline to utility-sponsored energy efficiency programs. A utility may need to make changes to its budget, reserve levels, or rate structure to maintain its financial health throughout the recession, but, historically, most recession-induced declines in demand are temporary.

Public Power Utility Examples

A good working relationship between city officials and the utility's governing body is a key factor in keeping the goals of

4 Fitch Ratings, "U.S. Utilities, Power and Gas 2009 Outlook," December 22, 2008, p. 4.
5 American Public Power Association, "10 Questions: Dan Aschenbach," *Public Power*, January-February 2009, p. 10.
6 Electric Power Research Institute, *Assessment of Achievable Potential from Energy Efficiency and Demand Response Programs in the U.S. (2010-2030)*, January 2009, p. 7 of Executive Summary.

the city and utility aligned. If energy efficiency is an important goal throughout local government, the utility will have the support it needs to invest in efficiency programs and to enact any necessary rate adjustments. At the same time, the city's governing body can assist in conservation efforts by adopting energy-efficient building codes and standards.

The public power utilities in Burlington, Vermont; Austin, Texas; and Waverly, Iowa; have worked together with their governing bodies and communities over the long term to implement effective energy efficiency programs. At the same time, all three utilities have consistently maintained a strong financial standing.

The ***Burlington Electric Department*** (BED) began its energy conservation programs in the early 1990s, after the city voters overwhelmingly approved a bond measure to fund energy efficiency. In 1997, the city enacted energy efficiency standards for rental housing, and named BED the program administrator in recognition of the utility's extensive experience in implementing conservation programs. As a result of the utility's energy efficiency programs and the community's investments in conservation, electricity consumption in 2007 was only 1 percent above the 1989 level.[7] Without the utility's energy efficiency programs, energy consumption would be 15 percent higher today.

Beginning in 2003, the Austin City Council adopted a series of resolutions setting policies and goals to make the city the clean-energy capital of the world. The resolutions have established goals for the utility to obtain 30 percent of its energy from renewable resources and 700 megawatts of new savings through energy efficiency measures by 2020. In line with City Council policies, ***Austin Energy*** adopted in its 2003 plan a major strategy of using cost-effective renewable energy and demand-side solutions to meet new energy needs. The utility's 2007 strategic plan update describes the interaction between the City Council and the utility in setting renewable resource and conservation goals.[8]

In 1991, ***Waverly Light and Power***'s Board of Trustees directed utility management to emphasize environmentally responsible electric service, including investing in conservation and renewable energy. As a result, the utility began an aggressive energy efficiency and customer awareness campaign in late 1991. Programs include rebates for the purchase of qualifying appliances and rate discounts for homes that meet specific standards, including appliance and weatherization standards for existing homes and design standards for new construction. The utility maintains a long-term planning focus and uses an integrated resource plan (IRP) to guide its decisions on power supply, investment in generation – including renewable generation – and investment in cost-effective conservation programs. In 2004, Waverly Light & Power joined the World Wildlife Fund's Power Switch initiative, and committed to meet 15 percent of its energy needs through energy efficiency programs by 2020.

Santee Cooper (South Carolina Public Service Authority) and the Lakeland Electric in Florida are two examples of public power utilities that have recently made strong commitments to energy efficiency. Both utilities are careful to include in their rate studies adjustments that capture the expected effects of conservation programs, and Lakeland may consider alternate rate structures in its next rate review.

In 2007, ***Santee Cooper's*** Board of Directors approved a goal of obtaining 40 percent of its energy from non-greenhouse-gas-emitting resources, biomass fuels, energy efficiency and conservation, by 2020. At the same time, the utility realigned the organization and created a new position of vice president of conservation and renewable energy to ensure a strong utility-wide focus on the new goals.

During the process of considering and adopting these goals, Santee Cooper's management made sure that its board was well-educated on energy efficiency program costs and their potential effect on rates. Management explained that in the long run, overall system costs are expected to grow at a slower rate as savings from properly designed efficiency programs reduce energy consumption and postpone the need for new generation investment. In the short run, however, implementation of new energy efficiency programs will put pressure on rates. Higher rates should still result in lower bills for program participants however, depending on how much they reduce electricity consumption.

When Santee Cooper conducts rate proceedings, it incorporates the effects of energy efficiency programs by using a projected test calendar year based on budgets and the utility's load forecast. In making its rate presentations, utility management continues to educate the board on rate structures and the need to fully recover all costs.

Lakeland Electric's utility-sponsored efficiency and conservation programs are only one year old, and the Florida utility estimates that the programs' effects through 2009 will be 0.2 percent of annual consumption. Efforts will continue at a pace to double the level of energy savings by the end of fiscal year 2011, and the utility is also considering a significant expansion of the program. In addition, Lakeland expects customer-owned photovoltaic (PV) generation to increase significantly. The loss of sales revenue from conservation programs and customer-owned PV, along with premium pricing for excess PV energy sold back to the utility, are factors that will be considered in the utility's next rate study. Lakeland will re-evaluate its rate design to improve recovery of fixed and demand costs and will consider a conservation rider and other rate design changes to enhance fixed-cost recovery.

The new energy efficiency and PV programs are not the only cause of lower energy sales, as average residential consumption has declined steadily since the summer of 2006. This behavior change has had a huge, unexpected effect on revenue. ■

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7 Burlington Electric Department, *2007 Energy Efficiency Annual Report*, p. 1, available at: http://www.burlingtonelectric.com/EnergyEfficiency/EnergyEfficiencyAnnualReport.pdf Also see http://www.burlingtonelectric.com/EnergyEfficiency/tos1.htm for information on the city ordinance establishing energy efficiency standards for rental housing.

8 *Austin Energy's Strategic Planning Update*, December 30, 2007, pp. 8-11, available at: http://www.austinenergy.com/About%20Us/Newsroom/Strategic%20Plan/strategicPlanningUpdate_2007.pdf