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**ENERGY**

Energy Efficiency &  
Renewable Energy

**Technical Assistance Program  
An Assessment of Utility Program  
Portfolios**

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## Introduction

For utilities in Kentucky to develop new energy efficiency programs and augment their existing ones, it will be invaluable to provide them with recent evidence of program portfolio design and performance from utilities in other states. In this document we review program portfolios from utilities in several states with a variety of experience administering energy efficiency programs. By diversifying the states for which we assess utility program performance, we intend to show the volume of energy savings that can be achieved relative to utility experience and program portfolio design and maturity.

In our assessments we focus on electric efficiency programs only. While some portfolios we review in this document include programs for both electricity and natural gas, we concentrate on electric efficiency programs because: the number of these programs far exceed those for gas; utility regulatory commissions generally require more comprehensive suites of program offerings for electric utilities; and more robust evaluation data is available from electric programs than from natural gas programs.

## Energy Efficiency Context

In order to facilitate the interpretation of these results, it is important to provide some context. Utilities across the nation have been offering energy efficiency programs to their customers for varying periods of time – some for decades, others have begun only in the last several years. The impetus for program development and implementation across utilities and over time has also varied – economics, regulatory policies, system reliability concerns, market competition, and rate impacts are factors that typically influence utilities in the number and scope of programs that they offer. Understanding when and why utilities cultivate their program portfolios gives insight into how the various programs perform and grow, allowing utilities to make informed decisions that will help ensure greater success with their portfolios.

A defining moment in the era of utility efficiency programs was the wave of energy market deregulation that spread across many states during the 1990s. In order to foster competition between utilities, some states began deregulating energy markets in the hopes that greater competition between utilities would generate greater customer benefits, such as lower customer energy rates. In the race for market share, however, utilities in many states quit investing in energy efficiency programs altogether because the administration costs cut into their revenues – costs that utilities were previously able to recover through regulatory mechanisms.

The foray into market deregulation proved largely unsuccessful. As a result, regulators have been looking to other measures to control consumer costs, such as investments in energy efficiency. Thus we have seen the number and efficacy of energy efficiency programs grow significantly over the last several years. Much of this growth can be attributed to utility regulatory policy and, to a lesser degree, legislative mandates, particularly due to the introduction of Energy Efficiency Resource Standards (EERS) in over half of the states in the nation.<sup>1</sup> It is no surprise that, of the utilities reviewed below, those with the most comprehensive and effective program portfolios, as well as the most detailed reporting of program performance, are utilities in markets with an EERS that, importantly, have also developed complementary utility regulatory policies to facilitate investment in energy efficiency programs.<sup>2</sup>

### *Utility Program Portfolios*

Our analysis focuses on utility program portfolios as a whole rather than focusing on individual program performance. In some states, data at the individual program level can be unreliable or difficult to compare to other programs, while aggregate portfolio results are more consistently comparable. We did, however, collect and analyze data for many individual programs in order to determine the effectiveness of utility

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<sup>1</sup> See <http://www.aceee.org/files/pdf/State%20EERS%20Summary%20Dec%202010.pdf> for a map and list of states with and EERS and detailed information on the annual targets.

<sup>2</sup> Regulatory policies that promote utility investment in energy efficiency programs are: policies that address a utility's lost revenues from administering programs and from the revenue lost due to reduced sales arising from those programs (lost revenue adjustment mechanisms or cost recovery); and incentives for meeting/surpassing savings targets (performance incentives). Prudent evaluation, measurement and verification (EM&V) policies ensure the rigorous reporting of program savings.

program portfolios overall. Individual program performance is important to assess. However, its importance is greater for program administration rather than for making comparisons of similar programs across portfolios. This is because program portfolios differ significantly not only across states, but also between utilities within the same state as well as within one utility that operates in several states. Furthermore, programs that may appear similar can also differ significantly with regards to many economic and administrative factors that affect program performance: utility investment, program marketing, program incentives (rebates, tax breaks), availability of trained/qualified contractors, and energy prices and demand are just a few examples.

### *Assessment of Results*

In evaluating utility energy efficiency programs, there are a number of metrics that are widely used to determine program and portfolio effectiveness. Below we discuss several of the most common metrics, which we use in our portfolio assessments later on. The key for any metric is providing some sort of normalization so that comparisons can be made across portfolios from utilities of various sizes and regions of the country. This list is by no means conclusive:

- **Savings as a Percent of Sales** – This metric calculates the volume of energy savings generated by a program/portfolio relative to a utility's annual retail sales, reported as a percentage. By normalizing the savings relative to a utility's annual sales, differences in utility market share are taken into account, allowing comparisons of programs between utilities of different sizes. As a result, this metric is an invaluable indicator to evaluate a utility's overall efforts in developing and implementing efficiency programs. Portfolios with higher percent savings can therefore be said to offer programs that are well-funded, prudently marketed, and rigorously administered. It is important to note that the program savings considered in this metric are incremental, new savings; i.e., the savings are unique to that program year rather than the accumulation of savings from past program years.<sup>3</sup>

It is important to understand, however, that this metric is not perfect, despite its usefulness in comparing program portfolios. Utilities use different methodologies for determining program savings, which can produce some inequities when comparing utilities using this variable. For example, some utilities rely on "deemed savings", which provides *ex ante* savings measurements for individual products and equipment (a massive document listing hundreds of measures with pre-verified savings and costs, filed with a state's regulatory commission). A program's savings are then calculated by taking the number of installed measures and multiplying by their individual per unit savings. A more rigorous approach would be to measure savings impacts *ex post* through evaluation, measurement, and verification (EM&V). EM&V is costly and time consuming, however, so many utilities tend to rely on deemed savings, at least for a portion of their portfolio. The benefit of measuring savings *ex post* through EM&V is that it takes into account variations in the quality of installation. More often than not, equipment is installed poorly, thereby preventing that equipment from performing at peak levels and generating savings on par with its deemed savings.

Experience in other states provides a benchmark with which to ascertain the range of percent savings that is indicative of a strong program portfolio. ACEEE's *2010 State Efficiency Scorecard* reported that the utilities in the top ten states are achieving annual incremental savings between 0.7% and 2.6% of annual retail sales.<sup>4</sup> The next tier of ten states is achieving annual incremental savings between 0.4% and 0.7%. We must qualify these results, though: utilities in states that are

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<sup>3</sup> *Incremental annual* is one of three metrics used to measure the absolute energy savings generated by energy efficiency programs. *Cumulative annual* and *total cumulative annual* are the other two and, between them all, the definitions are frequently confused. *Incremental annual* savings is defined as the energy savings occurring in a single year from current programs and policies. *Cumulative annual* is defined as the sum of all incremental annual savings, or the savings occurring from a single year from current programs and policies and counting prior year savings. *Total cumulative annual* is defined as the sum of the *cumulative annual* energy savings over a certain time frame.

<sup>4</sup> Data is from 2008 due to lag in the reporting of annual sales. These values are aggregated incremental annual savings from all investor-owned utilities in the state divided by the aggregated annual retail sales from those utilities.

achieving the highest savings have, understandably, had years of experience running energy efficiency programs. It generally takes years of planning, development, and implementation for utilities to begin to generating savings on par with the leaders.

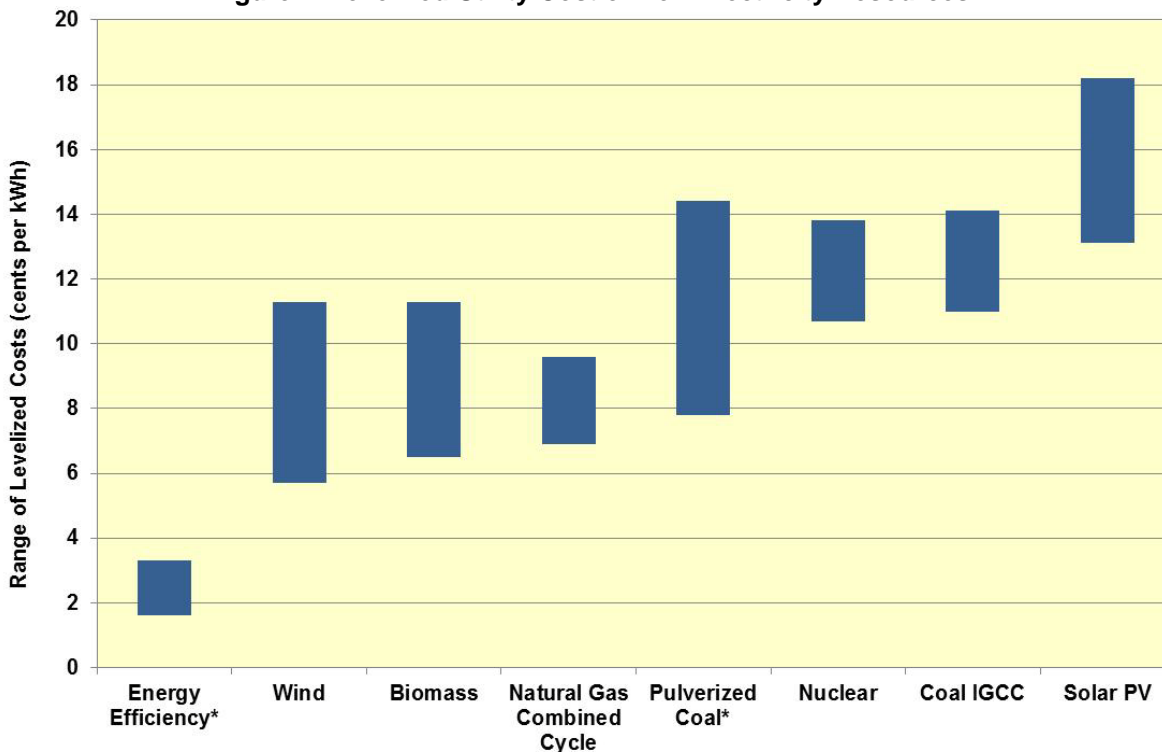
- **Levelized Cost of Saved Energy (\$/kWh)** – The levelized cost of saved energy (CSE) is defined as the level of payment necessary each year to recover the total investment and interest payments (at a specified interest rate) over the life of an efficiency measure; or, in the case of energy efficiency programs, over the average life of all the measures installed through a program. The levelized CSE is essentially a measure of the “bang for the buck”, or the volume of savings achieved with each dollar of program investment: the lower the CSE, the greater savings being generated per dollar. This methodology is an exercise in normalization that allows utilities to compare energy efficiency with other generation resources to evaluate the relative cost-effectiveness over their lifetimes and is usually reported in dollars per kilowatt hour. For example, if the total cost of a pulverized coal plant is around \$0.08 per kWh but a utility can generate energy savings through efficiency programs at a rate of \$0.03 per kWh, then energy efficiency is the more cost-effective resource for meeting electricity demand

There are a number of ways to measure the costs (and benefits) of energy efficiency programs, which focus on either the customer or utility perspective, or both. Figure 1 represents costs from a program administrator (utility) perspective. This is known as the *utility cost* or *program administrators cost (PAC)* test. This is a cost/benefit test that measures the net costs of a program based on the costs incurred by the utility (including incentive costs) and excluding any net costs incurred by the participant (customer). The costs used to determine the portfolio results we report below are from the utility perspective, so they do not include customer costs. The benefits for this test are the avoided supply costs of energy and demand; the costs are the program costs incurred by the utility, incentives paid to the customer, and any increased supply costs. The other test frequently utilized is the *total resource cost (TRC)* test. Unfortunately, regulators implement TRC inconsistently, which makes comparisons between states difficult. The TRC benefit/cost test includes both the participants’ and the utility’s costs. The benefits are avoided energy supply costs; the costs are the program costs (including equipment costs) paid by both the utility and the participants, plus the increase in supply costs for any period in which load has been increased.

To provide a reference for reviewing the levelized CSE estimated for program portfolios in this report, the 2009 ACEEE study, *Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved through Utility-Sector Energy Efficiency Programs*, found that the energy efficiency programs for utilities across 14 states have portfolios performing at a levelized CSE ranging from \$0.016 to \$0.033 per kWh, with an average cost of \$0.025 per kWh (Friedrich et al, 2009). At these levels, energy efficiency is the least costly energy resource option available for utility resource portfolios: saving a kWh through energy efficiency is around one-third or less the cost of any new source of electricity supply (see Figure 1).

The 2009 ACEEE study assumes an average measure lifespan of 10-15 years for electricity programs, with a median of 13 years, which were reported by utilities for their energy efficiency program portfolios in a given program year. Unfortunately, the program portfolios that we reviewed for the current study did not consistently report average measure lives. Therefore, we used the 10-15 year range from the 2009 study to estimate a range of levelized CSEs for each utility’s portfolio in each program year. For each utility, tabular results are only reported assuming the median value of 13 years. Figures 3 and 4 on pages 22-23 report the full range of levelized CSEs for each utility. Appendix A provides tables by state that include the full range of levelized CSEs for each utility’s portfolio.

Figure 1. Levelized Utility Cost of New Electricity Resources



Notes: Energy efficiency data from Friedrich et al. 2009 (ACEEE), which represents 5 years of average utility efficiency program cost data from 12 states. The states included are geographically disperse and therefore a good indication of efficiency program costs throughout the country; all other data from Lazard 2009. High-end range of advanced pulverized coal includes 90% carbon capture and compression.

- Program Participation (%)** – Program participation is a measure of the market share reached by a program. Occasionally participation is expressed as a percentage relative to the number of potentially eligible customers. Few utilities report program participation as a percentage, however, if they report program participation at all. Instead, they focus only on the number of actual program participants. For some programs one could assume that the total number of customers in a sector (residential, commercial, industrial) is equivalent to the total number of potential customers. But well-designed programs target particular market segments within a sector, such as low-income customers or small commercial operations, so this assumption is not an accurate reflection of potential market participation. Additionally, many utilities measure program participation based on the number of installed efficiency measures, such as compact fluorescent lights or central air-conditioning tune-ups, as opposed to the number of households or firms.

Increasing overall program savings cannot be accomplished cost-effectively simply by expanding participation in existing programs. So while this metric is another useful tool in the program analysis kit, program performance should not be measured based on participation alone. Ultimately, good program design maximizes the volume of savings generated per customer. This generally means customers must install more energy efficient measures with greater incremental efficiency gains to achieve deep savings. In leading states, program administrators are augmenting customer participation through better advertising (targeting social media), greater convenience (minimizing administrative costs), and offering higher incentives, the latter of which can potentially backfire if funding is not adequate enough to meet demand.<sup>5</sup> Friedrich et al (2009), for example, found that program incentives average around 75% of total program costs and range

<sup>5</sup> Efficiency Vermont, for example, emphasizes long-term planning, relationship building, program implementation flexibility and innovation as means to increasing participation as opposed to higher rebates.

between 60%-90%. As we will see later on, the majority of portfolios analyzed in this report fall within that range.

We do not estimate program participation or savings per customer in this report because of a severe lack of data for both total program participation and, to a much greater degree, the number of potentially eligible customers. As a measure of program performance, reporting customer participation either as a percentage of potential customers or in terms of savings per customer is a valuable indicator that utilities must strive to document in their program assessments. Comparing these numbers over time illustrates the progress of a program and gives administrators another metric with which to determine the tenets of a program that are in need of adjustment.

## **Utility Program Assessments**

In this section of the report we review the program portfolios of utilities in ten states (9 states and the Tennessee Valley Authority) that have varying degrees of experience administering energy efficiency programs. By including utilities from a diverse set of states in the analysis, we intend to convey the level of savings achievable at different stages of energy efficiency program implementation. For each state, we first give a brief discussion of the history of energy efficiency in the state, followed by a description of existing programs for the major investor-owned utilities and an assessment of program performance based on publicly available data acquired through state regulatory commissions.

Again, the metrics we consider are savings as a percent of sales and the levelized cost of saved energy for program portfolios, not for individual programs. Data on program participation was too scant to allow for consistent comparisons across utilities.

### **Arkansas**

#### *Background*

Utility-funded energy efficiency programs in Arkansas started in 2007 following an order from the Arkansas Public Service Commission requiring the state's electric and natural gas utilities to file so-called "Quick Start" energy efficiency programs, pursuant to the provisions of Section 9 of the Commission's Rules for Conservation and Energy Efficiency Programs. Following the Quick Start phase is Arkansas' "Comprehensive" program phase, which is a more aggressive phase that intends to build upon the initial Quick Start programs as well as add to the individual utilities' program portfolios. The comprehensive phase will transpire between January 2010 and June 2011.

#### *Program Portfolios – Years Offered: 3*

Our analysis focused on the three major electric utilities in the state: Entergy Arkansas, Southwestern Electric Power Company (SWEPCo, a subsidiary of American Electric Power, or AEP), and Oklahoma Gas & Electric. Utilities are required to file status reports annually by April 1. Arkansas' investor-owned utilities each offer at least a half-dozen residential and commercial/industrial energy efficiency programs to their customers. Residential programs cover lighting (CFL replacement), audits/reports identifying low-cost improvements and incentives for equipment replacement, HVAC tune-ups, and education. Commercial/industrial programs include lighting, retrofit programs that provide audit services and incentives for equipment replacement, and motor replacement. Entergy offers C&I programs that target both small and large customers. Along with their individual program offerings, Arkansas' investor-owned utilities collectively participate and assist in the administration of two statewide energy efficiency programs: the Arkansas Weatherization Program, a weatherization program for "severely inefficient homes", and Energy Efficiency Arkansas, a statewide education program.

All programs targeting equipment replacement provide some degree of incentives. Data on incentives were available only for SWEPCo, however. In the 2008 program year, incentives constituted 22% and 78% of program costs for its residential and commercial program portfolios, respectively, or around 60%

overall. In the 2009 program year, incentives for SWEPCo's residential portfolio rose to 44% of total portfolio costs, while incentives for its commercial portfolio fell to 71% of total portfolio costs. Overall, incentives in the 2009 program year constituted, again, around 60% of total portfolio costs.

*Assessment of Results*

Arkansas' utilities have made noticeable improvements to the efficacy of their programs during the first several years of their existence, as shown by the increase in program savings as a percent of sales and the decrease in the cost of achieving those savings. Overall program portfolio savings increased for all three utilities over the two program years. Meanwhile, the levelized CSE for each utility's program portfolio has also fallen (see Table 1). Together, these three Arkansas utilities generated savings equivalent to 0.1% and 0.13% of statewide sales in 2008 and 2009, respectively, at a levelized CSE of \$0.012/kWh and \$0.010/kWh.

**Table 1. Results for Utility Energy Efficiency Portfolios in Arkansas**

Arkansas		Residential		Commercial & Industrial		Portfolio	
Utility	Program Year	% Savings (of total sales)	Levelized CSE (\$/kWh)	% Savings (of total sales)	Levelized CSE (\$/kWh)	% Savings (of total sales)	Levelized CSE (\$/kWh)
Entergy Arkansas, Inc. SWEPCo Oklahoma Gas & Electric	2008	0.03%	\$ 0.030	0.15%	\$ 0.009	0.18%	\$ 0.012
		0.03%	\$ 0.018	0.10%	\$ 0.010	0.13%	\$ 0.012
		0.04%	\$ 0.015	0.04%	\$ 0.008	0.09%	\$ 0.012
Entergy Arkansas, Inc. SWEPCo Oklahoma Gas & Electric	2009	0.05%	\$ 0.025	0.20%	\$ 0.006	0.24%	\$ 0.010
		0.03%	\$ 0.020	0.13%	\$ 0.006	0.16%	\$ 0.009
		0.04%	\$ 0.019	0.18%	\$ 0.003	0.22%	\$ 0.006

**Georgia**

*Background*

The Georgia Power Corporation (GPC) is the sole regulated electric utility in Georgia. The Georgia Public Service Commission (GPSC) reviews GPC's energy efficiency programs every three years as part of an Integrated Resource Planning (IRP) process. GPC offered energy efficiency programs until 1994 when the GPSC discontinued them due to high program costs and uncertain results. During the 2004 IRP proceeding, energy efficiency advocates were able to revive efficiency programs in a settlement with GPC and the GPSC staff that created the Demand Side Management (DSM) Working Group. Efficiency programs were reaffirmed and expanded in the 2007 and 2010 IRP proceedings. Under the 2010 settlement, GPC will expand its certified efficiency programs from one program to eight and double its proposed investment in energy efficiency programs over the next 3 years, reaching \$27.8 million in 2013. During the course of the IRP proceedings, GPC opposed the Commission's adoption of an EERS, but the final 2010 IRP settlement includes such a provision according to Georgia Watch, a consumer advocacy group.

*Program Portfolios*

Currently Georgia Power offers energy efficiency programs for home energy audits and a low-income weatherization assistance program that began in 1996, along with education and demand response programs. According to its 2010 integrated resource plan, GPC is requesting certification of eight new energy efficiency programs. For the residential sector, these new programs will focus on new construction, existing home retrofits, incentives for lighting and appliance replacement, refrigerator recycling, and water heater replacement. For the commercial sector, the new programs will include energy audits, and incentives for prescriptive and custom projects. GPC will also be offering an energy audit program specifically for industrial facilities.



### *Assessment of Results*

Assuming that Georgia Power's new programs are approved by the GPSC, its portfolio will establish a solid foundation of efficiency programs that target not only low-hanging fruit such as lighting improvements, but also address the need for comprehensive retrofits of the building stock in its service territory. However, for a utility of its size, its projections for its portfolio investments over the next three years may not allow it capture the level of savings that would be expected of a major utility making a concerted effort to expand energy efficiency in its service territory. In 2009, Georgia Power's retail electricity sales were just above 81,000 gigawatt-hours (GWh), which will continue to grow in the future. In 2011, GPC projects investing \$13.7 million in its portfolio, increasing to \$27.8 in 2013, which is a considerable sum.

To provide some context on GPC's level of investment relative to its annual retail sales, MidAmerican in Iowa had 2009 sales of around 18,000 GWh and spent almost \$25 million on its energy efficiency portfolio, a comparable level of investment to GPC's 2013 projections despite being 75% its size. Utilities in Iowa, of course, have also been investing in energy efficiency for years whereas GPC has only recently become more aggressive in its program offerings. As another example, in Arkansas, a state where utilities are just getting their programs off the ground, Entergy invested \$4.5 million in its energy efficiency portfolio in 2009 – about one-third of GPC's projected 2011 investments – and is roughly a quarter of the size of Georgia Power, with 2009 retail sales of almost 20,000 GWh.

### **Illinois**

#### *Background*

Illinois' investor-owned utilities began offering energy efficiency programs to their customers June 1, 2008 following the introduction of the Illinois Power Agency Act (IPAA) in July 2007, which includes requirements for energy efficiency and demand response programs. The IPAA also established an energy efficiency resource standard, setting incremental annual electric and natural gas savings targets based on the previous year's sales, beginning in June 1 of that year. Investor-owned electric utilities are responsible for roughly 75% of program savings and spending, while the Illinois Department of Commerce and Economic Opportunity (DCEO) is responsible for the remaining 25%, which targets efficiency programs serving government facilities, low-income households, and market transformation-oriented information and training programs.<sup>6</sup>

#### *Program Portfolios – Years Offered: 2*

Our analysis focused on the two major electric utilities in the state: Ameren Illinois, which is the parent company of Central Illinois Light, Central Illinois Public Service Company, and Illinois Power; and Commonwealth Edison (ComEd). Utilities are required to file status reports annually by March 4. Both companies offer around a dozen programs to their customers, most of which target the same markets. For the residential sector, both utilities offer direct install programs for single family homes, appliance recycling, lighting, tuning and replacing HVAC systems, and direct load control (of central air conditioning). For the commercial sector, both have prescriptive and custom retrofit programs, programs targeting new construction and building retrocommissioning.<sup>7</sup>

Both utilities offer incentives for their programs. Detailed data on program costs were available only for ComEd, however. In 2008, or program year 1 (PY1), incentives constituted almost 60% of program costs while contractor costs constituted about 33%. In program year 2 (PY2), however, incentives rose to 95%

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<sup>6</sup> We do not analyze programs operating under the purview of the Illinois Department of Commerce and Economic Opportunity.

<sup>7</sup> Retrocommissioning (often abbreviated as RCx) is a systematic process for optimizing building performance. As buildings age, changes in their use and operation can lead to degraded building performance. RCx typically focuses on energy-using equipment such as mechanical systems, controls, and lighting to ensure the functionality of system components as well as their combined functionality in order to reduce energy consumption and operating costs. While RCx utilizes building diagnostics and operations and maintenance (O&M) tune-ups in order to improve building performance, the process may also be used to identify potential capital improvements for additional performance gains.

of program costs. Data for ComEd’s program costs in PY2 were only broken down between incentives and administration and implementation, so it is uncertain what other costs, such as contractor costs, make up the incentive portion of total program costs, if they did at all.

*Assessment of Results*

Both Ameren and ComEd’s efficiency programs have exhibited considerable progress over the first two years. Total program savings and savings as a percent of sales increased between program years and across sectors (see Table 2). In fact, the vast majority of programs offered by both utilities generated greater savings – often considerable savings increases to boot – in PY2 compared to PY1. Ameren did not report program costs for either PY1 or PY2, so we were unable to estimate the levelized CSE for their portfolio. ComEd’s program portfolios became noticeably more cost-effective, the levelized CSE dropping by almost 50% in PY2 for their entire portfolio.

**Table 2. Results for Utility Energy Efficiency Portfolios in Illinois**

Illinois		Residential		Commercial & Industrial		Portfolio	
Utility	Program Year	% Savings (of total sales)	Levelized CSE (\$/kWh)	% Savings (of total sales)	Levelized CSE (\$/kWh)	% Savings (of total sales)	Levelized CSE (\$/kWh)
Ameren Illinois	Plan Year 1 (2008)	0.19%	\$ -	0.27%	\$ -	0.46%	\$ -
Commonwealth Edison		0.16%	\$ 0.013	0.20%	\$ 0.014	0.36%	\$ 0.014
Ameren Illinois	Plan Year 2 (2009)	0.32%	\$ -	0.40%	\$ -	0.72%	\$ -
Commonwealth Edison		0.60%	\$ 0.005	0.52%	\$ 0.009	1.13%	\$ 0.007

**Indiana**

*Background*

The first utility programs offered in Indiana were approved by the Indiana Utility Regulatory Commission (IURC) in the early 1990’s, shortly after the IURC established administrative rules for integrated resource planning (IRP). By 2006, only two electric utilities had energy efficiency programs in place: Indianapolis Power and Light Company and Duke Energy Indiana. The other demand side management (DSM) programs offered in the state focused primarily on interruptible rates and/or load control. This prompted the IURC to issue an order in December 2009, Cause No. 42693, which requires all jurisdictional utilities to meet specified efficiency targets between 2010 and 2019. The first year for utility efficiency programs required under the order began in April 1, 2010 and ended March 31, 2011.

*Program Portfolios*

Energy efficiency programs and portfolios in Indiana are in a considerable state of flux since the IURC only just began requiring utilities to offer them. One complicating factor is the IURC requirement that certain statewide programs be administered by a third party, others administered by the utilities themselves. The large IOUs are still in the process of having their programs and the selection of a third party administrator approved by the IURC. Duke Energy has already made considerable progress in developing its portfolio, since it has the most experience relative other utilities in the state. Duke’s portfolio for the 2009 program year included residential programs targeting home energy audits, low-income (weatherization and appliance rebates), HVAC equipment replacement, and new construction. For its commercial programs, Duke offered programs targeting lighting improvements, efficient cooling systems, and efficient motors/pumps. Duke further expanded its portfolio for 2010, adding a number of residential programs, such as personalized energy reports and a home retrofit program.

Indiana Michigan Power (I&M) has filed monthly progress reports with the IURC for its portfolio, which consists of residential appliance recycling programs, low- and moderate-income weatherization, a home retrofit program, and appliance rebates. Currently I&M only offers an equipment rebate program for

commercial/industrial customers. Southern Indiana Gas & Electric and Indianapolis Power & Light offer a similar portfolio of programs, which, for the residential sector, include lighting, home energy audits, low-income weatherization, appliance recycling, existing home retrofits and new construction. For their commercial/industrial portfolios, programs include prescriptive and custom retrofits, new construction, and retrocommissioning.

#### *Assessment of Results*

Program portfolio results are beginning to trickle in for Indiana's utilities, though most programs have yet to achieve significant, if any, savings because customer participation is still growing. Still, the portfolios that the utilities have developed are robust and should be able to meet the annual savings targets for the first several years, which begin at 0.3% of the three prior years' average sales. The targets ramp-up to 2% savings by 2019, however, which will require a concerted effort that looks beyond simply maximizing program participation, instead focusing on maximizing savings per customer. Additional programs, including those targeting the industrial sector specifically, will need to complement and build upon existing programs. For example, programs that target the entire building system, whether residential or commercial, must be an integral part of Indiana's portfolios. This includes customer behavior programs that, although contributing minor savings relative to other programs, will likely provide those incremental savings necessary to meeting the aggressive goals set by the IURC.

### **Iowa**

#### *Background*

Legislation introduced in the 1990's and codified in Iowa Code 476.6.16 mandates that electric and natural gas investor-owned utilities offer their customers energy efficiency programs through cost-effective Energy Efficiency Plans approved by the Iowa Utilities Board (IUB). In addition, Senate Bill 2386, passed in May 2008, established an energy efficiency resource standard that requires utilities to file energy efficiency goals annually. So while Iowa's utilities have been running efficiency programs for decades, the establishment of an energy efficiency resource standard was the primary impetus for utilities to begin offering comprehensive programs across all economic sectors.

#### *Program Portfolios – Years Offered: ~ 20 years*

Our analysis of Iowa's energy efficiency programs focused on the two major investor-owned utilities: Interstate Power and Light and MidAmerican Energy. Both utilities offer around a dozen energy efficiency programs to their customers. For the residential sector, both utilities offer programs for rebates on energy efficient equipment, audits, appliance recycling, home retrofits, new construction, low-income weatherization, and multifamily buildings. Commercial/Industrial sector programs include prescriptive and custom rebate programs, new construction, small commercial audits, building retrocommissioning, and performance contracting (third-party financing).

Both utilities offer incentives for programs targeting equipment replacement that are directed towards either the property owner (e.g., retrofits, audits, equipment rebates) or the contractor (e.g., new construction). Over the 2008 program year, incentives costs for MidAmerican and Interstate P&L's constituted 77% and 82% of total portfolio costs, respectively. Over the 2009 program year, incentives rose to 84% and 83% of total portfolio costs for the two utilities, respectively.

#### *Assessment of Results*

Since the establishment of its energy efficiency resource standard in 2008, utility efficiency programs have shown considerable progress in generating energy savings. Over the 2008 and 2009 program years, both utilities have increased the energy savings of their portfolios considerably, both reaching over 1% incremental annual savings over the 2009 program year (see Table 3). The levelized CSE for both utility's commercial program portfolios rose somewhat for the 2009 program year, possibly due to the higher incentives being offered, which in turn likely led to the additional energy savings realized in 2009. The

levelized CSE for the overall program portfolios across the 2008 and 2009 program years, however, essentially remained static.

**Table 3. Results for Utility Energy Efficiency Portfolios in Iowa**

Iowa		Residential		Commercial & Industrial		Portfolio	
Utility	Program Year	% Savings (of total sales)	Levelized CSE (\$/kWh)	% Savings (of total sales)	Levelized CSE (\$/kWh)	% Savings (of total sales)	Levelized CSE (\$/kWh)
Interstate Power & Light	2008	0.23%	\$ 0.028	0.56%	\$ 0.013	0.79%	\$ 0.017
MidAmerican		0.16%	\$ 0.028	0.74%	\$ 0.009	0.90%	\$ 0.013
Interstate Power & Light	2009	0.40%	\$ 0.022	0.77%	\$ 0.016	1.17%	\$ 0.018
MidAmerican		0.24%	\$ 0.019	0.88%	\$ 0.011	1.13%	\$ 0.013

**Michigan**

*Background*

Public Act 295, signed into law in October 2008, requires Michigan’s electric and natural gas utilities – investor-owned, municipals, and cooperatives – to develop and offer energy efficiency programs to their customers through the development of Energy Optimization Plans filed with the Michigan Public Utilities Commission. The Act also established an EERS, setting annual energy savings targets that begin at 0.3% and ramp up to 1.0% per year by 2012 to be met by all utilities through programs offered in the utility optimization plans.

*Program Portfolios – Years Offered: 2*

Our analysis of Michigan’s energy efficiency programs focused on the two major investor-owned utilities: Consumers Energy and Detroit Edison, for which only 2009 portfolio results were available. Utilities are required to file status reports annually by March 31. Both utilities offer about a dozen energy efficiency programs to their customers. For their residential portfolios, both utilities offer programs targeting lighting, equipment replacement, appliance recycling, HVAC equipment replacement, low-income weatherization, multifamily buildings, and education. Consumers Energy added programs for existing home retrofits and new construction for its 2010 program year. For their commercial and industrial portfolios, both utilities offer prescriptive and non-prescriptive rebate programs as well as self-direct programs. Consumers Energy also offers a small business direct install program for customers typically considered “hard to reach” and who have limited resources to participate in standard business programs.

Neither utility disaggregated customer incentives from the reported program expenditures for their portfolios over the 2009 program year. However, both utilities did disaggregate administrative costs from total program costs, from which we can infer the percentage of portfolio expenditures dedicated to providing customer incentives. Consumers Energy reported administrative expenditures of 20% of total portfolio expenditures, which covered administrative, EM&V, and tracking costs. We can assume, then, that customer incentives constituted *at most* 80% of total portfolio expenditures. Detroit Edison reported administrative expenditures equal to about 22% of total portfolio expenditures, which also included EM&V costs, so that *at most* 78% of remaining portfolio expenditures was dedicated to providing customer incentives. For the 2010 program year, Consumers Energy reported administrative expenditures of 13%, so we can assume that customer incentives constituted *at most* 87% of total portfolio expenditures. Detroit Edison reported administrative expenditures of 14% of total portfolio expenditures, which again included EM&V costs, so that *at most* 86% of remaining portfolio expenditures was dedicated to providing customer incentives.

*Assessment of Results*

Program results for Michigan’s two investor owned utilities show that both utilities have improved their percent savings while reducing or maintaining a consistent levelized CSE for their portfolios. Detroit Edison doubled its percent savings for its portfolio between 2009 and 2010 and Consumers Energy did not lag too far behind (see Table 4). Detroit Edison’s 2010 percent savings are relative to 2009 retail sales, however, because 2010 sales have not yet been reported, so it is likely that these results will change somewhat when new data is released. Nonetheless, absent a significant change in its retail sales in 2010, the percent savings are unlikely to change much. We were able to find Consumers Energy’s 2010 sales from a separate filing.

**Table 4. Results for Utility Energy Efficiency Portfolios in Michigan**

Michigan		Residential		Commercial & Industrial		Portfolio	
Utility	Program Year	% Savings (of total sales)*	Levelized CSE (\$/kWh)	% Savings (of total sales)*	Levelized CSE (\$/kWh)	% Savings (of total sales)*	Levelized CSE (\$/kWh)
Consumers Energy	2009	0.14%	\$ 0.018	0.29%	\$ 0.015	0.43%	\$ 0.016
Detroit Edison		0.28%	\$ 0.010	0.18%	\$ 0.011	0.46%	\$ 0.010
Consumers Energy	2010	0.26%	\$ 0.015	0.45%	\$ 0.014	0.70%	\$ 0.014
Detroit Edison		0.49%	\$ 0.011	0.41%	\$ 0.011	0.90%	\$ 0.011

\* 2010 Savings for Detroit Edison are relative to 2009 retail sales as 2010 retail sales have not yet been reported.

*Background*

North Carolina embraced integrated resource planning (IRP) and demand side management in the 1980s. Its investor-owned utilities offered some limited programs, complemented by additional programs provided through the North Carolina Alternative Energy Corporation (AEC), now known as Advanced Energy. With the prospect of market deregulation in the late 1990s, most of these programs were abandoned, leaving AEC the primary deliverer of energy efficiency programs. In 2007, the legislature passed a Renewable Energy Portfolio Standard (REPS) that included a requirement that the two largest IOUs, Duke Energy and Progress Energy, meet a portion of their savings obligations with energy efficiency programs starting in 2012. Plans were filed for residential and commercial programs in 2009 with implementation beginning in 2010.<sup>8</sup> The electric cooperatives began offering programs in 2008 through a statewide services company owned by the state’s cooperatives, GreenCo Solutions, Inc., which was established to help them define and meet their energy efficiency and renewable energy goals.

*Program Portfolios – Years Offered: 1*

Duke Energy and Progress Energy are the two major investor-owned utilities in the state, accounting for almost 75% of electricity sales. In their 2010 IRPs, both utilities reported on their existing energy efficiency programs, though only Duke has filed a status report on its program portfolio. Duke offers a half-dozen programs to its residential and commercial/industrial customers, which include residential and commercial/industrial energy assessments, Smart Saver for residential and commercial/industrial customers, low-income services, and energy efficiency education programs for schools. Progress Energy offers a half-dozen programs to its residential and commercial/industrial customers, which include an existing home improvement program, residential new construction, residential lighting, low-income, residential appliance recycling, and a retrofit and new construction efficiency program for commercial/industrial/government projects and facilities.

<sup>8</sup> Duke Energy plans on banking its program savings so that it may count towards its goal of generating or procuring renewable or energy efficiency resources equal to 3% of their 2011 retail sales. It is unclear from Progress’ 2010 IRP the degree to which they will rely on energy efficiency to meet the REPS requirement.

*Assessment of Results*

Only Duke Energy's has released its status report for its first year running programs as required by the REPS (see Table 5). The results are laudable, which is understandable given that Duke has been operating energy efficiency programs in North Carolina (and other states) for many years. The vast majority of portfolio savings come from its residential Smart \$aver program, which experienced much higher participation than anticipated, specifically with regards to the lighting measures offered in the program. The levelized CSE for its program portfolio is one of the lowest for any of the portfolios reviewed in this document, while the percent savings achieved is also one of the highest. The 2010 savings percentages are relative to 2009 sales, however, because 2010 retail sales have not yet been reported. Nonetheless, absent a significant change in sales in 2010, the percent savings are unlikely to change noticeably.

**Table 5. Results for Utility Energy Efficiency Portfolios in North Carolina**

North Carolina		Residential		Commercial & Industrial		Portfolio	
Utility	Program Year	% Savings (of total sales)*	Levelized CSE (\$/kWh)	% Savings (of total sales)*	Levelized CSE (\$/kWh)	% Savings (of total sales)*	Levelized CSE (\$/kWh)
Duke Energy**	2010	0.91%	\$ 0.006	0.14%	\$ 0.009	1.06%	\$ 0.007

\* Savings are relative to 2009 retail sales as 2010 retail sales have not yet been reported.

\*\* Program results are for programs operating in both North and South Carolina. Duke did not apportion program savings by state.

**Ohio**

*Background*

In May 2008 Senate Bill 221 was signed, requiring electric investor-owned utilities to implement energy efficiency programs in order to meet the annual savings targets mandated by the state's Energy Efficiency Portfolio Standard (EEPS) beginning January 1, 2009. The annual savings targets begin at 0.3% and ramp up to 1% by 2014, and are a function of the three prior years' average sales. Prior to SB 221, Ohio's investor-owned utilities offered a very limited number of programs – mostly low-income weatherization – as a result of electric market deregulation established by Senate Bill 3 during the 1999-2000 legislative session. SB 3 became effective January 1, 2001, providing a five-year market development period during which utilities' rates were frozen to allow a competitive resale market to develop. When competition failed to materialize, the Public Utilities Commission of Ohio (PUCO) worked with electric utilities to develop rate stabilization plans (RSP) so that customers wouldn't be adversely impacted when the transition to market-based rates transpired in 2006. The RSPs and other rate modifications kept rates stable and predictable until SB 221 effectively ended deregulation in the state by incorporating a system under which rates would be set by the PUCO beginning January 1, 2009, contemporaneous with the first year of energy efficiency program offering as required by the EEPS.

*Program Portfolios – Years Offered: 2*

Our analysis of Ohio's energy efficiency programs focused on seven major investor-owned utilities: Columbus Southern Power and Ohio Power, which are subsidiaries of American Electric Power (AEP); Duke Energy Ohio; Dayton Power & Light (DP&L); and Cleveland Electric Illuminating Company, Toledo Edison and Ohio Edison, which are subsidiaries of FirstEnergy.<sup>9</sup> The program years for which detailed results are reported varies by utility. All utilities are required to file status reports annually by March 15. All seven utilities have filed program status reports for 2009, the first year in which the programs were offered as required by the state's Energy Efficiency Portfolio Standard. Duke and the three subsidiary

<sup>9</sup> Portfolio results for Toledo Edison, another subsidiary of FirstEnergy, were several orders of magnitude below those of any other utility analyzed in this report, so we elected not to include them in the assessment.

utilities of FirstEnergy have not yet filed program status reports for the 2010 program year, however, and only Duke appears to have reported program results for efficiency programs offered prior to 2009.

The number of energy efficiency programs offered varied considerably across utilities, ranging anywhere from a half-dozen to a dozen programs. For their residential portfolios, Ohio's IOUs offer programs targeting lighting (CFLs), appliance recycling and rebates, HVAC equipment replacement and rebates, low-income weatherization, home energy audits and retrofits, new construction, and customer behavior. Commercial and industrial energy efficiency programs are relatively limited, consisting of prescriptive and custom rebate programs, lighting, self-direct, and express install programs.

2009 program costs were reported by all utilities except Duke Energy, while a detailed breakdown of those costs (administrative, third party administration, incentives) was reported only by DP&L and the AEP subsidiaries. For 2009 and 2010, incentives for DP&L's portfolio constituted 61% and 75% of total portfolio expenditures. For Columbus Southern and Ohio Power, incentives dropped from 71% in 2009 to 63% and 60%, respectively, in 2010.

*Assessment of Results*

Over the first two years of program offerings as required by SB 221, utility program portfolios have generally improved (see Table 6). Although the two AEP utilities (Columbus and Ohio Power) and Dayton Power & Light have seen their levelized CSE increase somewhat in 2010 relative to 2009, their percent savings have increased considerably. In fact, Dayton Power & Light's percent savings achieved in 2010 for its overall program portfolio are the highest of any utility reviewed in this report. The level of percent savings achieved in Duke Energy's 2009 overall portfolio also increased relative to its 2008 portfolio. Overall, Ohio's best-performing utilities are generating savings from their energy efficiency programs at some of the lowest levelized CSE compared to other utilities in this report.

Unfortunately, Duke did not report program costs for either 2008 or 2009, and its 2010 status report did not include results for the 2010 program year. Additionally, while we did consider the three FirstEnergy utilities in this assessment, their 2009 results were so disparate compared to results from utilities in Ohio and other states that this assessment would not have benefited from their inclusion. The three FirstEnergy utilities have also not released their results for the 2010 program year. 2010 savings percentages for all utilities are relative to 2009 retail sales as 2010 retail sales have not yet been reported.

**Table 6. Results for Utility Energy Efficiency Portfolios in Ohio**

Ohio Utility	Program Year	Residential		Commercial & Industrial		Portfolio	
		% Savings (of total sales)*	Levelized CSE (\$/kWh)	% Savings (of total sales)*	Levelized CSE (\$/kWh)	% Savings (of total sales)*	Levelized CSE (\$/kWh)
Duke Energy Ohio	2008	0.18%	\$ -	0.07%	\$ -	0.26%	\$ -
Dayton Power & Light	2009	0.75%	\$ 0.005	0.20%	\$ 0.010	0.96%	\$ 0.006
Duke Energy Ohio		0.16%	\$ -	0.35%	\$ -	0.51%	\$ -
Cleveland Electric Illuminating		0.008%	\$ 0.268	0.05%	\$ 0.000	0.05%	\$ 0.042
Ohio Edison		0.006%	\$ 0.288	0.07%	\$ 0.000	0.08%	\$ 0.021
Columbus Southern Power		0.24%	\$ 0.006	0.34%	\$ 0.007	0.58%	\$ 0.006
Ohio Power		0.16%	\$ 0.007	0.37%	\$ 0.004	0.53%	\$ 0.005
Dayton Power & Light	2010	1.05%	\$ 0.006	0.44%	\$ 0.007	1.48%	\$ 0.007
Duke Energy Ohio		0.00%	\$ -	0.00%	\$ -	0.00%	\$ -
Columbus Southern Power		0.30%	\$ 0.010	0.64%	\$ 0.008	0.94%	\$ 0.008
Ohio Power		0.22%	\$ 0.010	0.39%	\$ 0.009	0.61%	\$ 0.009

\* 2010 Savings are relative to 2009 retail sales as 2010 retail sales have not yet been reported.

## **Pennsylvania**

### *Background*

Act 129, signed October 15, 2008, charged the Pennsylvania Public Utility Commission (PAPUC) with establishing an energy efficiency and conservation program. The result was the PAPUC mandating energy savings and demand reductions goals for the largest electric distribution companies in Pennsylvania. Annual savings targets are set at 1% of 2009-2010 sales in 2011 and a total 3% of 2009-2010 sales by 2013. Pursuant to these goals, electric utilities are required to submit Energy Efficiency and Conservation plans to the PAPUC.

### *Program Portfolios – Years Offered: 2*

Our analysis of Pennsylvania's energy efficiency programs focused on five major investor-owned utilities: Metropolitan Edison, Pennsylvania Electric and Pennsylvania Power (subsidiaries of FirstEnergy); PECO; and West Penn Power Company. Energy efficiency program status reports are filed with the PAPUC every September 15, so results were available only for first program year following the establishment of energy savings goals, which ran from June 2009 to May 2010. Duquesne Light was not included because its 2010 filing was its revised energy efficiency and conservation plan as opposed to a status report, which only included savings goals and not actual program results.

All of Pennsylvania's investor-owned utilities offer around 15 energy efficiency programs that cover the residential, small commercial/industrial, large commercial/industrial, and government/non-profit sectors. However, only about half of these programs for each utility have operated long enough to generate results, while the remainder are still under development, scheduled for full launch in program year two. For their residential portfolios, Pennsylvania's utilities offer programs targeting lighting, appliance recycling, rebates for energy-efficient equipment, HVAC equipment replacement and rebates, home audits and whole home retrofits, new construction, and low-income rebates for energy efficient equipment and weatherization. For their commercial/industrial portfolios, utilities offer programs targeting lighting, HVAC replacement, audits and assessments, rebates for efficient equipment, performance contracting, street lighting, and similar programs for government facilities and schools. An important feature of Pennsylvania's commercial programs is that they differentiate between the small and large commercial/industrial as well as government/non-profit markets, ensuring that programs have been developed that cater to the needs of that particular market segment.

2009 program costs were reported by all five of the utilities mentioned above, and all five provided a breakdown of those costs between administrative, evaluation, and incentives. For program year one, incentives for all utilities except West Penn Power constituted around 20% of total portfolio costs. West Penn Power provided incentives that constituted only 3% of total program costs, whereas its administrative costs account for 94% of portfolio costs. The relatively low incentive levels for utility efficiency program portfolios in Pennsylvania is likely due to the fact that many programs were still under development while the first program year was underway and, therefore, were still striving to increase customer participation. Another indicator of the infancy of these programs is the fact that administrative costs constituted more than 70% of total portfolio costs for all five utilities in the first program year – in the other states we have analyzed for this exercise, administrative costs rarely exceed 25% of total portfolio costs.

### *Assessment of Results*

Since program results are only available for the first program year, we are unable to report how these programs have progressed since the PAPUC savings targets became effective. Clearly efficiency programs are still in their nascent stages, as evident by the low percent savings achievements and the relatively high levelized CSE (see Table 7). As mentioned above, the vast majority of portfolio costs during the first program year were administrative while program incentives were relatively low, additional evidence that Pennsylvania's programs over the first program year were just getting off the ground. Program costs for mature efficiency programs, on the other hand, are generally characterized by the



reverse: high incentive levels and low administrative costs. Nonetheless, the breadth of utility efficiency programs in Pennsylvania is indicative of portfolios that, once they truly begin ramping-up, have the potential to generate considerable energy savings.

**Table 7. Results for Utility Energy Efficiency Portfolios in Pennsylvania**

Pennsylvania		Residential		Commercial & Industrial		Portfolio	
Utility	Program Year	% Savings (of total sales)	Levelized CSE (\$/kWh)	% Savings (of total sales)	Levelized CSE (\$/kWh)	% Savings (of total sales)	Levelized CSE (\$/kWh)
Metropolitan Edison	Program Year 1	0.10%	\$ 0.020	0.02%	\$ 0.039	0.12%	\$ 0.024
Pennsylvania Electric		0.10%	\$ 0.020	0.03%	\$ 0.034	0.12%	\$ 0.023
Pennsylvania Power		0.32%	\$ 0.011	0.01%	\$ 0.131	0.33%	\$ 0.015
PECO		0.03%	\$ 0.020	0.01%	\$ 0.034	0.04%	\$ 0.023
West Penn Power		0.01%	\$ 0.089	0.02%	\$ 0.078	0.03%	\$ 0.083

**Tennessee Valley Authority (TVA)**

*Background*

TVA had a substantial array of energy-efficiency programs around the late 1970s and early 1980s, including a major residential, energy efficiency loan program, as well as a variety of commercial programs. These programs were dismantled by the mid-1980s when TVA decided to focus instead on the construction of new power plants. The situation began to change in the early 2000s when TVA decided to again begin offering energy efficiency programs, adopting a strategic plan in May 2007 that recognized the importance of energy efficiency and demand response in meeting resource needs. Ultimately these policy developments culminated in August 2010 when TVA renewed its vision to become a regional leader in energy efficiency. To help meet this vision, TVA set a goal of achieving energy consumption savings of 3.5% by 2015, whereas previous efforts had focused more on demand response and load management. In 2011 TVA published an energy efficiency plan that will expand upon its program offerings.

*Program Portfolios – Years Offered: ~ 30 years*

TVA does not serve the majority of its end users directly, so it must work closely with the power distributor community to ensure proper program implementation. Since TVA has only just signaled its intent to begin to invest more heavily in energy efficiency, it has not yet completed the development of its energy efficiency program portfolios. However, TVA released an integrated resource plan in March 2011 that laid tentative plans for its energy efficiency and demand response programs. Currently TVA offers eight energy efficiency programs through participating power distributors under the TVA EnergyRight® Solutions brand, including programs for new construction, heat pumps, water heaters, manufactured homes, and home energy evaluations. In May 2009, TVA added three programs for residential, business, and large industrial customers; In-Home Energy Evaluation, EnergyRight® Solutions for Business and the Major Industrial Program. TVA also offers programs targeting end-use generation, demand response, and education and outreach.

*Assessment of Results*

There are no publicly available documents reporting detailed information on TVA's success with its energy efficiency program portfolios. However, in its 2011 IRP, TVA reports that it achieved 211 GWh of energy savings through existing energy efficiency and demand response programs for fiscal year 2010 and has increased its goals for fiscal year 2011 (FY11) to 550 GWh of energy savings with a budget of \$135 million. If the FY11 goals were met, the savings goal would be achieved at a levelized CSE of about \$0.029 per kWh, within range of results from other utility program portfolios reviewed in this report.

## Discussion

The utility program portfolios we have reviewed in this report represent utilities with varying degrees of experience running energy efficiency programs. The states were selected for their similarity to the energy markets in Kentucky, not necessarily because they represent the most successful or cost effective programs being implemented in the country. For the most part, the primary impetus for utility investment in energy efficiency was a mandate from the public utilities regulatory body or the state legislature, requiring utilities to meet annual savings targets. The presence of a mandate has not always been the case, however, as many utilities offered programs to their customers of their own volition (e.g. Iowa utilities) prior to regulatory or legislative mandate because they regarded energy efficiency as the least cost resource available to meet rising customer demand. Yet it was infrequent that utilities were able to recuperate the costs associated with administering energy efficiency programs through regulatory mechanisms typically available for supply-side investments, thus perpetuating the “throughput” incentive that favored investments in additional capacity. Furthermore, as we discussed earlier, energy market restructuring (deregulation) all but killed the vast majority of utility-funded energy efficiency programs, which have only in the past several years begun to reappear now that most states’ energy markets are again regulated and, subsequently, that energy efficiency programs are more often given similar earnings opportunities as are supply-side investments. These earnings opportunities include the ability to recuperate program costs through rates, mechanisms allowing the recovery of the lost contribution to fixed costs, and incentives for reaching and exceeding annual savings targets.

From the data and program information that we have collected and analyzed in this report, there are several trends that are clearly correlated with the success of utility program portfolios:

- **Experience:** Utilities that have been engaged with energy efficiency for longer periods of time tend to generate greater savings through their programs. Fortunately, as more utilities become involved, the more information we have on “best practices” through which program development can be informed. Of course other factors play an important role in the overall success of portfolios, such as funding and marketing. But ultimately the utilities that best balance these factors will reap the greatest benefit from their programs. Simply investing large sums of money into a program or running massive advertising campaigns will not guarantee success. How that money is spent – the division of funds between program administration, customer incentives, marketing, contractor training, etc. – is more important than the volume of funds invested. And utilities with greater experience tend to know how best to diversify their program investments. Still, the volume of funds invested is crucial, especially since providing customer incentives is a key driver of demand for energy efficiency services (see below).
- **Scope of Portfolios:** The greater the diversity of a program portfolio, the more likely the portfolio will satisfy the demand for services of a heterogeneous market. In other words, programs must reach all customer segments of a market (low- and moderate-income households, small and large commercial buildings, small and large industrial facilities) and target all major end-uses (lighting, HVAC, water heating) in order to maximize savings. In this report, the majority of successful utility portfolios that we have assessed include the following programs:
  - **Residential**
    - Lighting (CFLs)
    - Home Energy Assessments (audits) with enhancements (rebates, list of qualified contractors)
    - Appliance Rebates (ENERGY STAR)
    - Appliance Recycling with ENERGY STAR replacements
    - New Home Construction (ENERGY STAR)
    - Low-Income Weatherization and Incentives
  - **Commercial/Industrial**
    - Lighting
    - New Construction

- Incentives for high efficiency HVAC
  - Prescriptive Incentives
  - Custom Incentives (customer works with utilities/contractors to develop custom solutions)
  - Appliance/Equipment Rebates (ENERGY STAR)
- **Marketing:** We did not cover utility program marketing in this report because marketing campaigns are rarely discussed in portfolio status reports. However, understanding the attributes that characterize successful marketing campaigns is important for achieving greater customer participation. Of course, determining the impact of marketing on customer participation is difficult because the correlation between savings from efficiency programs and investment in marketing is not necessarily quantifiable. Nonetheless, here are some key marketing attributes that are widely recognized to augment program marketing campaigns<sup>10</sup>:
    - **Understanding Your Market** – Collecting information on market segmentation and demographics is critical for determining how to target programs that will meet the specific needs of customers in a utility service territory. Saturation of efficient products, age of housing/building stock, and customer demographics are examples of market characteristics that are key to understanding these needs.
    - **Use Captivating Information** – Marketing materials must capture a customer's attention. Making the information vivid, concrete and personal ensures that a customer focuses their attention on the material initially and recalls the information later on in time.
    - **Message Framing** – Convincing customers to invest in energy efficiency can be a message delivered either positively (installing energy efficient light bulbs will save you money) or negatively (if you don't install energy efficient light bulbs you will end up spending more money). More often than not, presenting a message that emphasizes losses rather than gains will evoke customers to take action.
    - **Emphasize Personal Contact** – The most successful programs are those that develop a regular, personal relationship with the target audience, including post-installation follow-up contacts to verify that measures are working properly and to promote additional measure installation.
  - **Incentives:** Providing financial incentives helps catch customer attention and can greatly reduce the up-front cost of measure implementation, depending on the measures being installed. Incentives are clearly a key driver of participation in energy efficiency programs because they lower the up-front costs that must be paid by a customer. Data on the effect of incentive levels on customer participation are limited, so while there is most definitely a correlation between incentive levels and participation, it is hard to determine an exact relationship, if one does exist, especially in light of other relevant factors, such as effectiveness of program marketing and the strength of the local economy. Of the portfolios reviewed in this report, we found that incentive levels in the first program year ranged between 60%-84% and, in the second program year, ranged between 60% and 95%.<sup>11</sup>

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<sup>10</sup> For more information on attributes of successful marketing campaigns, see Dr. Doug McKenzie-Mohr's *Fostering Sustainable Behavior*, *Community-Based* *Social* *Marketing*.  
[http://www.uwsp.edu/cnr/uwexplakes/ecology/shorelands/com\\_based\\_social\\_market/pdf\\_docs/fostering\\_sustainable\\_behavior\\_dmm.pdf](http://www.uwsp.edu/cnr/uwexplakes/ecology/shorelands/com_based_social_market/pdf_docs/fostering_sustainable_behavior_dmm.pdf)

<sup>11</sup> For Pennsylvania's first program year, incentive levels for all utilities but one hovered around 20% of total portfolio costs.

*Assessing Overall Portfolio Results*

In Table 8 we report the range of portfolio results for program years one and two, ignoring the major outliers.<sup>12</sup> The table represents portfolio results assuming a median average measure life of 13 years. Between the two program years, utilities were able to increase their percent savings while also lowering their levelized CSE. Table 8 provides some context for evaluating the portfolio results in Figures 2, 3 and 4, allowing readers to determine the overall success of a utility's portfolio by where it falls within the range of values provided. Table 9 provides the range of levelized CSE across program years for the selected portfolios, assuming 10-, 13-, and 15-year average measure lives. Note that the variation in the ranges of the levelized CSE is small whether assuming a 10-, 13-, or 15-year average measure life for a portfolio; small enough that utilizing one average measure life over the other will not significantly impact a portfolio's relative cost-effectiveness. Levelized CSEs are consistently below three cents/kWh, with a maximum program cost of only 2.9 cents/kWh when assuming a conservative 10-year efficiency measure lifespan (see Table 9). These results are well within the range of levelized CSEs for efficiency programs identified in Figure 1, falling far below the cost of new supply-side resources.

**Table 8. Range of Portfolio Results for Program Years One and Two, 13-year Measure Life**

Portfolio Results				
Program Year	% Savings (of total sales)	Levelized CSE (\$/kWh)	Average Cost of Saved Energy	Median Cost of Saved Energy
Year One	0.04% - 1.06%	\$0.005 - \$0.024	\$0.015	\$0.013
Year Two	0.16% - 1.48%	\$0.006 - \$0.018	\$0.010	\$0.009

As shown in Figures 2, 3 and 4 below, the utility portfolios for which program results are available for their first and second program year have exhibited improvement as they have matured. In no instances where the levelized CSE increased across the program years did the percent savings fall. In fact, in the instances where the levelized CSE did increase – Interstate Power & Light, Detroit Edison, Dayton Power & Light, Columbus Southern Power and Ohio Power – percent savings also increased. There were also no instances where both the levelized CSE and the percent savings fell across program years.

In making comparisons, readers should remember that the metrics are given in different units of measurement, thus the relative height of the columns for an individual utility do not necessarily imply the strengths or shortcomings of a portfolio. Rather, comparisons should be made by utilizing one metric across utility portfolios. For example, in Figures 2, 3 and 4, clearly Dayton Power & Light in Ohio has achieved great success with its portfolio, achieving the highest percent savings with a relatively low levelized CSE across the first two program years. But there are examples where utilities are investing more per kilowatt-hour in their portfolios and achieving greater savings percentages as a result, implying that a portfolio's relatively high levelized CSE is not indicative of poor performance. For instance, Interstate Power & Light of Iowa is achieving some of the highest savings but also requiring a greater investment per kilowatt-hour saved than most utility portfolios.

So while it is true that the ultimate goal of a program portfolio is to maximize savings while minimizing costs, we must remember that utilities that are achieving this goal most often have portfolios that are much more mature than others. During the initial years of these programs, we often see a substantial disparity across utilities with respect to these two metrics. This arises from a number of factors, some under the control of the utility (marketing, incentives) and some that are not (strength of local economy, seasonal and environmental variables). What is most important is that, *over time*, program portfolios achieve greater savings while reducing costs. To that end, if there is one lesson that is paramount in

<sup>12</sup> These outliers include Toledo Edison and Cleveland Electric Illuminating in Ohio and Duquesne Light and West Penn Power in Pennsylvania. West Penn Power, Cleveland Electric Illuminating and Toledo Edison achieved 0.05% savings or less at a cost of saved energy many order of magnitudes higher (2x and ~13x) than that of the next closest utility. Duquesne Light's overall portfolio results for its first program year were projections that exceeded those of the best performing utilities in this report. Utility projections of program results are rarely achieved – projected budgets are often over- and under-spent, while predicting how the market will react to new programs is practically impossible – so readers should always question their reliability.

evaluating utility program portfolios, it is that rigorous, transparent reporting of portfolio activity that is consistent across utilities is absolutely invaluable. Assessing program performance from a snapshot of portfolio activity will never be as instructive as comparing results over time.

Figure 2. Percent Savings Results for Selected Portfolios (%)

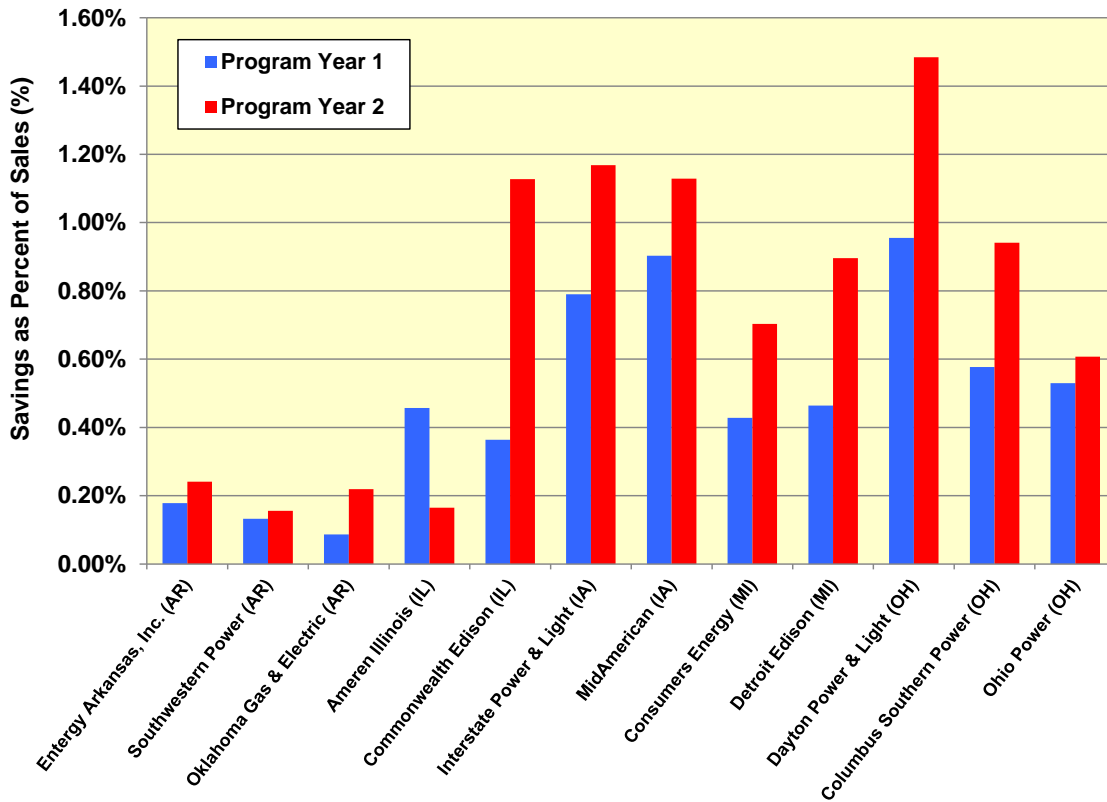


Figure 3. Levelized CSE Results for Selected Portfolios, Year One (\$/kWh)

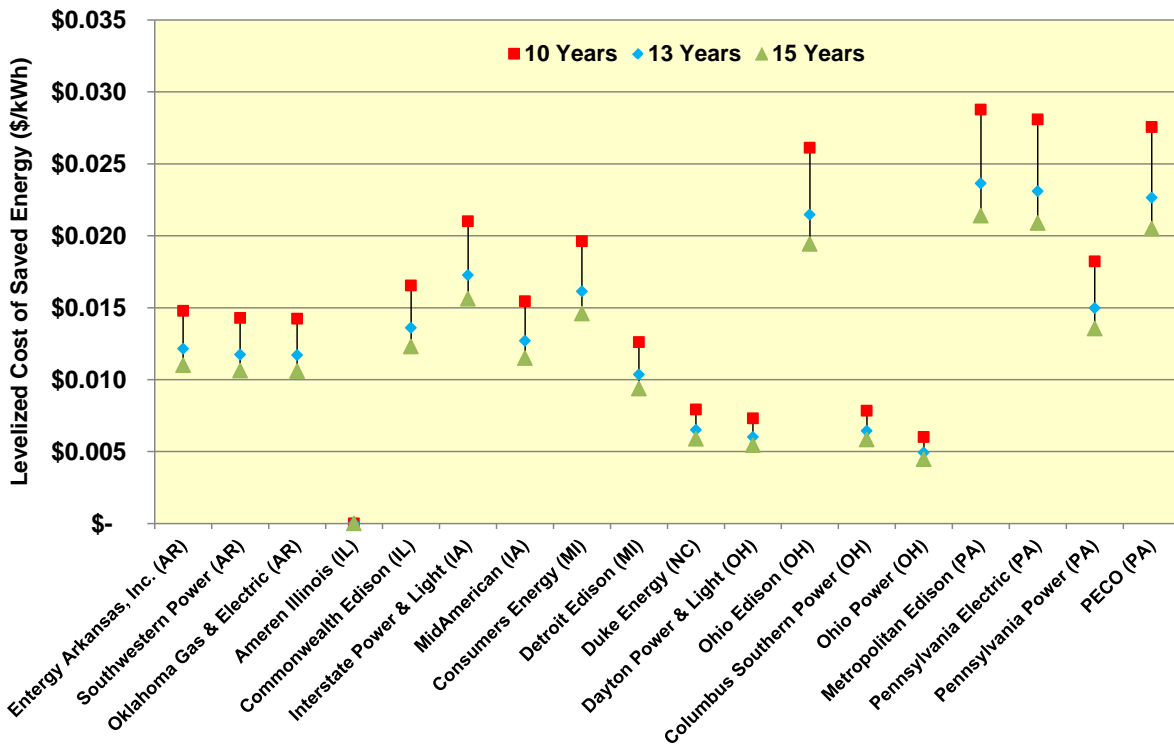


Figure 4. Levelized CSE for Selected Portfolios, Year Two (\$/kWh)

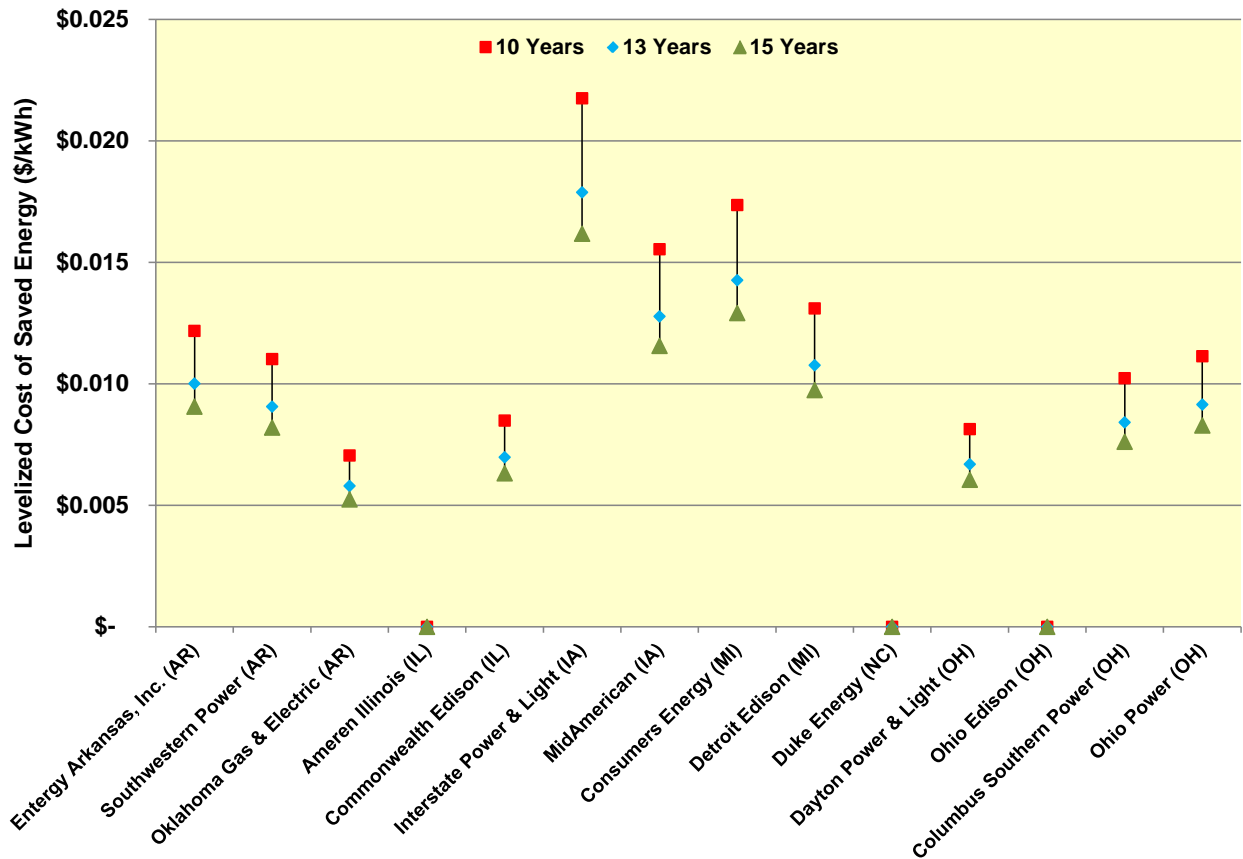


Table 9. Range of Levelized CSE (\$/kWh), Program Years One & Two

	Year 1	Year 2
<b>10 Years</b>	\$0.006 - \$0.029	\$0.007 - \$0.022
<b>13 Years</b>	\$0.005 - \$0.024	\$0.006 - \$0.018
<b>15 Years</b>	\$0.004 - \$0.021	\$0.005 - \$0.016

## Conclusions

Several valuable lessons can be learned from this heuristic exercise. First, there are a number of factors that impact the success of efficiency program portfolios, some that utilities can directly control, others that they cannot. It is important, then, that utilities understand how to manipulate the factors that they can control and that the prudent development of program portfolios – scope and targeting of programs, incentive levels, marketing campaigns – will ultimately dictate how portfolios perform in spite of those exogenous factors that are uncontrollable.

Second, program performance is something that is augmented over time, so to expect immediate, positive results is unreasonable. As we have seen, utilities with programs that perform well tend to have more experience in their administration. Still, from our analysis we have shown that utilities with the least experience running energy efficiency programs are still generating savings at a levelized cost of saved energy below three cents per kilowatt-hour, even when assuming a conservative ten-year average measure life for the portfolio. This will not always be the case, so it is important to understand that programs that initially perform below expectations should not necessarily be consigned to the waste bin. Assessing the true performance of installed measures generally requires at least a year so that seasonal variations, customer behavior, and the quality of the installation can be gleaned from a customer's utility bills. Thus, the need for reliable data over time attests to the importance of rigorous tracking and reporting of program performance. If programs are to be given a fair chance at succeeding, utilities must be certain that sufficient information is being collected in order to make informed programmatic decisions.

Fortunately there is a breadth of program results and information available for utilities in other states that can be referenced to help Kentucky's utilities design effective programs and portfolios. Energy efficiency program administration is certainly not new – utilities have been offering programs for decades. But we must dispel the notion that simply offering customers financial incentives or issuing kits with free compact fluorescent light bulbs will transform energy markets. Energy efficiency programs are dynamic and require thorough development and incessant tracking to guarantee their success. Every facet of a program must be carefully designed and executed, which requires time and money. By acknowledging the massive effort that must be undertaken in administering energy efficiency programs, only then can we guarantee their success.



## Appendix A – Full Results of Program Analysis

In this appendix we present the full results of our energy efficiency program analysis, by state and utility. The results are estimated using a range of average measure lifespans between 10-15 years, which is the range of measure lifespans identified in the 2009 ACEEE study, *Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved through Utility-Sector Energy Efficiency Programs*. This study assumes an average measure lifespan of 10-15 years for electricity programs, with a median of 13 years, which was reported by utilities for their energy efficiency program portfolios in a given program year. The range of estimates of the levelized cost of saved energy that was reported in Table 9 is drawn from these results.

### Arkansas

Arkansas		Residential				Commercial & Industrial				Portfolio			
Utility	Program Year	% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)			% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)			% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)		
			10 yrs	13 yrs	15 yrs		10 yrs	13 yrs	15 yrs		10 yrs	13 yrs	15 yrs
Entergy Arkansas, Inc. Southwestern Power Oklahoma Gas & Electric	2008	0.03%	\$0.036	\$0.030	\$0.027	0.15%	\$0.011	\$0.009	\$0.008	0.18%	\$0.015	\$0.012	\$0.011
		0.03%	\$0.022	\$0.018	\$0.017	0.10%	\$0.012	\$0.010	\$0.009	0.13%	\$0.014	\$0.012	\$0.011
		0.04%	\$0.018	\$0.015	\$0.014	0.04%	\$0.010	\$0.008	\$0.008	0.09%	\$0.014	\$0.012	\$0.011
Entergy Arkansas, Inc. Southwestern Power Oklahoma Gas & Electric	2009	0.05%	\$0.031	\$0.025	\$0.023	0.20%	\$0.008	\$0.006	\$0.006	0.24%	\$0.012	\$0.010	\$0.009
		0.03%	\$0.024	\$0.020	\$0.018	0.13%	\$0.008	\$0.006	\$0.006	0.16%	\$0.011	\$0.009	\$0.008
		0.04%	\$0.023	\$0.019	\$0.017	0.18%	\$0.004	\$0.003	\$0.003	0.22%	\$0.007	\$0.006	\$0.005

**Illinois**

Illinois		Residential				Commercial & Industrial				Portfolio			
Utility	Program Year	% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)			% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)			% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)		
			10 yrs	13 yrs	15 yrs		10 yrs	13 yrs	15 yrs		10 yrs	13 yrs	15 yrs
Ameren Illinois Commonwealth Edison	Plan Year 1	0.19%	\$ -	\$ -	\$ -	0.27%	\$ -	\$ -	\$ -	0.46%	\$ -	\$ -	\$ -
		0.16%	\$0.015	\$0.013	\$0.011	0.20%	\$0.017	\$0.014	\$0.013	0.36%	\$0.017	\$0.014	\$0.012
Ameren Illinois Commonwealth Edison	Plan Year 2	0.32%	\$ -	\$ -	\$ -	0.20%	\$ -	\$ -	\$ -	0.16%	\$ -	\$ -	\$ -
		0.60%	\$0.007	\$0.005	\$0.005	0.52%	\$0.011	\$0.009	\$0.008	1.13%	\$0.008	\$0.007	\$0.006

**Iowa**

Iowa		Residential				Commercial & Industrial				Portfolio			
Utility	Program Year	% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)			% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)			% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)		
			10 yrs	13 yrs	15 yrs		10 yrs	13 yrs	15 yrs		10 yrs	13 yrs	15 yrs
Interstate Power & Light MidAmerican	2008	0.23%	\$0.034	\$0.028	\$0.025	0.56%	\$0.016	\$0.013	\$0.012	0.79%	\$0.021	\$0.017	\$0.016
		0.16%	\$0.034	\$0.028	\$0.026	0.74%	\$0.011	\$0.009	\$0.008	0.90%	\$0.015	\$0.013	\$0.011
Interstate Power & Light MidAmerican	2009	0.40%	\$0.027	\$0.022	\$0.020	0.77%	\$0.019	\$0.016	\$0.014	1.17%	\$0.022	\$0.018	\$0.016
		0.24%	\$0.023	\$0.019	\$0.017	0.88%	\$0.013	\$0.011	\$0.010	1.13%	\$0.016	\$0.013	\$0.012

**Michigan**

Michigan		Residential				Commercial & Industrial				Portfolio			
Utility	Program Year	% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)			% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)			% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)		
			10 yrs	13 yrs	15 yrs		10 yrs	13 yrs	15 yrs		10 yrs	13 yrs	15 yrs
Consumers Energy	2009	0.14%	\$0.022	\$0.018	\$0.017	0.29%	\$0.018	\$0.015	\$0.014	0.43%	\$0.020	\$0.016	\$0.015
Detroit Edison		0.28%	\$0.012	\$0.010	\$0.009	0.18%	\$0.014	\$0.011	\$0.010	0.46%	\$0.013	\$0.010	\$0.009
Consumers Energy	2010	0.26%	\$0.018	\$0.015	\$0.013	0.45%	\$0.017	\$0.014	\$0.013	0.70%	\$0.017	\$0.014	\$0.013
Detroit Edison		0.49%	\$0.013	\$0.011	\$0.010	0.41%	\$0.013	\$0.011	\$0.010	0.90%	\$0.013	\$0.011	\$0.010

**North Carolina**

North Carolina		Residential				Commercial & Industrial				Portfolio			
Utility	Program Year	% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)			% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)			% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)		
			10 yrs	13 yrs	15 yrs		10 yrs	13 yrs	15 yrs		10 yrs	13 yrs	15 yrs
Duke Energy	2010	0.91%	\$0.007	\$0.006	\$0.006	0.14%	\$0.011	\$0.009	\$0.008	1.06%	\$0.008	\$0.007	\$0.006

**Ohio**

Ohio  Utility	Program Year	Residential				Commercial & Industrial				Portfolio			
		% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)			% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)			% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)		
			10 yrs	13 yrs	15 yrs		10 yrs	13 yrs	15 yrs		10 yrs	13 yrs	15 yrs
Duke Energy Ohio	2008	0.18%	\$ -	\$ -	\$ -	0.07%	\$ -	\$ -	\$ -	0.26%	\$ -	\$ -	\$ -
Dayton Power & Light	2009	0.75%	\$0.006	\$0.005	\$0.004	0.20%	\$0.013	\$0.010	\$0.009	0.96%	\$0.007	\$0.006	\$0.005
Duke Energy Ohio		0.16%	\$ -	\$ -	\$ -	0.35%	\$ -	\$ -	\$ -	0.51%	\$ -	\$ -	\$ -
Cleveland Electric Illuminating		0.008%	\$0.326	\$0.268	\$0.242	0.05%	\$0.000	\$0.000	\$0.000	0.05%	\$0.051	\$0.042	\$0.038
Ohio Edison		0.006%	\$0.350	\$0.288	\$0.261	0.07%	\$0.000	\$0.000	\$0.000	0.08%	\$0.026	\$0.021	\$0.019
Toledo Edison		0.005%	\$0.334	\$0.274	\$0.248	0.00%	\$ -	\$ -	\$ -	0.01%	\$0.334	\$0.274	\$0.248
Columbus Southern Power		0.24%	\$0.008	\$0.006	\$0.006	0.34%	\$0.008	\$0.007	\$0.006	0.58%	\$0.008	\$0.006	\$0.006
Ohio Power		0.16%	\$0.008	\$0.007	\$0.006	0.37%	\$0.005	\$0.004	\$0.004	0.53%	\$0.006	\$0.005	\$0.004
Dayton Power & Light	2010	1.05%	\$0.008	\$0.006	\$0.006	0.44%	\$0.009	\$0.007	\$0.007	1.48%	\$0.008	\$0.007	\$0.006
Duke Energy Ohio		0.00%	\$ -	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -	0.00%	\$ -	\$ -	\$ -
Cleveland Electric Illuminating		% -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Ohio Edison		% -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Toledo Edison		% -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Columbus Southern Power		0.30%	\$0.012	\$0.010	\$0.009	0.64%	\$0.009	\$0.008	\$0.007	0.94%	\$0.010	\$0.008	\$0.008
Ohio Power		0.22%	\$0.012	\$0.010	\$0.009	0.39%	\$0.010	\$0.009	\$0.008	0.61%	\$0.011	\$0.009	\$0.008

**Pennsylvania**

Pennsylvania		Residential				Commercial & Industrial				Portfolio			
Utility	Program Year	% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)			% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)			% Savings (of total sales)	Levelized Cost of Saved Energy (\$/kWh)		
			10 yrs	13 yrs	15 yrs		10 yrs	13 yrs	15 yrs		10 yrs	13 yrs	15 yrs
Metropolitan Edison	Plan Year 1 (2009)	0.10%	\$0.025	\$0.020	\$0.019	0.02%	\$0.047	\$0.039	\$0.035	0.12%	\$0.029	\$0.024	\$0.021
Pennsylvania Electric		0.10%	\$0.025	\$0.020	\$0.018	0.03%	\$0.041	\$0.034	\$0.030	0.12%	\$0.028	\$0.023	\$0.021
Pennsylvania Power		0.32%	\$0.013	\$0.011	\$0.010	0.01%	\$0.159	\$0.131	\$0.118	0.33%	\$0.018	\$0.015	\$0.014
PECO		0.03%	\$0.024	\$0.020	\$0.018	0.01%	\$0.041	\$0.034	\$0.030	0.04%	\$0.028	\$0.023	\$0.020
Duquesne Light		0.42%	\$0.022	\$0.018	\$0.017	0.89%	\$0.019	\$0.016	\$0.014	1.31%	\$0.020	\$0.017	\$0.015
West Penn Power		0.01%	\$0.109	\$0.089	\$0.081	0.02%	\$0.095	\$0.078	\$0.071	0.03%	\$0.102	\$0.083	\$0.076