SPEER

The South-central Partnership for Energy Efficiency as a Resource

Examining the History of Texas Energy Efficiency Programs

Costs and Benefits of Utility Programs

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About the South-central Partnership for Energy Efficiency as a Resource (SPEER)

SPEER is a regional non-profit organization dedicated to increasing and accelerating the adoption of energy efficient products, technologies, and services in Texas and Oklahoma. Much of SPEER's work focuses on finding the best market-based approaches to increase energy efficiency and overcoming persistent market barriers. The views expressed in this paper do not necessarily reflect the views of all of SPEER's members, funders, or supporters. For more information about SPEER, please visit: www.eepartnership.org

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I. INTRODUCTION

Every state has developed some level of energy efficiency incentive or assistance program for consumers through some form of utility policy. The foundation for such programs is the recognition that a private investment by an individual can create a public benefit by helping all other ratepayers avoid unnecessary utility investments or operating expenses. Public incentives reflect the value of that public contribution. Texas statute establishes such assistance by giving each investor owned utility (IOU) a minimum demand reduction goal to meet, through the administration of market-neutral energy efficiency incentive programs for their residential and commercial customers. The Public Utility Commission of Texas (PUCT) complemented this peak demand reduction goal with a proportionate energy consumption reduction goal. While utilities lose revenues for helping customers use less electricity under the current regulatory construct, the law provides for a performance bonus to utilities for exceeding their efficiency goals that helps make up for this lost revenue.

Since 2002, the state's ten IOUs[1] have helped Texans save $3.3 billion in energy costs,[2] by providing incentives for efficiency upgrades. The utility administration of state-mandated efficiency programs, on the other hand, cost customers only $1.3 billion. Since 2010, these utilities have spent between $100 million and $130 million annually on energy efficiency programs, saving the equivalent of around $400 million each year in future energy and capacity costs. Chart 1 illustrates the total annual spending of the IOUs and the total costs avoided as reported by each utility to the PUCT. By this limited measure, utility efficiency programs produce a return on investment of 300% to 400% in most years. The noticeable spike of benefits in 2013 was driven by a dramatic increase in wholesale energy prices that occurred during the summer drought and heat wave of 2011.

Texas law requires that "each electric utility annually will provide incentives sufficient for retail electric providers and competitive energy service providers to acquire additional cost-effective energy efficiency."[3] This language has two important pieces. First, the incentives must be administered through market participants, not by the utilities to end use customers, although the Commission allowed larger customers to serve as their own service provider. Second, the sentence requires a regulatory definition for cost-effective, which is the focus of this paper. The PUCT declared by rule[4] that "cost effective" simply means that qualified benefits outweigh the utilities' costs to administer the incentive programs. But, the cost effectiveness of energy efficiency programs can be measured in a number of ways. Energy efficiency benefit tests can be based on different perspectives: the utility's perspective, the ratepayers' perspective, the participating customer's perspective, the societal perspective, or a combination of these perspectives.

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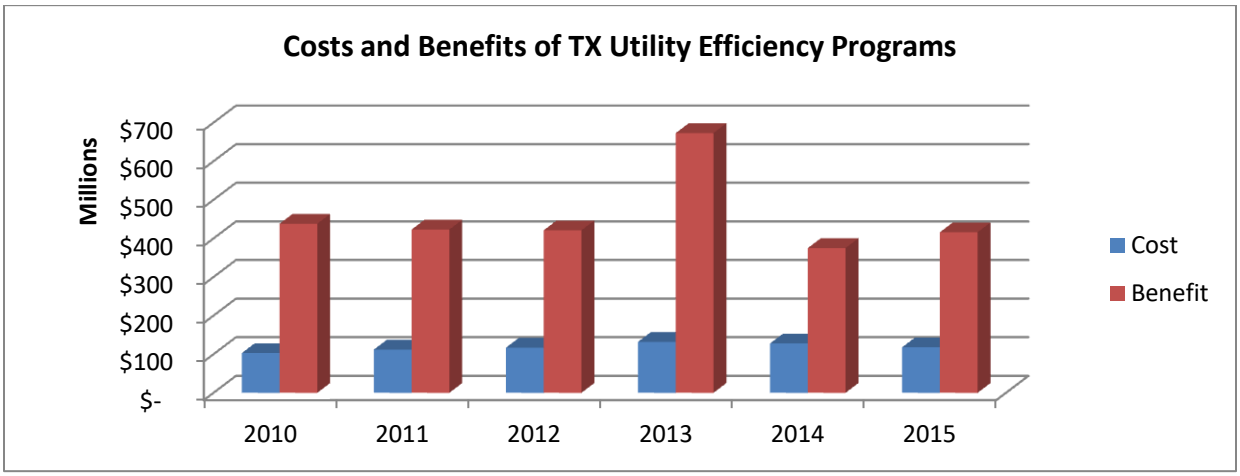
[1] Oncor, CenterPoint Energy, American Electric Power-Texas Central Company, AEP-TNC, Texas-New Mexico Power, Sharyland Utilities, Swepco, Entergy, Xcel (SPS), and El Paso Electric
[2] Source: Annual Energy Efficiency Plans and Reports filed by each IOU with the PUCT
[3] PURA §39.905(b)
[4] PUCT Substantive Rule Section 25.181

Chart 1



Utility costs can include administrative and regulatory costs, interest cost, opportunity cost, or lost revenues. A number of benefits can be considered, including the benefits of attaining specific policy objectives. Examples of other common benefits include: avoided energy and capacity costs, suppressed energy or capacity prices, avoided ancillary services costs, reduced congestion and line losses, avoided transmission and distribution costs, reduced air pollution and the resulting environmental and public health benefits, reduced water use, and economic development and jobs.

II. Benefit/Cost Tests

The simplest benefit/cost test is known as the Utility Cost Test (UCT) (sometimes referred to as the Program Administrator Cost Test), a form of which was adopted by the PUCT in 2002, following the legislature's decision to open the ERCOT region energy markets to competition. The UCT adopted by the PUCT is limited to the direct utility costs of administering a program on the one hand, and the direct benefits of reduced energy and capacity saved on the other. How much consumers will spend, over and above utility incentives, to reduce their demand or consumption is a matter of personal valuation and judgment, therefore supporting the position that the UCT is appropriate for state evaluation of utility programs, particularly in a consumer choice state. Because it essentially measures the utility return on investment, and Texas programs are relatively modest in scale, it can also be considered a proxy for a test of benefits to all ratepayers or non-participants. That is, the UCT helps assure even customers not directly receiving incentives also benefit.

This test forms the basis for all other versions of cost-effectiveness tests and is the simplest and narrowest of tests in that it ignores the out-of-pocket customer costs for installing efficiency, societal benefits, local economic benefits, and other benefits, some of which can be difficult to quantify. Although the UCT as defined by Texas rules is relatively simple and may help limit administrative and associated regulatory oversight costs, the Texas utilities' efficiency programs also do not receive credit

for many of the benefits delivered through energy efficiency either, potentially leading to undervalued efficiency programs.

There are two other traditional energy efficiency cost effectiveness tests, as described in the industry's primary reference source, the California Standard Practice Manual.[5] Utility efficiency programs generally pay only a fraction of the total amount required to install efficiency measures. The **Total Resource Cost Test (TRC)** expands upon the UCT to include the customer's portion of the costs for efficiency upgrades. In addition, expanding to use a TRC Test would require detailed determination of the matching expense of every utility customer that participated in an incentive program, which would be a very difficult and costly process, as well as an invasive one.

The **Societal Cost Test** is an expansive variation of a benefit/cost test which explicitly includes societal benefits such as economic development and jobs, environmental benefits, reduced health care costs and reduced water use. The Utility Cost Test, however, could include any benefits specified by regulators to reflect the policy goals of the state, as discussed further below.

III. CALCULATING COSTS

Calculating the utility costs of the Texas utility administered efficiency programs is relatively easy, because it is based only on in-house and contracted costs for administration, research and development, a shared cost of the state-level third-party evaluation, measurement and verification (EM&V) contractor, incentives paid, and any performance bonus earned.

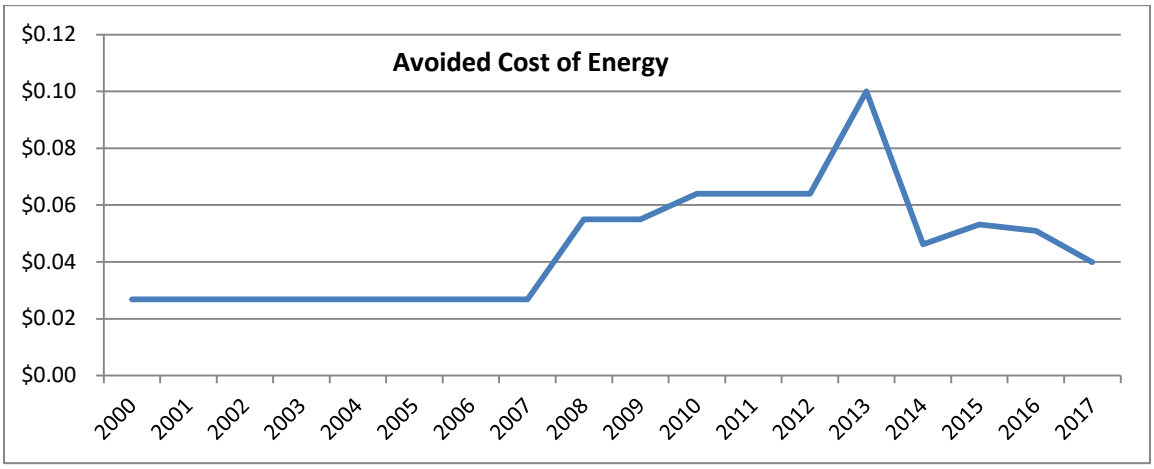
IV. THE VALUE OF BENEFITS: AVOIDED COSTS

The real trick to completing benefit/cost evaluation is quantifying the benefits associated with the programs. As mentioned above, there are two kinds of benefits that the PUCT's Utility Cost Test considers: avoided energy cost and avoided capacity cost.

> **Avoided Energy Costs:** When the initial PUCT rule was established in 2000, the avoided cost was set at $0.0268 / kWh and remained constant until the energy goal was established in 2008. The value credited to the utility for energy saved or "avoided costs" are now recalculated annually and posted to the PUCT website[6]. Since 2008, the avoided cost of energy has averaged $0.058/kWh, but is based on the average wholesale price of energy in Texas during the summer and winter peaks over the past two years.[7] The avoided cost of energy can be quite volatile in Texas. For example, in 2013, the avoided cost of energy was $0.10/kWh and in 2017 it is $0.04/kWh (see Chart 2).

[5] http://www.calmac.org/events/spm_9_20_02.pdf
[6] Avoided Cost of Capacity and Energy: https://www.puc.texas.gov/industry/projects/electric/38578/38578.aspx
[7] The summer peak period is 1pm to 7pm from June through September and the winter peak period is 6am to 10am and 6pm to 10pm in December through February (excluding weekends and holidays).

Chart 2



Avoided Capacity Cost: The avoided cost of capacity (or peak demand) is derived from the PUCT's determination of the base cost of a new conventional or advanced combustion turbine, whichever is lower, as reported in the Department of Energy's Energy Information Administration's Annual Energy Outlook[8]. In contrast to the avoided cost of energy, the avoided cost of capacity has not shown volatility over time. In fact, the value was initially set at $78.50/kW-year in 2000, increased to $80.00/kW-year in 2008, and has remained unchanged ever since.

V. Calculating Benefits

The PUCT calculates efficiency benefits either by using direct measurements taken, or by referencing pre-agreed "deemed" savings, stipulated by the PUCT based on a documented history of measure performance or engineering studies. In 2011, the Legislature directed the PUCT to employ a third-party EM&V contractor, which has developed a **Technical Resource Manual (TRM)** adopted by the PUCT.[9] The PUCT's TRM is a 745-page manual that prescribes standard methods for collecting data and calculating savings, and specifies common parameters for such calculations. In the TRM, each efficiency measure is assigned an estimated useful life (EUL), which represents the average lifespan of the given efficiency product. The TRM helps the service provider and the utility calculate the specific efficiency benefits attributable to each measure applied (i.e. equipment, material or practice). The PUCT also incorporates into the TRM tables of "deemed" savings associated with common measures, based on documented historical data or engineering studies.

[8] See section (d)(2)(A)(i-iii) in http://www.puc.texas.gov/agency/rulesnlaws/subrules/electric/25.181/25.181.pdf
[9] The TRM (version 4.0) was last updated in October 2016 for use in Program Year 2017 in PUCT project 46495. FAQ on the TRM can be found at:
https://www.puc.texas.gov/industry/projects/electric/38578/EMV_FAQs_for_SharePoint_12152015.pdf

Consider the following example:
A utility might offer a $1,000 incentive for the installation of new *ENERGY STAR* windows. For example, the installed windows may conserve 500 kWh of energy and 0.25 kW of demand, with a EUL of 25 years. In this example, the amount of avoided *energy* would be approximately (500 kWh x 25 yrs) or 12,500 kWh and the amount of avoided *demand* would be approximately 0.25 kW per year for all 25 yrs. The avoided cost of energy would be calculated as 12,500 kWh x $0.04 per kWh or $500. The avoided cost of demand would be calculated as 0.25 kW x $80.00 per kW-yr x 25 yrs or $500. Therefore, the qualified benefit would be ($500 + $500) or $1,000.

The PUCT rule states that incentive payments for each customer class shall not exceed 100% of avoided costs in all their programs, to be cost effective. In the example above, a $1,000 incentive payment is equal to 100% of the avoided costs, yielding a cost to benefit ratio of 1:1 or zero net benefit. The actual cost-to-benefit ratio of the utility programs overall in recent years is about 1:4, as illustrated in Chart 1 above, resulting in substantial net benefits.

VI. PROGRAM COSTS

Consumers in Texas IOU territories have spent about $120 million per year on average since 2009 on utility efficiency programs via a small charge of approximately $1 per month on their electric bills.[10] The maximum cost to consumers is capped by PUCT rule at $1.27 per MWh for residential customers and $0.79 per MWh for commercial customers.[11] Actual rates per MWh for residential customers in the three largest IOU territories are currently $0.78, $0.88 and $0.53 in Oncor, CenterPoint and AEP-Central territories, respectively.

However, Texas has a relatively modest state energy efficiency goal, and ranks 40th in states *per capita* spending on electric energy efficiency, as reported in the American Council for an Energy-Efficient Economy's (ACEEE) 2016 State Energy Efficiency Scorecard.[12] The annual per capita spending on electric utility programs in Texas calculates to only $6.62, while the top ten states spend more than $30[13], and the top two are spending over $80. The ACEEE report includes the two large municipally owned utilities in Texas, so ACEEE's numbers are higher than just the IOUs alone.

[10] Energy efficiency program cost recovery was established by the legislature in 2007, codified by the PUCT in 2008 and implemented by the utilities in 2009 and 2010. Program costs are recovered by utilities directly from retail electric providers through the Energy Efficiency Cost Recovery Factor (EECRF) and these charges generally do not appear as separate line items on customer bills.
[11] Cost Cap: The PUCT rule caps the 2017 rate at $0.001266/kWh for residential customers and $0.000791/kWh for commercial customers and established that the cost caps increase (or decrease) annually with the consumer price index. Current actual residential rates for the biggest three utilities are $0.00078 (Oncor), $0.000877 (CenterPoint) and $0.000532 (AEP-Central).
[12] http://aceee.org/state-policy/scorecard P. 132, Appendix B.
[13] http://aceee.org/state-policy/scorecard P. 132, Appendix B.

Chart 3

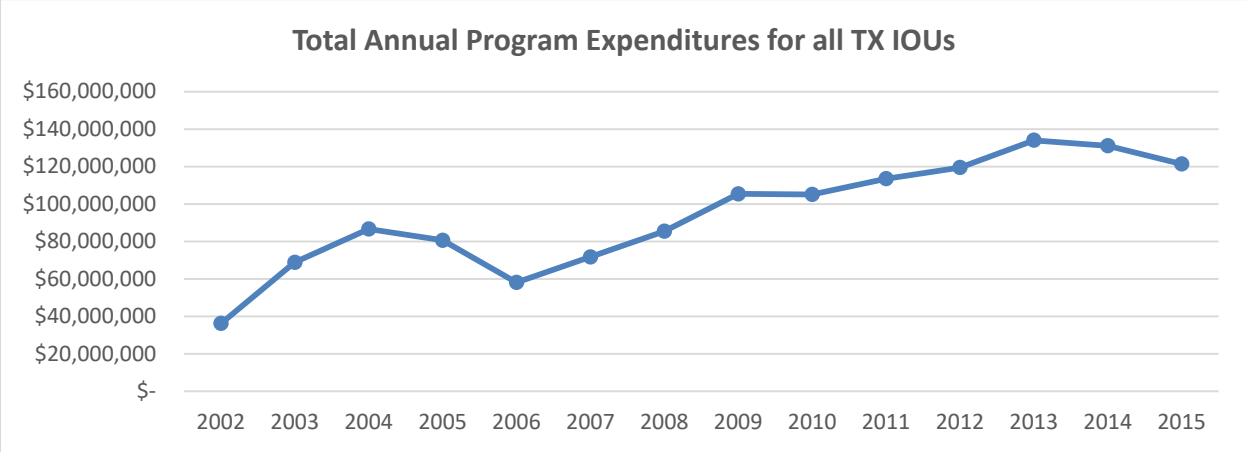
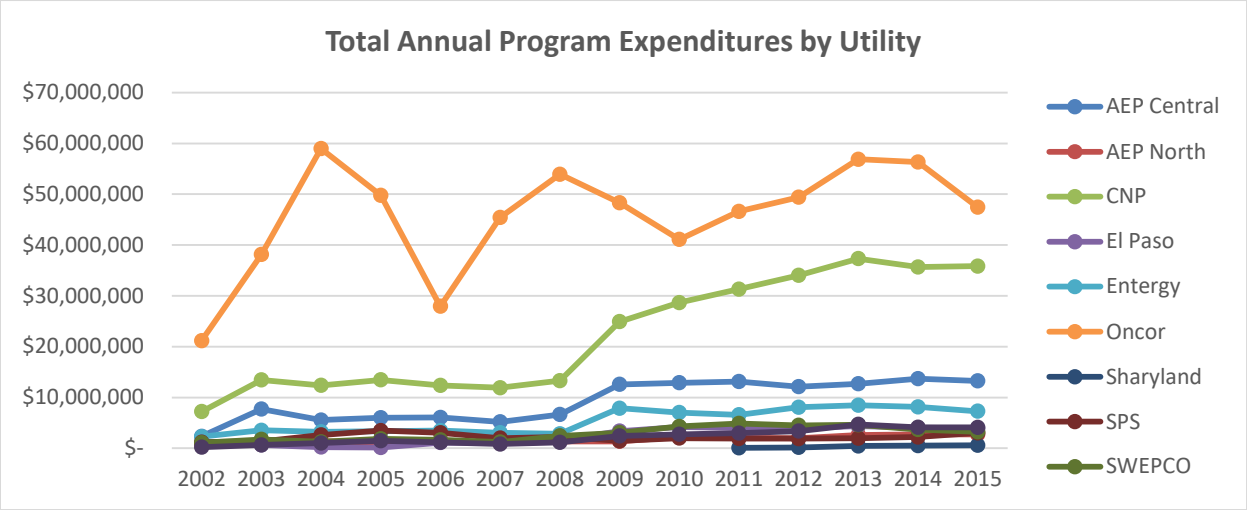


Chart 4



VII. Program Benefits

ACEEE reports that 26 states now have a state-mandated energy efficiency resource standard (EERS), following Texas' lead as the first state to develop such a goal. Achieved savings ranges from a high of 2.9% of retail sales in Rhode Island[14] to a low of ~0.18% of retail sales in Texas.[15]

Despite low annual *per capita* spending on electric utility programs, the amount of energy savings delivered through IOU programs in Texas was over 550 million kWh in both 2014 and 2015[16] (see Charts

[14] http://aceee.org/state-policy/scorecard Table 9, 2015 net incremental electricity savings by state. Also see http://aceee.org/topics/energy-efficiency-resource-standard-eers

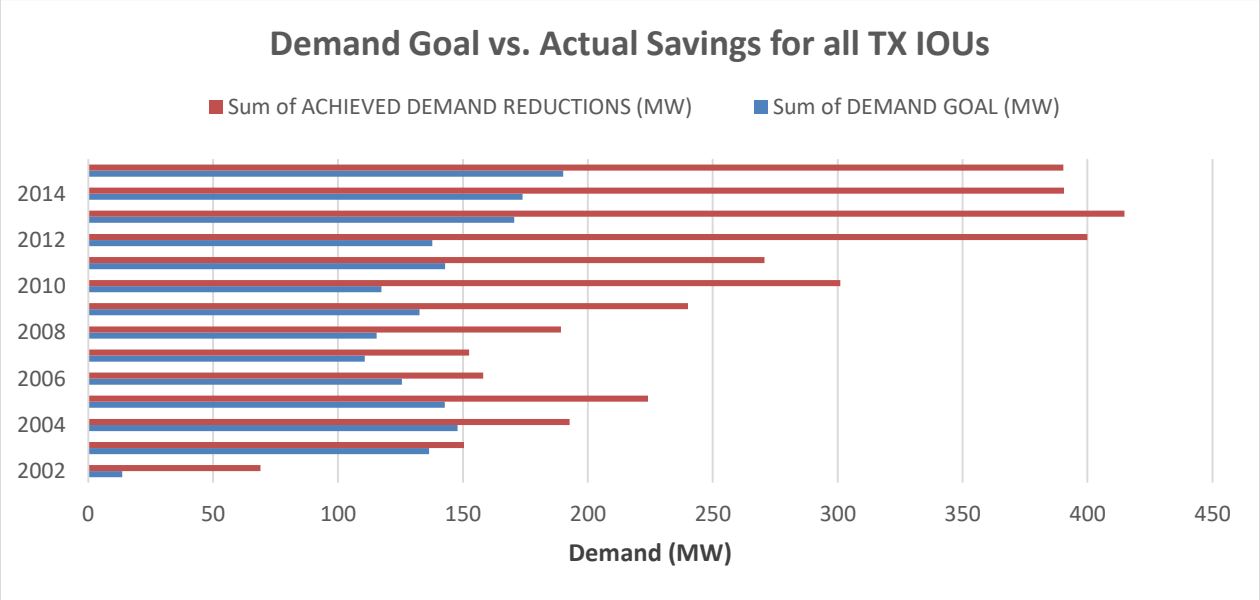
[15] http://database.aceee.org/state/texas This figure of approximately 0.18% is estimated by comparing the state's energy savings achieved with the total volume of energy delivered, as reported in utility energy efficiency Plans and Reports filed with the PUCT.

5 and 6). Demand and energy savings include only first-year savings, and do not include any future-year savings based on the EUL of each measure. Future-year savings are reported by the utilities, however, as part of total benefits, or avoided costs, described above and illustrated in Chart 1.

VIII. Meeting Goals

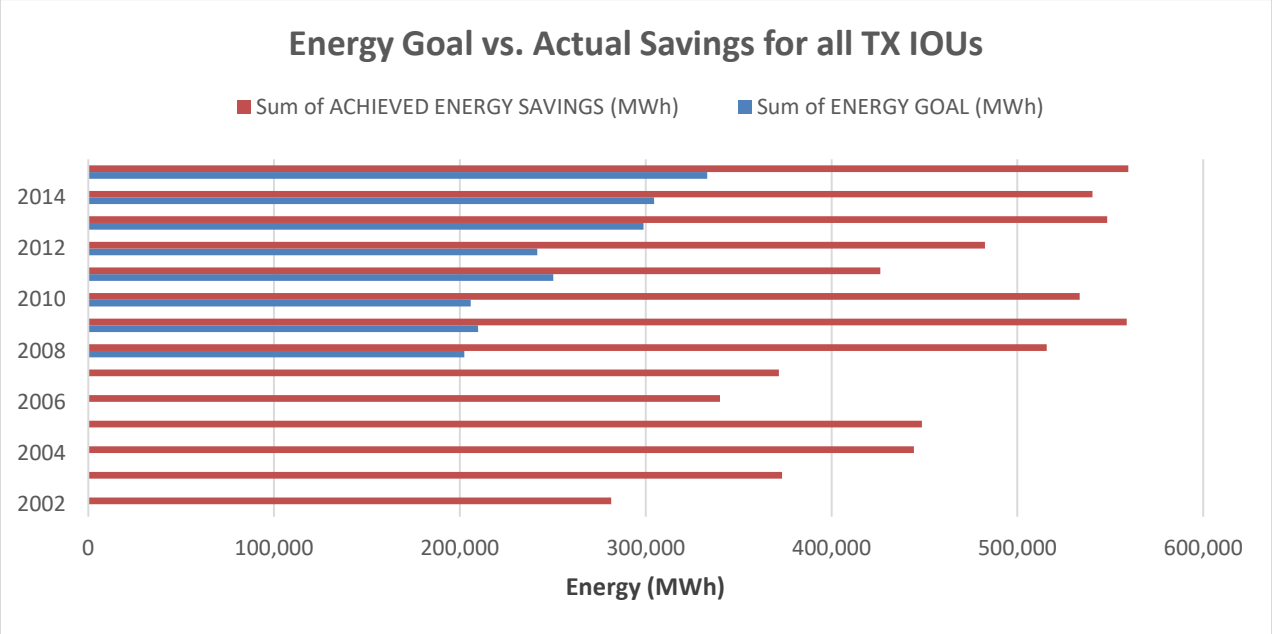
As a group, the utilities have regularly exceeded their mandated demand and energy goals by as much as 100% or more since 2010 (see Charts 5 and 6). This overachievement is encouraged through a bonus payment which was designed to reward this success. The goals have been changed over the years, including the establishment of a goal for energy savings in 2008, which is the subject of another brief in this series.[17]

Chart 5



[16] Data compiled from annual IOU filings of Energy Efficiency Plans and Reports. Statewide, Texas had 700,000 MWh of net incremental savings in 2015 according to the 2016 ACEEE State Scorecard.
[17] The Effect of Changes in the EERS Goal on Program Spending and Savings

Chart 6



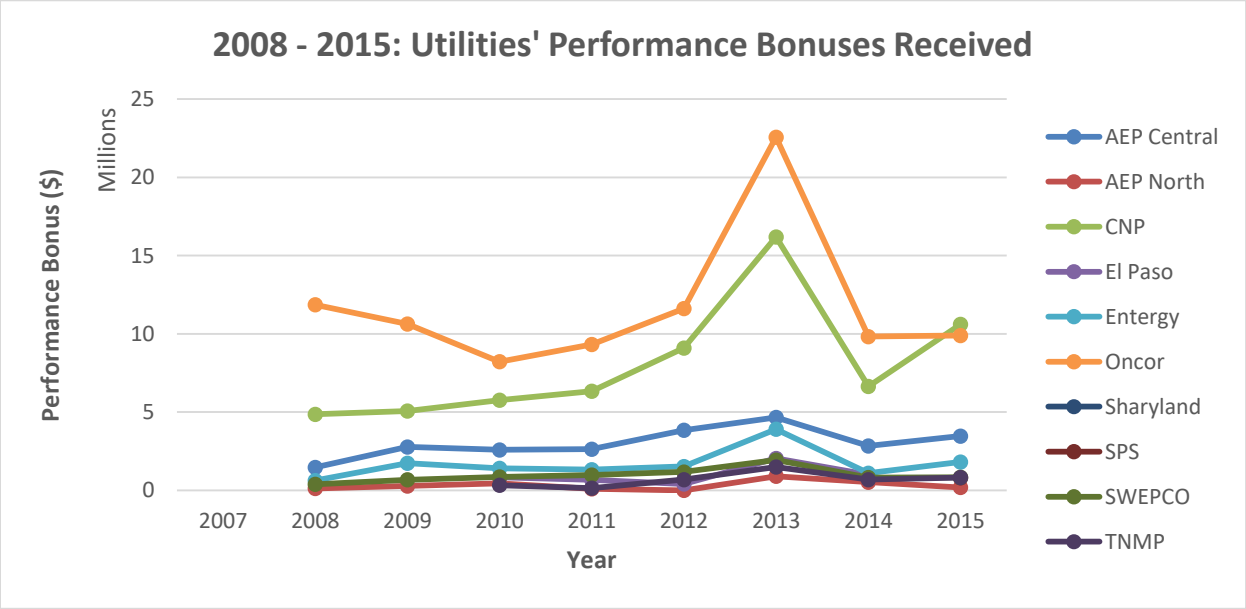
*Energy Goal was not established until 2008.

IX. Bonus Payment For Exceeding Goals

Included in the PUCT energy efficiency rule is a bonus payment that was authorized by statute in 2007,[18] and designed to incentivize utilities to achieve higher savings cost effectively. Initially, the bonus was contingent upon the utility exceeding only its demand goal. In 2010, the bonus criteria were expanded to require the utility to also meet its recently established energy savings goal. Utilities that exceed their goals are entitled to a bonus payment of up to 10% of the total net benefits generated for the year. Total net benefits are calculated by multiplying the amount of energy and demand reduced (projected over the estimated useful life of each measure), by the avoided cost of energy and capacity, as posted on the PUCT website.[19] Bonus payments can be quite large and are important to help utilities recover revenue lost due to lower volumes of energy delivered, through increased efficiency. Chart 7 below illustrates the bonus amounts paid to utilities since 2008. The notable spike in 2013 was driven by the high value of the avoided cost of energy that year, one tenth of benefits delivered to consumers when prices spiked.

[18] PURA §39.905(b)(2)
[19] https://www.puc.texas.gov/industry/projects/electric/38578/38578.aspx

Chart 7



X. CONCLUSION

The utility energy efficiency programs in Texas provide tremendous value to consumers, delivering a 3 to 4-fold benefit compared to the costs. The state's independent EM&V contractor estimates that the utility programs save energy at a cost of $0.011 / kWh and save capacity at a cost of $17.59/kW-year, on average.[20] Compare these values to the PUCT identified avoided cost of energy at $0.04/kWh and the avoided cost of capacity at $80/kW-year, and it is quite apparent that energy efficiency is an extremely high-value energy resource in Texas. Current state policy establishes energy efficiency goals and investment at relatively low levels compared to other states. This general observation, and previous studies,[21] indicate that substantial opportunity continues to exist for additional cost effective investment in energy efficiency, which also creates local jobs and stimulates local economies in Texas.

[20] TetraTech presentation at Sept 29, 2016 EEIP meeting at the Public Utility Commission of Texas.

[21] Independent Audit of Texas Energy Efficiency Programs in 2003 and 2004, prepared by Summit Blue Consulting; https://www.puc.texas.gov/industry/projects/electric/38578/EEP_Audit_Rpt_03-04.pdf. Assessment of the Feasible and Achievable Levels of Electricity Savings from Investor Owned Utilities in Texas: 2009-2018, prepared by Itron, Inc. https://www.puc.texas.gov/industry/electric/reports/misc/Electricity_Saving_2009-2018_122308.pdf