Weathering Economic Downturns with Program Diversification

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ABSTRACT

The recent and ongoing economic downturn has posed a significant challenge to industrial energy efficiency resource acquisition programs. The goals of these utility ratepayer-funded programs have been growing significantly in recent years as public utility commissions and others choose to acquire efficiency resources instead of building new generation to meet future load. The programs designed to provide these verifiable efficiency savings are often based upon a model that relies upon capital investment from industrial sites: the programs assist industrial sites in identifying energy-saving equipment, provide financial assistance for the equipment purchase, and then claim the associated energy savings when the installation is complete. In a capital-constrained economic environment, however, industrial sites are less willing to make large capital investments and efficiency programs suffer the consequences. Despite this, just as a properly balanced investment portfolio can better weather changes in the economic climate, industrial efficiency programs can diversify their sources of savings to maintain success in periods of low capital investment.

This paper will discuss how The Energy Trust of Oregon's industrial efficiency program was able to maintain successful results throughout the economic downturn. In addition to large capital projects, the program achieved savings from a variety of sources requiring little or no capital investment. The program saw an increase in prescriptive and smaller, vendor-driven projects that did not require as large of a capital investment. Technical field staff worked with sites to identify operations and maintenance changes that would result in energy savings that would endure. Finally, by engaging sites in strategic energy management practices, sites were able to reduce their energy use and energy intensity often with little or no investment beyond the staff time spent training and implementing energy management practices.

Background

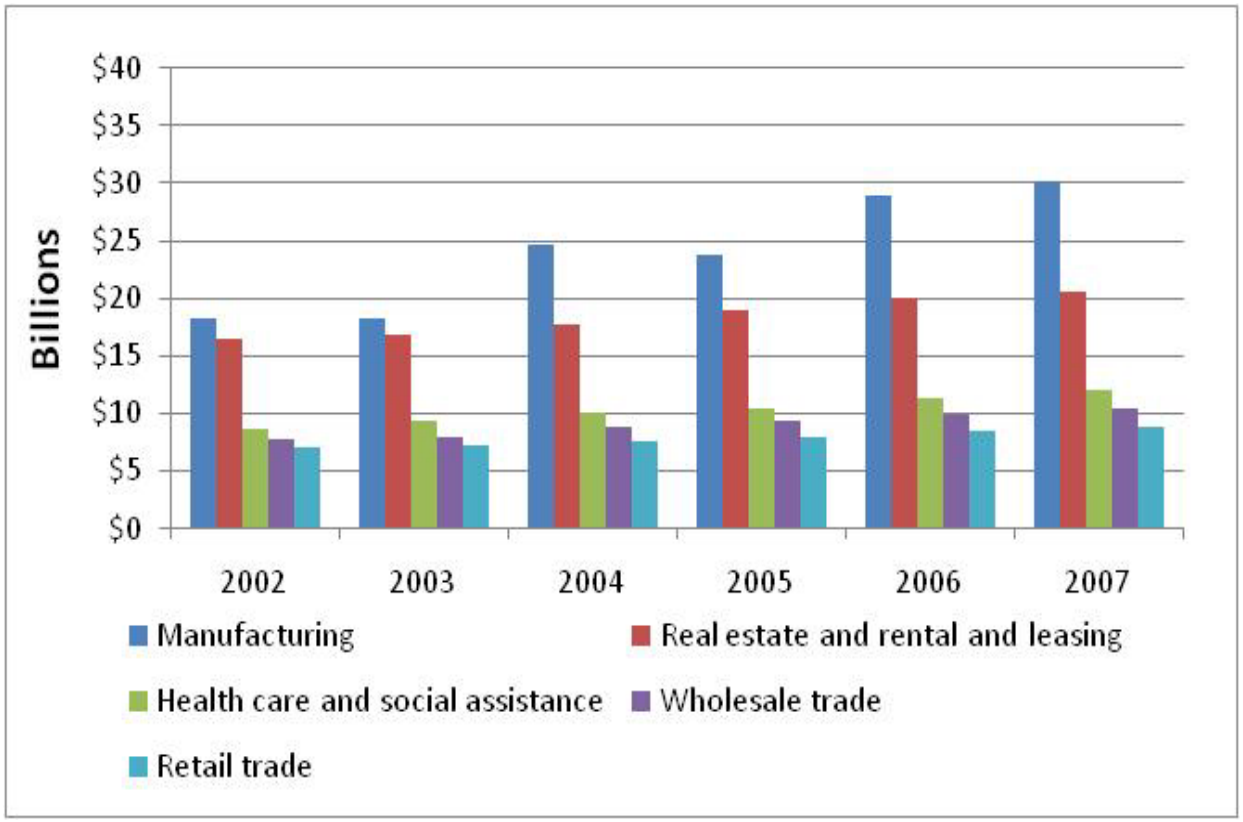
In 1999, Oregon lawmakers and citizens envisioned a future with Oregon homes and businesses powered by clean, affordable energy. They established stable, consistent funding to help Oregonians invest in energy efficiency and renewable resources and a new nonprofit organization—Energy Trust of Oregon—to administer the public purpose funds.

Energy Trust began operation in March 2002, charged by the Oregon Public Utility Commission with investing in cost-effective energy efficiency, helping to pay the above-market costs of renewable energy resources, delivering services with low administrative and program support costs and maintaining high levels of customer satisfaction. Energy Trust's Production Efficiency program for industrial efficiency was launched in 2003.

As shown in Figures 1 & 2 below, manufacturing accounts for the largest private sector industry in the state's economy, and also the largest energy consuming sector after transportation. Having a robust industrial sector provides a lot of opportunity for savings. Accordingly, Energy Trust has invested heavily in industrial efficiency, dedicating approximately 25 percent of the organization's efficiency funding to the sector and reaping 84 average megawatts (aMW) of

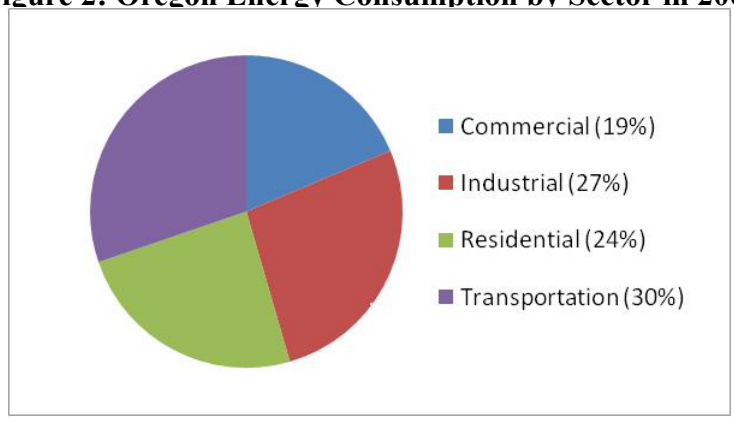
highly cost-effective savings over the Production Efficiency program's 8-year history, approximately 33 percent of the organization's total gross energy savings during this period.

Figure 1: Oregon's Top 5 Private Sector Industries by GDP



Source: Oregon Economic and Community Development Department. 2009

Figure 2: Oregon Energy Consumption by Sector in 2005



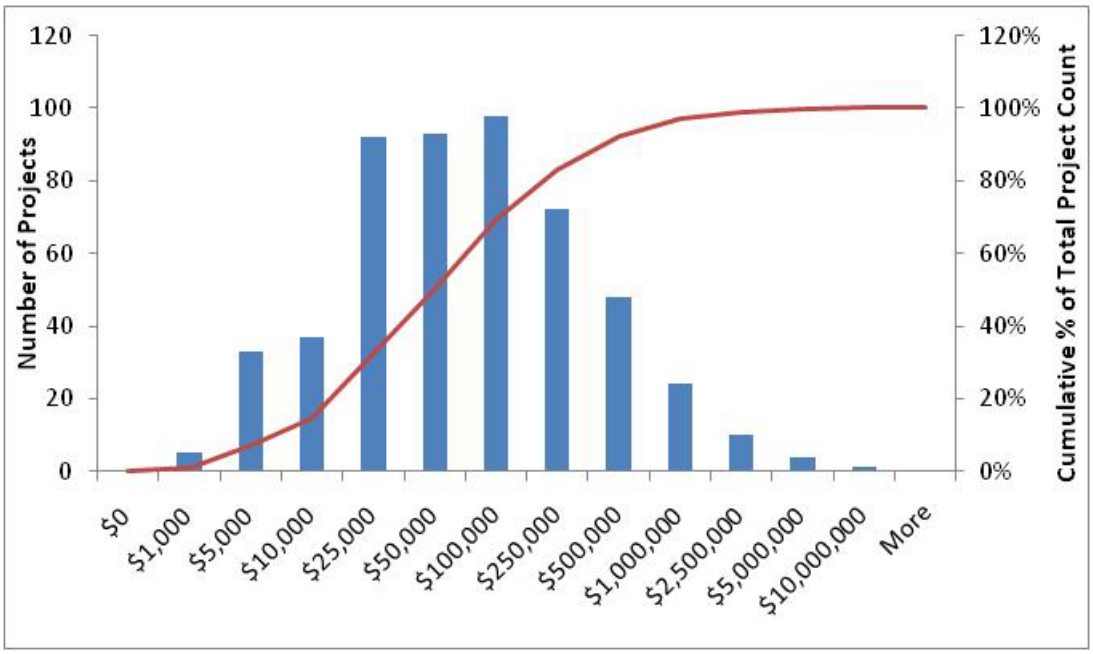
Source: US DOE Energy Information Administration. 2008.

The program began with a focus on capital projects, including retrofits, replacements and major process changes, using a custom approach to analyze savings and cost-effectiveness through engineering analysis, and paying a cash incentive amount after the completion of the project. Incentive levels evolved over time as the program grew and reached maturity, but included paying a percentage of project costs, paying a per kilowatt-hour incentive, using a buy

down calculation to drive the simple payback of the project down to a year and a half, or some combination of the above. Current incentives for capital projects are $0.25 per first year kilowatt-hour of energy savings, capping at 50 percent of project costs. Many projects are also eligible for a tax credit equal to 35 percent of project costs through the Oregon Department of Energy, which is taken over five years.

Figure 3 below shows a histogram of project costs for custom projects over the first four years of the program, from inception until 2007. The red line tracks the cumulative percentage of project counts. From this graph, a clear fall off can be seen to the left of the $25,000 project cost bin. This demonstrates that the custom projects on which the program depended for a majority of its savings relied upon large capital investments from industrial sites.

Figure 3: Number of Custom Projects by Total Project Cost, 2003-2007



Source: Energy Trust internal project data tracking system

Prescriptive or rebate-style incentives were added later for National Electrical Manufacturers Association (NEMA) Premium Efficiency motors, but these did not account for a significant source of program savings. Rather, they were an easy first step for industrial sites to begin participating in the program, allowing sites to start interacting with the program on small, low-risk investments before moving to consider larger projects. The program also began offering incentives for lighting retrofits in 2005.

The contribution of these program offerings, in terms of megawatt hours (MWh) savings by year is show in Table 1 below. For the first years of the program, custom capital projects accounted for nearly 90% of its savings.

Table 1: Program Savings (MWh) by Project Track, 2004-2007

Project Type	2004	2005	2006	2007	Grand Total
Custom	89,759	177,055	60,563	110,332	437,708
Lighting	-	10,649	10,305	15,768	36,721
Prescriptive Motors	-	559	1,118	2,360	4,038
Grand Total	**89,759**	**188,263**	**71,9845**	**128,460**	**478,467**

Source: Energy Trust internal project data tracking system

As can be seen in Table 1, savings outcomes from year to year are "spiky", i.e., not showing linear growth, due to the impact of a few very large projects completed in 2005 and 2007. Although the program achieved significant savings cumulatively over time, this dynamic, along with long project development periods of 1 – 3 years for large capital projects, had a big effect on staff's ability to confidently set annual goals and budgets, to quickly ramp up to address a shortfall in savings or to achieve consistent increases in savings year over year.

Balancing the Portfolio

The diversification of the industrial program began in early 2008 with the launch of a vendor-driven initiative targeted towards small industrial and agricultural sites. These sites had been historically underserved, as it was difficult to cost-effectively work with smaller sites through the high-touch custom track model traditionally used by the program. Instead, the initiative developed a streamlined approach for smaller projects that could be analyzed quickly, using simple calculation tools in place of the study typically required of custom projects. Additional prescriptive incentives were also added for irrigation sprinklers and nozzles as well as compressed air accessories as part of the initiative. The development of this initiative was discussed at length in the 2009 Industrial Summer Study (Prause 2009).

Lighting retrofit projects also became an increasingly large part of the program in 2008. The results come in part from an expanded team of Energy Trust lighting specialists to assist vendors with projects and identify opportunities for additional savings, including the application of lighting controls. Further, many electrical contractors shifted their focus to selling lighting retrofits during the economic downturn since the residential and commercial new construction markets had slowed.

In 2008, the program also planned two pilots based on realizing operations & maintenance savings through strategic energy management. The Industrial Efficiency Improvement (IEI) pilot was designed to provide tools and training to help ten large industrial sites adopt a comprehensive energy management system. IEI participants worked together within a mentored peer support network as they received training and support to achieve energy intensity savings through no- and low-cost behavioral and O&M changes. The Kaizen Blitz (KB) pilot was designed to rely on visualization of energy data, lean manufacturing techniques and expert technical support to drive persistent O&M savings in less complex organizations (Crossman 2009).

All of these things were made possible in part by the fact that in 2008, Energy Trust brought the management of the industrial program in-house, which brought Energy Trust program staff closer to the market, and allowed for greater nimbleness in bringing new program offerings to fruition. The program also faced continuously rising goals, and therefore needed to reach previously untapped markets and sources of savings.

In the second half of 2008, economic conditions began to worsen for Oregon's industrial sector. New commitments for capital projects began to slow and expected project completions were delayed or cancelled outright. With 2009 goals calling for a 60 percent increase in savings over 2008 achievements, the program faced a daunting challenge of how to continue to grow results in an environment of limited capital investment.

Historically, there have been very few options for program implementers to fill a short term gap in industrial savings, due to the long lead time for most industrial capital projects. Program managers could raise incentive levels, increasing the economic viability of energy projects, but program participants were still on the hook to pay the upfront cost and were hesitant to spend any capital. Several bonus incentives, increasing incentives by up to 10 percent were offered in later 2008 and 2009 to encourage project completions. The program also remained engaged with customers during the year even if they couldn't make capital investments, by taking advantage of the decreased production at sites to study additional capital projects. These studies would be in place for companies to consider as production increased and capital became available again.

Fortunately, the IEI and KB pilots planned in 2008 were launched in early 2009, at the same time that many capital projects were being delayed or canceled due to economic conditions and plant closures. Many large plants enthusiastically embraced these behavior-focused offerings, looking to cut operating costs without spending capital. The IEI cohort was fully subscribed within 30 days, and the waitlist of potential participants combined with strong positive feedback and early results of the first cohort prompted the program to launch a second cohort in mid-2009.

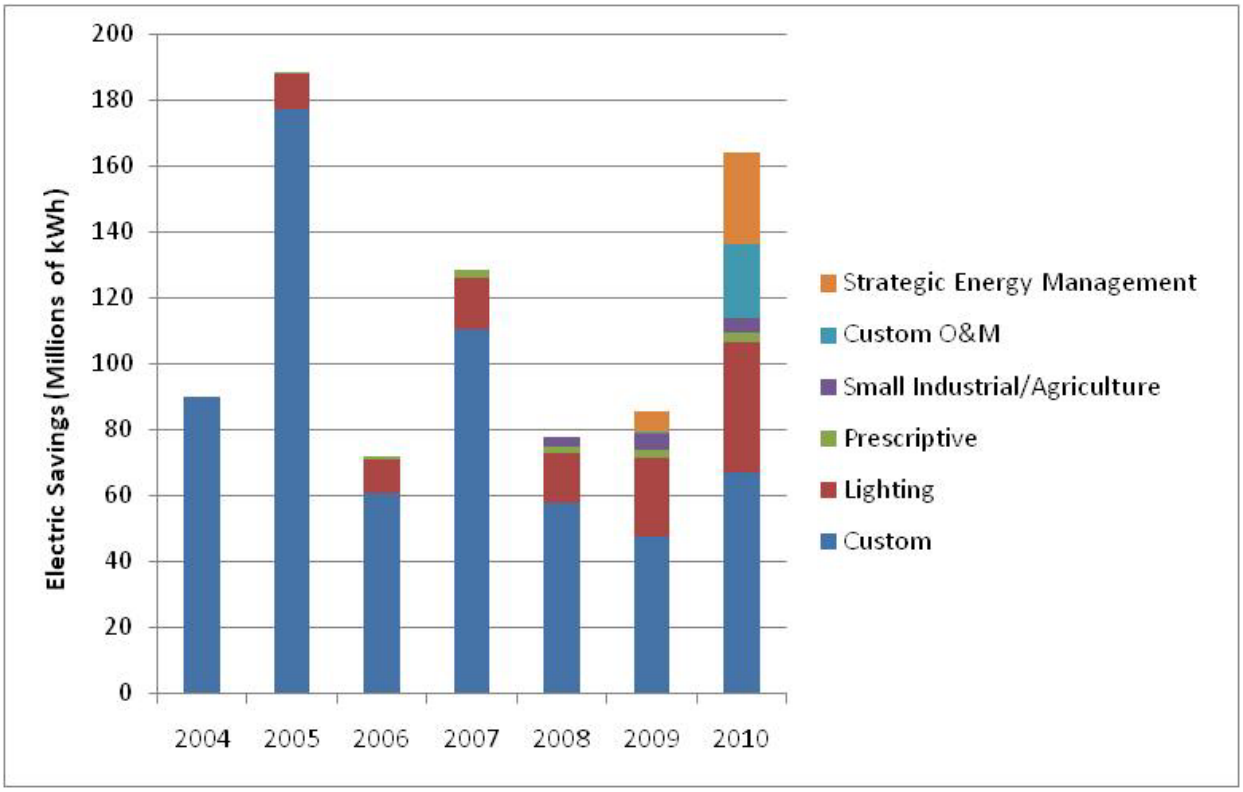
Four sites were recruited for the Kaizen Blitz early in the year, and another five sites signed up in a second round of recruitment in the fall of 2009. The four sites that completed the Kaizen Blitz in 2009 saved a combined total first year energy savings of more than 6.5 million kWh, avoiding more than $350,000 in energy costs, at an average implementation cost of just over $20,000 for each site, with incentives paying for approximately half of that cost. The first two cohorts completed the IEI in 2010, providing close to 25 million kWh in savings and achieving an average of 7 percent energy intensity reduction per site from strategic energy management during their one-year IEI implementation period.

Working on the IEI and Kaizen Blitz in 2009 and 2010 provided the program with experience in identifying energy waste and provided a strong basis in measurement and persistence of O&M and other behavioral savings, which had not previously been addressed in most industrial resource acquisition programs.

In early 2010, after a year of having many projects cancelled by sites unwilling to make capital investments, the program needed a strategy to make up a gap in the project pipeline in less than one year in order to achieve ever growing electric efficiency goals. Based on experience gained through the pilots, Production Efficiency introduced a special incentive offer for operation and maintenance based energy saving measures, called the 90 by 90 Custom O&M Special Offer. Program field representatives would work with sites to identify improvements and changes that would lead to energy savings as well as a persistence strategy that would ensure the measure would continue to save energy over a three-year measure life. Sites that implemented a recommended change within 90 days were eligible to receive cash incentives of 90% of implementation costs, up to the program's standard O&M incentive of $.08/kWh.

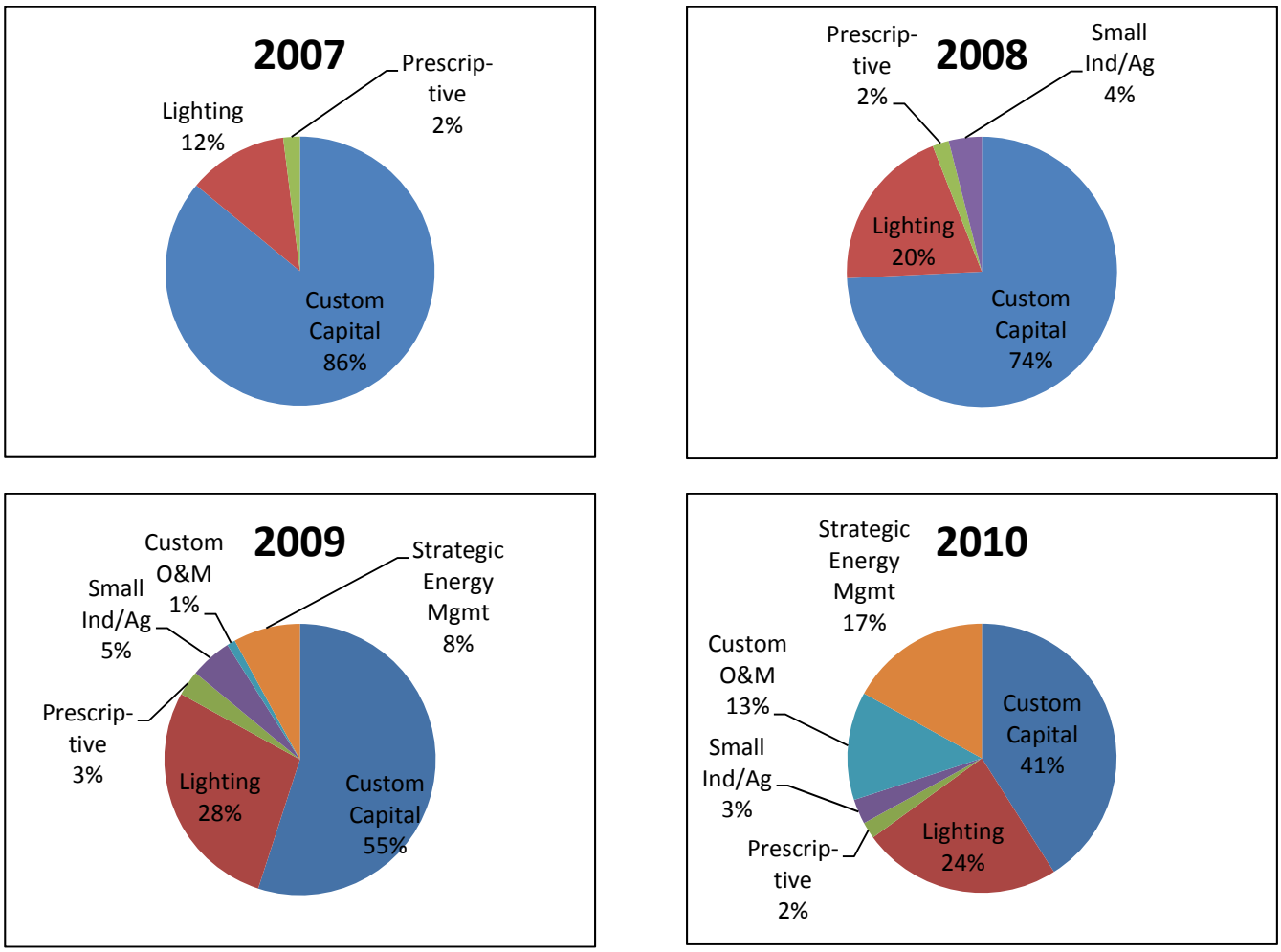
All of these additional program components had the effect of diversifying the potential sources of savings, the evolution and contributions of which can be seen in Figures 4 & 5 below. Industrial sites could participate in the program without making large capital investments. Low-investment, quick-payback lighting projects, as well as operations and maintenance savings that required little to no capital expense were now also options for energy savings. Strategic energy management offered a pathway both to immediate savings and to increasing the pipeline of capital projects at these sites as they became more energy-aware and started strategically managing their energy usage. Previously untapped agricultural sites, although individually small, provided strength in savings numbers through volume served under the Small Industrial Initiative. Altogether, these options made 2010 one of the most successful years for the program to date despite the effects of the recession.

Figure 4: Net Electric Savings Accomplishments by Program Track and Year



Source: Energy Trust internal project data tracking system

Figure 5: Diversifying Sources of Savings (Percent of Total Program Savings per Year)



Source: Energy Trust internal project data tracking system

Acquisition Costs for Diverse Sources of Industrial Energy Savings

In mid-2010, the costs of these new sources of savings to Energy Trust were compared to the program's traditional custom capital projects in order to determine whether to continue with strategic energy management and other O&M activities after the pilots and to optimize incentive designs for the post-pilot period. Acquisition costs of first year savings vary widely across the full range of program offerings, but due to the shorter measure life of three years associated with O&M savings, the levelized costs over the measure life are fairly equal, as shown in Table 2. The impact of these new sources of savings on the program's overall levelized costs was nil—the program didn't get more or less expensive, but stayed just under $.03/kWh, and below the Oregon Public Utility Commission's performance metric of $.035/kWh. Average acquisition costs shown in Table 2 represent the cost of incentives and technical services provided by Energy Trust to procure the first year savings associated with these projects, but do not include program management or delivery.

Table 2: Production Efficiency Measure Incentive and Cost Comparison

Measure Type	Average Measure Life (yrs)	Cash Incentive ($/ annual kWh)	Project cost cap %	Avg. acquisition cost ($/first yr kWh)	Levelized cost ($/kWh over measure life
Custom capital – non-lighting	10	$.25	50%	$.150	$.015
Capital < 1 yr payback	10	$.02	50%	$.025	$.003
Capital - lighting	9	$.17	35%	$.100	$.011
Custom O&M	3	$.08	50%	$.038	$.013
Custom O&M – 90 by 90 special	3	$.08	90%	$.043	$.014
Custom O&M – Kaizen Blitz	3	$.08	50%	$.041	$.014
Custom O&M - Strategic Energy Mgmt	3	$.02	na	$.020	$.007

Conclusion

Having a diverse set of offerings available for participants of industrial efficiency programs offers many benefits. It allows program staff to remain engaged with sites, regardless of their willingness or ability to spend capital, both through the implementation of low or no-cost measures as well as the identification and investigation of future capital projects. This allows programs to continue to achieve savings, even in down economic years.

Having a broader suite of available energy saving measures also allows the program to reach a broader spectrum of participants. In the case of Energy Trust's industrial program, large industrial sites made up much of the early participation. By adding streamlined options for smaller industrial as well as agricultural sites, the program was able to offer solutions for sites that were historically underserved. It also offers another level of diversification in that the program now works with sites in a broader range of sizes as well as industries.

Large capital projects will continue to play a dominant role in the program savings, but building a balanced, diversified portfolio of measures, technical services and delivery strategies makes the program more resilient against slow economic cycles that might hit different sectors at different times. It also allows Energy Trust to work continuously and comprehensively with the industrial sites that we rely upon for savings. Instead of being merely limited to projects driven by capital investments, the program can also engage sites with a suite of smaller projects, O&M changes, and the development of long-term strategic energy management practices.

Building on the success of recent program development, in 2011 the program is in the process of rolling out an even broader menu of services for industrial and agricultural sites that will further target operations and maintenance savings and the benefits of engaging sites in strategic energy management.

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