

Economic Impacts From Energy Trust of Oregon 2010 Program Activities

Final Report

ECONorthwest

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1. INTRODUCTION AND SUMMARY

ECONorthwest was retained by Energy Trust of Oregon (“Energy Trust”) to estimate the economic impacts of its energy efficiency and renewable energy programs in 2010 on the Oregon economy.¹ These impacts include changes in output, wages, business income, and employment in Oregon that resulted from 2010 program spending and activities. Each year, Energy Trust programs generate energy efficiency gains (i.e., energy savings) and renewable energy generation that continue into the future. As a result, ECONorthwest also analyzed the economic impacts from the current program year that accumulate in following years.

For this analysis, *gross impacts* are calculated and then compared against a Base Case spending scenario, which assumes that funds that were paid to Energy Trust are returned and spent by Oregon ratepayers in the Oregon service territories of Portland General Electric (PGE), Pacific Power, Northwest Natural, and Cascade Natural Gas. The difference in economic impacts between the gross economic impacts attributed to Energy Trust spending and the Base Case scenario is referred to as *net impacts*.²

In 2010, Energy Trust spending totaled \$122.8 million. This spending was primarily focused on program implementation, with \$99.5 million for energy efficiency programs and \$19.1 million for renewable energy programs. In addition, the Energy Trust incurred \$4.1 million in administrative and program support costs during the 2010 program year.

Energy efficient equipment and renewable energy installations saved Oregonians 48.9 average megawatts (aMW) of electricity (428,652 MWh annually) and 4.6 million therms of natural gas. The gross and net economic impacts for Energy Trust 2010 program activities are shown in Table ES1. The changes in spending and energy savings associated with these programs had the following net economic impacts on the Oregon economy in 2010:

- An increase of \$184.4 million in output;
- An increase of \$56.0 million in wages and \$14.9 million in income to small business owners; and
- 1,249 full- and part-time jobs.

¹ Some of these projects also received financial and/or technical assistance through state and federal tax credit programs. Based on evaluations, Energy Trust believes their participation to be critical to these projects.

² An analysis of the *net economic impacts* requires that only economic stimuli that are new or additive to the economy be counted. By making adjustments for program funding, net economic impacts provide a more reliable measure of job and income creation. For example, if an impact of 5 net new jobs is reported, this means that spending on Energy Trust programs resulted in 5 more jobs relative to what would have occurred had the money been returned and spent by Oregon ratepayers in the utility service territories.

Table ES1: Gross and Net Economic Impacts

Impact Type	Gross Impacts	Net Impacts
Output	\$275,136,000	\$184,388,400
Wages	\$81,052,300	\$56,018,800
Business Income	\$18,461,600	\$14,853,100
Jobs	2,005	1,249

Table ES2 reports the net economic impacts for every million dollars in Energy Trust spending.³ For the 2010 program year, every million dollars in Energy Trust spending is associated with approximately \$1.5 million in new economic activity in Oregon, including \$458,300 in wages, \$121,500 in business income, and 10.2 jobs.

Table ES2: Net Economic Impacts Per Million Dollars in Energy Trust Spending

Impact Type	Net Impacts Per Million Dollars in Spending
Output	\$1,508,600
Wages	\$458,300
Business Income	\$121,500
Jobs	10.2

The remainder of this report documents the analysis that was completed to develop these economic impact estimates.

³ These are “fully loaded costs” that include Energy Trust program and administrative costs, as well as incentives paid to program participants.

2. ENERGY TRUST 2010 PROGRAM ACTIVITIES

2.A. 2010 EXPENDITURES

For this analysis, budget information provided by Energy Trust was aggregated into several general categories to facilitate economic impact modeling for similar areas of spending. Table 1 shows the general areas of spending for Energy Trust and reflects actual expenditures for 2010. As shown at the bottom of the table, total spending by Energy Trust in 2010 was \$122.8 million. This represents a \$25.8 million, or 26.6 percent, increase from the 2009 program year.

As a general rule, spending on program incentives goes directly to equipment purchases and labor for installation. Common measures that receive incentives include high efficiency lighting (compact fluorescents and T-8's), high efficiency HVAC systems, home and commercial weatherization, high efficiency industrial motors, and variable speed fan drives for commercial applications. In 2010, program expenditures⁴ for energy efficiency measures totaled \$99.5 million (a \$19.3 million or 24.1 percent increase from program year 2009). Program expenditures for renewable energy resources totaled \$19.1 million (a \$6.0 million or 45.8 percent increase from 2009).

Table 1: 2010 Energy Trust Program Spending (\$ millions)

Spending Category	Total Program Expenses	Total Support Costs	Total
Energy Efficiency Programs	\$99.5		\$99.5
Renewable Energy Programs	\$19.1		\$19.1
Other Admin & Program Support		\$4.1	\$4.1
Total	\$118.6	\$4.1	\$122.8

Source: Energy Trust of Oregon

2.B. 2010 ENERGY SAVINGS AND GENERATION

Table 2 shows the total net energy saved by Energy Trust programs in 2010. On an annualized basis, a total of 48.9 average megawatts were saved as a direct result of Energy Trust program activities in 2010. This includes energy savings for both residential and commercial-industrial energy efficiency programs, as well as energy generated through the renewable energy program. The amount of energy generated by the renewable energy program in 2010 is relatively small compared to the energy savings attributed to the efficiency programs. However, it is included in Table 2 because renewable generation and energy savings are essentially identical from a customer standpoint in terms of economic effects, i.e., they both reduce energy bills.

⁴ Program expenditures are based on incentives and allocated support costs.

Table 2: 2010 Net Energy Savings

Program Sector	Annual kWh Saved	Average MW Saved (aMW)	Annual Therms Saved
Residential Energy Efficiency Programs	106,459,940	12.2	1,856,650
Commercial/Industrial Energy Efficiency Programs	293,349,569	33.5	2,766,130
Renewable Energy Programs	28,842,438	3.3	0
Total Energy Saved	428,651,947	48.9	4,622,780

Source: Energy Trust of Oregon

Similar to previous program years, electric energy savings (kWh) form the bulk of net energy savings. In total, 428,652 MWh of electricity were saved in 2010. This is about 40.0 percent more than in 2009. Natural gas savings in 2010 amounted to 4,622,780 therms. This represents a 61.4 percent increase over 2009. In addition, there was a significant change in the mix of energy savings from the 2009 program year, with significantly more energy savings in the commercial/industrial sector (73.4 percent of total energy savings in 2010 vs. 39.9 percent in 2009) and less from the residential sector (26.6 percent in 2010 vs. 60.1 percent in 2009).

The efficiency gains shown in Table 2 result in a loss of revenue to Oregon utilities due to lost power sales, and this loss of revenue is included in the gross economic impacts measured in this analysis.⁵ If the utility sector had similar economic impact multipliers as other sectors in Oregon's economy, then the energy cost savings in other sectors would roughly cancel out the loss of revenue in the utility sector. For Oregon utilities, much of the spending impact flows outside the state, as Pacific Power is owned by an out-of-state company, and both Pacific Power and PGE have shareholders that are widely distributed throughout the country. Consequently, some of the revenue losses for utilities (and the resulting losses in employment and economic activity) accrue to businesses and households outside of Oregon.

There is an additional long-term benefit from the efficiency gains, as they delay the need for building new power generation. Power generated from new sources will almost certainly be more expensive than existing power resources due to increased costs of capital and issues associated with siting new power plants. In this sense, efficiency gains can be viewed as a means for prolonging the use of lower-cost resources and delaying the need for switching to higher cost power supplied by new generation. By enabling the efficient use of lower cost resources, these programs help the entire Oregon economy run more efficiently. This benefit was not explicitly modeled for this analysis because it is directly addressed in the Energy Trust's benefit/cost analysis. It is nevertheless an important issue and is one of the primary tenets underlying conservation and demand-side management programs.

⁵ For this analysis, it was assumed that utilities did not sell saved power on the spot market, as estimates of the amount of power sold due to energy efficiency are generally unavailable. If utilities can sell conserved power on the market due to the efficiency programs, then there is an additional benefit in the form of increased revenues to the utility sector. As this was not included in this analysis, the results discussed here represent a lower bound for potential utility sector benefits.

3. ANALYSIS METHODS

Estimating the economic impacts attributable to Energy Trust programs is a complex process, as spending by Energy Trust—and subsequent changes in spending by program participants—unfold over a lengthy period of time. From this perspective, therefore, the most appropriate analytical framework for estimating the economic impacts is to classify them into the following categories:

- *Short-term* economic impacts associated with changes in business activity as a direct result of changes in spending by Energy Trust programs and participants.
- *Long-term* economic impacts associated with the subsequent changes in factor costs and optimal use of resources.

This analysis estimates the short-term economic impacts of Energy Trust program activities during the 2010 program year. The short-term economic impacts are those attributed to additional dollars accruing to Oregon households and businesses as a result of these programs. The economic modeling framework that best measures these short-term economic impacts is called input-output modeling. Input-output models provide an empirical representation of the economy and its inter-sectoral relationships, enabling the user to trace the effects (economic impacts) of a change in the demand for commodities (goods and services). Because input-output models generally are not available for state and regional economies, special data techniques have been developed to estimate the necessary empirical relationships from a combination of national technological relationships and county-level measures of economic activity. This modeling framework, called IMPLAN (for IMpact Analysis for PLANning), is the technique that ECONorthwest has applied to the estimation of impacts.⁶

Input-output analysis employs specific terminology to identify the different types of economic impacts that result from economic activities. Expenditures made through Energy Trust programs affect the Oregon economy *directly*, through the purchases of goods and services in this state, and *indirectly*, as those purchases, in turn, generate purchases of intermediate goods and services from other, related sectors of the economy. In addition, the direct and indirect increases in employment and income enhance overall economy purchasing power, thereby *inducing* further consumption- and investment- driven stimulus. This cycle continues until the spending eventually leaks out of the local economy as a result of taxes, savings, or purchases of non-locally produced goods and services or “imports.”

⁶ IMPLAN was developed by the Forest Service of the US Department of Agriculture in cooperation with the Federal Emergency Management Agency and the Bureau of Land Management of the US Department of the Interior to assist federal agencies in their land and resource management planning. Applications of IMPLAN by the US Government, public agencies and private firms span a wide range of projects, from broad, resource management strategies to individual projects, such as proposals for developing ski areas, coal mines, and transportation facilities, and harvesting timber or other resources.

In addition, the IMPLAN model and datasets have been updated since the previous study. This analysis relies on the IMPLAN v. III model and a 2008 dataset for Oregon.

The IMPLAN model reports the following economic impacts:

- *Total Industrial Output (Output)* is the value of production by industries for a specified period of time. Output can be also thought of as the value of sales including reductions or increases in business inventories.
- *Employee Compensation (Wages)* includes workers' wages and salaries, as well as other benefits such as health and life insurance, and retirement payments, and non-cash compensation.
- *Proprietary Income (Business Income)* represents the payments received by small-business owners or self-employed workers. Business income would include, for example, income received by private business owners, doctors, accountants, lawyers, etc.
- *Job* impacts include both full and part time employment.

Within this modeling framework, the following terms are used to classify impacts:

- *Gross Impacts* reflect the economic impacts with no adjustment made for impacts that might have occurred in the Base Case scenario. Gross impacts include:
 - *Program operations spending* as Energy Trust purchases labor and materials to carry out its energy efficiency and renewable energy programs.
 - *Incremental measure spending* by participants in Energy Trust programs.
 - *Reductions in energy consumption* and the associated lower operating costs to businesses and increase in household disposable income.
 - *Reductions in utility revenues* as households and businesses consume less electricity and natural gas.
- *Net Impacts* are the effects of Energy Trust program activities that have been adjusted to reflect the Base Case scenario. That is, net impacts are those impacts over and above what would have occurred in the Base Case scenario. Net impacts are based on:
 - *Gross* Energy Trust program impacts (discussed above).
 - *Less foregone household spending* as a result of the public purpose charges that are collected from households and used by Energy Trust to cover program management and administrative costs, and as incentives in their energy efficiency and renewable energy programs.

4. GROSS ECONOMIC IMPACTS

The gross economic impacts attributed to 2010 Energy Trust programs are based on the program costs (including administration costs), and the incremental measure spending and energy savings of program participants. Incremental measure spending by program participants consists of expenditures on energy efficiency equipment such as appliances and furnaces/boilers, heating, ventilation and air conditioning (HVAC) systems, lighting modifications, and also industrial

processing equipment. ECONorthwest received detailed measure spending data from Energy Trust, and this spending data was then mapped to over 20 different IMPLAN sectors.

Energy Trust also supplied detailed energy savings estimates, broken out by fuel type (electricity, natural gas) for program participants. For residences, lower energy costs will increase Oregon households’ disposable income. Therefore, the estimated energy cost savings were input into a modified consumption function representing the spending pattern of a middle-income household in Oregon, which mapped the spending to over 400 IMPLAN sectors.⁷

Energy savings for commercial/industrial participants were first mapped to industry sector using North American Industrial Classification System (“NAICS”) codes, and then cross-referenced to 233 different business sectors in the IMPLAN model.⁸ From an input-output perspective, energy savings will affect Oregon businesses by lowering their production costs. To estimate the economic impacts associated with these lower energy costs, ECONorthwest used an elasticity-based approach to measure the change in output. That is, this approach assumes that lower energy costs increase the competitiveness of Oregon businesses, allowing them to decrease price, and increase output.⁹

Lastly, the energy savings for households and businesses translate into lower revenues to electric and natural gas utilities. ECONorthwest used estimated energy savings, by fuel type, to reduce revenues to utilities.

The gross economic impacts of Energy Trust programs for 2010 are shown in Table 3.

Table 3: 2010 Gross Economic Impacts

Impact Type	Gross Impacts
Output	\$275,136,000
Wages	\$81,052,300
Business Income	\$18,461,600
Jobs	2,005

Sources: ECONorthwest using detailed Energy Trust program data and IMPLAN.

In 2010, spending and energy savings attributed to Energy Trust programs increased economic output in Oregon by \$275.1 million, including increases of \$81.1 million in wages and \$18.5

⁷ This consumption function was modified to exclude spending on electricity and natural gas.

⁸ Energy savings were allocated to 100 different industry sectors for the 2006 program year, 181 industry sectors in 2007, and 199 industry sectors in 2009. The significant and continuing increase in the number of benefiting industry sectors (up 133 percent since 2006) shows that Energy Trust commercial/industrial sector involvement is expanding.

⁹ Because we do not have price elasticity of demand coefficients for each of the 233 business sectors (and their commodities) that benefited from reduced energy costs, ECONorthwest assumed that the price elasticity of demand for each industry’s output was -1.0, i.e., unitary elastic. A 1 percent decrease in costs would, therefore, translate into a 1 percent decrease in price and a 1 percent increase in output.

million in business income. This activity also created 2,005 jobs in Oregon. Table 3, however, reports gross impacts that do not take into consideration alternative uses of Energy Trust and participant spending related to these programs. These net impacts are addressed in the next section.

5. NET ECONOMIC IMPACTS

All of the economic impacts reported in this section of the report are *net impacts* and reflect economic benefits over and above what would have occurred had Energy Trust programs not existed. To calculate net impacts, the economic impacts of the Base Case scenario are estimated first, which assumes that the money that is currently spent on Energy Trust programs is instead allocated to utility ratepayers. The economic impacts resulting from the Base Case scenario are then subtracted from the gross impacts discussed in the previous section to determine net impacts.

Table 4 shows the net economic impacts attributed to Energy Trust programs in 2010. The net economic impacts are positive and (by design) significantly less than the gross economic impacts reported previously. The gross economic impacts include the assumption that revenues to utilities and other providers of energy services decline as a result of the energy savings by households and businesses. To this, we have now included the Base Case spending scenario that assumes that all Energy Trust funds are instead spent by ratepayers of the utilities according to the spending patterns of a typical Oregon household.

For 2010, Energy Trust programs had a net effect of increasing Oregon’s economic output by \$184.4 million relative to the Base Case scenario. This includes an increase of \$56.0 million in wages and \$14.9 million in business income within Oregon. Energy Trust programs also had a positive net impact on employment in Oregon, with 1,249 jobs created in 2010. This reflects jobs over and above what would have been created in the Base Case scenario.

Table 4: 2010 Net Economic Impacts

Impact Type	Net Impacts
Output	\$184,388,400
Wages	\$56,018,800
Business Income	\$14,853,100
Jobs	1,249

Sources: ECONorthwest using detailed Energy Trust program data and IMPLAN.

6. ENERGY SAVINGS-RELATED ECONOMIC IMPACTS OVER TIME

For many projects, the installations occur in the same year that the equipment and program costs are incurred. The energy savings from these measures, however, extend into future years as most measures have expected useful lives of eight to 40 years (or more). The cost savings from these measures for homes and businesses also extend into future years (with some degradation as equipment ages) after the initial purchase. These cost savings continue to benefit the economy, as

households spend less on electricity and natural gas and more on other consumer products, and businesses are able to produce goods and services more efficiently. As a consequence, the net effects from the first year when the equipment and program spending occur only capture a fraction of the overall benefit of these programs.

6.A. 2010 PROGRAM YEAR

Table 6 shows the annualized gross economic impacts due to energy cost savings from energy efficiency measures installed in 2010 (i.e., they do not account for new generation from renewable sources). These estimates were calculated using the input-output model to estimate the economic impacts of reduced energy costs while setting all other costs (i.e., equipment purchases and program implementation costs) equal to zero. To truly isolate the impact of the energy cost savings, we also assumed that there were no lost utility revenues resulting from the measures installed and that utilities would be able to sell the unused power to other customers. This provides an estimate of energy efficiency benefits based solely on the reduced energy costs to the economy and excludes any additional benefits due to the spending on these programs and measures.

Table 6: Annualized Economic Impacts Due to 2010 Energy Savings Alone

Economic Impact Measure	Impact Due to 2010 Savings Only
Output	\$50,314,900
Wages	\$12,431,400
Business Income	\$2,244,900
Jobs	479

Source: ECONorthwest

To be consistent with previous impact reports, the energy savings impacts shown in Table 6 are reported on an annualized basis, i.e., they describe the economic impacts from energy savings for measures that were installed in 2010 and operated for an entire year. In the first program year, energy savings develop as energy efficiency measures are installed, and installation occurs over the course of the year. ECONorthwest does not have data on when each individual installation was completed. Thus, we have assumed that installations occur evenly throughout the year and have used a 50 percent implementation adjustment factor for energy savings in the first program year. (The economic impacts shown earlier in this report are based on energy savings that have been adjusted using this implementation adjustment factor.)

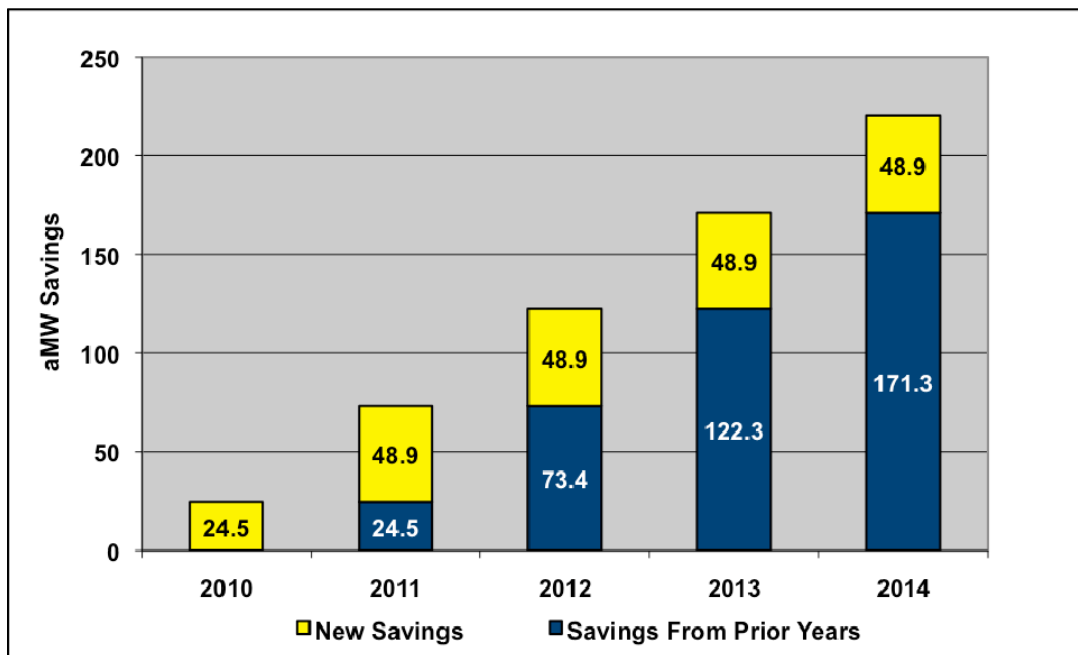
As shown in Table 6, on an annualized basis, 48.9 aMW of energy savings from energy efficiency will increase economic output by \$50.3 million, which includes an increase of \$12.4 million in wages and \$2.2 million in business income. This increase in economic activity is associated with 479 jobs.

The following figures illustrate how the effects of energy efficiency accumulate in the future, assuming that energy cost savings in future years continue at the annualized level observed in

2010. These figures highlight the fact that the incremental benefit of any single year is only a fraction of the cumulative effect of efficiency gains achieved in prior years. It should also be noted that 2010 does not include impacts from renewable energy projects. When the effects of the larger renewable energy projects are included, the cumulative impacts will be significantly greater than what is shown here using only the energy savings generated by Energy Trust efficiency program activities.

Figure 1 shows the cumulative energy savings resulting from Energy Trust energy efficiency program activities in 2010. This exhibit assumes that the 48.9 aMW in annual energy savings achieved in 2010 is achieved in future years. Given that the average measure life for equipment covered by Energy Trust programs is over 10 years, the potential for sustained cumulative energy savings benefits is quite large.

Figure 1: Cumulative Energy Savings Over Time



In 2010, Energy Trust’s program activities included installation of energy efficiency measures that would yield an estimated 48.9 million aMW of energy savings annually. As shown in Figure 1, these energy savings have been adjusted in the first program year to account for actual implementation throughout the year, and then cumulate each year thereafter. By 2014, Energy Trust’s 2010 energy efficiency program will have generated approximately 220.2 aMW of energy savings over the five year time period.

Figure 2 illustrates a similar cumulative effect for the economic output impacts that result from energy cost savings associated with Energy Trust energy efficiency programs. In 2010, economic output in Oregon increased an additional \$25.2 million based on the energy cost savings achieved in that year. If these energy cost impacts are annualized and this trend continues in subsequent years, the cumulative benefits expand over time. By the end of 2014, Oregon’s economic output will have increased by \$226.4 million due solely to efficiency gains made over the past five years.

Figure 2: Cumulative Output Effects Based on 2010 Energy Savings

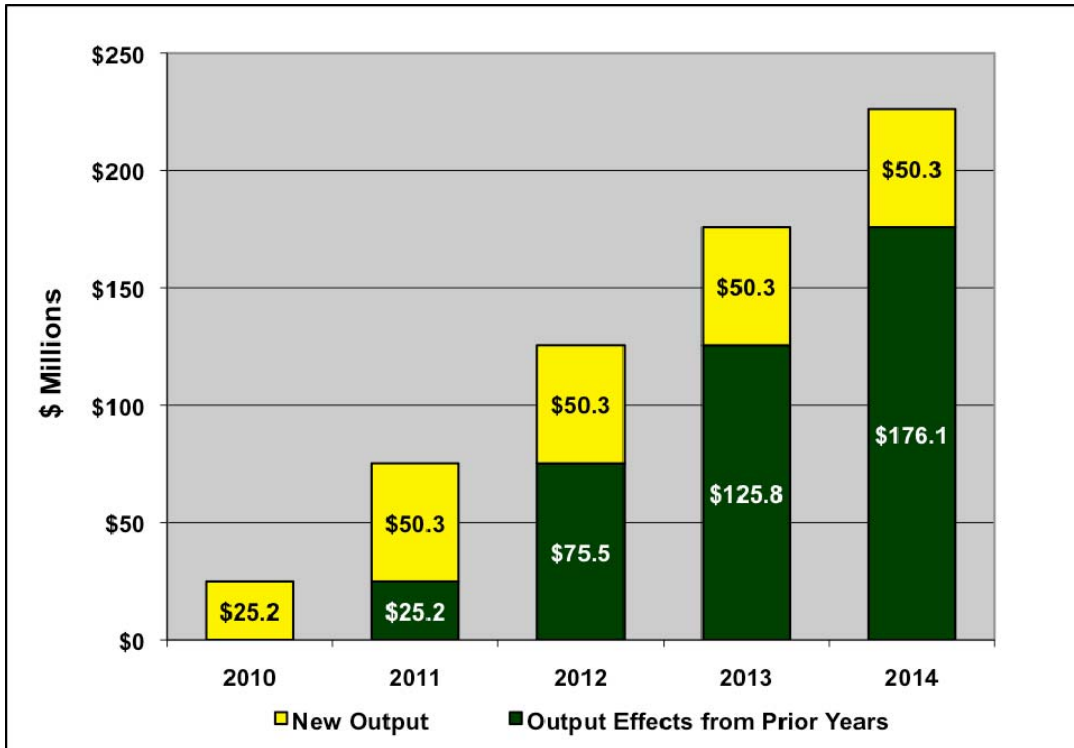
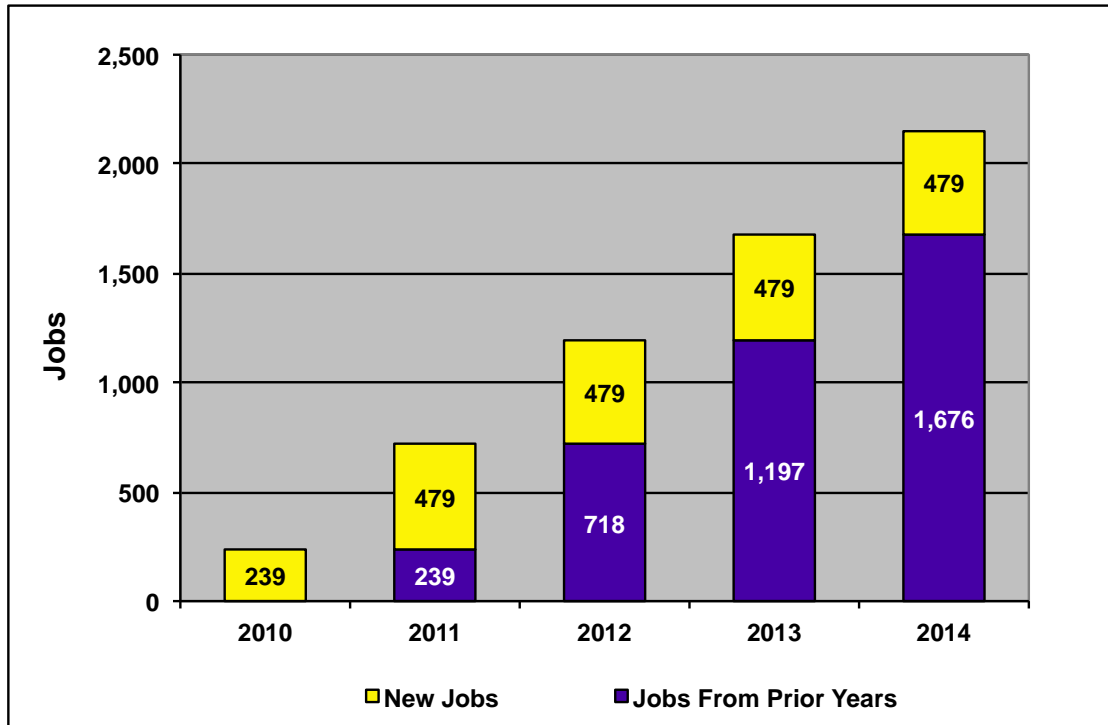


Figure 3 illustrates the potential cumulative impact of energy cost savings on employment in Oregon. When energy cost savings persist over time, businesses are able to direct spending away from energy costs to other factors of production. By lowering their costs, businesses are able to increase output. Similarly, less residential spending on energy also contributes to increased employment as spending shifts to other goods and services in sectors that have a greater impact on the Oregon economy.

As shown in Table 6 and Figure 3, on an annualized basis, Oregon employment increased by 479 jobs based on the energy cost savings achieved in the 2010 program year. If these energy cost savings can be sustained over time, then the employment impacts should persist as well, at least in the short term. By the end of 2014, the costs savings attributed to Energy Trust’s energy efficiency programs in 2010 will have generated 2,155 person-years of employment in Oregon over the five-year period.

Figure 3: Cumulative Employment Impacts Based on 2010 Energy Savings



6.B. ACROSS ALL PROGRAM YEARS, 2002 THROUGH 2010

As just shown, the cost savings and economic impacts from the 2010 program year will persist and cumulate over time. In similar fashion, the energy savings and economic impacts across program years will also persist and grow over time. ECONorthwest calculated the cumulative net impacts from energy cost savings across Energy Trust’s nine program years, from 2002 through 2010.¹⁰ These results are shown in Table 7.

¹⁰ ECONorthwest did not measure the economic impacts for the 2003, 2005, and 2008 program years. As a result, the economic impacts for those program years were measured using program spending and economic impacts from the previous year, with adjustments for changes in spending between program years.

Table 7: Cumulative Impacts From Energy Savings Across Program Years, 2002 Through 2010

Year	Output	Wages	Business Income	Jobs
2002	\$14,063,800	\$4,316,000	\$793,700	140
2003	\$59,355,500	\$18,215,500	\$3,349,700	590
2004	\$96,344,000	\$29,573,300	\$5,340,900	950
2005	\$109,355,600	\$33,580,900	\$5,857,800	1,090
2006	\$126,383,600	\$39,326,900	\$6,533,700	1,260
2007	\$151,601,800	\$47,451,300	\$7,541,800	1,490
2008	\$182,483,900	\$56,674,900	\$8,872,500	1,740
2009	\$215,885,100	\$66,287,200	\$10,109,100	2,030
2010	\$266,200,000	\$80,963,500	\$12,354,000	2,509

Source: ECONorthwest.

Figures 4 and 5 show the cumulative job and output effects associated with Energy Trust programs between 2002 and 2010. The methodology employed here is similar to that for the 2010 program year. We assume that installation occurs evenly and that 50 percent of the total “annualized” energy savings are realized in the initial program year; subsequent years include the full amount of energy savings attributed to the initial program year. For example, ECONorthwest previously estimated that Energy Trust’s 2002 and 2003 energy efficiency programs would generate, on an annualized basis, 280 and 620 jobs, respectively. As shown on the left hand side of Figure 4, one-half of the 280 annualized job impacts are reported for the 2002 program year. In 2003, the cumulative job impacts (590 jobs) are based on the annualized job impacts from 2002 (280 jobs, of which 140 occurred in the prior year) plus one-half of the annualized job impacts in 2003 (310 jobs). Following this approach, ECONorthwest estimates that the energy savings associated with Energy Trust’s energy efficiency programs will sustain approximately 2,509 jobs in Oregon at the end of that nine-year time period.

Figure 4: Cumulative Job Impacts From Energy Savings Across Program Years, 2002 Through 2010

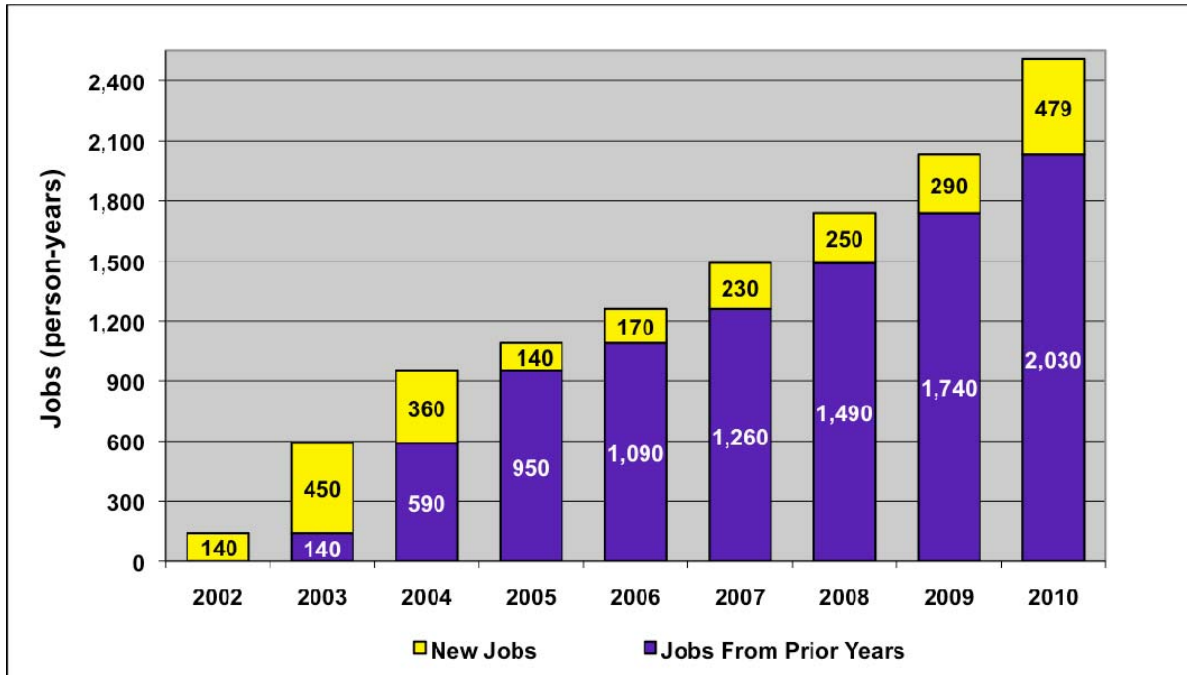
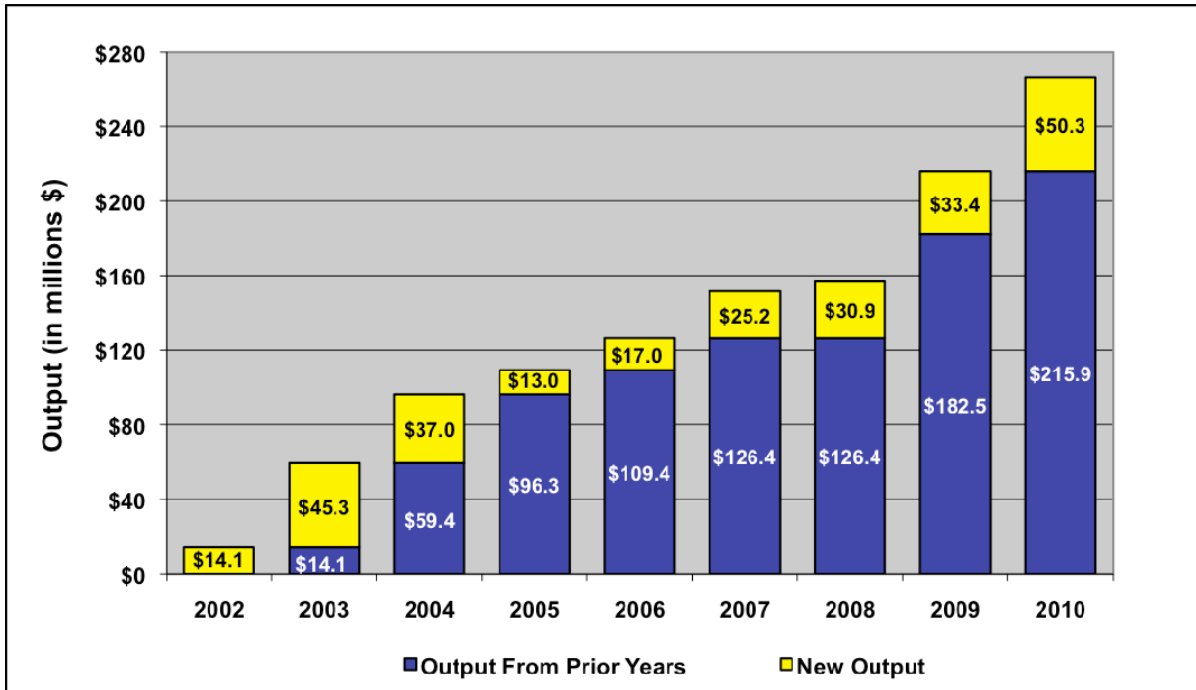


Figure 5 reports the cumulative output impacts from Energy Trust program activities from 2002 through 2010.

Figure 5: Cumulative Output Impacts From Energy Savings Across Program Years, 2002 Through 2010 (dollars in millions)



Although the methodology used to calculate cost savings and economic impacts across program years is similar to that used for any given program year, the results are not directly comparable and should be interpreted carefully. For a given program year, the cumulative impacts are the impacts that have occurred over time, i.e., the energy savings and economic impacts generated in a program year will continue in years to come. The cumulative impacts across program years are the total impacts occurring at that time, i.e., the energy savings and economic impacts generated in subsequent program years are added to the energy savings and economic impacts generated in previous years.

In addition, there are other economic factors that could cause the economic impacts to decline over time in which case the economic impacts reported above would be overstated.

Given the static nature of input-output modeling, in general, and the IMPLAN model used in this analysis, cumulative impacts do not take into account changes in production and business processes that Oregon businesses make in anticipation of future higher energy prices and/or increased market pressure from international competition to increase production efficiency. To the extent that Oregon businesses are already adjusting in anticipation of higher costs and/or tougher competition, then cumulative impacts presented here are overstated, as the overall market would become more efficient due to factors outside Energy Trust influence. However, Energy Trust savings estimates do not include the energy savings that program evaluations indicate would have happened, either immediately or in the very near future, without Energy Trust programs. This possible overstatement, therefore, only pertains to additional, future market-driven increases in efficiency.

The cumulative numbers also rely on the critical assumption that each dollar saved will translate into a dollar of increased economic output for those businesses adopting conservation measures. This assumption is a simplifying assumption made in absence of better information specific to Oregon's economy. This assumption is reasonable in the short run, but in the long run it is likely that a dollar of energy savings will translate to less than a dollar of increased economic output (as reflected in the current economic variables for Oregon used in IMPLAN) as the overall market adopts more efficient production practices in anticipation of increased competition and higher energy costs. Consequently, the cumulative impacts shown here represent an upper bound. Despite these caveats, the ongoing and cumulative effect of conservation due to Energy Trust activities is nevertheless a significant net benefit to Oregon's economy.