

Economic Impacts From Energy Trust of Oregon 2011 Program Activities

Final Report

ECONorthwest
ECONOMICS • FINANCE • PLANNING

888 SW Fifth Avenue, Suite 1460
Portland, Oregon 97204
503-222-6060

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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 2011 on the Oregon economy.¹ These impacts include changes in output, wages, business income, and employment in Oregon that resulted from 2011 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 program spending and the Base Case scenario is referred to as *net impacts*.²

In 2011, Energy Trust spending totaled \$139.6 million. This spending was primarily focused on program implementation, with \$117.6 million for energy efficiency programs and \$18.0 million for renewable energy programs. In addition, the Energy Trust incurred \$4.0 million in administrative and program support costs during the 2011 program year.

Energy efficient equipment and renewable energy installations saved Oregonians 48.4 average megawatts (aMW) of electricity (423,645 MWh annually) and 5.4 million therms of natural gas. The gross and net economic impacts for Energy Trust 2011 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 2011:

- An increase of \$208.0 million in output;
- An increase of \$57.7 million in wages and \$17.4 million in income to small business owners; and
- 1,235 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, i.e., net impacts consider both the positive economic impacts from investment in energy efficiency and the negative economic impacts of foregone spending associated with program funding. 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	\$387,718,000	\$207,936,000
Wages	\$108,425,000	\$57,729,000
Business Income	\$24,957,000	\$17,379,000
Jobs	2,739	1,235

Table ES2 reports the net economic impacts for every million dollars in Energy Trust spending.³ For the 2011 program year, every million dollars in Energy Trust spending is associated with approximately \$1.5 million in new economic activity in Oregon, including \$413,400 in wages, \$124,400 in business income, and 8.8 jobs.

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

Impact Type	Net Impacts Per Million Dollars in Spending
Output	\$1,489,000
Wages	\$413,400
Business Income	\$124,400
Jobs	8.8

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 2011 PROGRAM ACTIVITIES

2.A. 2011 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 2011. As shown at the bottom of the table, total spending by Energy Trust in 2011 was \$139.6 million. This represents a \$16.8 million, or 13.7 percent, increase from the 2010 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, high efficiency HVAC systems, appliances, industrial process efficiency improvements, and home and commercial weatherization. In 2011, program expenditures⁴ for energy efficiency measures totaled \$117.6 million (a \$18.1 million or 18.2 percent increase from program year 2010). Program expenditures for renewable energy resources totaled \$18.0 million (a -\$1.1 million or -2.3 percent change from 2010).

Table 1: 2011 Energy Trust Program Spending (\$ millions)

Spending Category	Total Program Expenses	Total Support Costs	Total
Energy Efficiency Programs	\$117.6		\$117.6
Renewable Energy Programs	\$18.0		\$18.0
Other Admin & Program Support		\$4.0	\$4.0
Total	\$135.6	\$4.0	\$139.6

Source: Energy Trust of Oregon

2.B. 2011 ENERGY SAVINGS AND GENERATION

Table 2 shows the total net energy saved by Energy Trust programs in 2011. On an annualized basis, a total of 48.4 average megawatts were saved or generated as a direct result of Energy Trust program activities in 2011. 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 2011 is relatively small (about 7 percent of total electric energy savings) 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: 2011 Annualized Energy Savings

Program Sector	Annual kWh Saved	Average MW Saved (aMW)	Annual Therms Saved
Residential Energy Efficiency Programs	147,911,449	16.1	2,298,944
Commercial/Industrial Energy Efficiency Programs	262,808,429	30.0	3,108,250
Renewable Energy Programs	12,924,816	1.5	0
Total Energy Saved	423,644,694	48.4	5,407,244

Source: Energy Trust of Oregon

Similar to previous program years, electric energy savings (kWh) form the bulk of net energy savings. In total, 423,645 MWh of electricity were saved in 2011. This is about 3.0 percent more than in 2010. Natural gas savings in 2011 amounted to 5,407,244 therms. This represents an 17.0 percent increase over 2010.

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 2011 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 This analysis relies on 2010 IMPLAN data for the Oregon economy.

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. ECONorthwest has used IMPLAN for all of our previous impact analyses for Energy Trust, as well as similar analyses conducted for the Bonneville Power Administration, Consumers Energy of Michigan, and the Hawaii Public Utility Commission.

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. Over time, these job impacts are referred to as person-years of employment.

All of the economic impacts measured in this analysis are transitory and depend on program spending and energy savings in each year. That is, economic impacts for each program year are generated by changes in final demand (spending) that can be directly or subsequently linked back to Energy Trust energy efficiency programs. The mix and level of program spending may change from year to year, or could end in any given year. This means that the economic impacts will also vary from year to year, or could end in any given year. This is particularly important when discussing employment impacts. Although employment impacts are reported as a mix of full- and part-time jobs, they are jobs that occur as spending occurs and should be considered person-years of employment. In addition, it is highly likely that some of the employment benefits accrue to the same individuals over time.

Within this modeling framework, the following terms are used to classify impacts:⁷

- *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.⁸
 - *Reductions in utility revenues* as households and businesses consume less electricity and natural gas.

⁷ Both incremental measure spending and energy savings are included on a net basis, i.e., both have been adjusted to account for potential free riders. In energy efficiency programs, free riders are participants who would have adopted the energy efficiency measure even in the absence of the program.

⁸ Energy savings include the energy savings associated with market transformation efforts conducted by the Northwest Energy Efficiency Alliance (NEEA).

- *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 2011 Energy Trust programs are based on the program costs (including administration costs), and the net incremental measure spending and net 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 incremental 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.⁹

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 267 different business sectors in the IMPLAN model.¹⁰ 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.¹¹

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

⁹ This consumption function was modified to exclude spending on electricity and natural gas.

¹⁰ Over the previous four program years, energy savings were allocated to 100, 181, 199, and then 233 industry sectors. In 2011, energy savings were aligned with 267 business sectors, an increase of 15 percent from the previous program year. The significant and continuing increase in the number of benefiting industry sectors shows that Energy Trust commercial/industrial sector involvement is expanding.

¹¹ Because we do not have elasticity coefficients for each of the 267 business sectors (and their commodities) that benefited from reduced energy costs, ECONorthwest unitary elasticity, i.e., a 1 percent decrease in costs translates into a 1 percent increase in output.

revenues to utilities. The gross economic impacts of Energy Trust programs for 2011 are shown in Table 3.

Table 3: 2011 Gross Economic Impacts

Impact Type	Gross Impacts
Output	\$387,718,000
Wages	\$108,425,000
Business Income	\$24,957,000
Jobs	2,739

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

In 2011, spending and energy savings attributed to Energy Trust programs increased economic output in Oregon by \$387.7 million, including increases of \$108.4 million in wages and \$25.0 million in business income. This activity also sustained 2,739 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 2011. 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 2011, Energy Trust programs had a net effect of increasing Oregon’s economic output by \$207.9 million relative to the Base Case scenario. This includes an increase of \$57.7 million in wages and \$17.4 million in business income within Oregon. Energy Trust programs also had a positive net impact on employment in Oregon, with 1,235 jobs sustained by Energy Trust program activities in 2011. This reflects jobs over and above what would have been created in the Base Case scenario.

Table 4: 2011 Net Economic Impacts

Impact Type	Net Impacts
Output	\$207,936,000
Wages	\$57,729,000
Business Income	\$17,379,000
Jobs	1,235

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

6. ECONOMIC IMPACTS ATTRIBUTED ENERGY SAVINGS ACHIEVED IN THE 2011 PROGRAM YEAR

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 estimated useful lives of eight to 20 years (or more). The cost savings from these measures for homes and businesses also extend into future years (with some degradation as equipment ages and some increase in savings as rates increase) 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.

Table 5 shows the annualized gross economic impacts due to energy cost savings from energy efficiency measures installed in 2011 (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 5: Annualized Economic Impacts Due to 2011 Energy Savings Alone

Economic Impact Measure	Impact Due to 2011 Savings Only
Output	\$59,573,000
Wages	\$17,330,000
Business Income	\$2,282,000
Jobs	483

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

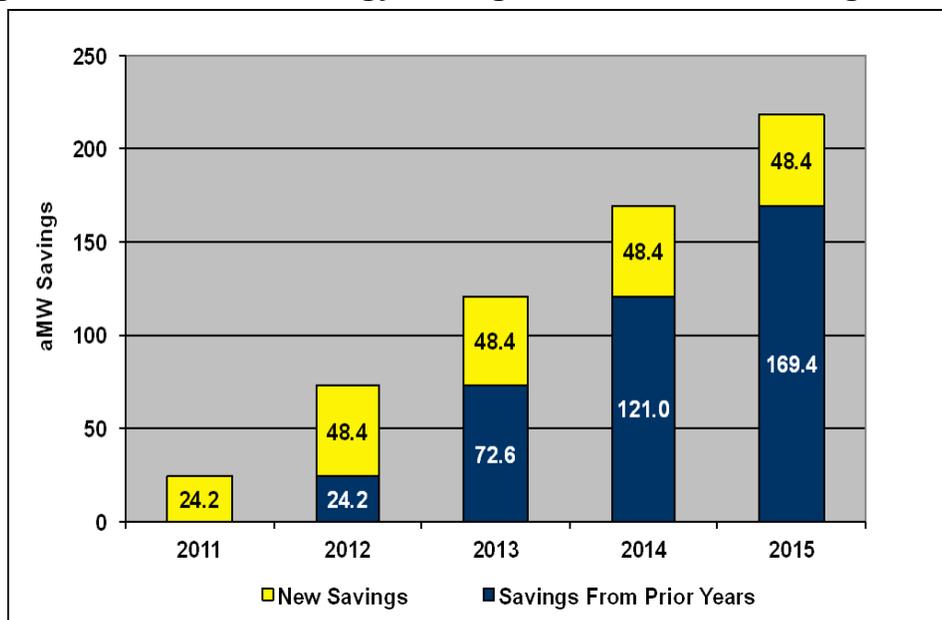
To be consistent with previous impact reports, the energy savings impacts shown in Table 5 are reported on an annualized basis, i.e., they describe the economic impacts from energy savings for measures that were installed in 2011 and operated for an entire year. In the first program year, energy savings 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 5, on an annualized basis, 48.4 aMW of energy savings from energy efficiency will increase economic output by \$59.6 million, which includes an increase of \$17.3 million in wages and \$2.3 million in business income. This increase in economic activity is associated with 483 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 2011. 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 these energy savings impacts associated do not include the impacts from renewable energy projects.)

Figure 1 shows the cumulative energy savings over a five-year period resulting from Energy Trust energy efficiency program activities in 2011. This exhibit assumes that the 48.4 aMW in annual energy savings achieved in 2011 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, 2011 Program Year

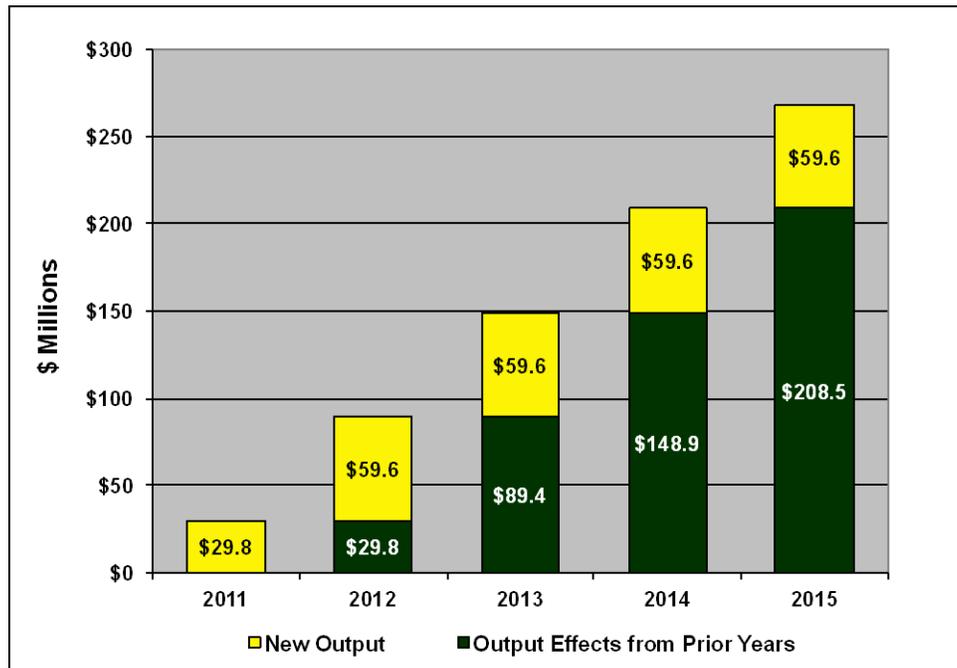


Sources: ECONorthwest using detailed Energy Trust Program data and IMPLAN.

In 2011, Energy Trust’s program activities included installation of energy efficiency measures that would yield an estimated 43.3 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 2015, Energy Trust’s 2011 energy efficiency program will have generated approximately 194.9 aMW of energy savings over the five-year 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 2011, economic output in Oregon increased an additional \$29.8 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 2015, Oregon’s economic output will have increased by \$268.1 million due solely to efficiency gains made over the past five years.

Figure 2: Cumulative Output Effects Based on Energy Savings Achieved in the 2011 Program Year



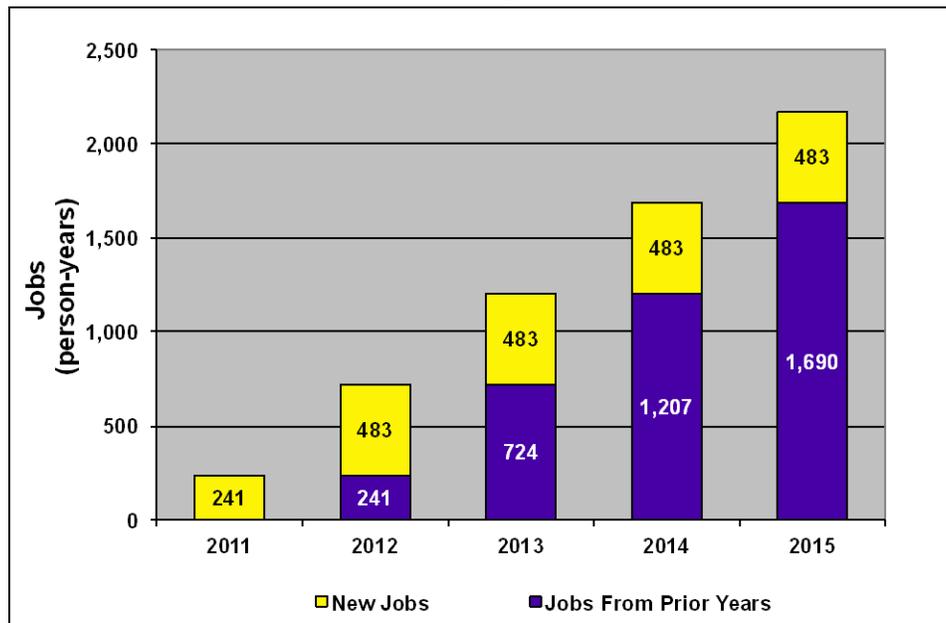
Sources: ECONorthwest using detailed Energy Trust Program data and IMPLAN.

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 5 and Figure 3, on an annualized basis, Oregon employment increased by 483 jobs based on the energy cost savings achieved in the 2011 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 2015, the costs savings attributed to Energy Trust’s energy efficiency programs in 2011 will have sustained 2,173 person-years of employment in Oregon over the five-year period, with some of these employment benefits accruing to the same individuals over time.

Figure 3: Cumulative Employment Impacts Based on Energy Savings Achieved in the 2011 Program Year



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

7. ECONOMIC IMPACTS ACROSS ALL PROGRAM YEARS, 2002 THROUGH 2011

Energy Trust first introduced its energy efficiency programs in Oregon in 2002. Thus, the 2011 program year represents the tenth year of energy efficiency program activity in this state. By most measures, Energy Trust program activity has increased significantly over this ten-year period.

- Program spending increased from \$19.6 million in 2002 to \$139.6 million in 2011, or by over 600 percent.
- Electric energy savings increased from 12.6 aMW in 2002 to 43.3 aMW in 2011, or by almost 250 percent.
- Energy savings for commercial-industrial program participants were mapped to 100 business sectors in 2004. In 2011, energy savings were mapped to 267 business sectors.

As discussed in the previous section, an important dimension of energy efficiency programs is that the energy savings and associated economic impacts continue to benefit the economy after the first program year, when spending and installations occur. To this, we now add the economic impacts attributed to spending in each program year.

Table 7 reports the net economic impacts associated with Energy Trust’ energy efficiency programs in Oregon between 2002 and 2011. The net economic impacts are based on spending and actual energy savings in each program year, as well as the annualized energy savings in future years through 2011. Economic impacts in subsequent years for energy savings installed prior to 2011 have been adjusted for the Estimated Useful Life (EUL) for measures installed each year.

Table 7: Summary of Cumulative Net Impacts From Energy Trust Program Activities Between 2002 and 2011 (in millions of nominal dollars)

Economic Impact Measure	Cumulative Net Impacts During Program Years 2002-2011	Annualized Impacts in Future Years
Output	\$2,133.2	\$335.1
Wages	\$630.9	\$98.4
Business Income	\$120.8	\$17.3
Jobs (person-years)	17,976	3,057

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

As is shown in Table 7, the spending and energy savings associated with Energy Trust program activities in Oregon between 2002 and 2011:

- Sustained, on a net basis, \$2,133.2 million in output (or economic activity), including \$630.9 million in wages, \$120.8 million in business income and almost 18,000 person-years of employment over the ten-year period.
- Will continue to generate additional energy savings that is linked to \$335.1 million in output, including \$98.4 million in wages, \$17.3 million in business income, and 3,057 person-years of employment annually, albeit at diminishing levels, in the short run.

The cumulative net impacts reported in Table 7 are derived from previous analyses conducted by ECONorthwest that rely on a consistent methodology across program years. This methodology measures 1) **gross impacts** based on program spending, net (adjusted for free riders) incremental measure spending and energy savings, and foregone utility revenues, and 2) **net impacts** based on gross impacts less foregone household spending as a result of ratepayer charges used to fund Energy Trust program activities and incentives. Energy savings beyond each program year do not include energy savings from the renewable energy projects, and have been adjusted (reduced) to reflect the EUL of measures installed in each program year.

There are, however, 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) if 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.