

Economic Impacts of Oregon Energy Tax Credit Programs in 2007 and 2008 (BETC/RETC)

Final Report

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ECONOMICS • FINANCE • PLANNING

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1. INTRODUCTION AND SUMMARY

The Oregon Department of Energy (ODOE) offers tax credits to Oregon residents and businesses that invest in energy conservation and renewable energy projects. Residents may apply for tax credits for eligible equipment models. Businesses can collect tax credits for 35 percent of eligible conservation project costs, which are the incremental costs associated with moving from a standard efficiency to a more energy efficient option. In addition, business can receive a tax credit for up to 50 percent of the cost of a renewable project.

ODOE asked ECONorthwest to estimate the economic effects of the Business Energy Tax Credit (BETC) and Residential Energy Tax Credit (RETC) programs. These effects include impacts on employment, output, and wages, as well as tax revenue in Oregon that resulted from 2007 and 2008 tax credits and the subsequent spending on measures and labor that these credits create. This analysis also separates the derived impacts from conservation versus renewable projects. In addition, ECONorthwest isolated the economic impacts of energy efficiency improvements (i.e., energy savings) that were realized in each program year in order to estimate the benefits to the economy that accumulate in future years. Notably, ODOE only supplied 2008 data through October 31, 2008, and therefore the 2008 impacts are derived from 10 months of program activity.

For this analysis, ECONorthwest compared all impacts against a Base Case scenario in which the BETC and RETC programs do not exist and the tax credit funds are spent on other Oregon government programs.¹ The difference in economic impacts between the tax credit program spending and the Base Case scenario is referred to as the *net impact* of the tax credit programs. For example, if an impact of five new jobs is reported, this means that BETC and RETC programs resulted in five more jobs than would have occurred had the money been spent on other Oregon government programs.

The combined spending on the BETC and RETC programs for 2007 totaled \$73.3 million for tax credits and program administration. That is, \$73.3 million in tax credits and program administration costs were obligated for projects completed in 2007. The effect of these tax credits combined with spending by businesses and residences taking advantage of these tax credits had the following net impacts on the Oregon economy in 2007:

- Energy costs (through conservation or renewable energy generation) decreased by \$102.9 million
- Output in Oregon's economy increased by \$185 million
- 900 new jobs were created in Oregon

¹ An alternative Base Case scenario would be to assume that the tax credit funds are returned to Oregon residents and spent based on historical spending patterns. Since the multipliers for government spending are typically greater than for general household (i.e., more government spending remains within the state relative to typical household spending), the use of the government spending Base Case results in more conservative estimates of BETC/RETC net economic impacts.

- Oregon wages increased by \$20.7 million
- Tax revenues for state and local government increased by \$6.1 million
- Carbon dioxide emissions were reduced by 712,000 tons

The combined spending on the BETC and RETC programs for 2008 (through October 31, 2008) totaled \$170.8 million for tax credits and program administration.² That is, \$170.8 million in tax credits and program administration costs were obligated for projects completed in 2008. The effect of these tax credits combined with spending by businesses and residences taking advantage of these tax credits had the following net impacts on the Oregon economy in 2008:

- Energy costs decreased by \$194.3 million
- Output in Oregon's economy increased by \$390.7 million
- 806 new jobs were created in Oregon
- Oregon wages increased by \$21.1 million
- Tax revenues for state and local government increased by \$16.3 million
- Carbon dioxide emissions were reduced by 1.7 million tons

Again, these net impacts reflect the benefits *over and above* what might have been achieved if the RETC and BETC did not exist and the tax credit dollars were reallocated and spent by Oregon State government on other programs.

In 2007, Governor Ted Kulongoski established Oregon's greenhouse gas reduction goal to reduce emission levels to 10 percent below 1990 levels by 2020. The latest Oregon emissions data available from the Energy Information Administration is from 2005. The reported 2005 Oregon carbon emissions in the residential sector were 2.7 million metric tons and 31.7 million metric tons in the business sector (including the commercial, industrial, and transportation sectors).³ The difference between the Governor's 2020 goal and the emissions levels in 2005 was 0.8 million metric tons of carbon in the residential sector and 7.5 million metric tons in the business sector. Thus, the energy savings realized from the RETC and BETC programs generate significant reductions in carbon emissions that move Oregon closer to its 2020 goal.

² Data provided by ODOE for 2008 was through October 31, 2008.

³ U.S. Energy Information Administration, Emissions Detail by State. In 1990, Oregon emitted 2.0 million metric tons of carbon in the residential sector and 26.8 million metric tons of carbon in the business sector. The electric power industry sector is excluded from these figures. A 10 percent decrease in 1990 carbon emissions levels is equivalent to a target of 1.8 million metric tons in the residential sector and 24.1 million metric tons in the business sector (including commercial, industrial, and transportation) by 2020.

The remainder of this report documents the analysis methods used to estimate these impacts. The first part of the report provides a brief overview of both the RETC and BETC programs. The following section provides background information on the analysis methods and data used to estimate the economic impacts. The gross and net economic impacts in 2007 and 2008 for both programs are presented in the next section. The final section contains a brief discussion that isolates the economic impacts associated with the improvements in energy efficiency in Oregon's economy.

2. RETC AND BETC PROGRAM OVERVIEW

RETC PROGRAM OVERVIEW

The Oregon Department of Energy (ODOE) offers Oregon residents who invest in energy conservation and efficiency improvements a personal income tax credit. Residents can obtain a credit for efficient appliance purchases and a maximum credit of \$1,500 (per project per year) for installation of renewable energy equipment and \$1,500 (per vehicle) for the purchase of an alternative fuel or hybrid vehicle. To obtain their credit, residents must submit an application to ODOE by April 1 of the year following their purchase of an eligible measure. (After April 1, residents can still receive credits, but must amend their tax filings.)

ODOE lists the following products and technologies as eligible for the RETC:

Conservation Projects:

- **Appliances:** Clothes washers, dishwashers, and refrigerators
- **Heating and Air Conditioning Systems:** Includes various heat pump systems, heat/energy recovery ventilation systems, furnaces and boilers, air ducts, and combination space and water heating systems.
- **Water Heaters:** Includes combination space and water heaters and wastewater heat recovery systems
- **Vehicles:** Hybrid and alternative fuel.

Renewable Projects:

- **Solar:** Includes solar water and space heaters and solar electric (photovoltaic) systems
- **Wind Systems**
- **Fuel Cells**
- **Geothermal Systems**
- **Hydroelectric Systems**

BETC PROGRAM OVERVIEW

The Oregon Business Energy Tax Credit (BETC) is offered as an incentive to encourage commercial investments in energy conservation, renewable energy resources, and sustainable resource use. The tax credit amount is 35 to 50 percent of eligible energy project costs deducted from Oregon income tax liability and is available to all business, trade, or rental property owners within Oregon. The 35 percent credit is available for energy efficiency projects. Renewable

projects, such as solar, wind, biomass, and combined heat and power are eligible for the 50 percent tax credit.

A business itself, its partners, or its shareholders can use the credit, but the credit applicant must own the project or purchase its contract, and the project equipment can only be used or leased for use in Oregon. For all but the smallest projects, the 35 to 50 percent credit is taken over five years, and any unused portion can be carried forward for a maximum of eight years.⁴ Tax credits for small projects (eligible costs of \$20,000 or less) can be fully redeemed in one year.

The tax credit value is calculated based on the eligible project costs, which are the incremental costs associated with moving from a standard efficiency to a more energy efficient option. Specific eligible project costs include direct expenses associated with equipment, materials and supplies, fees paid for engineering and design, loan and permit costs, and installation costs that relate to installing more energy efficient equipment. Costs associated with equipment maintenance, equipment replacement at the end of its useful life, or equipment required to meet established code are not eligible for the BETC program.

ODOE classifies BETC-eligible projects into the following categories:

Conservation Projects:

- **Energy Efficiency Equipment.** In general, project equipment must be at least 10 percent more efficient than existing equipment. For lighting projects, retrofit equipment must increase efficiency by at least 25 percent and the project owner must present a plan for recycling the existing fixtures or systems. Most retrofit projects must have a simple payback of one to 15 years.
- **Transportation Projects.** Projects must reduce work-related travel (bicycle purchases, carpool/vanpool, transit passes) and/or make investments in alternative fuels. Tax credits are also available for hybrid electric vehicles used for business travel.
- **LEED buildings.** These are buildings that meet established standards set by the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) or are rated by a comparable program. The tax credit is based on the square footage of the entire building.

Renewable Projects:

- **Renewable Resource Projects.** Projects must generate or reclaim energy from wind, water, sun, geothermal sources, or biomass. Energy from projects can be used onsite or sold and must replace at least 10 percent of the electricity or fossil fuels used. In addition, tax credits are available for homebuilders who install a renewable energy resource facility in their homes, such as photovoltaic.

⁴ For projects eligible for the 35 percent credit, 10 percent is taken the first and second years and 5 percent is taken each year thereafter. For projects eligible for the 50 percent credit, 10 percent is taken each year.

- **Renewable Manufacturing Plants.** Business owners of facilities used to manufacture equipment, machinery, or other products that will be used exclusively for renewable energy resource facilities are eligible for this tax credit.
- **Co-generation Projects.** Projects must use the heat by-product of electricity generation and must improve efficiency by 10 percent. Co-generation projects must have a simple payback of one to 15 years.
- **Recycled Material Projects.** Projects must develop new markets for recyclable materials or recycle materials not mandated by law. New or replacement equipment used to sort or transport materials that are already covered by existing recycling laws are ineligible for the BETC.

Businesses must apply for the BETC before they begin a project and can start the project once they receive preliminary certification from ODOE. Once the project is complete, businesses must apply for final certification to actually receive their tax credit, and project modifications occurring between the preliminary and final certifications must be submitted in writing. Businesses also must spread the tax credit for larger projects over five years. For the purposes of this analysis, however, the BETC is modeled as being taken in one year as it simplifies the analysis and this assumption does not change the estimates of net economic impacts.

Businesses, non-profit organizations, schools, tribes and public entities with no income tax liability (or businesses with liability that choose not to use their credit) can use the BETC pass-through option. The business can transfer its tax credit eligibility to a tax-liable third party in exchange for a lump sum cash payment. The pass-through rate for five-year, 35 percent credits is currently set at 25.5 percent and the rate for one-year credits is 30.5 percent. For the 50 percent credits, these rates are 33.5 percent and 43.5 percent, respectively.

3. ANALYSIS METHODS

Estimating the economic impacts attributed to the Oregon Department of Energy’s BETC and RETC programs is a complicated process as spending by ODOE—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 the Oregon Department of Energy or program 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 ODOE’s program activities during the 2007 and 2008 program years. The short-term economic impacts are those attributed to the dollars coming to Oregon households and businesses as a result of the RETC and BETC programs. The economic modeling framework that best measures the 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 out 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.⁵

Input-output analysis employs specific terminology to identify the different types of economic impacts resulting from economic activities. Expenditures made through ODOE 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.”

⁵ 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. ECONorthwest has applied the model to a variety of public and private sector projects including an analysis of the economic impacts of the Energy Trust of Oregon’s energy efficiency and renewable energy programs.

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. It is the broadest measure of economic activity, and includes purchases by businesses of intermediate goods and services, as well as the total value added during production. (Total value added is discussed below.)
- *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.
- *Other income* includes payments to individuals in the form of rents received on properties, royalties from contracts, dividends paid by corporations, and profits earned by corporations.
- *Indirect business taxes* are taxes paid by businesses to local, state, and federal taxing jurisdiction. In Oregon, indirect business taxes consist primarily of property taxes. Further, in Oregon, approximately 85 percent of the indirect business taxes paid accrue to state and local taxing jurisdictions; the remainder goes to the federal government.
- *Total value added* is the sum of wages, business income, other income, and indirect business taxes. Total value added is a component of output, and the two should not be added together. In addition, total value added is a close approximation of gross state product.
- *Job impacts* include both full and part time employment.
- *State and local taxes* include indirect business taxes (discussed above) as well as personal income taxes; social insurance (employer and employee contributions) taxes; and various other taxes, fines, and fees paid by businesses and households.

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.
- *Net Impacts* are the effects of ODOE program expenditures 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.

For this study, the economic impacts are estimated relative to a Base Case scenario that reflects the economy had the RETC and BETC programs not existed and that the funds are instead spent on other Oregon government programs. Specifically, the Base Case scenario explicitly allows us to examine the opportunity costs of the BETC and RETC programs by accounting for that fact

that the funds dedicated for these tax credits cannot be used for other programs. In some cases, certain sectors in the economy might show a negative net impact as employment or economic output decreases relative to the Base Case. This reflects a shift of output or employment from one sector to another as we move from the Base Case to a scenario containing the RETC and BETC programs.

The following types of impacts form the basis of this analysis:

- *Program operations spending* as the Oregon Department of Energy purchases labor and materials to carry out their energy efficiency programs.
- *Incremental measure spending* by participants in the RETC and BETC programs. Incremental measure spending refers to the extra costs associated with purchasing energy efficiency equipment, compared to a standard efficiency model.
- *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.
- *Changes in government spending* attributed to expenditures by ODOE (program operations and tax credits for BETC and RETC participants) and other state government programs.

GROSS ECONOMIC IMPACTS

The gross economic impacts attributed to the RETC and BETC programs are based on the program costs and tax credits issued by ODOE, and the incremental measure spending and energy savings of program participants. Although tax credits are not entered separately in the input-output model, they are included in the model as part of the total equipment cost. Program costs and tax credits are the key component of the Base Case scenario, as these funds could instead be spent on other programs.

Incremental measure spending by program participants consists of the extra spending required to purchase energy efficient equipment, rather than the standard efficiency model. ECONorthwest received detailed measure spending data from ODOE (such as appliances and furnaces/boilers for RETC participants, and heating, ventilation and air conditioning (HVAC) systems, lighting modifications, and industrial process modifications for BETC participants) and, in total, mapped the spending on the various types of energy measures to over 20 different IMPLAN sectors. ODOE supplied the incremental cost of the equipment for the BETC data, but provided only the total cost of the equipment with RETC data. ECONorthwest reduced the RETC total equipment cost amounts by 50 percent to make the cost data more consistent with incremental costs of purchasing energy efficiency equipment. Notably, the total costs of renewable measures are assumed to be the incremental cost, and thus the incremental factor of 50 percent was not applied to renewable RETC measures.

ODOE also supplied detailed energy savings estimates and energy cost rates, broken out by fuel type (electricity, natural gas, petroleum, wood products, and other) for program participants. For residences, lower energy costs will increase Oregon households' disposable income. As such, the

estimated energy cost savings were fed into a consumption function representing the spending pattern of a middle-income household in Oregon.⁶

Energy savings for business participants were identified by Standard Industrial Classification (SIC) codes provided by ODOE. ECONorthwest used this detailed energy savings information to allocate energy savings to approximately 150 different business sectors in the IMPLAN model. From an input-output perspective, energy savings will *indirectly* 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 likely 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.⁷

Finally, the energy savings for households and businesses translate into lower revenues to utilities, refiners, and other providers of energy services. ECONorthwest used estimated energy savings, by fuel type, to reduce revenues to utilities, refiners and other providers of energy services.

NET ECONOMIC IMPACTS

The *net impacts* reflect economic benefits over and above what would have occurred had the BETC and RETC programs not existed. To calculate net impacts, the economic impacts of the Base Case scenario are estimated assuming that the money that is currently spent on the BETC and RETC programs is instead spent on other Oregon government programs. 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.

The following sections present the gross and net impacts of both the BETC and RETC programs for 2007 and 2008 using the methods and input data discussed in this section. The net impacts are the focus of this analysis and these impacts are also distinguished between conservation and renewable project types. The contexts of each of the program's activities in the respective years are presented before the associated economic and fiscal impacts.

⁶ This consumption function was modified to exclude spending on electricity.

⁷ Because we do not have price elasticity of demand coefficients for each of the 150 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.

4. RETC IN 2007

RETC PROGRAM ACTIVITIES IN 2007

ECONorthwest’s impact analysis of the RETC program in 2007 relies on program data compiled and reported by the Oregon Department of Energy. These data are summarized in Table 1. The Tax Credits and Program Expenditure data reported in Table 1 are actual amounts provided by ODOE. The Tax Credits are the incentives paid to RETC participants who install energy efficient equipment. The Program Expenditures represent the program operating expenditures by ODOE necessary to conduct the RETC program.

The Net Incremental Measure Spending, Net Energy Savings, and Net Carbon Dioxide Reductions data reported in Table 1 are derived from the gross measure spending and energy savings data provided by ODOE. ECONorthwest adjusted all measure cost and energy savings numbers to reflect net values. That is, some program participants would have installed energy efficiency equipment even in the absence of the program (“free riders”). The spending and energy savings attributed to these free-rider participants, therefore, should not be included in overall impacts of the programs. ECONorthwest removed these free-rider participants by using net-to-gross ratios on a measure-by-measure basis. As explained previously, ECONorthwest also applied the incremental cost factor of 50 percent to the total cost of conservation measures in order to arrive at the incremental cost (the additional cost associated with purchasing an energy efficient option rather than standard efficiency equipment).

Overall, program outlays of \$13 million (tax credits and program expenditures) produced a Net Incremental Measure Spending of \$69 million and a Net Energy Cost Savings of \$2.6 million.

Table 1: RETC Program Data in 2007

Activity	2007
Net Incremental Measure Spending	\$69,039,016
Net Energy Cost Savings	\$2,553,344
Net Carbon Dioxide Reduction (in tons)	12,290
Tax Credits	\$12,474,469
Program Expenditures	\$505,483

Source: Oregon Department of Energy. Net values calculated by ECONorthwest.

Table 2 and Figure 1 show the types of projects receiving a RETC in 2007. An average net-to-gross ratio of 80 percent was used to adjust annual energy savings to remove the effect of “free riders” that would have purchased the equipment even if the RETC were unavailable. As shown in the following table and chart, appliances comprised the majority of RETC projects, accounting for 78 percent of the RETC projects, 37 percent of the tax credits, and 40 percent of the energy cost savings achieved through the program. Alternative Fuels/Hybrids only represented seven

percent of the RETC projects, but received 35 percent of the tax credits and 39 percent of the energy savings. Only two percent of the installations were renewable projects.

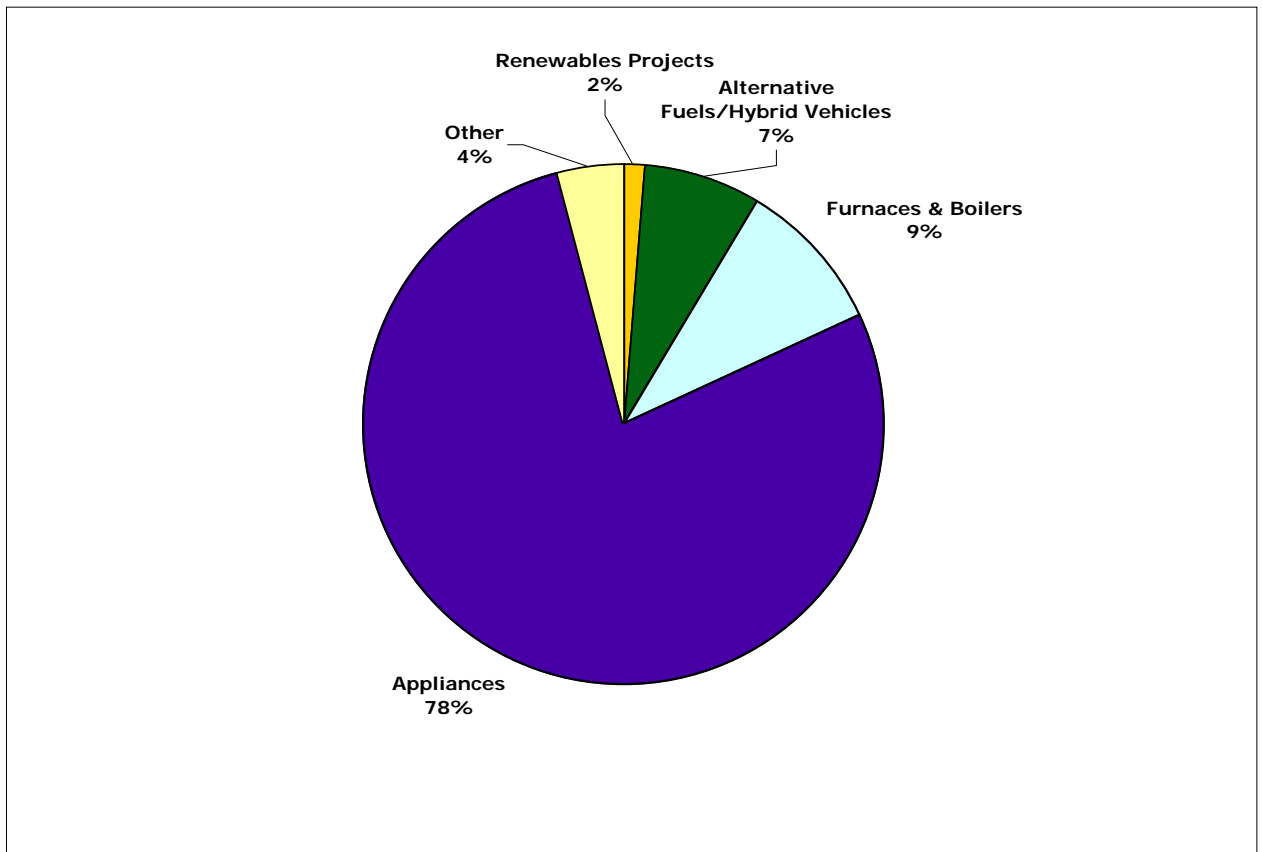
Table 2: RETC Program Summary (2007)

Product/System	Number of Installations	Total Tax Credits	Net Annual Energy Savings*	Net Annual CO2 Reduction (tons)
Renewables	622	\$1,721,397	\$112,132	683
Appliances	32,074	\$4,593,252	\$1,031,259	5,613
Ducts	917	\$212,045	\$82,154	483
Furnaces & Boilers	3,905	\$1,368,458	\$285,926	1,361
Heat Pumps/AC	742	\$223,282	\$35,265	226
Heat/Energy Recovery Ventilators	36	\$8,829	\$2,545	13
Alternative Fuels/Hybrid Vehicles	2,924	\$4,347,207	\$1,004,054	3,910
Total	41,220	12,474,469	\$2,553,334	12,290

Source: Oregon Department of Energy.

*Includes savings values for electricity, natural gas, and automobile gasoline, oil, and wood. For renewables, this number reflects the value of the energy produced.

Figure 1: Share of RETC Installations by Product Type (2007)



*Other includes, ducts, heat pumps/AC, and heat/energy recovery ventilators.

RETC ECONOMIC AND FISCAL IMPACTS IN 2007

The gross and net economic and fiscal impacts of the RETC program for 2007 are shown in Table 3 and Table 4, respectively. Spending related to the RETC program increased net Industrial Output by \$36 million in 2007. Net Industrial Output is the broadest measure of economic activity and this metric describes the value of production by industries for a specified period of time. Total Value Added is a component of Industrial Output and these two measures should not be added together. Total Value Added is a close approximation of Gross State Product and is composed of wages, business income, other income, and indirect business taxes. The RETC program generated a net \$15 million in Total Value Added in 2007. This means that the RETC program in 2007 resulted in an increase in Total Value Added of \$15 million relative to the case where the 2007 RETC program did not exist and the program funds were spent on other Oregon government programs.

Analogous impacts are also shown in Table 3 for the other economic impact metrics. As shown in the third row of the table, the 2007 RETC spending resulted in an increase of \$3 million in Oregon wages relative to the case where the RETC program did not exist and the 2007 RETC funds were instead spent on other government programs. Similarly, the RETC program resulted in an additional \$3 million in business income (payments received by small business owners or self-employed workers), relative to the Base Case where the RETC program did not exist. The 2007 RETC program resulted in a net gain of 106 jobs in Oregon relative to the Base Case.⁸

As shown in Table 4, the total impact of the RETC program in 2007 on state and local tax revenues is a net gain of \$3 million. This overall tax revenue figure is composed of indirect business taxes (discussed above), as well as personal income taxes, social insurance taxes, and various other taxes, fines, and fees paid by businesses and households.

A more detailed definition of each of these impact types is provided in the Analysis Methods section of this report.

⁸ It is important to note that in all of the tables showing net impact results, the net impact values represent a change relative to the Base Case scenario. Because these values represent *changes*, it is not appropriate to use these numbers to calculate average values. In particular, it is incorrect to divide the net wage result by the net job result to determine the “average wage” for jobs created by the BETC/RETC programs.

Table 3: RETC Gross and Net Economic Impacts (2007)

Impact Type	Gross Impact	Net Impact
Output	\$56,048,500	\$35,716,700
Total Value Added	\$30,785,700	\$14,794,100
• <i>Wages</i>	<i>\$15,615,100</i>	<i>\$3,252,300</i>
• <i>Business Income</i>	<i>\$3,579,200</i>	<i>\$3,174,100</i>
• <i>Other Income</i>	<i>\$8,050,200</i>	<i>\$5,355,100</i>
• <i>Indirect Business Taxes</i>	<i>\$3,541,200</i>	<i>\$3,012,600</i>
Jobs	385	106

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE.

Table 4: RETC Gross and Net Fiscal Impacts (2007)

Tax Revenue	Gross Impact	Net Impact
Corporate profits and dividends taxes	\$454,200	\$302,100
Business taxes	\$2,946,500	\$2,506,700
Personal taxes	\$843,100	\$291,600
Social insurance taxes	\$5,300	\$1,100
Total state and local taxes	\$4,249,100	\$3,101,500

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE.

Table 5 and Table 6 present a more detailed view of the economic and fiscal impacts from the 2007 RETC program, broken out by project type. The conservation measures generated the bulk of the economic impacts, with a net increase in economic output of over \$31 million in 2007, which includes an increase of \$3 million in wages, \$3 million in business income, 104 jobs, and additional tax revenues of nearly \$3 million to state and local governments.

Table 5: RETC Gross and Net Economic Impacts by Project Type (2007)

Impact Type	Conservation		Renewables	
	Gross Impact	Net Impact	Gross Impact	Net Impact
Output	\$48,882,800	\$31,502,700	\$7,165,700	\$4,214,000
Total Value Added	\$27,083,900	\$13,414,300	\$3,701,800	\$1,379,800
• <i>Wages</i>	<i>\$13,315,800</i>	<i>\$2,747,900</i>	<i>\$2,299,300</i>	<i>\$504,400</i>
• <i>Business Income</i>	<i>\$3,267,200</i>	<i>\$2,920,900</i>	<i>\$312,000</i>	<i>\$253,200</i>
• <i>Other Income</i>	<i>\$7,255,500</i>	<i>\$4,952,000</i>	<i>\$794,700</i>	<i>\$403,100</i>
• <i>Indirect Business Taxes</i>	<i>\$3,245,400</i>	<i>\$2,793,500</i>	<i>\$295,800</i>	<i>\$219,100</i>
Jobs	343	104	42	2

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE.

Table 6: RETC Gross and Net Fiscal Impacts by Project Type (2007)

Tax Revenue	Conservation		Renewables	
	Gross Impact	Net Impact	Gross Impact	Net Impact
Corporate profits and dividends taxes	\$409,400	\$279,400	\$44,800	\$22,700
Business taxes	\$2,700,200	\$2,324,300	\$246,300	\$182,400
Personal taxes	\$729,300	\$257,800	\$113,800	\$33,800
Social insurance taxes	\$4,600	\$1,000	\$700	\$100
Total state and local taxes	\$3,843,500	\$2,862,500	\$405,600	\$239,000

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE.

5. RETC IN 2008

RETC PROGRAM ACTIVITIES IN 2008

ECONorthwest’s impact analysis of the RETC program in 2008 relies on program data compiled and reported by the Oregon Department of Energy. Data for 2008 are through October 31, 2008. These data are summarized in Table 7. The Tax Credits and Program Expenditure data reported in Table 7 are actual amounts provided by ODOE. The Tax Credits are the incentives paid to RETC participants who install energy efficient equipment. The Program Expenditures represent the program operating expenditures by ODOE necessary to conduct the RETC programs.

The Net Incremental Measure Spending, Net Energy Savings, and Net Carbon Dioxide Reduction data reported in Table 7 are derived from the gross measure spending and energy savings data provided by ODOE. ECONorthwest adjusted all measure cost and energy savings numbers to reflect net values. That is, some program participants would have installed energy efficiency equipment even in the absence of the program (“free riders”). The spending and energy savings attributed to these free-rider participants, therefore, should not be included in overall impacts of the programs. ECONorthwest removed these free-rider participants by using net-to-gross ratios on a measure-by-measure basis. As with the 2007 RETC data, ECONorthwest applied an adjustment factor of 50 percent to the total cost of conservation measures in order to estimate incremental costs of the new equipment purchases.

Overall, program outlays of \$12.9 million (tax credits and program expenditures) produced a Net Incremental Measure Spending of \$70.4 million and a Net Energy Cost Savings of \$2.5 million.

Table 7: RETC Program Data in 2008

Activity	2008*
Net Incremental Measure Spending	\$70,433,378
Net Energy Cost Savings	\$2,507,556
Net Carbon Dioxide Reduction (in tons)	12,052
Tax Credits	\$12,558,177
Program Expenditures	\$386,600

Source: Oregon Department of Energy. Net values calculated by ECONorthwest.

* Data for 2008 are through October 31, 2008.

Table 8 and Figure 2 show the types of projects receiving a RETC in 2008. The same average net-to-gross ratio of 80 percent that was used for the 2007 program year was used to adjust annual energy savings to remove the effect of “free riders” that would have purchased the equipment even if the RETC were unavailable. As shown in the following table and chart, appliances continued to dominate the measure mix in 2008, with 71 percent RETC installs, 32 percent of the tax credits, and 37 percent of the energy cost savings achieved through the program. The Alternative Fuels/Hybrid project category represented only eight percent of the installations, but claimed 35 percent of the total tax credit dollars and produced 39 percent of the

energy savings. As in 2007, only two percent of the installations in 2008 were renewable projects.

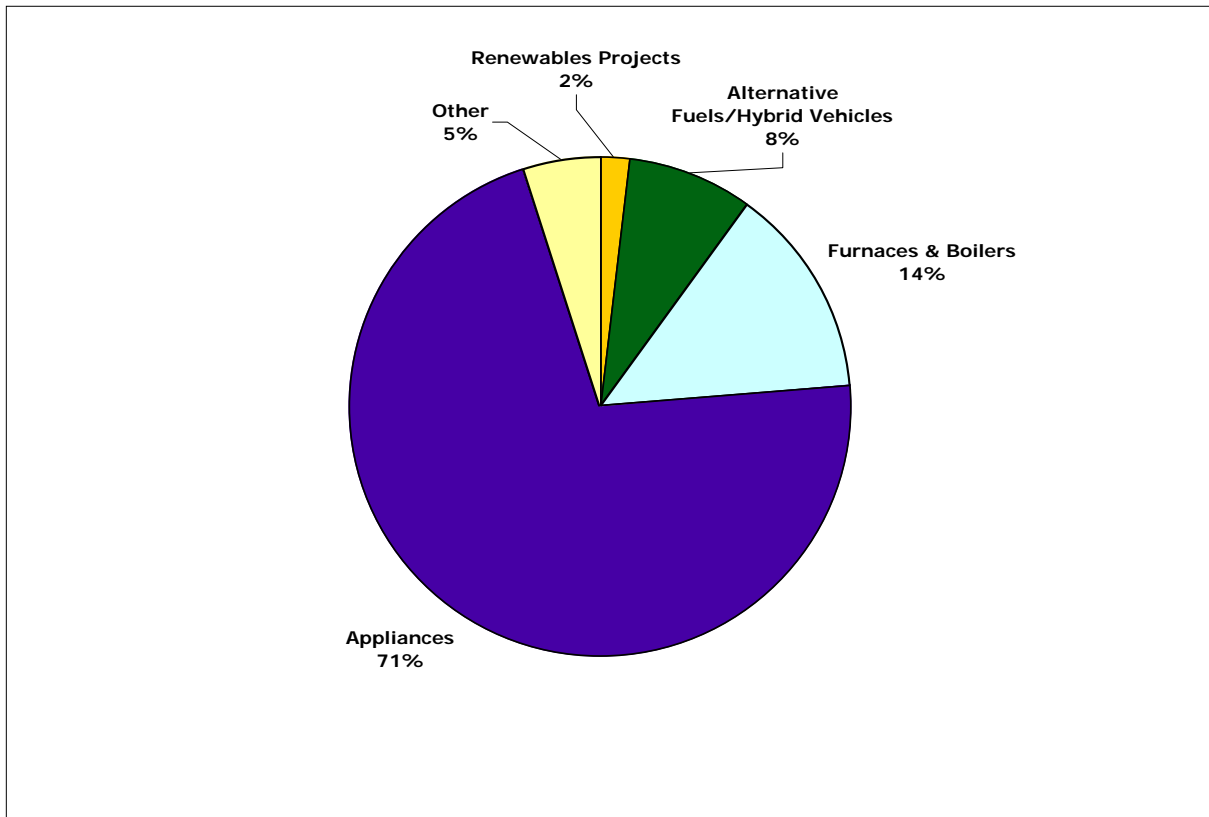
Table 8: RETC Program Summary (2008)

Product/System	Number of Installations	Total Tax Credits	Net Annual Energy Savings*	Net Annual CO2 Reduction (tons)
Renewables	737	\$1,974,472	\$135,790	827
Appliances	26,042	\$4,048,554	\$921,010	5,003
Ducts	989	\$232,078	\$86,189	497
Furnaces & Boilers	4,965	\$1,703,934	\$340,894	1,642
Heat Pumps/AC	764	\$256,241	\$37,359	240
Heat/Energy Recovery Ventilators	27	\$6,266	\$2,006	11
Alternative Fuels/Hybrid Vehicles	2,911	\$4,336,633	\$984,308	3,833
Total	36,435	\$12,558,177	\$2,507,556	12,052

Source: Oregon Department of Energy. Data are through October 31, 2008.

*Includes savings values for electricity, natural gas, and automobile gasoline, oil, and wood. For renewables, this reflects the value of energy generated.

Figure 2: Share of RETC Installations by Product Type (2008)



*Other includes ducts, heat pumps/AC, and heat/energy recovery ventilators.

RETC ECONOMIC AND FISCAL IMPACTS IN 2008

The net and gross economic and fiscal impacts of the RETC program for 2008 are shown in Table 9 and Table 10, respectively. Spending related to the RETC program increased net economic output by \$38 million in 2008, which includes an increase of nearly \$4 million in wages and \$3 million in business income within Oregon. This activity also created 103 jobs and resulted in additional net tax revenues of \$3 million to state and local governments.

Table 9: RETC Gross and Net Economic Impacts (2008)

Impact Type	Gross Impact	Net Impact
Output	\$58,399,400	\$37,883,000
Total Value Added	\$31,922,300	\$15,833,300
• <i>Wages</i>	<i>\$16,070,900</i>	<i>\$3,668,000</i>
• <i>Business Income</i>	<i>\$3,768,600</i>	<i>\$3,355,300</i>
• <i>Other Income</i>	<i>\$8,424,400</i>	<i>\$5,695,200</i>
• <i>Indirect Business Taxes</i>	<i>\$3,658,400</i>	<i>\$3,114,800</i>
Jobs	383	103

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE. Data are through October 31, 2008.

Table 10: RETC Gross and Net Fiscal Impacts (2008)

Tax Revenue	Gross Impact	Net Impact
Corporate profits and dividends taxes	\$466,300	\$313,700
Business taxes	\$2,951,400	\$2,511,700
Personal taxes	\$849,400	\$294,300
Social insurance taxes	\$5,300	\$1,100
Total state and local taxes	\$4,272,400	\$3,120,800

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE. Data are through October 31, 2008.

Table 11 and Table 12 present the impacts from the 2008 RETC program, broken out by project type. As in 2007, the conservation projects generated the majority of the impacts, with a net economic output of \$33 million. This includes an increase of \$3 million in wage income, \$3 million in business income within Oregon, a gain of 100 jobs, and additional tax revenues of nearly \$3 million to state and local governments.

Table 11: RETC Gross and Net Economic Impacts by Project Type (2008)

Impact Type	Conservation		Renewables	
	Gross Impact	Net Impact	Gross Impact	Net Impact
Output	\$49,976,400	\$32,787,200	\$8,423,000	\$5,095,800
Total Value Added	\$27,600,400	\$14,120,200	\$4,321,900	\$1,713,100
• <i>Wages</i>	<i>\$13,404,600</i>	<i>\$3,012,900</i>	<i>\$2,666,300</i>	<i>\$655,100</i>
• <i>Business Income</i>	<i>\$3,397,700</i>	<i>\$3,051,500</i>	<i>\$370,900</i>	<i>\$303,800</i>
• <i>Other Income</i>	<i>\$7,491,000</i>	<i>\$5,204,200</i>	<i>\$933,400</i>	<i>\$491,000</i>
• <i>Indirect Business Taxes</i>	<i>\$3,307,100</i>	<i>\$2,851,600</i>	<i>\$351,300</i>	<i>\$263,200</i>
Jobs	336	100	47	3

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE. Data are through October 31, 2008.

Table 12: RETC Gross and Net Fiscal Impacts by Project Type (2008)

Tax Revenue	Conservation		Renewables	
	Gross Impact	Net Impact	Gross Impact	Net Impact
Corporate profits and dividends taxes	\$414,700	\$286,800	\$51,600	\$26,900
Business taxes	\$2,667,500	\$2,299,000	\$283,900	\$212,700
Personal taxes	\$721,000	\$255,900	\$128,400	\$38,400
Social insurance taxes	\$4,400	\$900	\$900	\$200
Total state and local taxes	\$3,807,600	\$2,842,600	\$464,800	\$278,200

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE. Data are through October 31, 2008.

6. BETC IN 2007

BETC PROGRAM ACTIVITIES IN 2007

ECONorthwest's impact analysis of the BETC program in 2007 relies on program data compiled and reported by the Oregon Department of Energy. These data are summarized in Table 13 and are discussed in more detail in later sections of this report. The Tax Credits and Program Expenditure data reported are actual amounts provided by ODOE. The Tax Credits are the incentives paid to BETC participants who install energy efficient equipment. The Program Expenditures represent the program operating expenditures by ODOE necessary to conduct the BETC programs.

The Net Incremental Measure Spending, Net Energy Savings, and Net Carbon Dioxide Reduction data presented in Table 13 are derived from the gross measure spending and energy savings data provided by ODOE. Note that for the BETC program, ODOE reports incremental equipment cost values rather than total equipment costs as was done in the RETC program. As a consequence, no additional adjustment was made to the cost data for the BETC program (other than the free rider adjustment described below).

As with the RETC program, ECONorthwest modified all measure cost and energy savings numbers to reflect net values. That is, some program participants would have installed energy efficiency equipment even in the absence of the program ("free riders"). The spending and energy savings attributed to these free-rider participants, therefore, should not be included in overall impacts of the programs. ECONorthwest removed these free-rider participants by using net-to-gross ratios on a measure-by-measure basis.

BETC program outlays of \$60.3 million (tax credits and program expenditures) generated a Net Incremental Measure Spending of \$126.6 million and a Net Energy Cost Savings and Renewable Energy Generation of \$100.3 million.

Table 13: BETC Program Data in 2007

Activity	2007
Net Incremental Measure Spending	\$126,571,397
Net Energy Cost Savings / Renewable Energy Generation	\$100,347,017
Net Carbon Dioxide Reduction (tons)	699,527
Tax Credits	\$58,456,380
Program Expenditures	\$1,858,721

Source: Oregon Department of Energy. Net values calculated by ECONorthwest.

Table 14 shows how the BETC was distributed across industries for 2007. Projects in the Construction and Manufacturing sector received 41 percent of the tax credit dollars during 2007 and also achieved 25 percent of the energy cost savings estimated for the BETC program.

Projects in the Transportation, Communication, and Utilities sector claimed 18 percent of the tax credit dollars but accounted for over half of the savings (53 percent). Note that the energy cost savings / renewable energy generation numbers reflect *net* values, with a reduction for measures that would still have been purchased even if the BETC program had not existed. The savings values were adjusted using net-to-gross adjustment factors, with net-to-gross ratios used averaging about 80 percent across all technologies.⁹ That is, on average 80 percent of the projects would not have been completed without the BETC available as an incentive. The net-to-gross calculation avoids crediting the program with free rider installations, as these would have occurred even if the BETC program had not existed. In this case, with a net-to-gross ratio of 80 percent, 20 percent of the projects are assumed to be free riders that would have done the project even if the BETC had not been available.

Table 14: BETC Summary by Industry (2007)

SIC Industry Category	Number of Projects	Total Value of Tax Credits	Net Annual Energy Savings*	Net Annual CO2 Reduction (tons)
Natural Resources	52	\$988,799	702,564	3,740
Construction and Manufacturing	247	\$23,679,686	24,752,762	298,349
Transportation, Communication, and Utilities	251	\$10,302,746	53,295,488	277,028
Wholesale and Retail Trade	218	\$3,291,151	4,478,237	23,911
Finance, Insurance and Real Estate	644	\$8,491,562	2,480,761	16,477
Services	326	\$6,731,869	5,584,905	34,305
Public Administration	106	\$4,970,571	9,052,299	45,716
Total	1,844	\$58,456,383	100,347,017	699,527

Source: Oregon Department of Energy. * Includes savings values for electricity, natural gas, and automobile gasoline, oil, and wood. Values also account for energy produced from the BETC measures.

Figure 3 illustrates the BETC tax credit dollars received by the type of project completed (conservation versus renewables). Conservation projects represent over 94 percent of the BETC projects in 2007. While a minority of participating businesses pursued renewable projects through the BETC program, renewable measures tend to be much more expensive to implement, and thus tend to garner a significant share of the BETC tax credit dollars dispersed, as well as a higher percentage of the resulting of the “energy cost savings,” as this number also includes the value of energy produced through renewable energy projects covered by the BETC program.

Figure 4 shows the energy savings and renewable energy amounts resulting from the BETC projects, broken out the type of project completed. Taken together, the renewable category only

⁹ The net savings adjustment factors are taken from the California PUC *Energy Efficiency Policy Manual* (October 2001), with a default value of 80 percent applied to those measures not specifically covered in the manual.

used 35 percent of BETC credit dollars and generated 63 percent of the BETC energy savings/production dollars in 2007.

Figure 3: Share of Total BETC Credits (\$) by Project Type (2007)

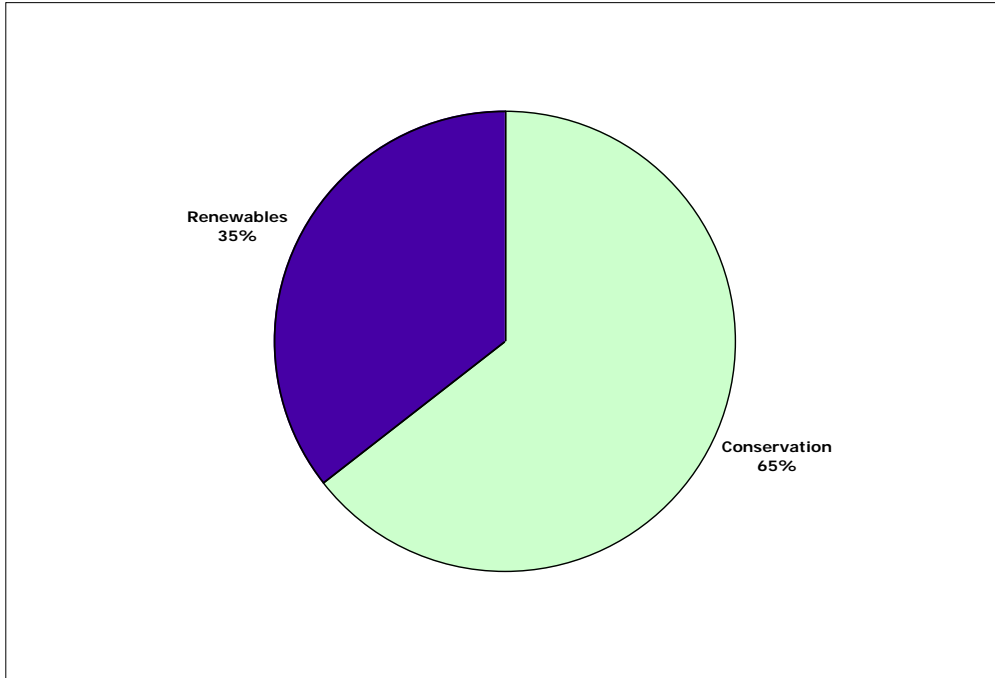
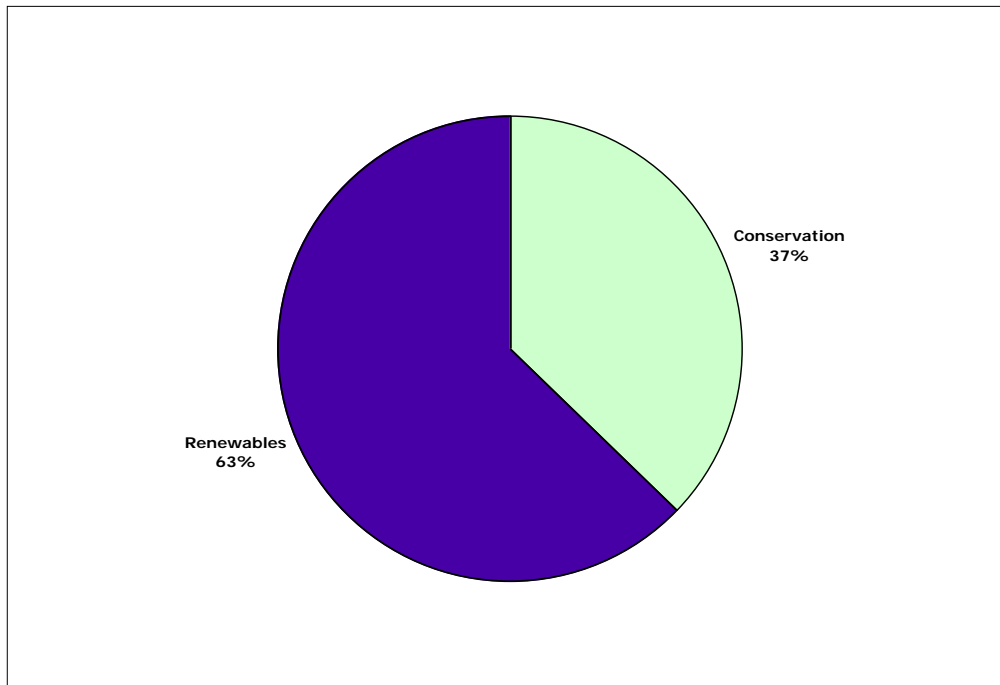


Figure 4: Share of Total BETC Energy Savings (\$) by Project Type (2007)



BETC ECONOMIC AND FISCAL IMPACTS IN 2007

Total BETC Impacts in 2007

Table 15 and Table 16 present the net economic and fiscal impacts of the BETC program in 2007. As with the RETC impacts discussed earlier, all of the BETC economic impacts are measured relative to the Base Case where the BETC program does not exist and the BETC funds are instead spent on other Oregon government programs.

As shown earlier in Table 13, the 2007 BETC program generated \$126.6 million in Net Incremental Measure Spending, which led to \$100.3 million in Net Energy Cost Savings / Renewable Energy Generation for businesses. That is, the BETC program resulted in a net increase of \$100.3 million in energy cost savings and renewable energy generation relative to the case where the BETC program did not exist and the money was instead spent on other Oregon government programs.

Additional net impact values are also shown in Table 15 and Table 16 for the 2007 BETC program. The net economic impacts attributed to BETC activity in 2007 included more than \$149 million in additional economic output, including about \$17 million in wages, and 794 new jobs for workers in Oregon. The net fiscal impact was an additional \$3 million in state and local tax revenue. Again, these impacts are all net values and represent increases over and above what would occur if the 2007 BETC program does not exist and the BETC funds were spent on other Oregon government programs.

The subsequent tables provide greater detail about the economic and fiscal impacts by project type.

Table 15: BETC Gross and Net Economic Impacts (2007)

Impact Type	Gross Impacts	Net Impacts
Output	\$244,177,100	\$149,699,100
Total Value Added	\$117,010,600	\$42,702,900
• <i>Wages</i>	<i>\$74,873,700</i>	<i>\$17,427,200</i>
• <i>Business Income</i>	<i>\$10,530,300</i>	<i>\$8,646,600</i>
• <i>Other Income</i>	<i>\$28,029,400</i>	<i>\$15,508,200</i>
• <i>Indirect Business Taxes</i>	<i>\$3,577,200</i>	<i>\$1,120,900</i>
Jobs	2,084	794

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE.

Table 16: BETC Gross and Net Fiscal Impacts (2007)

Tax Revenue	Gross Impacts	Net Impacts
Corporate profits and dividends taxes	\$1,581,500	\$874,900
Business taxes	\$2,976,200	\$932,800
Personal taxes	\$3,727,400	\$1,163,200
Social insurance taxes	\$25,600	\$5,800
Total state and local taxes	\$8,310,700	\$2,976,700

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE.

BETC Impacts by Project Type in 2007

Table 17 and Table 18 describe the BETC program’s impacts by project type (conservation versus renewables) and the majority of the impacts are attributed to the renewable projects. The net economic impacts attributed to renewable measures in 2007 were \$94 million in economic output (versus \$55 million in economic output for conservation measures), \$16 million in wages (versus \$1 million in wages generated by conservation measures), and 485 jobs (versus 309 jobs created by conservation measures). The net fiscal impacts for renewable and conservation projects are split fairly evenly at about \$1.5 million for each category.

Table 17: Gross and Net Economic Impacts by Project Type (2007)

Impact Type	Conservation		Renewables	
	Gross Impact	Net Impact	Gross Impact	Net Impact
Output	\$116,471,300	\$55,300,800	\$127,705,800	\$94,398,300
Total Value Added	\$57,148,300	\$9,037,400	\$59,862,300	\$33,665,500
• <i>Wages</i>	<i>\$38,206,400</i>	<i>\$1,012,600</i>	<i>\$36,667,300</i>	<i>\$16,414,600</i>
• <i>Business Income</i>	<i>\$4,949,500</i>	<i>\$3,729,800</i>	<i>\$5,580,800</i>	<i>\$4,916,800</i>
• <i>Other Income</i>	<i>\$11,106,000</i>	<i>\$2,999,000</i>	<i>\$16,923,400</i>	<i>\$12,509,200</i>
• <i>Indirect Business Taxes</i>	<i>\$2,886,400</i>	<i>\$1,296,000</i>	<i>\$690,800</i>	<i>-\$175,100</i>
Jobs	1,145	309	939	485

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE.

Table 18: Gross and Net Fiscal Impacts by Project Type (2007)

Tax Revenue	Conservation		Renewables	
	Gross Impact	Net Impact	Gross Impact	Net Impact
Corporate profits and dividends taxes	\$626,600	\$169,100	\$954,900	\$705,800
Business taxes	\$2,401,400	\$1,078,300	\$574,800	-\$145,500
Personal taxes	\$1,881,900	\$221,600	\$1,845,500	\$941,600
Social insurance taxes	\$13,100	\$300	\$12,500	\$5,500
Total state and local taxes	\$4,923,000	\$1,469,300	\$3,387,700	\$1,507,400

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE.

7. BETC IN 2008

BETC PROGRAM ACTIVITIES IN 2008

This analysis is repeated with the BETC program in 2008 based on program data compiled and reported by the Oregon Department of Energy. Data for 2008 is through October 31, 2008. The Net Incremental Measure Spending, Net Energy Savings / Renewable Energy Generation, and Net Carbon Dioxide Reduction data presented in Table 19 are derived from the gross measure spending and energy savings data provided by ODOE. As with the 2007 BETC data, ECONorthwest modified all measure cost and energy savings numbers to reflect net values.

BETC program outlays of \$157.9 million (tax credits and program expenditures) generated a Net Incremental Measure Spending of \$619.2 million and a Net Energy Cost Savings of \$191.8 million.

Table 19: BETC Program Data in 2008

Activity	2008*
Net Incremental Measure Spending	\$619,218,573
Net Energy Cost Savings / Renewable Energy Generation	\$191,811,174
Net Carbon Dioxide Reduction (tons)	1,710,104
Tax Credits	\$156,092,169
Program Expenditures	\$1,796,699

Source: Oregon Department of Energy. Net values calculated by ECONorthwest.

* Data are through October 31, 2008.

Table 20 shows how the BETC was distributed across industries for 2008. Projects in the Construction and Manufacturing sector claimed the majority (60 percent) of the tax credit dollars during 2008, realized 57 percent of the energy cost savings estimated for the BETC program in 2008, and account for 55 percent of the carbon dioxide reduction achieved by the program. Projects in the Transportation, Communication, and Utilities sector collected 29 percent of the tax credit dollars but accounted for 25 percent of the accrued energy savings. Note that again the energy cost savings / renewable energy generation number reflects *net savings* and account for the fact that some measures would have been purchased even if the BETC program had not existed. The savings values were adjusted using net-to-gross adjustment factors, with net-to-gross ratios used averaging about 80 percent across all technologies.¹⁰

¹⁰ The net savings adjustment factors are taken from the California PUC *Energy Efficiency Policy Manual* (October 2001), with a default value of 80 percent applied to those measures not specifically covered in the manual.

Table 20: BETC Summary by Industry (2008)

SIC Industry Category	Number of Projects	Total Value of Tax Credits	Net Annual Energy Savings / Generation*	Net Annual CO2 Reduction (tons)
Natural Resources	75	\$1,059,699	\$726,420	5,367
Construction and Manufacturing	188	\$93,665,358	\$109,800,933	942,619
Transportation, Communication, and Utilities	617	\$45,021,115	\$47,250,663	581,307
Wholesale and Retail Trade	262	\$3,529,521	\$19,735,037	98,820
Finance, Insurance and Real Estate	549	\$5,016,298	\$1,518,169	10,805
Services	278	\$5,746,037	\$4,654,625	25,563
Public Administration	57	\$2,054,143	\$8,125,327	40,114
Total	2,026	\$156,092,170	\$191,811,174	1,704,594

Source: Oregon Department of Energy. Data are through October 31, 2008.

* Includes savings values for electricity, natural gas, and automobile gasoline, oil, and wood. The value of the energy produced from renewable energy projects and other BETC measures is also included.

In 2008, more than 93 percent of the BETC projects were conservation measures, rather than renewables. Figure 5 illustrates the share of 2008 BETC tax credit dollars received by the type of project completed. Similarly, Figure 6 shows the distribution of energy savings / generation dollars by project type. In 2008, renewable projects claimed 74 percent of the BETC tax credit dollars granted and represent 69 percent of the value of energy savings and energy generation dollars.

Figure 5: Share of Total BETC Credits (\$) by Project Type (2008)

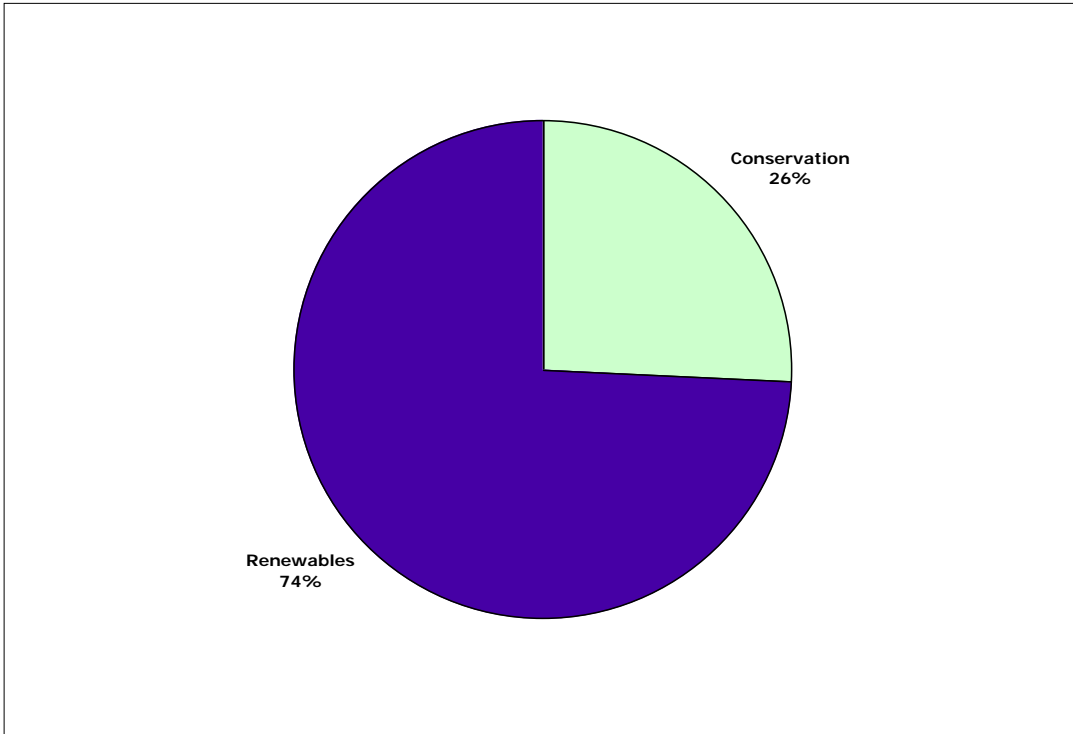
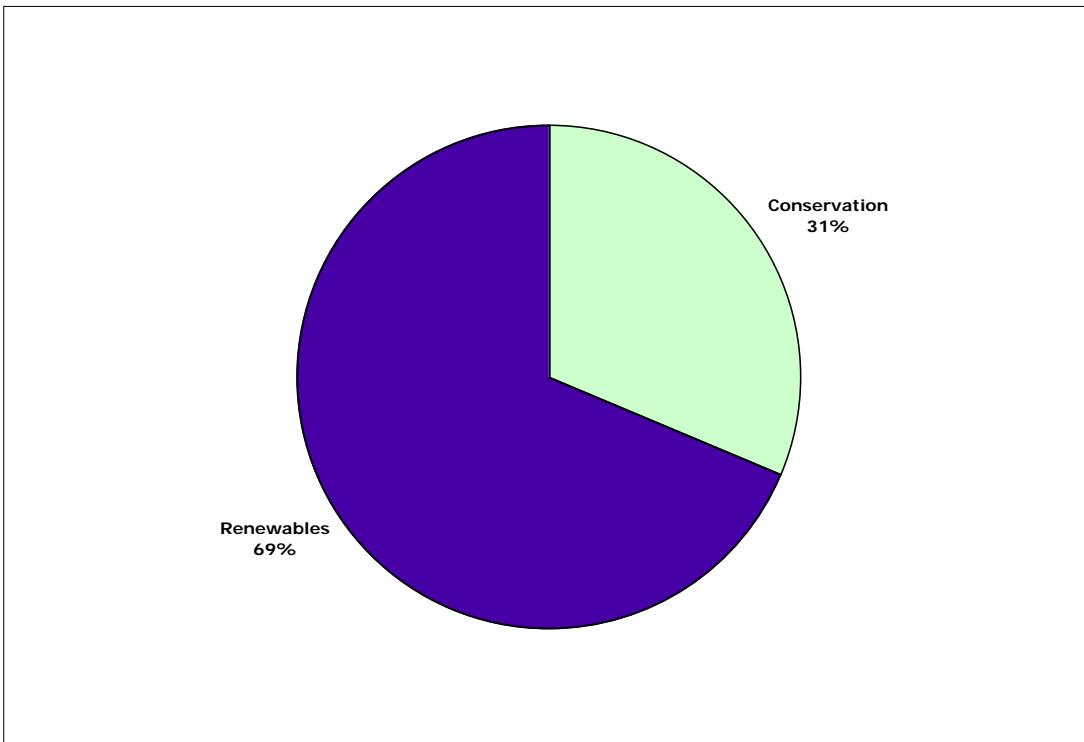


Figure 6: Share of Total BETC Savings (\$) by Project Type (2008)



BETC ECONOMIC AND FISCAL IMPACTS IN 2008

The same impact analysis was conducted for the BETC program in 2008. As shown earlier in Table 19, the 2008 BETC program generated \$619.2 million in Net Incremental Measure Spending, which led to \$191.8 million in Net Energy Cost Savings / Renewable Energy Generation for businesses.

As a result of these projects, the net impacts attributed to the 2008 BETC program include \$353 million in additional economic output within Oregon. This represents an additional \$353 million in economic output over what would have occurred without the BETC program. This activity also resulted in a net gain of \$17 million in wage income and the creation of 703 jobs for workers in Oregon (Table 21). Moreover, Table 22 shows that the 2008 BETC program generated net additional revenue of \$13 million for state and local governments. As with all net impacts shown in this report, these impacts all reflect net increases relative to the case where the BETC program did not exist and the BETC funds were instead spent on other Oregon government programs.

The separate impacts of the BETC conservation versus renewable projects in 2008 are explained in greater detail in the subsequent tables.

Table 21: BETC Gross and Net Economic Impacts (2008)

Impact Type	Gross Impact	Net Impact
Output	\$601,623,300	\$352,777,100
Total Value Added	\$293,944,500	\$98,790,700
• <i>Wages</i>	<i>\$167,913,800</i>	<i>\$17,472,300</i>
• <i>Business Income</i>	<i>\$28,210,700</i>	<i>\$23,194,600</i>
• <i>Other Income</i>	<i>\$81,062,200</i>	<i>\$47,957,500</i>
• <i>Indirect Business Taxes</i>	<i>\$16,757,800</i>	<i>\$10,166,300</i>
Jobs	4,111	703

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE. Data are through October 31, 2008.

Table 22: BETC Gross and Net Fiscal Impacts (2008)

Tax Revenue	Gross Impact	Net Impact
Corporate profits and dividends taxes	\$4,604,700	\$2,753,900
Business taxes	\$13,920,300	\$8,587,300
Personal taxes	\$8,554,200	\$1,820,900
Social insurance taxes	\$57,100	\$5,500
Total state and local taxes	\$27,136,300	\$13,167,600

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE. Data are through October 31, 2008.

BETC Impacts by Project Type in 2008

Table 23 and Table 24 depict the 2008 BETC impacts attributed to conservation and renewable projects. As in 2007, the bulk of economic impacts are associated with renewable measures. Renewables produced a net gain of \$275 million in economic output, an additional \$10 million in wage income, and a gain of over \$9 million in state and local tax revenues in Oregon. The renewable projects also resulted in a net increase of 426 jobs in Oregon relative to the Base Case.

Table 23: Gross and Net Economic Impacts by Project Type (2008)

Impact Type	Conservation		Renewables	
	Gross Impact	Net Impact	Gross Impact	Net Impact
Output	\$142,675,300	\$77,540,500	\$458,948,000	\$275,236,600
Total Value Added	\$69,394,900	\$18,314,600	\$224,549,600	\$80,476,100
• <i>Wages</i>	<i>\$46,501,400</i>	<i>\$7,124,300</i>	<i>\$121,412,400</i>	<i>\$10,348,000</i>
• <i>Business Income</i>	<i>\$5,465,100</i>	<i>\$4,152,300</i>	<i>\$22,745,600</i>	<i>\$19,042,300</i>
• <i>Other Income</i>	<i>\$12,730,300</i>	<i>\$4,065,300</i>	<i>\$68,331,900</i>	<i>\$43,892,200</i>
• <i>Indirect Business Taxes</i>	<i>\$4,698,100</i>	<i>\$2,972,700</i>	<i>\$12,059,700</i>	<i>\$7,193,600</i>
Jobs	1,172	277	2,939	426

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE. Data are through October 31, 2008.

Table 24: Gross and Net Fiscal Impacts by Project Type (2008)

Tax Revenue	Conservation		Renewables	
	Gross Impact	Net Impact	Gross Impact	Net Impact
Corporate profits and dividends taxes	\$791,300	\$306,900	\$3,813,400	\$2,447,000
Business taxes	\$4,085,800	\$2,689,900	\$9,834,500	\$5,897,400
Personal taxes	\$2,349,000	\$586,500	\$6,205,200	\$1,234,400
Social insurance taxes	\$16,400	\$2,900	\$40,700	\$2,600
Total state and local taxes	\$7,242,500	\$3,586,200	\$19,893,800	\$9,581,400

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE. Data are through October 31, 2008.

8. COMBINED RETC AND BETC IMPACTS FOR 2007 AND 2008

The net impacts for the RETC and BETC programs for 2007 are reported in Table 25 and Table 26. In total both programs combined to produce \$185.4 million in net economic output, \$20.7 million in wages, 900 jobs, and an increase of \$6.1 million in tax revenues for state and local governments.

Table 25: Combined RETC and BETC Net Economic Impacts (2007)

Impact Type	Net Impact RETC	Net Impact BETC	Total Net Impact in 2007
Output	\$35,716,700	\$149,699,100	\$185,415,800
Total Value Added	\$14,794,100	\$42,702,900	\$57,497,000
• <i>Wages</i>	\$3,252,300	\$17,427,200	\$20,679,500
• <i>Business Income</i>	\$3,174,100	\$8,646,600	\$11,820,700
• <i>Other Income</i>	\$5,355,100	\$15,508,200	\$20,863,300
• <i>Indirect Business Taxes</i>	\$3,012,600	\$1,120,900	\$4,133,500
Jobs	106	794	900

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE.

Table 26: Combined RETC and BETC Net Fiscal Impacts (2007)

Impact Type	Net Impact RETC	Net Impact BETC	Total Net Impact in 2007
Corporate profits and dividends taxes	\$302,100	\$874,900	\$1,177,000
Business taxes	\$2,506,700	\$932,800	\$3,439,500
Personal taxes	\$291,600	\$1,163,200	\$1,454,800
Social insurance taxes	\$1,100	\$5,800	\$6,900
Total state and local taxes	\$3,101,500	\$2,976,700	\$6,078,200

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE.

Table 27 and Table 28 present the combined impacts of the RETC and BETC program in 2008. In 2008, the programs generated a net economic output \$390.7 million, increased wages by \$21.1 million, created 806 jobs in the state of Oregon, and produced \$16.3 million in tax revenues for state and local governments.

Table 27: Combined RETC and BETC Net Economic Impacts (2008)

Impact Type	Net Impact RETC	Net Impact BETC	Total Net Impact in 2008
Output	\$37,883,000	\$352,777,100	\$390,660,100
Total Value Added	\$15,833,300	\$98,790,700	\$114,624,000
• <i>Wages</i>	\$3,668,000	\$17,472,300	\$21,140,300
• <i>Business Income</i>	\$3,355,300	\$23,194,600	\$26,549,900
• <i>Other Income</i>	\$5,695,200	\$47,957,500	\$53,652,700
• <i>Indirect Business Taxes</i>	\$3,114,800	\$10,166,300	\$13,281,100
Jobs	103	703	806

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE. Data are through October 31, 2008.

Table 28: Combined RETC and BETC Net Fiscal Impacts (2008)

Impact Type	Net Impact RETC	Net Impact BETC	Total Net Impact in 2008
Corporate profits and dividends taxes	\$313,700	\$2,753,900	\$3,067,600
Business taxes	\$2,511,700	\$8,587,300	\$11,099,000
Personal taxes	\$294,300	\$1,820,900	\$2,115,200
Social insurance taxes	\$1,100	\$5,500	\$6,600
Total state and local taxes	\$3,120,800	\$13,167,600	\$16,288,400

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE. Data are through October 31, 2008.

9. ENERGY SAVINGS IMPACTS OVER TIME

2007 PROGRAM YEAR

For many projects, installation of BETC and RETC projects occurs 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 16 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 costs and tax credit costs have ended. These cost savings continue to benefit the economy, as households spend less on electricity 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 the BETC and RETC programs.

Table 29 shows the economic benefits per \$1 million in energy cost savings for both the BETC and RETC based on 2007 spending patterns and distribution of measures purchased. Note that there are slight differences in the economic impacts between the BETC and RETC due to the different spending patterns between the residential and non-residential sectors. 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 purchase 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.

As shown in Table 29, \$1 million in energy cost savings results in a \$1.2 million increase in economic output for Oregon through the RETC program, while \$1 million in energy savings and new power generation results in an increase of over \$1.7 million in output from the BETC program. The higher BETC value reflects the ability of businesses to produce goods at a lower cost due to their investments in energy efficiency through the program. Similarly, \$1 million in savings through the RETC program will increase Oregon wages by \$355,200 and create 11 jobs. With the BETC program, this same amount of savings increases wages by \$492,900 and creates 13 jobs (with higher salaries on average). The increase in economic activity due to \$1 million in energy cost savings will also increase tax revenues by \$84,800 with the RETC and \$89,000 for the BETC for each year that the energy cost savings continue.

**Table 29: Impacts per \$1 Million in Energy Cost Savings
(2007 BETC/RETC program year)**

Impact Type	RETC	BETC
Output	\$1,245,800	\$1,766,400
Total Value Added	\$675,300	\$890,800
• <i>Wages</i>	\$355,200	\$492,900
• <i>Business Income</i>	\$44,500	\$71,100
• <i>Other Income</i>	\$208,900	\$267,800
• <i>Indirect Business Taxes</i>	\$66,700	\$59,000
Jobs	11	13
State and local taxes and fees	\$84,800	\$89,000

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE.

CUMULATIVE ENERGY SAVING IMPACTS

As discussed above, the energy cost savings realized through BETC measures extend into future years and the associated economic impacts continue to benefit the economy as businesses are able to produce goods and services more efficiently. The above analysis presents information on the size of the economic impacts sustained over time based on energy cost savings from a single year (2007) of the BETC program. Since the BETC program has been in place for multiple years, the cumulative impact of new investments in energy efficiency become quite substantial over time. To illustrate this, cumulative economic impacts from the BETC program are estimated for several years (2006-2011). (A similar analysis could also be done for the RETC program over time.)

Table 30 shows the Net Energy Cost Savings realized by the BETC program in 2006, 2007, and 2008 (through October 31, 2008) and the isolated impacts of the energy savings on economic output and job creation.¹¹ We use the three-year average (2006-2008) to estimate impacts beyond 2008, assuming that the BETC program is funded at the average level observed for the 2006-08 period.

¹¹ ECONorthwest also conducted this economic impact study for the 2006 program year and thus we can use these findings to estimate the energy savings and subsequent economic impacts in 2006. “Economic Impacts of Oregon Energy Tax Credit Programs in 2006 (BETC/RETC).”

Table 30: Total Cumulative Impacts From BETC Energy Savings 2006-2011

Year	Net Energy Cost Savings (Millions \$)	Economic Output (Millions \$)	Jobs Created
2006	\$46	\$93	889
2007	\$100	\$177	1,320
2008 (thru October 31)	\$192	\$317	1,603
Average of 2006-2008 (Estimate used for subsequent years 2009-2011)	\$113	\$196	1,271

Source: Calculated by ECONorthwest using the IMPLAN modeling system and program data supplied by ODOE.

Again, it should be emphasized that these output and job impact 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 purchase 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.

Figure 7, Figure 8, and Figure 9 are derived from the data presented in Table 30 and show the cumulative energy savings impacts of the BETC program from 2006 through 2011, assuming that funding for the BETC program beginning in 2009 continues at the average level observed over the 2006-2008 period.

Figure 7 shows the cumulative energy cost savings resulting from the BETC energy efficiency program activities beginning in 2006. In 2006, the program produced \$46 million in annual energy cost savings, and the annual savings will persist over the life of the energy efficiency equipment. In 2007, the BETC program generated an additional \$100 million in energy cost savings, and these energy savings are also sustained each subsequent year over the useful life of the energy efficient equipment.

As this trend indicates, the total realized energy savings in 2007 are the sum of the energy savings generated by the program in 2007 and those energy savings realized in previous years. For this example beginning in 2006, the total energy cost savings in 2007 can be estimated at \$146 million (\$46 million from 2006 plus \$100 million from 2007). In 2008, funding levels for that year result in \$192 million in energy cost savings, in addition to the \$146 million continued from 2006 and 2007. From 2009 onward, the BETC program is assumed to be funded at the 2006-08 average rate and results in new energy cost savings of \$113 million annually from 2009 to 2011. As shown by the red area of the graph, this is in addition to the cumulative energy cost savings that were achieved from the previous years. This compounding of energy cost savings benefits is expected to continue as long as the BETC program is funded. Given that the measure life for equipment covered by the BETC is likely to be 10 years or more and that the program has

existed for over 20 years, the potential for sustained cumulative savings with this program is quite large.

Figure 7: Cumulative Energy Cost Savings Over Time from BETC 2006-2011

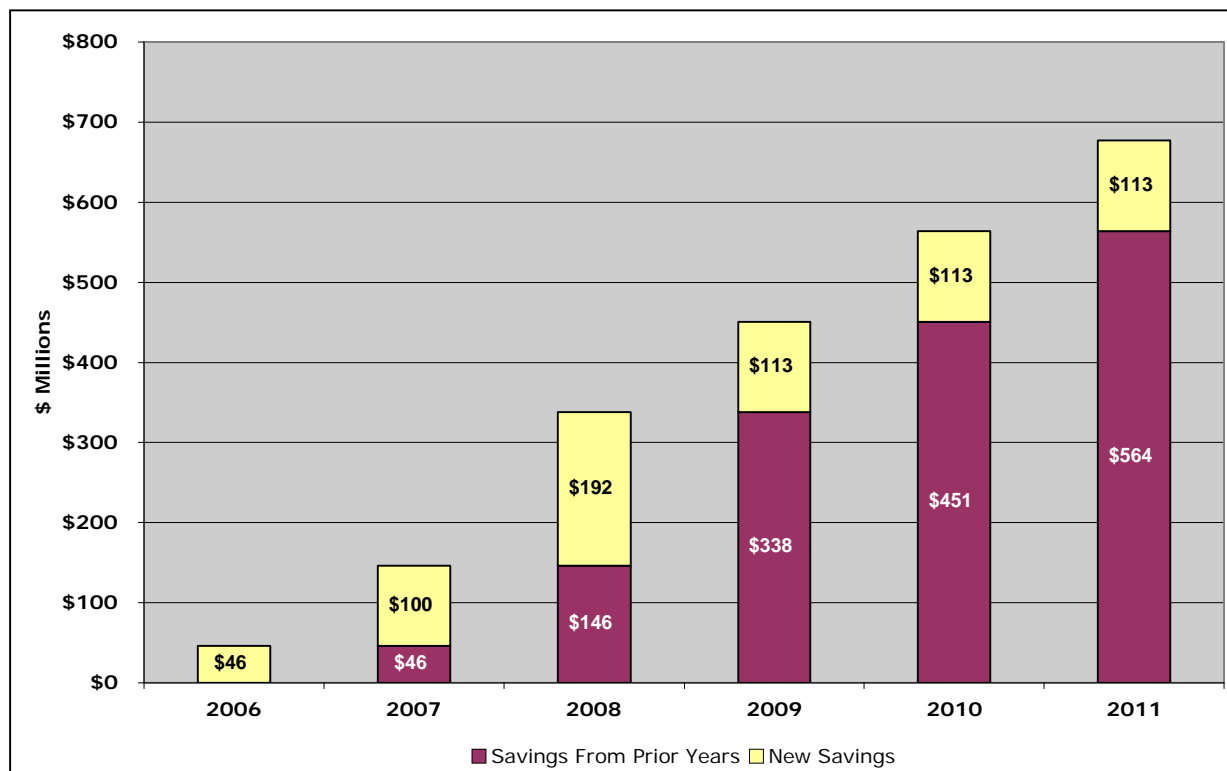


Figure 8 illustrates the cumulative economic output generated due to BETC energy savings achieved from 2006 through 2011, and employs the same methodology described for Figure 7. In 2006, economic output increased by \$93 million due to the BETC program activities in 2006. The energy savings impacts from 2006 will persist for the length of the equipment life, and thus will contribute a further \$93 million in economic output in 2007, and each subsequent year to the end of the equipment life. In addition, new energy savings from BETC tax credits issued in 2007 generated \$177 million in economic output. Thus, the cumulative economic output for the BETC program in 2007 is \$270 million dollars. This trend continues each year that the program exists and consequently the cumulative benefits expand over time. By 2011, the cumulative economic output is \$1,175 million due to efficiency gains in the last five years.

Figure 8: Cumulative Economic Output Effect Based on 2006-2011 BETC Energy Savings

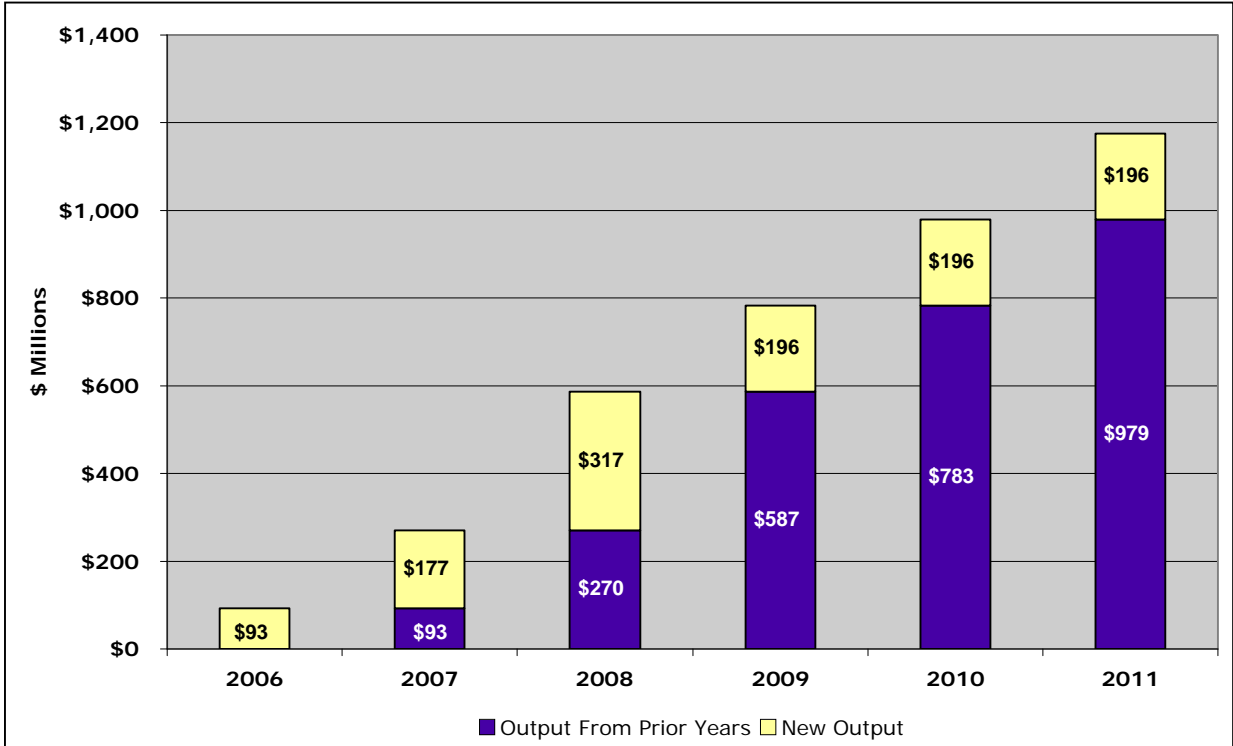


Figure 9 shows the cumulative employment impacts of the energy savings produced by the BETC program from 2006 through 2011. Energy savings derived from the BETC program in 2006 created 889 new jobs, and this employment is sustained through the useful life of the energy efficient equipment. In other words, these same 889 jobs continue in 2007, 2008, and on through 2011. In 2007, an additional 1,320 jobs are added due to energy savings realized through the BETC program in 2007. Therefore, the cumulative employment impact in 2007 is 2,209 jobs (889 jobs sustained from 2006 plus 1,320 new jobs in 2007). This pattern continues and by 2011, the BETC program will have generated and sustained a cumulative 7,624 new jobs if it is funded in future years at the average level observed for 2006-2008.¹²

¹² The extrapolation from past year impacts is presented here as an approximation of the potential employment impacts in the short term. Over the long term, shifts in the Oregon economy and changes in efficiency in other regions will alter the employment impacts. Estimating the long-term impacts taking into account *regional* changes in energy efficiency and the subsequent impact on economic output requires a much more extensive dynamic modeling exercise that is beyond the scope of this project.

Figure 9: Cumulative Employment Impacts Based on 2006-2011 BETC Energy Savings

