

OREGON'S BUSINESS ENERGY TAX CREDIT

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by the Clean Energy Finance Coalition
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Summary

The BETC program has been key to Oregon's success in attracting a multitude of clean energy businesses in Oregon including solar equipment manufacturers and major wind energy companies. In addition, BETC has helped companies all around Oregon save dollars and creates markets for renewable energy installations. Solar manufacturing is an industry that did not exist in this state four years ago, but will soon employ over 2,000 workers. The BETC has helped to make Oregon one of the country's centers for wind energy development, which in turn has led to multiple major wind energy companies calling Oregon home. These national and international companies employ over 2,000 skilled workers in the greater Portland area and along the Columbia Plateau. Thousands of companies have used the BETC to save energy or create new economic opportunities.

There is no current substitute for the BETC. The clean energy sector represents one of the most dynamic business opportunities available today, and many other states are vying for this economic prize. Eliminating the BETC would mean that Oregon would no longer be "on the map" and would lose its leadership position and the benefits gained through the hundreds of millions of dollars that have been invested to develop this sector. Scaled back funding for BETC has already diminished both the number and size of renewable energy projects in Oregon, as well as the jobs that accompany them and the private investment that makes them possible.

BETC (along with the RETC) has provided a good return for the State. In 2007 and the first quarter of 2008, , BETC cost the state \$244 million during and in return, it generated a net economic impact of \$576 million, created 1,700 new jobs worth \$42 million in wages, and generated \$22 million in new state and local tax revenues. From January 2005 to January 2011, \$614 million in BETC credits were matched by \$2.7 billion in private investment, leading to \$3.3 billion in projects.

BETC meets goals of saving energy and generating renewable energy. During 2009, the cumulative energy savings and renewable energy generation attributed to the BETC amounted to 72 trillion BTU – enough energy to power 1,750,000 homes (note that this went to industrial, commercial, and transportation uses as well as residential).

What is the public policy purpose of this credit?

The purpose of the BETC tax credits are to promote conservation and renewable energy. In addition, the program is supported because of its strong contribution to renewable energy. For example, between January 2005 and January 2011, the BETC leveraged an estimated \$2.7 billion¹ of private investment in renewable energy and energy conservation projects from a state expenditure of \$0.6 billion (Figure 1).

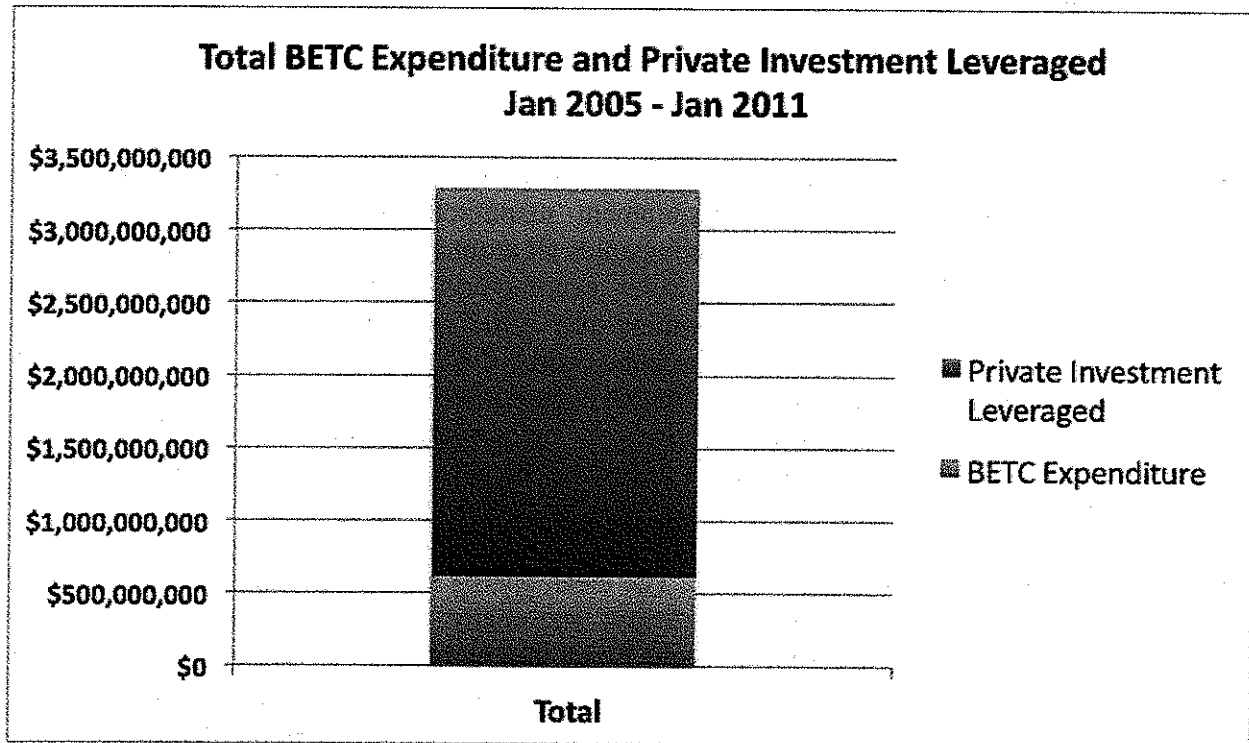


Figure 1. Total BETC expenditure and private investment leveraged through BETC projects from January 2005 – January 2011. During this time, \$614 million in tax credits were awarded to BETC projects, while those projects leveraged an additional \$2.7 billion in private investment to cover \$3.3 billion in estimated total projects costs.

¹ \$2.7 billion in private investment results from subtracting \$0.6 billion of BETC expenditure from \$3.3 billion in total estimated project investment. This amount of private investment, which is higher than would be expected from a proportional investment in a project with a 35% or 50% BETC, is due to the investment in renewable energy manufacturing facilities and large scale wind farms. The true project costs in these categories greatly exceeded the cap for eligible project costs, resulting in a higher private investment to BETC expenditure ratio.

These economic benefits are significant and policymakers have come to expect an economic return on investment from state expenditure in the BETC program.

In addition to the direct economic impacts associated with BETC projects, the BETC has played a crucial role in developing Oregon's clean energy economy.. Institutions around the state have invested significantly in the infrastructure to support the growth and development of this new sector. It is estimated that more than \$5 billion has been invested in Oregon's renewable energy industry alone.. Oregon is a leader in solar manufacturing and has over 40 companies working on electric vehicle components. Universities and community colleges around the state, such as Umpqua Community College, Hood River Community College, OIT, and PSU, have invested millions in becoming a world leader in training students to work in the clean economy. As a result, wind technicians, renewable energy engineers, solar installers, smart grid engineers, metal fabricators, ironworkers, environmental consultants, and GIS technicians, among others, can get educated in Oregon. Along with education, these young people are also getting jobs; the Oregon Institute of Technology has a 100% job placement rate within six months of graduation for students in its Renewable Energy Engineering program.

Other benefits of implementing energy conservation and renewable energy technologies, which speak to the original public policy goals of promoting health, safety, and welfare, include the ability to create financial stability and enhance national security through the avoidance of foreign fossil fuels. The US's reliance upon fossil fuels, particularly foreign sources, has consistently created economic strife and threatened national security. Furthermore, since the BETC was created in 1979, the importance of energy conservation and renewable energy in mitigating the effects of climate change have become ever more apparent. Climate change poses great threats to public health², safety³, and welfare⁴, all of which the BETC was instituted to remedy.

Is there an expected timeline for achieving this goal?

There is no statutory timeline for achieving the goals of the BETC program. A reasonable end date for the BETC program would be when the technologies it seeks to encourage have achieved parity with the traditional technologies it seeks to discourage. A transition to renewable energy is a long-term effort. Meanwhile, a central function performed by the BETC is to support the deployment of newer technologies that are "market ready" yet still have relatively high costs. The credit can be seen as speeding up an evolutionary process (Figure 2).

² British Medical Journal (BMJ). *Climate Change Poses A Huge Threat To Human Health*. January 30, 2008.

<<http://www.sciencedaily.com/releases/2008/01/080124190814.htm>>

³ Broder, John. *Climate Change Seen as Threat to U.S. Security*. August 8, 2009.

<<http://www.nytimes.com/2009/08/09/science/earth/09climate.html>>

⁴ Vergano, Dan. *Survey: Economists see threat in climate change*. November 3, 2009.

<http://www.usatoday.com/tech/science/environment/2009-11-03-economist-climate_N.htm>

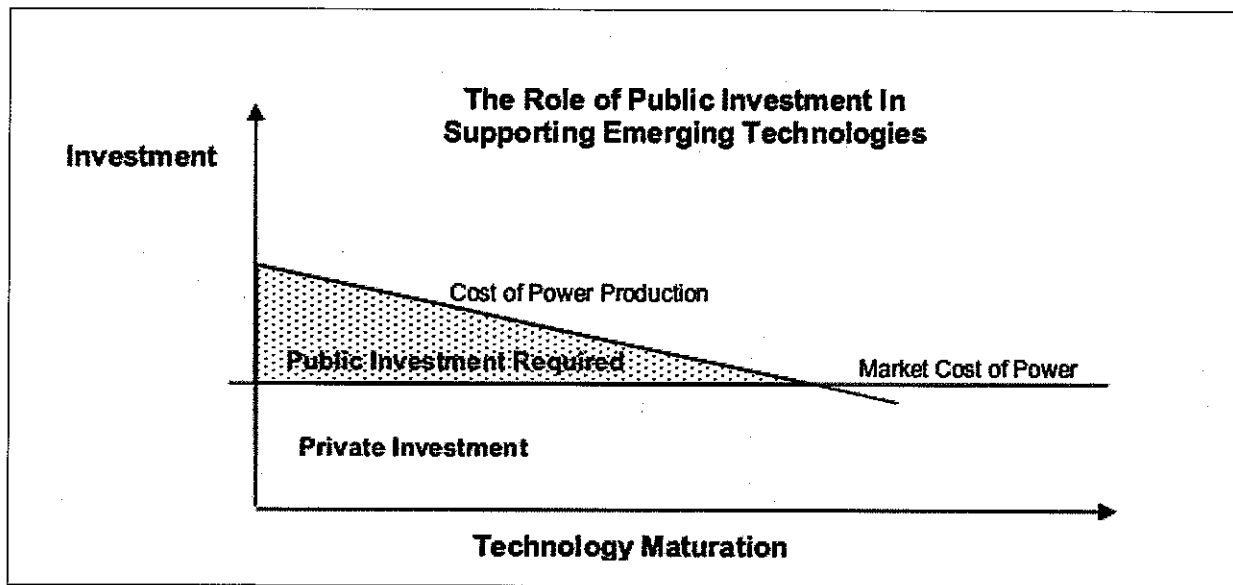


Figure 2. Theoretical timeline of an emerging technology and the purpose of government subsidy.

Is economic development and job creation a primary goal of this credit? If so, address the following:

- ***Number of jobs associated with the credit***
- ***Permanent vs Temporary jobs***
- ***Traded sector vs domestic sector jobs***
- ***Estimates of average wage per job***
- ***Estimate of tax revenue cost per job***

Number of Jobs: The BETC credits were not initially created with the primary purpose of creating jobs. For this reason, the Oregon Department of Energy did not, until recently, request job data as part of a BETC application. *No definitive data exists that links all of the BETC tax credits to job data.* However, circumstantial evidence exists that jobs have been created by BETC. Oregon has the highest number of clean energy jobs per capita of any state, according to a 2007 report from the PEW charitable trust. According to the Oregon Employment Division, in 2008, Oregon had an estimated 51,402 green jobs in 2008, spread across 5,025 employers. Green jobs accounted for 3 percent of Oregon's private, state government, and local government employment.

Wages: Again, according to the Oregon Employment Division, wages for green jobs are higher than average. In 2008, "a slightly larger share of employees working in the green environmental technologies and services sector earned high wages compared to all employees during the quarter. Within the sector roughly 40 percent of employees earned at least \$30 per hour, compared with 20 percent of all employees. The median hourly wage for the green environmental technologies and services sector was \$25.00 during the fourth quarter of 2009 while the median wage for similar sector firms was \$18.67. Both the similar sector and green-specific environmental technologies and services firms' wages exceed the \$15.70 median wage of all employees in the private sector".

Traded Sector vs Domestic jobs: BETC tax credits have created a wide variety of jobs including those in manufacturing companies that sell solar, fuel cell and other products worldwide. Many of the jobs created are strictly domestic such as jobs for those that install conservation systems. The data with a definitive breakdown between the categories is not available.

Permanent vs Temporary jobs: BETC tax credits have created both types including permanent full time manufacturing jobs and temporary construction and installation jobs. The exact breakdown is not available.

Tax Revenue cost per job: This data is not available.

Who directly benefits from this credit?

The BETC benefits a variety of private, public and non-profit organizations.. Some examples of types of business that benefit directly are:

Manufacturers that invest in property, plant and equipment for the purpose of producing renewable energy technologies, such as solar PV modules, wind turbine components, wave energy buoys, and biomass boilers. Examples of these types of businesses include SolarWorld and Oregon Ironworks;

Organizations that invest in and install renewable energy systems, such as solar PV and thermal, biomass, geothermal, small wind, and small hydro systems. Examples of these types of organizations include OIT which installed a geothermal heating system, Kettle Foods which purchased a solar electric system, and Blue Mountain Hospital for its biomass boiler in Grant County;

Organizations that invest in and install energy conservation technologies, such as weatherization, lighting, appliances, high-performance buildings and alternative fuel vehicles. Examples include Pendleton School District for lighting upgrades, First Unitarian Church for energy efficiency measures in its LEED Gold Elliott Center building, and Umpqua Boys and Girls Club for a high efficiency HVAC system.

Companies that provide the services to deploy renewable energy and energy efficient systems, such as engineering, design, procurement, construction and installation, along with the support services including environmental, legal, financial and insurance providers. Examples include David Evans and Associates, CH2M Hill, GL Garrad Hassan, SWCA Environmental Consultants, Stoel Rives, and Lane Powell, which are all companies with major offices in Oregon.

State and Local Governments that receive increased tax revenues.. For example, in Sherman County OR, which is home to six of the nine large-scale wind farms that have received BETC funding, more than \$17 million has been contributed to the County from these projects since 2002 through property taxes, fees and strategic investments⁵. Since the wind farms started operating in 2002, Sherman County's annual revenues have increased from roughly \$300,000 to \$10 million in 2010⁶. Among other benefits, this money has been used to support fire and health services districts, to construct a school, library and city halls, to buy new computers and instruments for schools, and to create a renewable energy technician program at the Columbia Gorge Community College.

What is expected to happen if this credit fully sunsets? Could adequate results be achieved with a scaled down version of the credit? What would be the effect of reducing the credit by 50%?

⁵ van der Voo, Lee. *Wind energy a \$17M boon for Sherman County*. February 17, 2011.

<<http://www.sustainablebusinessoregon.com/articles/2011/02/wind-energy-a-17m-boon-for-sherman.html>>

⁶ Ibid.

Full Sunset

If the BETC fully sunsets, it will drastically curtail the purchase of renewable energy technologies that cannot compete based on economics alone with firmly entrenched fossil-fuel based alternatives, and it would adversely affect those companies that install and support the installation of these systems. The vast majority of activity in the renewable energy sector would be geared towards larger projects that can achieve greater economies of scale, though these will have their own unique and formidable challenges with which to contend, such as siting, permitting, and transmission. Geographically, the rural areas stand to lose a greater percentage of project activity given their sole reliance on the BETC in the absence of any significant utility incentives, such as Energy Trust of Oregon rebates that are enjoyed by customers in Pacific Power and PGE territories.

In addition to halting the majority of renewable energy projects in Oregon, the sunset of the BETC will create a similar decline in energy efficiency projects. Though conservation is regarded as the least expensive investment toward reducing our dependency on carbon-based fuels, the enabling technologies still demand a premium and rely on public support to achieve an acceptable payback period. Many of the recipients of the BETC include public and non-profit organizations that stand to benefit most from greater efficiencies that reduce their overhead costs and allow them to divert scarce financial resources to achieving their missions.

Scaled Down Version

The restructuring of BETC by HB 3680 scaled back the program by imposing a program cap. Significant effects have already been seen from this change. For example, in the first Tier 3 competitive round, ODOE received applications totalling \$972 million in project costs and requests for \$172 million in BETC credits. Due to the cap, only \$30 million in credits was available which leveraged \$150 million in project costs. Thus, \$822 million in potential private sector investment was lost. Reducing the scale of the program further would mean slowing the significant momentum that has been built around the BETC in both the conservation and renewable energy industries. This would lead to job loss, reduced economic impacts, and fewer energy conservation and renewable energy projects being completed. Furthermore, scaling down the program more would make it difficult for Oregon to maintain a competitive edge in attracting and keeping renewable energy and conservation companies. If Oregon began to lose companies entirely due to a lack of state support, the loss in economic development could be drastic.

Credit Reduction

If the BETC rate was reduced, the likely result is that only larger projects, with greater economies of scale, would proceed. Also, only the more mature technologies would be supported.

What background information on the effectiveness of this type of credit is available from other states?

Tax credits, rebates, property tax abatements, loans, bonds and grants comprise the most common set of tools used to promote renewable energy and energy efficiency. In fact, there are over 2,500 federal and state incentive programs for clean energy according to the Database of State Incentives for Renewables and Efficiency (DSIRE). Though Minnesota has the most incentive programs for both renewables and conservation, Oregon is joined by Washington, California, and Colorado among the top ten leading states.

In comparison to other state's RE incentives, the BETC is a very unique program due to its versatility. It has proven tremendously successful in attracting an impressive array of manufacturers and major energy companies, particularly in the solar and wind industries, as well as spurring renewable energy projects throughout the state. Oregon ranks in the top 5 among states for wind power and in the top 10 per capita for solar power; there is no question that the BETC has been a critical driver used to leverage more than \$5 billion of private investment in the clean energy economy. Oregon was recently ranked second in the nation behind California for its clean energy leadership, which includes technology and policy among the evaluator's criteria⁷.

Other states do not have such a versatile tool as the BETC; however, they do offer various incentive programs to reward specific types of businesses and investment.

⁷ Clean Edge. *U.S. Clean Energy Leadership Index*. Retrieved March 21, 2011.
<<http://www.cleandedge.com/leadership/>>

Is use of a tax credit an effective and efficient way to achieve this policy goal?

The BETC has been an effective tool in promoting energy conservation, renewable energy development, and economic development. The amount of *energy conserved* by all BETC projects installed as of 2009 is approximately 49,500 billion BTU annually (49.5 trillion BTU)⁸ (Figure 3), which is equal to 396.2 million gallons of gasoline. The amount of *renewable energy generated or produced* by all BETC projects installed as of 2009 is approximately 22,293 billion BTU annually (22.3 trillion BTU)⁹ (Figure 4) or 6.5 million MWh of electricity, which is enough energy to power 540,000 Oregon homes¹⁰. Although these are substantial numbers, Oregon's total energy consumption is roughly 1,100 trillion BTU¹¹, leaving much room for continued policy to support energy conservation and renewable energy development. In addition to making Oregon's energy supply cleaner, Oregon businesses are highly responsive to the financial benefits of energy conservation and renewable energy. Since 2005, Oregon businesses have undertaken more than 8,700 conservation projects, nearly 3,000 transportation efficiency projects, and installed more than 600 solar systems.

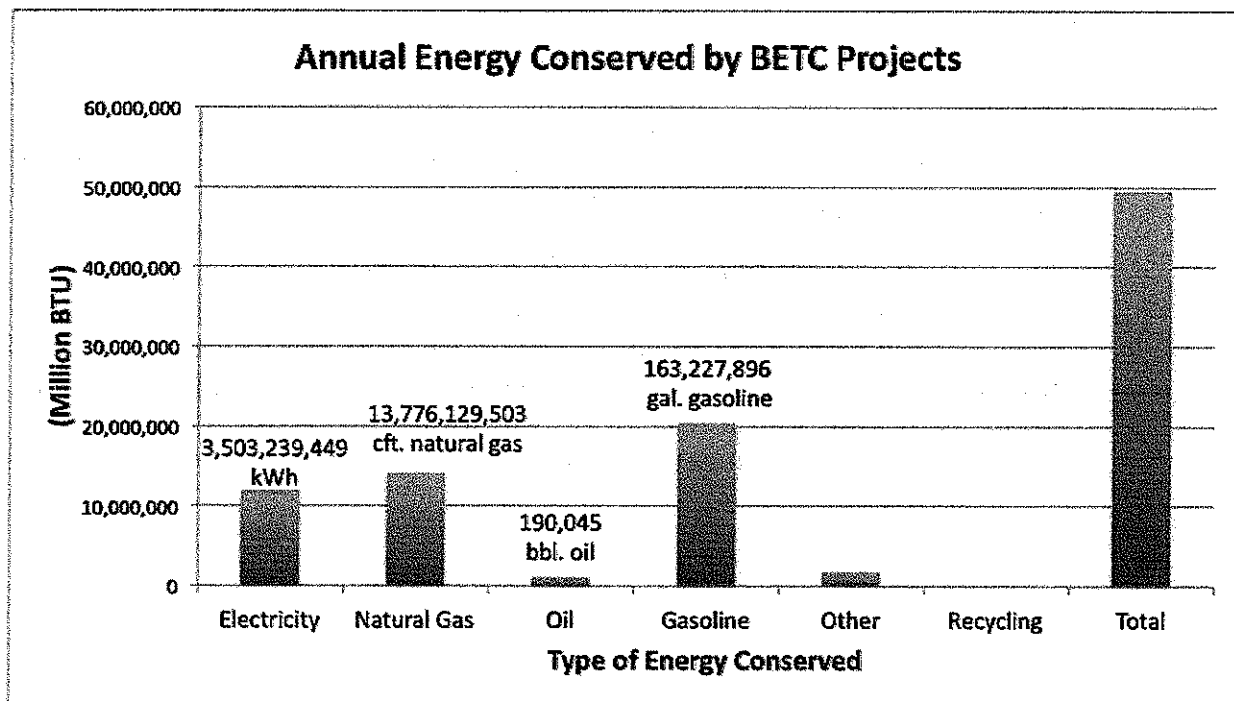


Figure 3. Annual energy conserved by BETC projects, by type of energy, from all projects that have received funding since program start. Data is for calendar year 2009, in million BTU. Source: ODOE, 2010.

⁸ Oregon Department of Energy (ODOE). *Savings During CY 2009 from all Projects Completed From Start of Programs Through Year End 2009*. December 15, 2010.

⁹ Ibid.

¹⁰ Assuming average home power usage equals 12,000 kWh/year.

¹¹ US Energy Information Administration. *State Energy Profiles: Oregon*. January, 2011.

<http://www.eia.gov/cfapps/state/state_energy_profiles.cfm?sid=OR>

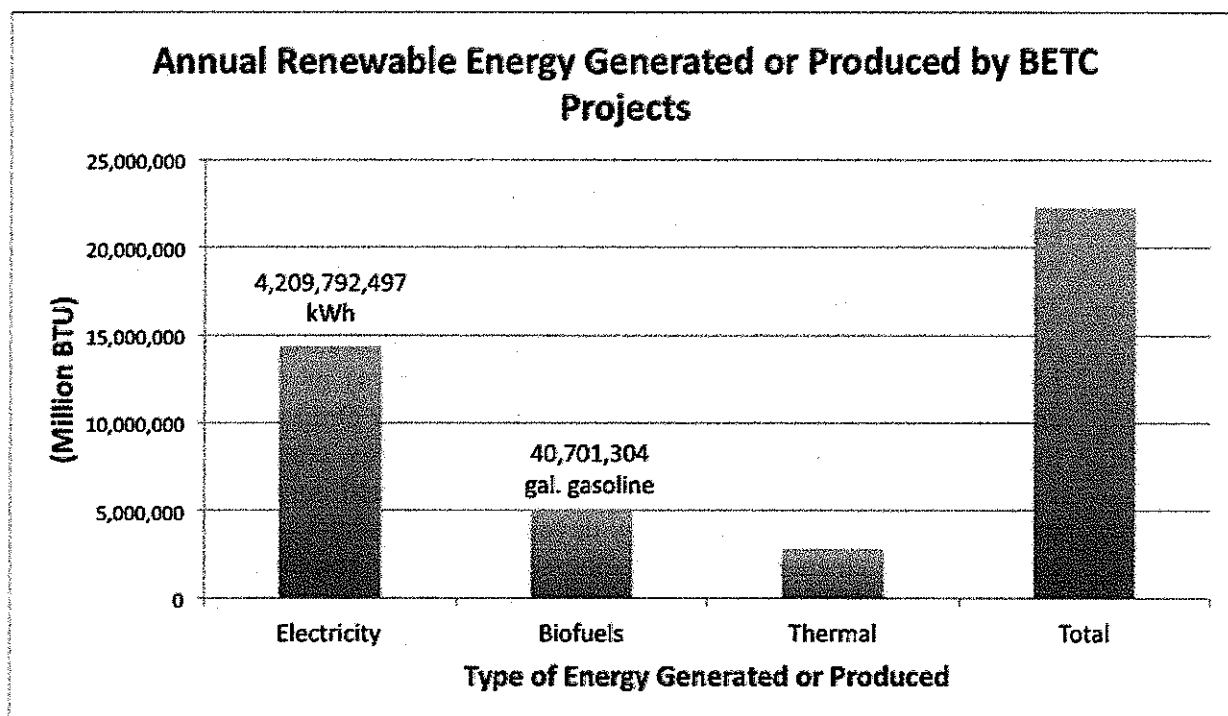


Figure 4. Annual renewable energy generated or produced, by type of energy, from all BETC projects that have received funding since program start. Data is for calendar year 2009, in million BTU. Source: ODOE, 2010.

In addition to energy savings, the BETC program has led to significant amounts of private investment in Oregon's clean energy economy. Since January 2005, the BETC has leveraged an estimated \$2.7 billion of private investment in renewable energy and energy conservation projects from a state expenditure of \$0.6 billion¹² (Figure 5). Over half of the total leveraged private investment is associated with the nine large-scale wind farms that received BETC support. In total, these wind farms received roughly \$83 million in BETCs, while the total capital cost of these projects is estimated at \$1.4 billion. Solar PV manufacturing plants provided significant returns, with a total BETC expenditure of roughly \$51 million for three manufacturing facilities that had total capital costs of over \$630 million.

¹² This amount of private investment, which is higher than would be expected from a proportional investment in a project with a 35% or 50% BETC, is due to the investment in renewable energy manufacturing facilities and large scale wind farms. The true project costs in these categories greatly exceeded the cap for eligible project costs, resulting in a higher private investment to BETC expenditure ratio.

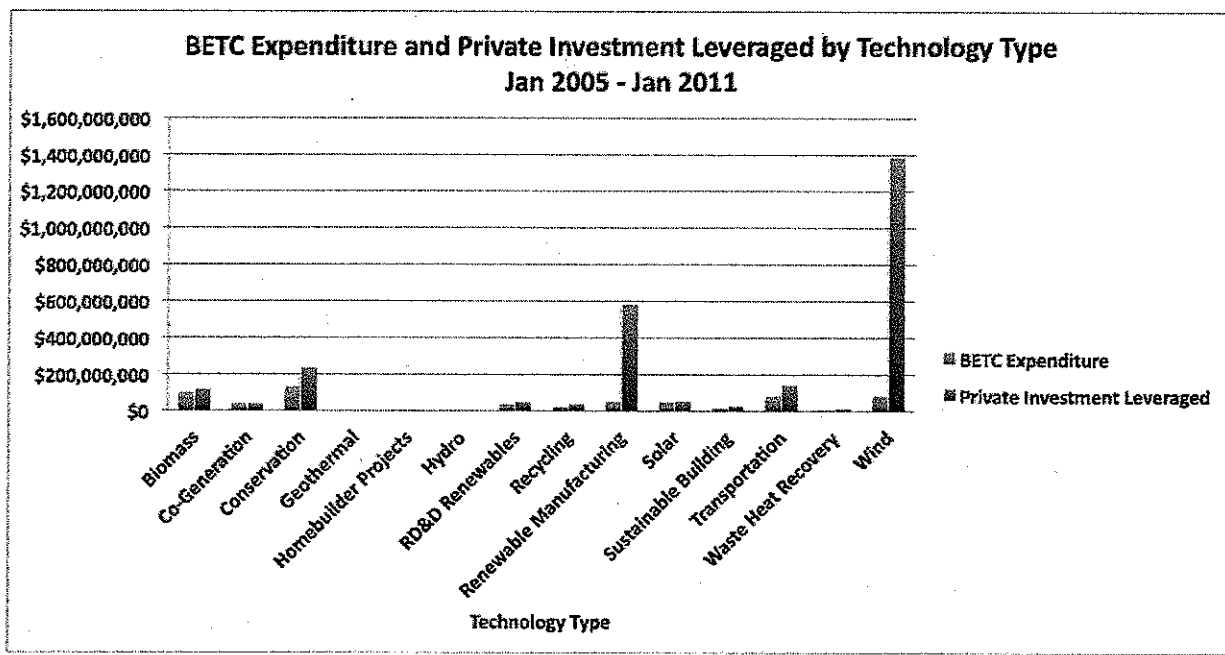


Figure 5. Private investment leveraged from BETC expenditures from January 2005 through January 2011. During this time, \$614 million in tax credits were awarded to BETC projects, while those projects leveraged an additional \$2.7 billion in private investment to cover \$3.3 billion in estimated total projects costs.

6. What other incentives (including state or local subsidies, federal tax expenditures or subsidies) are available that attempt to achieve a similar policy goal?

The BETC works to complement a variety of other programs to promote clean energy including;

The Renewable Portfolio Standard (RPS) – which mandates that utilities obtain a percentage of their power from renewable sources – has helped the state achieve part of this policy objective (the development of renewables) mainly through the development of large-scale wind projects.

The feed-in-tariff (FIT) approach for supporting solar projects holds a great deal of promise. However, at this time Oregon only has a small pilot project under the auspices of the Public Utility Commission, and a possible expansion of this model could be years away.

The Energy Trust of Oregon is a key player supporting renewable energy and efficiency projects. However, it only operates within the PGE, Pacific Power, and Northwest Natural territories. Also, the ETO's budget is relatively small, and historically its role has been to provide incremental support to BETC-funded projects.

The Federal Government has its own tax credit programs for both efficiency and renewables, but like the Energy Trust, these work to supplement the BETC incentives and are not sufficient to replace it. Furthermore, the availability of these credits in the future is limited. The 30% US Treasury Grant is only available

to projects that begin construction prior to 2012, while tax credits for energy efficiency and wind power expire in 2011 and 2012, respectively. The 30% investment tax credit (ITC) for solar technologies, small wind, and fuel cells expires in 2016, as does the 10% ITC for geothermal, microturbines, and combined heat and power (CHP).

With regard to manufacturing, there are a few incentive programs designed to attract companies to Oregon; however, they are not focused solely on the renewable energy sector. Some of the incentives for manufacturing include:

- 1) Strategic Investment Program (SIP) - exempts a portion of large capital investments from property taxes;
- 2) Enterprise Zones - exempt businesses from local property taxes on *new* plants and equipment for three to five years in a standard zone, and up to 15 years in a rural zone;
- 3) Oregon Investment Advantage - companies setting up operations in a qualifying county are eligible for a 10-year waiver on all income/excise taxes related to those operations, potentially avoiding state business tax liability for that period

For renewable energy and conservation projects, there are a number of incentive programs that either complement or are in addition to the BETC that are not included above:

- 1) Oregon Department of Energy (ODOE) State Energy Loan Program (SELP). Offers low-interest loans for projects that save energy, produce energy from renewable resources, use recycled materials to create products, or use alternative fuels.
- 2) Municipal and cooperative utilities – various programs to incentivize conservation and renewable energy technology for ratepayers in the respective utility's territory;
- 3) BPA energy efficiency programs – federal incentives, marketing and technical assistance to encourage energy conservation in the commercial, industrial and agricultural sectors
- 4) USDA Rural Energy for America Program - offers grants and/or loan guarantees for the purchase and installation of renewable energy generating systems and for energy efficiency improvements. Assistance is limited to small businesses and farmers & ranchers in rural areas.

Could this credit be modified to make it more effective and/or efficient? If so, how?

While the tax credit model is the current reality, there are some drawbacks to this approach. The major one is the requirement that a recipient have a tax liability in order to derive an economic benefit. The BETC's mechanism for a pass-through sale of the tax credit has been essential to its effectiveness, allowing private companies without sufficient tax liabilities, and public entities without tax obligations, to take advantage of the program.

However, a pass-through sale is at a discount and means that less money actually goes to the project. An alternative to the pass-through mechanism would be a refundable tax credit, whereby an entity could receive cash if it cannot make use of the tax credit.

A number of ideas have been proposed that would make the BETC program more efficient. Some options to significantly improve the BETC include:

- 1) Specify that the provision for “comparison of projects of similar costs against each other” should mean “by setting threshold criteria” for each sector rather than by a competitive process (which now requires an applicant to complete expensive project proposals with low probability of success – a strong disincentive for participation).
- 2) Limit the conditions under which a pre-certification can be withdrawn or modified by ODOE.
- 3) Modify the pass-through program whereby the 5-year tax credit is discounted from 50 to 40 percent and transferrable in yearly increments for five years to one or more pass-through partners. This would apply retroactively to all outstanding credits (to help the current backlog of credits to be sold).
- 4) If statutorily permissible, allow the pass through rate for larger projects to be determined by the market (i.e., negotiated between buyer and seller) rather than set by the ODOE.
- 5) Change handling of the Federal Investment Tax Credit (ITC). Under current procedures, the ITC, if taken as a tax credit, does not reduce the BETC basis; however, if taken as a grant it does. These should be consistent, so that an ITC grant does NOT reduce BETC eligible costs.

In addition to these suggested improvements, there are other ideas that could supplant the current BETC program. One promising alternative for the renewable BETC would include:

For projects less than 10MW in capacity, institute a community renewable energy incentive program that provides a tax credit equal to 50 percent of eligible project costs. Like the current BETC, the credit would be allocated at 10% per year for 5 years and would be tradable to an Oregon taxpaying company. Making the credit tradable would allow for both taxpaying and non-taxpaying entities to utilize the incentive. The project owner could sell the five-year credit for a lump sum upfront payment, or separate the five-year credit into single year credits to sell each year for five years.

For projects over 10MW in capacity, issue a refundable tax credit whereby the 5-year credit is discounted from 50 to 40 percent and claimed each year for five years. The claim generates a refund for taxpaying entities. This would lead to a less expensive program for the state and generate more value for credit recipients by avoiding the need for a pass-through partner.

How would the return on the State's investment be measured?

It makes sense to look at the total impact of the BETC including the amount of clean energy generated, the amount of energy saved, the number of jobs created and the economic impact of the program. A snapshot from 2007 –2008 shows that BETC (along with the RETC) cost the state \$244 million during 2007 and the first three quarters of 2008. In return, it generated a net economic impact of \$576 million, created 1,700 new jobs worth \$42 million in wages, and generated \$22 million in new state and local tax revenues. From January 2005 to January 2011, \$614 million in BETC credits were matched by \$2.7 billion in private investment, leading to \$3.3 billion in projects. In addition, clean energy jobs have contributed to economic activity and opportunity throughout the state.

Appendix A. Private Investment Leveraged by BETC from January 2005 – January 2011¹³

Project Type	Number of Projects	Total BETC Eligible Cost	Total Cost	Total Final Certified BETC	Total Private Investment Leveraged
Biomass	102	\$215,024,629	\$215,024,629	\$99,004,499	\$116,020,130
Co-Generation	15	\$76,957,682	\$76,957,682	\$38,374,006	\$38,583,676
Conservation	8,741	\$364,037,822	\$364,037,822	\$130,805,157	\$233,232,665
Geothermal	12	\$4,087,233	\$4,087,233	\$1,594,214	\$2,493,019
Homebuilder Projects	67	\$1,661,697	\$1,661,697	\$581,007	\$1,080,690
Hydro	8	\$1,202,094	\$1,202,094	\$596,571	\$605,523
RD&D Renewables	34	\$83,511,527	\$83,511,527	\$35,935,193	\$47,576,334
Recycling	87	\$58,582,011	\$58,582,011	\$20,796,161	\$37,785,850
Renewable Manufacturing	4	\$101,996,128	\$632,000,000¹⁴	\$50,998,064	\$581,001,936
Solar	613	\$101,286,093	\$101,286,093	\$49,222,816	\$52,063,277
Sustainable Building	82	\$42,561,319	\$42,561,319	\$15,243,267	\$27,318,052
Transportation	2,985	\$223,188,598	\$223,188,598	\$81,789,980	\$141,398,618
Waste Heat Recovery	10	\$18,143,097	\$18,143,097	\$6,350,084	\$11,793,013
Wind	18	\$172,428,847	\$1,466,800,000¹⁵	\$83,197,643	\$1,383,602,357
Total	12,778	\$1,464,668,777	\$3,289,043,802	\$614,488,662	\$2,674,555,140

¹³ All BETC data, except for estimated total costs of renewable manufacturing facilities and wind projects, was provided by Oregon Department of Energy (ODOE).

¹⁴ See sources in breakdown of solar manufacturing investments, Appendix B.

¹⁵ Assuming an installed cost of \$1,900/kW. According to the Lawrence Berkeley National Lab (LBNL) 2009 Wind Technologies Report, the capacity-weighted average installed cost of wind projects developed between 2007-2009 in the Northwest was over \$2,000/kW. The majority (roughly 80%) of total Northwest wind capacity came online in 2007 or later.

Wiser, Ryan and Bolinger, Mark. Lawrence Berkeley National Laboratory (LBNL). 2009 *Wind Technologies Report*. August, 2010.
<http://eetd.lbl.gov/ea/emp/reports/lbnl-3716e.pdf>

Appendix B. Estimated Total Renewable Energy Investment in Oregon

Total Renewable Energy Investment in Oregon

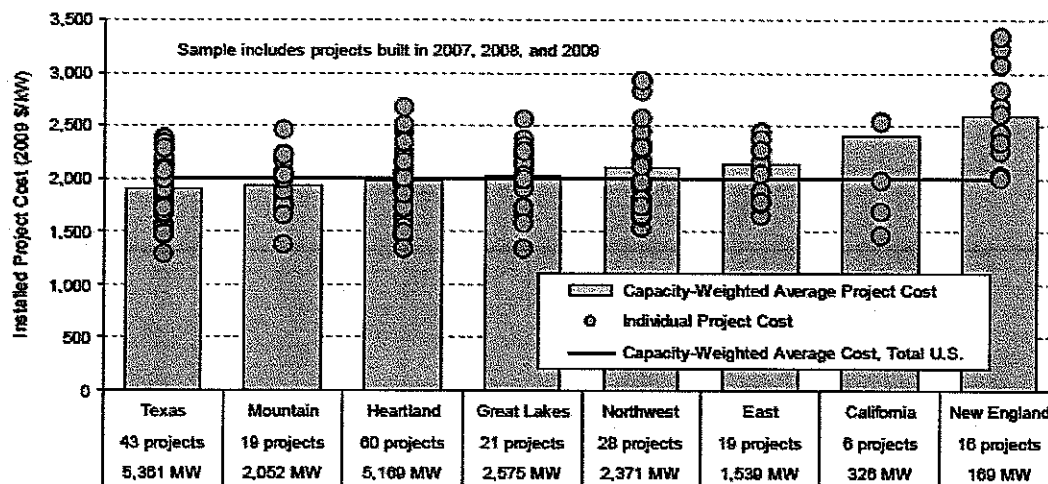
More than **\$5 billion** has been invested in Oregon's renewable energy industry.

Technology	Investment
Wind	\$4,509,968,594
Solar Manufacturing	\$632,000,000
Solar Development	\$143,531,794
Geothermal	\$121,152,545
Total	\$5,406,652,933

Oregon Wind

\$4.5 billion of total capital investment in wind project development.

There are currently 2,374 MW of wind operating or under construction in Oregon. Total investment of \$4.5 billion is based on an average installed cost of \$1,900/kW, which is likely to be a conservative estimate.¹⁶



Source: Berkeley Lab

Figure 29. Installed Wind Power Project Costs by Region: 2007-2009 Projects

¹⁶ According to the Lawrence Berkeley National Lab (LBNL) 2009 Wind Technologies Report, the capacity-weighted average installed cost of wind projects developed between 2007-2009 in the Northwest was over \$2,000/kW. The majority (roughly 80%) of total Northwest wind capacity came online in 2007 or later.

Wiser, Ryan and Bolinger, Mark. Lawrence Berkeley National Laboratory (LBNL). 2009 *Wind Technologies Report*. August, 2010. <<http://eetd.lbl.gov/ea/emp/reports/lbnl-3716e.pdf>>

Oregon Solar PV Manufacturing

Soon to be **2,370 jobs** in Oregon solar manufacturing.

More than **\$600 million** of capital investment in solar manufacturing plants.

Plant Investment	
SolarWorld ¹⁷	\$500,000,000
Solaix ¹⁸	\$52,000,000
Sanyo ¹⁹	\$80,000,000
PV Powered ²⁰	Unknown
Peak Sun ²¹	Unknown
Supply Chain ²²	Unknown
Total	\$632,000,000

Oregon Solar PV Development

More than **\$140 million** of capital investment in residential and commercial solar PV development²³.

Oregon Geothermal Development

With Federal cost share programs, **over \$120M** has been invested in geothermal exploration, research, and project development since 2009. At least 75MW will be coming online in the short term, and the exploration and research will provide a very "hot" future²⁴!

¹⁷ <<http://www.solarworld-usa.com/news-and-resources/news/solarworld-opens-north-americas-largest-solar-cell-manufacturing-facility.aspx>> and <<http://www.solarworld-usa.com/news-and-resources/news/SolarWorld-fulfills-1000-worker-commitment-in-Oregon.aspx>>

¹⁸ <<http://www.solaix.com/news-and-events.html>> and <http://www.sustainablebusinessoregon.com/articles/2010/01/solaix_plans_to_triple_portland_plant_capacity.html>

¹⁹ <http://www.oregonlive.com/business/index.ssf/2008/09/its_official_sanyo_hatching_80.html> and Oregon Solar Energy Industries Association (OSEIA).

²⁰ Direct conversation with PV Powered. February 2, 2011.

²¹ Oregon Solar Energy Industries Association (OSEIA). February 2, 2011.

²² Ibid.

²³ According to Oregon Department of Energy (ODOE), the total system costs of solar PV installations under the Residential Energy Tax Credit (RETC) program from 2001 through July, 2010, equals \$38,339,391. The total system costs of solar PV installations under the Business Energy Tax Credit (BETC) program from 2001 through January, 2011, equals \$105,191,863.

²⁴ US Department of Energy (ODOE), Energy Efficiency and Renewable Energy (EERE). Geothermal Technologies Program. <http://apps1.eere.energy.gov/geothermal/projects/state_listing.cfm/state=OR>

OREGON:

Renewable Energy Leader

Solar Manufacturers in Oregon

<u>Company</u>	<u>Status</u>	<u>Type</u>	<u>Location</u>	<u>Current Jobs</u>	<u>Jobs When Plants Completed</u>
SolarWorld	Operating	Ingots/wafers/cells/modules	Hillsboro	1,000 employees	1,145 employees
Sanyo Solar	Operating	Ingots/wafers	Salem	200 employees	200 employees
Solexant	Pending	Thin-film modules	Gresham	--	200 employees
PV Powered/Advanced Energy	Operating	Inverters	Bend	135 employees	210 employees
MEMC/Solaicx	Operating	Ingots/wafers	Portland	80 employees	150 employees
SoloPower	Pending	Thin-film modules	Wilsonville	--	140 employees
MEI LLC.	Operating	Wafer cleaning	Albany	100 employees	100 employees
Peak Sun	Operating	Polysilicon	Millersburg	50 employees	50 employees
Mr. Sun	Operating	Water heaters	Portland	30 employees	30 employees
Azuray	Operating	Micro-inverters	Durham	30 employees	30 employees
Oregon Crystal	Operating	Wafers	Gresham	30 employees	30 employees
PV Trackers	Operating	PV tracking systems	Bend	25 employees	25 employees
SIC Processing	Operating	Silicon recycling	Portland	20 employees	20 employees
FT Solutions (Ferrotec)	Operating	Crucibles	Fairview	20 employees	20 employees
				1,720 employees	2,350 employees

Data Courtesy of Business Oregon



Appendix C. Industry Phases and Proposed BETC Timeline

<i>Phase</i>	<i>Elements</i>	<i>Policy Leadership Needed</i>
<i>MARKET LAUNCH</i>	<ul style="list-style-type: none"> • Market-ready Technology; • Renewable technology cannot compete with fossil fuel subsidies • Testing new locations, adapting to scale • Early Adopters • New financial and marketing approaches 	<ul style="list-style-type: none"> • Financial Incentives such as loans and tax credits to drive markets • Agency/Government Coordination • Remove/address barriers • Government leadership as adopter of technology (may be needed in growth stage as well) • Research and development • New company incubation
<i>MARKET GROWTH</i>	<ul style="list-style-type: none"> • Benefits become significant • More Companies offer Product • Economies of scale bring prices down—but still unable to compete on a level playing field • Broad tests of new financing and marketing approaches • Broader Adoption – Significant impact on clean energy use in Oregon • Significant employment and significant number of users • Diversification in product and support industries • Infrastructure issues may be out of balance • Sustained market adoption remains fragile—may see media or other threats 	<ul style="list-style-type: none"> • Financial Incentives • Remove/address barriers • Public Education/Outreach • Assistance to create balanced infrastructure such as transmission, worker training, etc.
<i>MARKET MATURATION/PARITY</i> <i>Industry is self-sufficient</i>	<ul style="list-style-type: none"> • Product is integrated into traditional commercial systems • Clean energy competes on a level playing field with traditional sources • Infrastructure, workers, companies are in alignment 	<ul style="list-style-type: none"> • Remove/address barriers • Continue monitoring progress and benefits to State

Appendix D. Business Energy Tax Credit Success Stories

ClearEdge Power
Hillsboro, OR

Type of Business:
Fuel Cell Production

How they have used the BETC:

Create a Manufacturing Plan – ClearEdge Power has a Hillsboro manufacturing plant that has grown from just 33 employees to over 180 full-time Oregon employees making fuel cells that create energy and are sold worldwide. ClearEdge has attracted over \$25 million in venture capital in 2010 and looks forward to continued growth.

St. Vincent de Paul
Society of Lane
County (SVDP)
Eugene, OR

Type of business:
Nonprofit Human Services Organization

How they have used the Business Energy Tax Credit:

Energy Conservation – SVDP has over 360 employees in Lane, Linn and Marion counties. Since 2005, the BETC has allowed SVDP to include alternative energy systems, such as solar hot water systems in some of their affordable housing projects, directly lowering utility bills for 165 low-income Lane County families.

FCC Commercial
Furniture
Roseburg, OR

Type of business:
Designer and Manufacturer of Commercial Restaurant Interiors

How they have used the Business Energy Tax Credit:

Energy Conservation – Since 2005, FCC Commercial Furniture has reduced costs at its 140,000-square-foot-plant by installing high-efficiency lighting and production efficiency projects, saving 761,280 kWh and the company more than \$36,000 annually. The BETC helped reduce out-of-pocket investment expenses by \$129,466. This helps keep the company competitive and can help to retain jobs in Oregon.

ZeaChem Inc.
Boardman, OR

Type of business:
Bio-refinery Developer

How they have used the Business Energy Tax Credit:

Biofuels Manufacturing – The BETC was a very significant factor in the decision by ZeaChem to locate a 250,000 gallon per year bio-refinery facility in Boardman, Oregon. The BETC credit has been leveraged to attract \$40 million from venture capital and strategic partners. This project will create or retain 20 direct operations jobs, 75 construction jobs, and additional indirect jobs both in the Boardman area and throughout the state.

Vestas
Portland, OR

Type of business:
Manufacturer, Seller, Installer, and Servicer of Wind Turbines.

How they have used the Business Energy Tax Credit

Corporate Headquarters – Vestas received \$1.25 million in state tax credits and another \$1 million from the state's strategic reserve fund. This helped create over 600 construction related jobs. Vestas provides over 400 local jobs and is expected to employ over 600 employees in the next five years. It is the Northwest Headquarters for its US wind turbine manufacturing business.

Persephone Farm
Lebanon, OR

Type of business:

Vegetable Farm

How they have used the Business Energy Tax Credit:

Reduce Gasoline – The BETC has helped owner, Jeff Falen, convert his gas tractor into an electric tractor and 88% of the farm's electrical demand is now provided by on-site solar electric panels.

Oregon Iron
Works, Inc.
Clackamas, OR

Type of business:

Fabrication and Manufacturing of Hydroelectric, Bridge and Civil Construction

How they have used the Business Energy Tax Credit:

Manufacturing – The BETC will help Oregon Iron Works construct the first commercial wave energy PowerBouy® system in North America. This will generate approximately 1.5 megawatts of electricity to Oregon. It will also create over 200 full-time, family wage jobs.

Rough and Ready
Lumber Co.
Cave Junction, OR

Type of business:

Forest Industry

How they have used the Business Energy Tax Credit:

Energy Efficient Co-generation – Rough and Ready Lumber provides 85 jobs in a community of less than 200 residents. The BETC allowed the company to install an energy efficient cogeneration facility that produces much of their power, producing more than 10 million kWh from renewable fuel sources, enough for 700 homes.

Wallowa
Memorial Hospital
Enterprise, OR

Type of business:

Hospital and Health Care

How they have used the Business Energy Tax Credit:

Energy Conservation – The hospital was able to afford to install a central water-source heat pump system as well as high-efficiency lighting and insulation, saving an estimated \$52,000 a year in energy costs.

SolarCity
Portland, OR

Type of business:

Solar Power System Design, Financing, Installation, Monitoring and Related Services

How they have used the Business Energy Tax Credit:

Energy Conservation – Thanks to the BETC, SolarCity has been able to offer low-cost solar Power Purchase Agreements to many business and nonprofit organizations throughout the state resulting in a 10-15% reduction in energy bills.

Pacific Natural
Foods
Tualatin, OR

Type of business:

Natural and Organic Food Processing

How they have used the Business Energy Tax Credit:

Energy Conservation – In their nine buildings, Pacific Natural Foods has upgraded with high efficiency light fixtures and occupancy sensors, cutting electricity demand by half for an estimated \$45,699 in annual savings. This project was made possible with the help of the BETC. The savings help Pacific Natural Foods stay competitive.

Appendix E. Examples of renewable energy and efficiency incentives in other states.

Washington

- 1) Reduced Business and Occupation (B&O) tax rate to 0.275%, effective October 1, 2009. This tax rate is 43% lower than the standard manufacturing B&O tax rate and applies to manufacturers of photovoltaic modules and other compentry and materials within the solar value chain.
- 2) A sales and use tax exemption is in effect until June 30, 2011 for systems generating electricity using fuel cells, wind, sun, biomass energy, tidal or wave energy, geothermal, anaerobic digestion or landfill gas. Purchasers of the systems listed above may claim an exemption in the form of a remittance. The exemption is reduced to 75% from July 1, 2011 until June 30, 2013.
- 3) Solar 4R Schools non-profit grant program offered through Bonneville Environmental Foundation, an Oregon-based non-profit, funds 50-100% of small-scale (1.1 kW) solar systems at schools interested in increasing the visibility of renewable energy.
- 4) Small grants and incentives for green building projects and local utility-based incentives for renewable energy and energy conservation.

New Jersey

- 1) The Edison Innovation Clean Energy Manufacturing Fund (CEMF) has a \$35 million budget for 2011 and is intended to provide assistance for the manufacturing of energy efficient and renewable energy products at a 50% cost share with non-state funds up to \$3.3 million per project in the form of grants and 0% interest loans.
- 2) Solar Financing Incentive, a public benefits charge that generates \$3.8 million to be used as a rebate for residential (up to \$3,750), non-profit and government installations (up to \$15,000)
- 3) The Utility Solar Financing Program creates a Solar Renewable Energy Certificate (SREC) that represents 1MW of installed capacity and can be sold as a tradable commodity by solar system owners and used toward the state's RPS carve out requirement for solar energy.
- 4) Full exemption from the state's sales tax (currently 7%) for all solar energy equipment including equipment for passive solar.
- 5) Local property tax exemption for renewable energy systems used to meet on-site electricity, heating, cooling, or general energy needs, including solar PV, wind, fuel cells, sustainable biomass, geothermal electric, landfill gas, hydroelectric, resource recovery, wave, and tidal systems that produce electricity, as well as solar thermal energy (e.g., solar hot water) or geothermal energy (e.g., geothermal heat pumps).
- 6) Various state rebate programs for energy conservation and renewable energy technologies, except solar which uses SRECs.

California

- 1) Exclusion from the state's sales and use tax for expenses related to the design, manufacture, production, or assembly of renewable energy equipment, combined heat and power equipment, and alternative transportation equipment in California until January 1, 2021. When the total value of exclusions awarded reaches \$100 million annually, the administrative body must provide a 20-day notice to the Legislature prior to approving additional projects.

- 2) Thought rules for this program are pending, a feed-in tariff allows eligible customer-generators to enter into 10-, 15- or 20-year standard contracts with their utilities to sell the electricity produced by small renewable energy systems -- up to 3 megawatts (MW) - at time-of-use, market-based prices reflecting the increased value of the electricity to the utility during peak periods and its lesser value during off-peak periods. A special, higher-level rate is provided for solar electricity generated between 8 a.m. and 6 p.m. The tariffs will be available until the combined statewide cumulative capacity of eligible generation installed equals 750 MW.
- 3) A property tax exclusion for certain types of solar energy systems installed between January 1, 1999, and December 31, 2016.
- 4) Various state and utility rebate and loan programs for solar and other renewable energy systems.
- 5) Various local green building incentives

North Carolina

- 1) A tax credit equal to 35% of the cost of eligible renewable energy property constructed, purchased or leased by a taxpayer and placed into service in North Carolina during the taxable year, effective through December 31, 2015. The credit is subject to various ceilings depending on sector and the type of renewable-energy system including a maximum of \$10,500 per installation for photovoltaic systems, wind-energy systems, combined heat and power systems, or certain other renewable-energy systems used for a non-business purpose; and a maximum of \$2.5 million per installation for all solar, wind, hydro, geothermal, combined heat and power, and biomass applications used for a business purpose. A taxpayer who donates money to a tax-exempt nonprofit or government organization to help fund a renewable energy project may claim a tax credit that the system owner could claim if it were subject to tax.
- 2) A tax credit for costs incurred in the construction or retooling of a facility to manufacture renewable energy property or "a major component subassembly for a solar array or wind turbine" from January 1, 2011 through December 31, 2013. Eligible costs include construction and equipment costs specifically associated with the manufacture of eligible equipment. The credit is worth 25% of the eligible costs and must be claimed in five equal annual installments beginning with the year the facility is placed in service.
- 3) The Energy Improvement Loan Program (EILP) is available to businesses, local governments, public schools, community colleges, and nonprofit organizations for projects that include energy efficiency improvements and renewable energy systems. Loans with an interest rate of 1% are available for certain renewable-energy and energy-recycling projects and 3% for projects that demonstrate energy efficiency, energy cost savings or reduced energy demand. In order to qualify for the EILP, a project must, among other requirements, be able to recover capital costs within the loan's maximum term of 10 years through energy cost savings.
- 4) A property tax exemption of 80% of the appraised value of a "solar energy electric system," and all other active solar heating and cooling systems may not be assessed at more than the value of a conventional system for property tax purposes.
- 5) Various state and local rebates and incentives for green building initiatives.
- 6) Various local utility rebates and incentives for energy conservation and renewable energy systems.