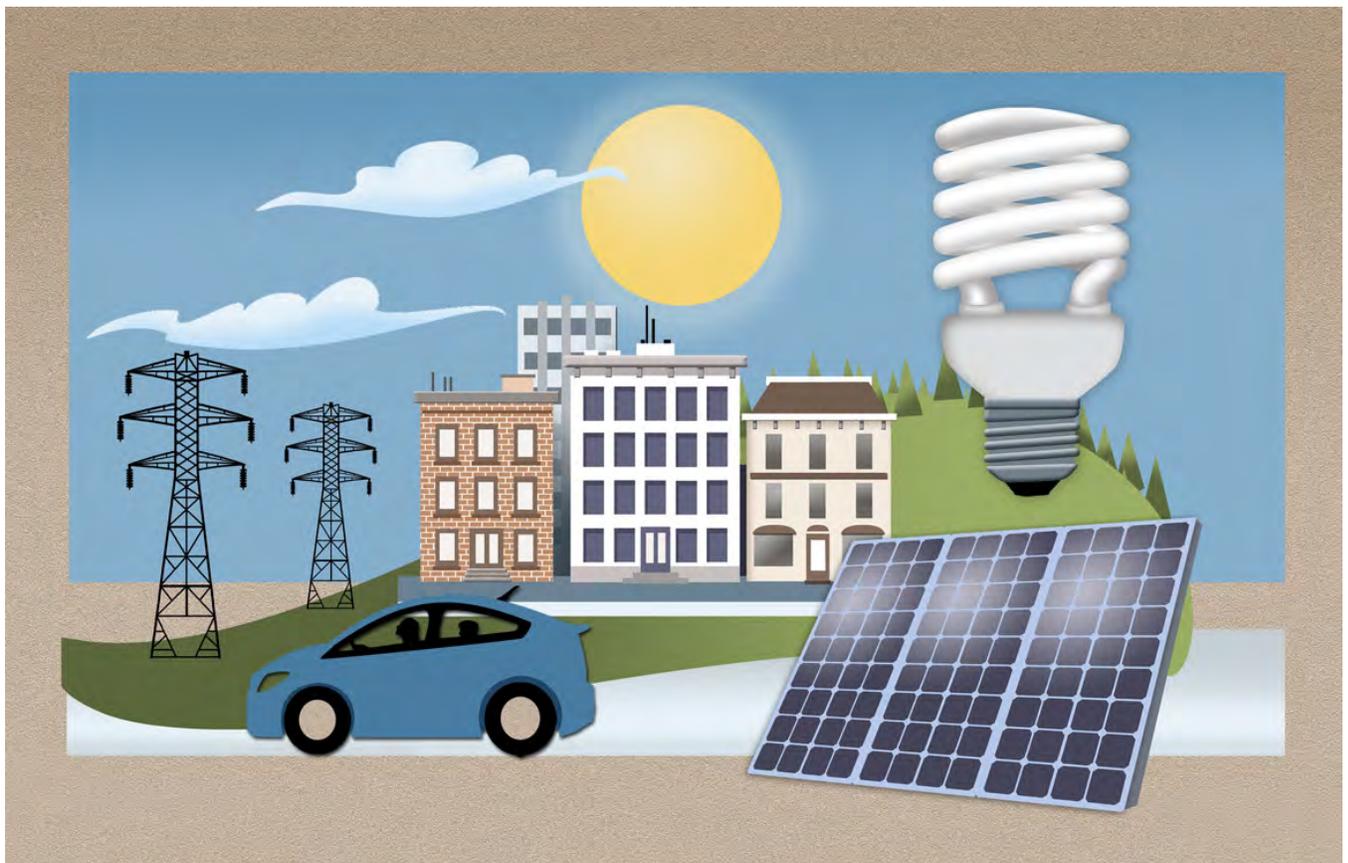




The Sustainable Thurston project is an opportunity to shape this region's future as well as the actions and responsibilities to achieve it.

Energy Panel White Paper



December 2011

About This Project

This community conversation comes at a time when the issues of economic resilience and efficiency are foremost in our minds. Our region's households, governments, nonprofits and businesses are making the most of resources in order to maintain quality of life and build toward a more resilient economy, society, and environment.

This region and its 29 public and private sector partners successfully competed for a Sustainable Communities Regional Planning Grant from the Federal Office of Housing and Urban Development, Department of Transportation, and the Environmental Protection Agency. Their interest in making these grants possible is to encourage regions to incorporate livability principles into sustainability plan discussions since these are proving to be essential to the creation of resilient communities.

The Sustainable Thurston Plan will build upon:

- 1) **Thurston Region Population Projections estimated to add 120,000 additional residents between 2010 and 2035**
- 2) **Existing state, regional, and local plans** as the base scenario for plan discussion and analysis
- 3) **State Requirements** set forth in the Growth Management Act
- 4) **Livability Principles**
 - Provide more transportation choices
 - Promote equitable affordable housing
 - Enhance economic competitiveness
 - Support existing communities
 - Coordinate policies and leverage investment
 - Value communities and neighborhoods

About Sustainable Thurston Panels

The Sustainable Thurston process begins with information development through a series of "white papers" produced by panels and work groups and reviewed by the Sustainable Thurston Task Force. This work will inform the three phase public process about a variety of elements that support our community and work together to enhance quality of life. These include:

- Economic development
- Housing
- Water infrastructure, stormwater, sewer
- Solid waste
- Public safety
- Schools and transportation
- Health and human services
- Local food systems
- Land use, transportation, climate change
- Energy
- Public outreach and education

Background and Context

In late 2010, Thurston Regional Planning Council secured a grant to develop a Regional Plan for Sustainable Development for Thurston County. The grant was sponsored by a federal partnership of Housing and Urban Development (HUD), Environmental Protection Agency (EPA) and Department of Transportation (DOT). The principle authors on this Energy Baseline White Paper are the Thurston Climate Action Team (TCAT) and the Thurston Energy program, with data input and guidance from Puget Sound Energy (PSE) and Thurston County.

Purpose of White Paper

Sustainability implies a balancing of supply and demand. How can the demands of today be met while leaving enough supply to meet future demand? How do we ensure that we have the correct amount of supply to meet the needs of our community during the planning horizon of the next 30 years? How are we planning to make transitions during the planning horizon, so that we'll set our community on a sustainable and resilient path for the rest of the 21st Century? Inherent in those questions are the concepts that resources are finite and that future sustainable growth and development can only be based on available energy resources.

The purpose of the Energy Baseline White Paper is to describe the current electricity and natural gas supply, demand, and usage in Thurston County, along with the projections over the planning horizon that PSE and others are currently working from. Additionally, it examines what is working well, and challenges and opportunities for the future. The Energy Baseline White Paper is not intended to make any specific recommendations about changes to energy production or delivery systems.

By understanding our community's current energy baseline, Sustainable Thurston participants will be able to effectively incorporate energy issues into their planning activities. Further, participants will be able to envision and plan for a sustainable and resilient energy future for our Thurston County community. In this instance, resiliency is a measure of how quickly and completely the energy deliverer can respond to failure, a measure of reliability.

Growth

Thurston County's population is expected to grow by 120,000 by 2035, from around 250,000 people to around 370,000 people. That's a growth rate of about 48%. Picture every two individuals replaced by three. As our community grows, it will require more resources, including energy.

Why is Energy Important?

Economists have focused on three *factors of production*—*land, labor and capital*. These are considered the basic elements that, when combined, produce value. We factor in natural resources as “natural capital”, and energy is a critical natural capital input.

Every aspect of our existence is influenced by the presence or absence of reliable energy. Certainly, our economy is energy dependent. Try to think of a business activity that wouldn't be affected by a loss of electricity or fuel. Walk down any street and imagine no electricity or natural gas. What businesses would still be open and operating without monumental changes? Personal lives are the same. Imagine our lives without lights, heat, cell phones, TV, the internet — the list goes on.

So as we examine a sustainable Thurston County, it's crucial we set a foundation for a thoughtful conversation about energy—what we have, what we'll need and how we'll meet that need. This paper focuses on electricity and natural gas for use in the built environment.

Providers

Puget Sound Energy (PSE) provides residential, commercial and industrial electricity and natural gas service in Thurston County. Several providers of liquefied petroleum gas (LPG) also exist. Their customer base is generally limited to remote sites and recreational vehicles.

Electricity

Current Status

The following table includes the total electricity used in Thurston County in 2009, by types of consumption.

2009 Thurston County Data from Puget Sound Energy

Customer Type	Customers in Thurston County	kWh Usage in 2009	kWh per capita
Lighting	112	4,419,884	39,463
Commercial	13,451	920,512,299	68,434
Industrial	211	136,413,709	646,510
Residential	105,105	1,266,273,211	12,048

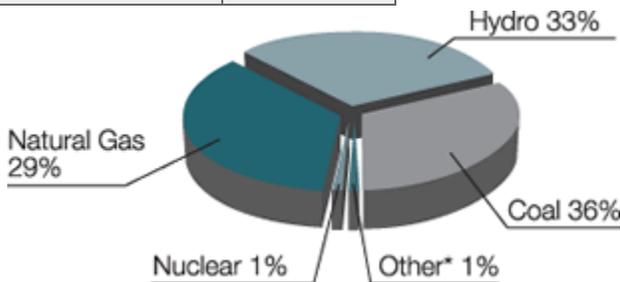
The current demand is met through a mix of utility owned electrical generation e.g. Wild Horse wind farm and contracts. The following charts identify current sources of power generation.

The electricity provided to customers by Puget Sound Energy is generated using a number of different resources. Hydroelectric power accounts for the single largest share of PSE's power portfolio. PSE also generates electricity with owned thermal power plants. PSE shares ownership of a large coal-fired generating facility in eastern Montana, and owns several natural-gas-fired power plants in the Puget Sound region.

Wind power is a very important and increasingly prominent resource for PSE. PSE owns and operates two large wind farms in Central and Eastern Washington, and a third is under construction. According to the American Wind Energy Association, PSE is the second-largest utility producer of wind power in the United States. Because PSE sells the excess green-energy attributes generated at their wind facilities to other entities across the nation, at this time, PSE does not currently include the energy from these facilities as "renewable" energy in their electric-power-supply profile as reported to the state of Washington. As a requirement of I 937, PSE is currently exceeding the initiatives requirements at this time.

2011 Puget Sound Energy Fuel Mix

Fuel	Percentage
Coal	36
Hydroelectric	33
Natural Gas	29
Nuclear	1
Other*	1
Total	100



There are around 85 independent solar installations in the county which represent around 375 kW of production capacity. In our climate, these systems could be expected to produce around 375,000 kWh per year, which is equivalent to the electricity used in just over 30 average homes. While most are private installations, there are an increasing number of community solar installations.

Energy Supply and Demand Projections

Puget Sound Energy has projected electricity supply and demand out through 2031 in its 2011 Integrated Resource Plan¹, including the fuel mixes that it expects to use to meet this demand. Although these projections are for PSE's full service territory, the shapes of the curves and the mixes of the fuel sources that will deliver that electricity are still relevant to a Thurston County specific analysis.

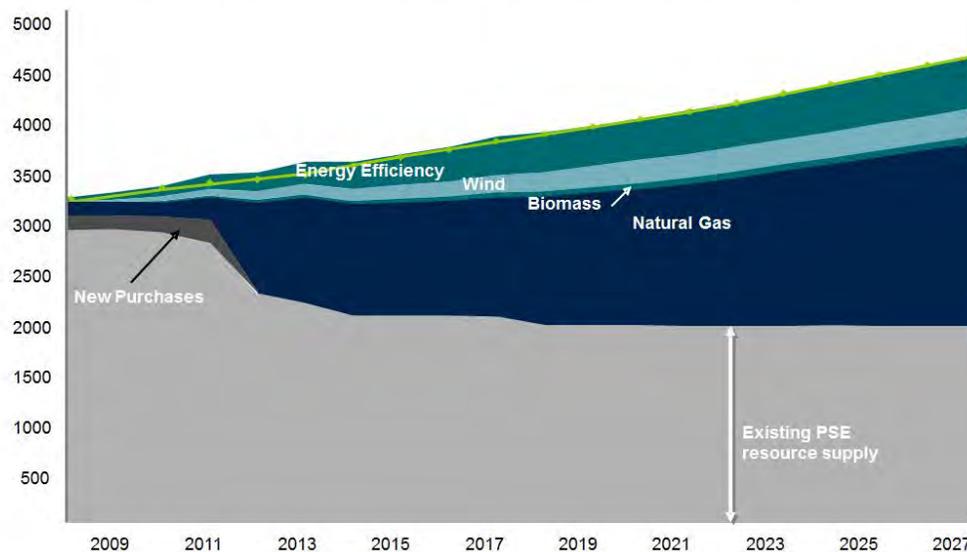
¹ Puget Sound Energy Integrated Resource Plan:

<http://pse.com/aboutpse/EnergySupply/Pages/Resource-Planning.aspx>

The chart below gives the fuel mix that PSE proposes to use in order to meet the projected future demand for electricity.



Forecasted Electric Supply Resources



Note that beginning in 2011 and moving beyond, the projected sources of new electricity (beyond the existing PSE resource supply) will be approximately 60% Natural Gas derived, 25% Energy Efficiency, and 15% renewable energy through Wind and Biomass. The natural gas portion will be a combination of 1) new natural gas fired power plants owned and operated by PSE that will need to be brought online and 2) electricity purchased from other producers that was derived from natural gas generation. Energy efficiency will come from the combination of efforts of individual homes and businesses across the territory, supported and incentivized by PSE.

Thurston County residents, businesses and municipalities can control the extent to which they use energy efficiency and renewable energy to meet their power needs. This includes the amount of distributed generation that they bring online and connect through net metering, and the amount of PSE Green Power that they purchase. In addition, PSE provides assistance to customers who are interested in installing customer-owned small scale generation systems, such as solar photo voltaic, micro hydro, wind, anaerobic digesters, etc. through their net metering program. PSE has a total of 1,007 net metering customers territory-wide, with 101 customers in Thurston County alone.

What's Working

In Washington, we enjoy some of the lowest electricity rates in the nation. According to the U.S. Energy Information Agency, the average retail price of residential electricity across the country was nearly 12 cents per kWh. In Thurston County, residents pay less than 10 cents per kilowatt hour. PSE has shown itself to be a reliable and resilient operation. As an electric utility, PSE is measured by two main metrics, SAIDI and SAIFI, to describe the reliability of the service they provide. For the purposes of this paper, it should be noted that the Puget Sound Energy utility has met and exceeded the requirements of Washington Utilities Transportation Commission (WUTC) for these indices. SAIDI, the System Average Interruption Duration Index, describes the average length of an outage in minutes, and PSE's score was 124 minutes. SAIFI, the System Average Interruption Frequency Index, describes the average number of outages a customer experiences, and PSE's score was 0.87. Both of these scores are above requirements set forth through public process and regulatory approval by the WUTC.

Challenges

- Supply: PSE predicates meeting future demand with an increase in natural gas fired power plants and strategic market investment strategies. Siting these facilities must be planned well in advance due to complex regulatory framework.
- Future costs: The increase in the use of natural gas derived electricity, along with the lack of additional supply available from lower cost hydroelectric power may result in a fluctuation in overall energy prices.
- Flexible generation: To the degree that existing and new demand is met by renewables like wind, there will be a need for what are known as *peaker* facilities that can quickly even out generation gaps from renewables. These plants can come on line quickly to deal with peaks in demand.
- The grid: PSE continues to maintain the electrical grid in a responsible manner, but the entire electrical grid across the nation requires additional investment in the coming years. As distributed power is more common, the ability of the grid to manage varying loads will require additional investment. What's known as a smart grid, that adapts to multiple supply and demand inputs will require even more investment.

Opportunities

- Efficiency: Improvements in our built environment would pay real dividends. Much of our housing, commercial and industrial building stock uses outmoded technology. Improvements in lighting, windows, insulation and heating often have relatively short cost recovery times.

In 2008, Lawrence Berkeley National Laboratory estimated savings of 30% and 35% for residential and commercial buildings respectively. ²

The State Energy Code results in ever more efficient structures. The Department of Commerce estimates that by 2030 the improved code, 2009 and later updates, will have affected half of all buildings.³

- Financing models: How will home owners finance efficiency upgrades? Clearly, in this 2011/2012 economy, the ability of people of modest means to make energy efficiency improvements is important. Some possibilities:
 - Government subsidized programs: These include establishment of revolving funds from which building owners can borrow. In an alternative, interest rate buy downs to make public or private borrowing more affordable.
 - On-bill financing: Current and future occupants can repay the cost of improvements on their energy bills. RCW 80.28.065 provides for such a practice. One issue preventing more widespread use of on-bill financing is the sourcing of investment capital. The source could be a federal or state revolving fund, or non-utility investors or financial institutions. A second issue to resolve is disclosure to new occupants.
 - PACE (Property Assessed Clean Energy): PACE is a local government solution that helps home and building owners finance energy efficiency and renewable energy projects. Repayment would be made through property tax payments, and the loans would pass to purchasers of properties that used the mechanism to fund energy improvements. Efforts to make use of PACE have been thwarted at the federal level due to objections by Fannie May and Freddie Mac.

² Lawrence Berkeley National Laboratory, *U.S. Building-Sector Energy Efficiency Potential*

³ Washington State Department of Commerce, *2012 Washington State Energy Strategy (draft)*

- Appliance and Equipment Efficiency Standards: Federal efficiency standards will continue to have a positive effect on energy savings. U.S. Department of Energy will publish new standards and requirements in the next 3 to 5 years.⁴

- Distributed Generation (DG): DG is a general term encompassing a variety of near-user power generation techniques. Some of them are familiar to Thurston County residents.
 - Solar generation: Even in Western Washington, good potential exists for solar power. Maximizing solar opportunities will require changes in both development and building codes. For example, buildings that are aligned with solar generation in mind are cheaper and easier to fit with effective arrays. State government has enacted financial incentives for installation of photovoltaic equipment.

 - Wind: Thurston County does not have sufficient wind for substantial power generation. There may be isolated locations where small private systems could augment other electricity sources.

 - Combined Heat and Power (CHP): This is sometimes referred to as co-generation. A local example is the LOTT Clean Water Alliance and the Hands On Children’s Museum. LOTT Clean Water Alliance is generating electricity from methane with an internal combustion generator. Waste heat will provide building heat for the new LOTT administrative office and the museum.

 - Geothermal: The term geothermal has assumed two meanings in recent years.
 - The first is the traditional meaning of the use of high temperature geological features to directly generate electricity, as in Iceland. Thurston County has little potential for this type of geothermal generating capacity.⁵
 - The second is in the context of ground source heat pumps used for residential and commercial heating and cooling. This is more of an energy efficiency technology, since it moves heat in and out of buildings, but does not generate electricity. In this case, Thurston County is a good site for such systems.

- Energy Storage: Another means to deal with peak loads is to have either large centralized energy storage devices or a network of smaller, distributed energy storage devices on the grid. These energy storage devices can be charged during times of plentiful supply and then used to deliver electricity during times of peak demand. Energy storage technologies include water pumping, chemical batteries, and hydrogen fuel cells. The technology for energy storage is

⁴ Washington State Department of Commerce, *2012 Washington State Energy Strategy (draft)*

⁵ Washington State Department of Natural Resources, *Geothermal Resources of Washington*

maturing and becoming cost-effective. As electricity grids use a higher percentage of intermittent renewable energy sources like wind, energy storage devices become more useful and important as a means to capture and store excess energy during times of high supply, and to deliver that energy quickly during periods of peak demand.

- Smart Grid: The grid can become incrementally “smarter” by bringing online devices to measure, record and transmit data about energy generation, availability and usage. Smart meters on homes or on specific devices can report to users and/or the utility how much power is being used. In this way, users can make informed decisions about shutting off or powering down appliances or equipment that is not in use. Likewise, technology is maturing for monitoring power throughout the distribution system that notifies utilities of excessive transmission losses due to malfunctions or other issues, allowing them to more quickly and cost-effectively solve those issues. As PSE is making investments in the grid to keep it operating smoothly, Thurston County municipalities can encourage PSE to make Smart Grid investments. Further, Thurston County communities can experiment with smart meters and other such strategies.
- Education: The Thurston County region is directly adjacent to the Centralia College’s Center of Excellence for Power Generation. The Center of Excellence provides an excellent resource for education and the development of entrepreneurs for local power generation, and for the pipeline of a labor force that is instrumental in the development of future power distribution, etc. Additionally, the Satsop Development Park, located in the adjacent county, Grays Harbor, is home to the newly established Regional Education Training Center (RETC). The RETC is a fully functioning program to work with electrical workers and organized labor in all aspects of skill development that are necessary for the long term maintenance of our local power system. In our area, the New Market Skills Center, South Puget Sound Community College, St. Martin’s University and The Evergreen State College all contribute to skill development in these subjects.

Natural Gas

Current Status

As with electricity, Puget Sound Energy (PSE) provides natural gas service to Thurston County. Unlike electricity, natural gas cannot be generated in a distributed fashion. The U.S. Energy Information Administration (EIA) estimates the supply of gas will increase from a forecast 23.98 trillion cubic feet in 2012 to 26.57 trillion cubic feet in 2035. Interestingly, net imports are forecast to decline from 2.64T to 0.18 T in 2035.

Natural gas prices can be volatile. Currently, prices are depressed as a result of the economic downturn and reduced demand. Likewise, hurricanes and other natural disasters can reduce supply with a resultant spike in price.⁶ The EIA forecasts natural gas prices will rise from \$6.70 per million Btu's to \$9.14 per million Btu's in 2035. Natural gas has shown both reliability and resilience.

What's Working

PSE provides a reliable supply of natural gas to customers in Thurston County. Recently gas prices have been reduced and supply meets demand. Natural gas is used for both retail sale to the consumer and for power generation.

Challenges

- Balancing supply and demand and resultant price effects. New deposits of natural gas are in the news. We expect demand to grow as population increases here in the county. What is difficult to evaluate is how discoveries and increasing demand will affect prices.

Opportunities

- Efficiency: Since natural gas can't be produced by individuals locally, improved efficiency appears to be the primary strategy. As referenced before, the Lawrence Berkeley National Laboratory⁷ estimates a 28% natural gas saving for homes and 35% improvement for commercial buildings.

⁶ U.S. Energy Information Administration, *Natural Gas Explained, Factors Affecting Natural Gas Prices*

⁷ Lawrence Berkeley National Laboratory, *U.S. Building-Sector Energy Efficiency Potential*

Summary

Energy will be an important factor in a sustainable Thurston County. That importance is evident in several contexts.

- First is simply that our economic well-being is dependent on an adequate supply of electricity and natural gas. If it is to be a sustainable economy, its business participants must make efficiency and wise use of their operations.
- Second, individuals as renters or homeowners will have to commit to using energy wisely and thriftily. They, too, play a major role in sustainability efforts.
- Third, almost all aspects of our lives are touched by energy availability and cost. Appendix “A” identifies some of the way in which energy relates to other Sustainable Thurston panels and workgroups.

The Sustainable Thurston public process will be an opportunity for innovative ideas to surface. In the meantime, the Washington Department of Commerce will release its 2012 Washington State Energy Strategy during December 2011. The draft executive summary is an attachment to this white paper.

Appendix A

Energy connections with other panels and work groups

- Economic Development Panel
 - Energy Costs
 - Grid
 - Reliability
 - Smart Grid
- Health and Human Services Panel
 - Energy Costs
- Housing Panel
 - Distributed Electric Generations (DG)
 - Grid
 - Reliability
 - Smart Grid
 - Energy costs
 - Energy efficiency
- Water/Infrastructure Panel
 -
- Emergency/Fire Services Panel
 - Grid
 - Reliability/resiliency: A grid that's unreliable or not resilient will result in increased calls.
- School Siting and Design Panel
 - Energy Costs
 - Distributed generation
 - Grid
 - Reliability
 - Smart Grid
- Local Food Systems Panel
 - Energy Costs
- Public Outreach and Education Panel
 - Information
 - White Paper
 - PowerPoint
- Land Use, Transportation and Climate Change Workgroup
 - Energy Costs
 - Grid

- Energy Generation
- Transportation
 - Fuel
 - Efficiency

Appendix B

WA Department of Commerce, the 2012 Washington State Energy Strategy
Draft (Executive Summary)

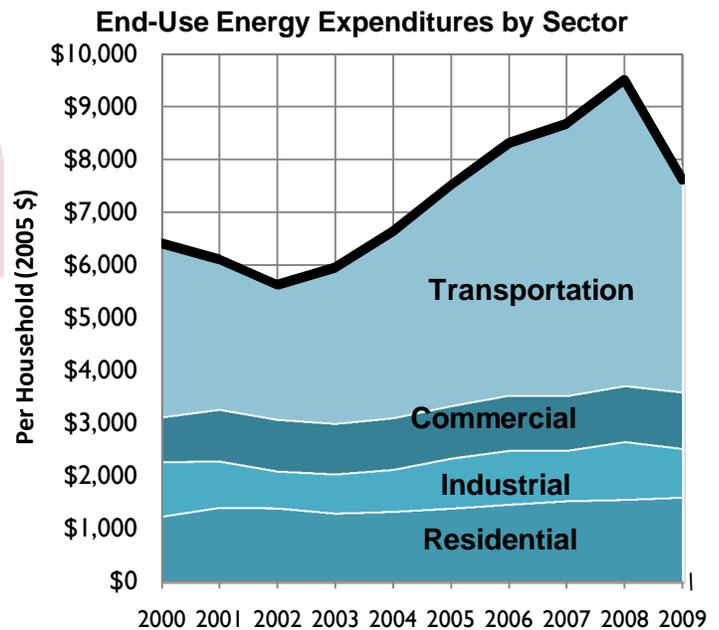


The 2012 Washington State Energy Strategy

Energy strategies – core solutions for jobs, economy and climate

The 2012 Washington State Energy Strategy comes at moment of opportunity, a time when Washington’s policy makers can look to the long-term priorities for energy, climate, and economic vitality. We have this opportunity because in the near term our state faces no great crisis in energy supply or pricing. The typical family energy bill is – with the notable exception of gasoline prices – stable or even declining. Natural gas prices have fallen as new technologies have opened up vast new reserves in the U.S. and Canada. Voters have endorsed conservation and renewable energy standards for electric utilities.

Tens of billions of dollars in recent global investment in energy technologies are now paying dividends, to point that wind and other renewable energy systems are challenging conventional power resources on cost. More fuel-efficient vehicles including hybrids are readily available, and electric cars are entering the market. Boeing delivered the first 787, 20% more fuel efficient than its predecessor.



As consumers, we have options for high-efficiency lighting systems, heat pumps, and water heaters that were just engineering concepts a few years ago. Even after decades of growth we continue to lead the nation in low-cost industrial electricity rates, providing an enduring competitive advantage that has driven substantial industrial growth and employment.

The path ahead, however, is neither obvious nor simple. We still spend more than \$20 billion per year – 6% of our economy – on energy. Almost all that money leaves the state to pay for fossil fuels. Moreover, global events are making those crude oil prices more volatile, driving cost risk into our state’s economy. The energy supply system has also grown more complex over time. Wind farms and photovoltaic systems must be coordinated with power

The legislature ... declares that a successful state energy strategy must balance three goals to:

(a) Maintain competitive energy prices that are fair and reasonable for consumers and businesses and support our state's continued economic success;

(b) Increase competitiveness by fostering a clean energy economy and jobs through business and workforce development; and

(c) Meet the state's obligations to reduce greenhouse gas emissions.

[RCW 43.31F.010(4)]

supply and demand. Carbon emissions must be dramatically reduced. Electric vehicles must be recharged. Internet server farms must be reliably energized.

The 2012 Energy Strategy has been heavily influenced by our economic recession. Our economy was thumped hard in 2008, and the experts say full recovery is years away. The downturn has dampened growth in energy demand and greenhouse gases, but that is not how we want to save energy. We aim to grow the economy by creating clean energy jobs through energy efficiency and renewable energy, following the guidance of the 2010 Clean Energy Leadership Council. Our growing regional expertise in integrating wind into the electric grid, designing and constructing high-performance buildings, and turning our abundant biomass into energy can serve as a foundation for job growth if we can develop and export world-beating technologies and products.

Finally, concern about climate change motivates our approach to an energy strategy. Experts say that our state will be hit early and hard because we rely on snowpack for drinking water, irrigation, and electric power. Policy makers and the public have recognized the consequences and the causes of global warming and our state is committed to reducing its contribution to global climate conditions. Even since the Legislature authorized this strategy less than two years ago, we have seen increasing evidence of the damage to our health, safety, and economic well-being inflicted by climate change. Energy consumption drives climate effects, so environmental concerns must drive our energy policy.

There are no lines at the gas pumps, but the swirl of new energy technologies and dark clouds on the climate horizon tell us that we must plan and prepare. We can chose to leave our energy decisions to the vagaries of national and international forces or we can analyze, plan, and actively pursue a better energy future for our state.

What we want from this energy strategy

As we take stock and set a direction for the future, the choices are complex and sometimes contradictory, but the desired outcomes are clear: We seek a set of energy policies that will supply the muscle behind our state's economy, maintain affordable energy prices for our families and businesses, and protect our global environment from the adverse effects of energy consumption.

We want an energy strategy that promotes clean job growth, competitive prices, and lower greenhouse gas emissions.

A path ahead – with a focus on the transportation sector

Energy affects every aspect of our daily life; as the Legislature said in initiating this work, it “drives the entire modern economy.” So pervasive is energy’s impact on our lives that there was really no end to the set of actions we might include in an energy strategy. From this wide array several common themes emerged, perhaps none is stronger than the emphasis on energy efficiency. We can reduce our consumption of energy, particularly fossil fuels, and still improve our economic well-being if we increase our efficiency. This is long-standing policy in Washington, and it runs throughout this strategy.

The Energy Strategy also reflects this state’s commitment to remain a leader in innovation in the energy sector and to build a clean energy economy. Our expertise in seemingly unrelated sectors, such as information technology and material sciences, can improve our competitive advantage among states and nations in electric vehicles, bio-energy, and smart systems.

Another common theme is giving individual consumers the information and tools to make wise energy choices. Market-based policies like pricing that reflects full environmental costs or full disclosure of building performance are preferred over mandates. Finally, our work reflects a pragmatic understanding that we are in a time of smaller government. Tax revenues are extremely scarce, but a lot can still be accomplished through sound policies.

For the 2012 State Energy Strategy we considered many ideas but chose one major area of emphasis – transportation efficiency - and two significant other topics. These areas of emphasis represent our greatest potential to transform our energy uses in ways that promote jobs, prices, and the climate.

1. **A more efficient and coordinated system of transportation**
2. **A broader approach to energy efficiency in our buildings**
3. **A more diverse supply portfolio through distributed energy**

Transportation

The heavy focus of this Energy Strategy on transportation issues reflects the dominant and growing burden that transportation energy places on our household budgets, our economy, and our environment. Our transportation problems are by no means exclusively an energy issue. The gridlocked Puget Sound traffic map is also a mobility problem for transportation planners and an emissions problem for environmental planners.

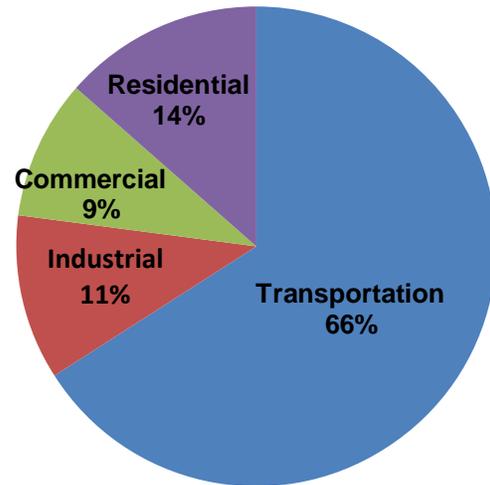
Beginning with the first Washington State Energy Strategy in 1993, policy makers in our state have recognized the key role of transportation in energy planning, and we continue this emphasis here. Half or more of our energy expenditures go to move people and goods within the state. It is not just our largest sector but also our least efficient sector. Our buses, cars and trucks are more efficient than they used to be, but their fuel still produces more heat and fumes than useful movement. Energy that we use for transportation is also the

most volatile, economically and politically, of all energy forms – petroleum. Finally, motor fuels have a 30% bigger carbon footprint than natural gas, the dominant fossil fuel used for non-transportation applications.

To make progress in the transportation sector, we recommend a policy package with these elements:

- **Improved vehicles and fuels** – Electric vehicles are a reality, and our state’s policies can make a big difference in how quickly they are adopted by consumers. Other recommended policies would push the efficiency of our diesel fuel use. We also should improve the fuel itself – in the near term by using more biodiesel in our motor fuels mix and over time by finding additional ways to take carbon out of our fuel mix.
- **More efficient travel** – We recommend policies to improve not just the fuel efficiency of our vehicles but the efficiency of our travel itself. These policies range from immediate actions such as encouraging car-pooling to the long-term decisions about how we plan and organize our cities.
- **Better pricing of trips** – As consumers and workers, our citizens make thousands of decisions about when, how, and whether to make a trip, and in doing so we each impose costs on our neighbors through congestion and pollution. We recommend comparing various long-term policies that use pricing to influence those individual decisions. Possibilities include mileage or congestion pricing or even a revenue-neutral tax on carbon. Near-term projects would pilot new approaches to road use costs, allowing tests of pay-as-you-drive insurance and mileage-based alternatives to fuel taxes.

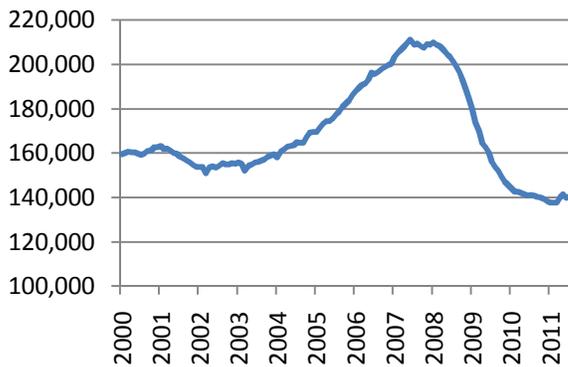
Wasted Energy by End Use Sector



Energy Efficient Buildings

The buildings component of our Energy Strategy starts, like a building itself, with a good foundation, built on three decades of effort to improve the efficiency of the energy that we use to heat, cool, illuminate, and power our homes and businesses. This effort has been led by electric utilities and guided by the analysis of the Northwest Power Planning Council. So far the greatest gains have been in the electric sector, and the policies recommended here seek to extend those achievements to customers who have yet to participate in significant numbers.

WA Construction Industry Employment



Source: ESD LMEA, seasonally adjusted

Jobs – and the unprecedented loss of jobs caused by the collapse of the housing bubble in 2008 – are a key reason for making efficient buildings a priority. Construction employment is down by one third since 2007, so there is great potential for energy retrofit work to restore employment. Moreover, the decline in real estate values has eliminated home equity for many property owners, making it difficult or impossible to finance energy efficiency improvements by conventional means.

The focus of the policy package is to make it easier for property owners to identify and

pay for energy efficiency improvements, but it also recognizes the need to sustain our successful low-income weatherization efforts.

- **Better information about energy performance** – Property owners will be more willing to improve their buildings if they are confident that prospective tenants and buyers will put a value on those improvements, so we recommend mechanisms to facilitate disclosure. Even a simple annual energy statement could help customers monitor performance and focus attention. We also recommend a concerted effort to improve coordination among utility, government, and private sector participants, with a focus on marketing and quality assurance.
- **Funding and financing** – Efficiency improvements can pay for themselves, but many property owners lack the capital to make the initial investment. Conventional loan-based approaches often do not work. We recommend an approach that ties efficiency financing to the utility meter, allowing those who actually get the energy cost savings to pay for the improvements.
- **Targeting low-income and rental properties** – Low-income and rental properties represent the portion of our housing stock with the worst energy performance, and success in these sectors will require more than improved access to information and investment capital. We recommend approaches to elevate the priority of low-income weatherization programs for utility and tax credit funding. To improve energy efficiency in rental properties, we recommend a requirement to include basic insulation and air sealing measures when a rental property changes hands.

Distributed Energy

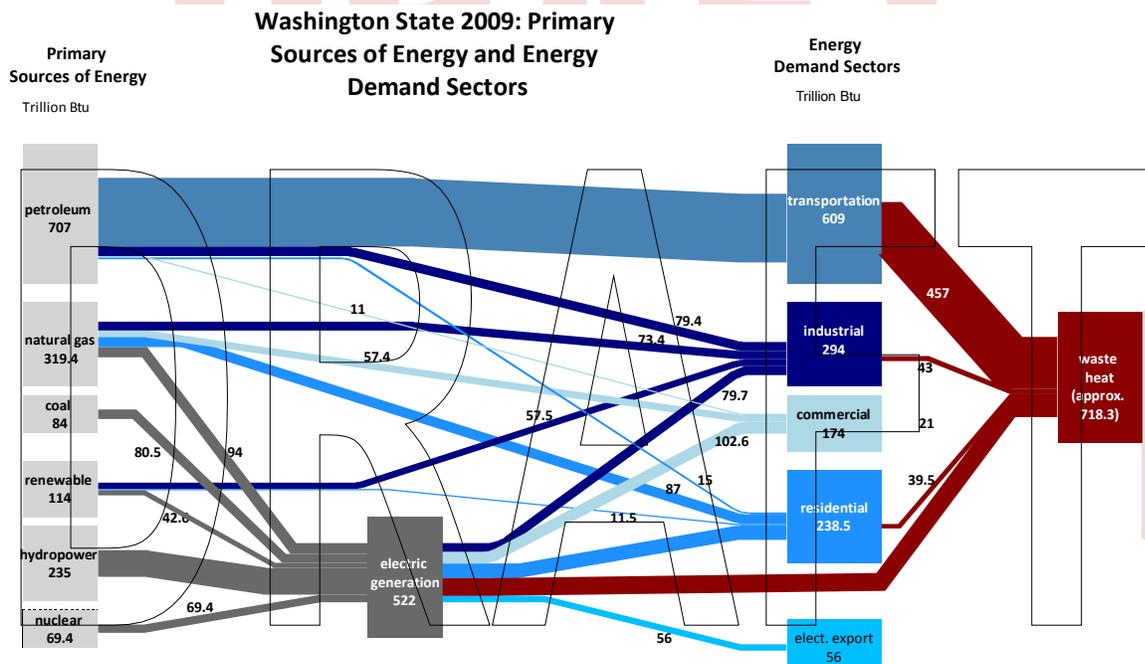
The third component of the 2012 Energy Strategy focuses on energy supply, specifically the potential to increase the amount of energy produced using smaller, alternative resources such as solar, wind, manure, and waste industrial heat. Manufacturing plants can increase efficiency by installing combined heat and power (cogeneration) projects. Cities and neighborhoods can heat and cool their buildings with district energy systems. These

resources can align with our goals to reduce climate impacts by displacing fossil fuels and to increase jobs. Realizing this potential will require that we improve our ability to cost effectively integrate alternative resources into our energy system.

- **Regulatory streamlining** – Distributed energy projects raise interconnection and land use concerns for utilities and potential neighbors. Consistent and streamlined standards can protect those legitimate interests while also ensuring that good projects move quickly to development. The Washington Utilities and Transportation Commission will be a key driver in the streamlining effort.
- **Consistent incentive mechanisms for distributed energy** – State policy encourages distributed energy projects through multiple mechanisms, including at least eight tax breaks and an extra weighting under the renewable portfolio standard. State tax funds are scarce, and tax expenditures for distributed energy should be tested to see if they advance our economic and climate goals.

Getting to the 2012 Energy Strategy – the Process behind the Policy

The 2012 Energy Strategy is built on legislative guidance, rigorous analysis, and extensive stakeholder involvement. In authorizing the Energy Strategy process, the 2010 Legislature called for a balanced approach to the three goals of clean jobs, competitive prices, and reduced greenhouse gas emissions. The Legislature also set out nine guiding principles that reflect concern for economic prosperity based on a clean-jobs economy, a concern for low-income families, our commitment to meet the state’s greenhouse gas goals, a recognition that the state needs a strong energy infrastructure, and other concerns.



Even this simplified picture of our energy sources and uses illustrates the complexity of this task. We draw on multiple sources for our energy and apply that energy in many different ways. Each supply and demand sector has its own technologies, its own economics, and its own stakeholder concerns.

The Energy Strategy was developed through the work of a 26-member Advisory Committee with members from business, labor, environmental groups, developers, and government. A smaller panel of technical experts guided the quantitative work.

In 2010 Commerce and the advisory groups produced the 2011 Energy Strategy Update, which outlined the analytical and stakeholder processes and identified 17 near-term initiatives. We have made progress on many of those recommended initiatives and several received additional analysis and recommendations in the 2012 Energy Strategy.

In developing the 2012 Washington State Energy Strategy, Commerce and the advisory groups sought to build on our state's history of careful, public-oriented energy planning and analysis. Washington has more than three decades of experience in this area, much of it in the electricity sector. Our last comparable state energy strategy in 1993 foreshadows the current emphasis on transportation, energy efficiency, and environmental values. The more specific analytical and policy elements of the 1993 energy strategy reflected policy efforts at the state departments of Transportation and Ecology, demonstrating the close links among energy, climate policy, and transportation.

The breadth of this prior work enabled the 2012 Energy Strategy team to focus its attention on the major policy themes discussed above. We developed a long list of potential policy changes that could influence the future performance of our state's energy system. In organizing and selecting from these potential initiatives, we looked for these characteristics:

- Does it provide a significant opportunity to address the legislative goals of clean energy jobs, competitive energy prices, and reduced greenhouse gas emissions?
- Does it appear to be ripe for action, addressing an issue with active policy interest?
- Is it an area that needs more attention? Has it been overlooked by past studies?

In developing a strategy, the advisory groups served to balance analytic rigor and stakeholder involvement, as the Legislature prescribed in authorizing the process. We relied on the advice and ideas of engaged stakeholders who brought their significant economic and policy interests to the process and our technical panel provided economic, engineering, and scientific expertise. We also sought to identify a mix of near-term and long-term strategies.

Gridlock Pollutes the air, wastes time and energy, and hurts the economy.



Source: The 1993 Washington State Energy Strategy

Implementation of the 2012 Energy Strategy

The 2012 Washington State Energy Strategy outlines a set of policies that can move the state significantly closer to its goals of clean job growth, competitive energy prices, and reduced greenhouse gas emissions. Implementation of the Energy Strategy will require the support of many stakeholders. Looking just at governmental entities, successful implementation of the Energy Strategy will involve numerous local governments and public utilities, the state departments of Agriculture, Commerce, Ecology, Revenue, and Transportation, the State Auditor, the Insurance Commissioner, and the Utilities and Transportation Commission. The Energy Strategy does not make specific legislative recommendations. Some of the initiatives do not even require legislative change. All of them require detailed stakeholder work prior to implementation or legislative action.

In each area we have identified a combination of near-term and long-term policy initiatives. The near-term items represent policies that are already well developed or at least ready for beta testing. It is equally important that policy makers and stakeholders begin work assessing the initiatives identified as long-term options. We set our policy objectives looking at the far horizon, because the toughest issues of how we supply our energy and preserve our environment are fundamental, long-term questions of the highest public import.

We would also emphasize the continuing nature of the state's energy policy development. This strategy is informed by many past efforts, and it should not be viewed as the last word. The strategy represents not just a set of recommendations but also a way of thinking about our energy system. The problems will evolve, but the modeling framework used in this project will help us adapt. This strategy represents one punctuation mark in an ongoing conversation about our state's energy future.

Ultimately we recognize that we cannot fully predict or forecast Washington's energy future but we can do our best to anticipate, analyze, and drive change in directions that benefit our long term prosperity.

2011-10-06

A complete list of policy initiatives and supporting analyses is available at the Washington State Department of Commerce website, www.commerce.wa.gov.

Appendix C

Puget Sound Energy, Thurston County Energy Efficiency and Renewable Energy
Participation, 2010

ENERGY EFFICIENCY AND RENEWABLE ENERGY COMMUNITY PROFILE

Thurston County

Energy Efficiency and Renewable Energy Participation
Puget Sound Energy, 2010

Puget Sound Energy's Energy Efficiency Services division works with businesses, residents and municipalities in its service territory to save money and protect the environment through improved use of energy. PSE's conservation programs range from rebates on energy-efficient space and water heating equipment, appliances and weatherization measures for homeowners to engineering consultation for commercial and industrial projects, to tailored grants for retrofits and upgrades in energy-intensive buildings.

Overall Energy Savings

In 2010 Thurston County residential and commercial customers took advantage of rebates for energy efficient insulation, space and water heating equipment, new windows and appliances. Commercial customers received grants and rebates for new efficient lighting and lighting controls, HVAC upgrades, refrigeration equipment and other energy saving measures. PSE offers over 100 rebates for commercial and residential customers as well as grants for commercial energy efficiency projects that meet guidelines for cost effectiveness. The retail lighting program provides direct retail mark downs and tracks efficient bulbs and fixtures sold at partner retail stores.

Rebate or Program	Approximate Number of Rebates	Amount Paid by PSE	Estimated Annual kWh Savings	Estimated Annual Therm Savings	Avoided CO ₂ in lbs
Weatherization	907	\$287,409	419,366	50,495	1,052,100
Clothes Washer Rebates	2,276	\$203,138	N/A	N/A	N/A
Refrigerator Decommissioning	74	\$2,220	66,822	N/A	73,504
Commercial Grants/Rebates	624	\$5,148,738	16,813,414	516,322	24,535,723
Residential Rebates	3,324	\$1,209,523	2,801,539	131,866	4,624,525
Retail Lighting	123,769	\$289,059	4,418,585	N/A	4,860,444
Totals	130,974	\$7,140,087	24,519,726	698,683	35,146,296

Resource Conservation Manager

The purpose of the Resource Conservation Manager (RCM) program is to achieve customer cost reductions for major resource utility bills through behavioral changes, operational improvements, facility maintenance, and attention to utility-cost accounting. Savings result from changes in practices and do not require major investments in equipment. PSE provides training, software, grants and other support. Participants usually have multiple facilities and portfolios of over 3 million square feet. In Thurston County there are currently 9 participants in the RCM Program including municipal agencies, school districts, hospitals and colleges.

Small Business Outreach

In partnership with Thurston Energy, PSE conducted walk-throughs of 35 small businesses in Thurston County.

Energy Efficiency Events

PSE provides event support to local organizations in your community with highly trained Energy Advisors to help answer questions on energy efficiency and PSE's corresponding programs at event booths. PSE also provided speakers to share energy efficiency information and advice at community functions. To encourage and promote energy efficient lighting, PSE partnered with National Night Out (www.nationalnightout.org) to sponsor block parties on August 3, 2010 throughout its electric service area. The Re-Energize Your Block's eight weekend events took place over the summer from the beginning of August to the end of September. The events took place at local Home Depot stores.

Thurston County Events 2010	
Lacey Alternative Energy Fair	Olympia Lake Fair
St Peter Hospital (2 events)	Thurston County Fair
Thurston Energy Community Fair	Thurston Energy Kickoff
Washington State Employment Security Department	
"ReEnergize Your Block" Lighting Events	
"National Night Out" Horizon Pt Housing Development-Lacey	Olympia Home Depot store event

PSE's Green Power Program

PSE supports the development of renewable energy through its Green Power Program, which offers customers the option to match their electricity with renewable energy resources generated in the region.

- 5,046 Residential and commercial participants
- 101,433,294 Pounds of Avoided CO₂

PSE's Customer Renewable Energy Program

PSE supports customers through its Net Metering program, which assists customers who generate at least a portion of the electricity they use through means of solar photovoltaic (PV), wind, biomass from animal waste or other qualifying renewable energy generating systems.

- 78 Installations
- 301 Approximate kW Capacity

Renewable Energy Education Program

Puget Sound Energy has created the Renewable Energy Education Program (formerly the Solar Schools Program). It is designed for educational and community facilities that have demonstrated a commitment to energy efficiency and are ready to expand their educational experience and opportunities with renewable electricity generation.

Solar Demonstration Projects in Thurston County		
Griffin Elementary School	2 kW System	321 lbs of CO ₂ avoided to date
Marshall Middle School	1 kW System	3,123 lbs of CO ₂ avoided to date
Washington Middle School	1 kW System	5,264 lbs of CO ₂ avoided to date

Powerful Choices for the Environment

As of January 2011, the Powerful Choices program will no longer be taught in the classroom by PSE employees. Due to budget and regulatory considerations, the format will continue with online, downloadable presentation materials for teachers. Over the past 17 years, Powerful Choices engaged nearly 135,000 students in 90 schools throughout Western Washington, including these schools in Thurston County:

Past Participants in Thurston County		
Jefferson Middle School	Marshall Middle School	Washington Middle School
Rochester Middle School	Tumwater Middle School	

As an online program, Powerful Choices will continue to teach students about their individual impact on the environment and PSE hopes to reach more students in a broader geographical range.

American Reinvestment and Recovery Act

Thurston County and its communities have been the recipient of Federal stimulus funding from multiple sources. PSE has worked with many communities throughout the county with projects to improve energy efficiency. By partnering with PSE, these groups have been able to use PSE rebates to leverage their Federal dollars and offer greater incentives to Thurston County customers. Here are some of the projects PSE has partnered on:

- Thurston Energy
- Lighting retrofits for county buildings
- HVAC and lighting upgrades for municipal facilities