

Investing in Portland's Future

PDC

PORTLAND DEVELOPMENT COMMISSION

**Economic Development
Sustainable & Energy Industries
Target Industry Plan**

Fiscal Year 2005/2006

November 25, 2005

Sustainable Industries

Energy Industries

Industry Definition/Summary

Sustainable Industries are businesses which produce a product or service whose consumer is able to use resources in a more environmentally-responsible and/or energy efficient manner. A still broader definition may be provided: "Sustainable industries are for-profit businesses having environmental innovation, resource conservation or superior environmental practices as a core component of their business."¹ A working definition will be reviewed by the Sustainable Industries advisory panel and may be altered to reflect their input.

Sustainable Industries were first identified as a city target industry in the 2002 City of Portland Economic Development Strategy. The primary categories within Sustainable Industries include Energy, Green Building, Recycled Products, Environmental Remediation and Sustainable Agriculture.

A 2003 study calculated that there are approximately 1200 sustainable businesses in the Portland metropolitan region². This number was compiled based largely upon self-certification and participation in events to discuss issues related to sustainability. As a result, the number likely undercounts the total that would qualify as a "sustainable business."

This document includes an overview and suggested strategies for both Sustainable Industries and Energy Industries. Energy Industries may be considered a subset of Sustainable Industries and include renewable energy, energy efficiency, and smart energy (or "smart grid") technologies.

Sustainable Industry Highlights

Area companies include energy industries, green building services, recycling, environmental remediation, water treatment, and sustainable agricultural companies. The creation of the Portland Office of Sustainable Development and the Sustainable Development Commission underscores Portland's leading role in advocating for sustainable policies with respect to green buildings, energy, and food policy.

Examples of Sustainable companies include: Clear Water West, Environmental Building Supplies, Enzyme Technologies, Gerding/Edlen Development Co., Stormwater Management and local offices of AMEC Environmental, CM2H Hill, and Ecology and the Environment, among many others.

Energy Industry Highlights

- Leading area companies include Cascade Energy Engineering, Christenson Electric, First Point Energy, Sequential Biofuels, Serveron, PPM Energy, local office of EC Power, Siemens International, and Vestas American Wind Systems, among others.
- Strong utility presence (PGE, PacifiCorp, NW Natural Gas, Bonneville Power Administration).
- The establishment of the Energy Trust of Oregon in 2002; network of advocacy organizations including The Northwest Energy Efficiency Alliance, the Oregon Environmental Council, the Renewable Northwest Project, among others.
- The availability of state tax credits and business loans to support renewable energy projects.
- City of Portland pledge for all city-consumed electricity to come from renewable sources by 2010.

Industry Trends

Given the broad definition above, Sustainable Industries are typically difficult to capture accurately based upon standard industry classifications alone. For example, not every architectural firm or dairy farmer focuses his/her business model on a sustainable product or service.

The 2002 city-wide Economic Development Strategy grouped together waste management, environmental consulting, scientific research and development, recyclable material wholesalers, electrical equipment manufacturing and HVACR equipment as a starting point. Using this definition, the number of

¹ 2003 Report Sustainable Industries in the Portland Metropolitan Region, Celilo Group.

² Ibid.

employees in the three county region of Clackamas, Multnomah and Washington counties, and on the West Coast was determined:

	<i>2001</i>	<i>2004</i>	<i>% Change</i>
3 County Area	17,462	16,040	8%
West Coast	461,510	456,014	-1%

The loss of jobs during this 3 year period may be attributed at least in part to the regional recession which impacted the state of Oregon during this same period of time. However, other, more anecdotal observations indicate an actual increase in the number of companies identifying themselves as sustainable. These include an increased level of activity among professional organizations, such as Businesses for a Livable Local Economy, the increased number of requests for information received at public agencies, and observations from technical assistance providers that work with sustainable companies.

It is important to note that different industries within this categorization fared differently during the local recession. A breakdown of the different industries shows that 3 of the subgroups reflected an increase in the reported number of jobs within the local region:

<i>Industry</i>	<i>% Change 3 County Area</i>	<i>% Change West Coast</i>
Environmental Consulting	23	7
Recyclable Wholesalers	19	-11
Scientific R&D	18	4
Waste Remediation	-8	3
Archit/Engineering Serv	-10	1
Electrical equip/appliance	-27	-21
HVACR	-35	-13

The Portland area fared better than average in terms of job performance. Nationally, the number of jobs within these industries decreased 30% between 2001 and 2004, resulting in a loss of 1.3 million positions. The 2004 employment level nation-wide was just over 3 million.

A closer look at local job growth within different subsections of Sustainable Industries may be an appropriate action for the Advisory Panel to consider. Within Environmental Consulting and Scientific Research and Development, for example, further research may be helpful to determine what types of jobs are being created.

Wages – Sustainable Industries

Sustainable Industry employment opportunities may be broken down into those typically requiring an education level above a bachelor's degree (scientific R&D, architectural services, environmental consulting), and those that may not (turbine power manufacturing, recyclable material wholesalers). Sustainable agriculture positions may also be included in this category.

Both categories of employment provide wage averages above family wage levels.³ The average annual wage for Sustainable Industries in the 3 county area in 2004 was \$52,700. The average wage for the three West Coast states in 2004 was \$63,135.

There are notable differences in average wages among the various sub-sectors of Sustainable Industries. Please see Table One for a breakdown of wages. The highest paid positions in the 3 County area of Multnomah, Washington and Clackamas counties were found in Scientific Research & Development

³ A "family-wage job" is defined as one that provides a minimum of two times Oregon's minimum wage plus benefits. The minimum wage in the state is \$7.25 for 2005.

Services, with a 2004 average wage of \$62,293. The lowest average wage could be found among recyclable material merchant wholesalers, with a 2004 average salary of \$33,260.

Energy Industries – Employment Levels and Wages

While narrower in scope than “Sustainable Industries,” Energy industries still include a wide-spectrum of companies. To determine the number of employees and wages received, the following industrial classifications were used: power generation, HVAC manufacturing, turbine manufacturing, electronic instrument manufacturing, electric equipment manufacturing, scientific research and other technical consulting services.

In 2001, approximately 12,000 people in the 3 County area were employed by Energy industries. This number declined between 2001-04 by 12%, decreasing to approximately 10,500. Employment in the West Coast region was approximately 336,800 in 2004. This number was down from 354,200 in 2001, a 5% decrease. Please see Table Two.

Companies in the Energy arena provide higher than average compensation, often significantly higher. The 3 County Average wage in 2004 was \$67,113. Please see Table Three.

Energy and Sustainable Industries – Portland Totals

Four NAICS classifications were included in both Sustainable Industries and Energy (HVAC manufacturing, turbine manufacturing, Electronic equipment and appliance manufacturing, and scientific R&D). This was done to accurately reflect each group of industries. The table below summarizes the employment total for both groups independently (that is, Energy and Sustainable Industries (without Energy)).

The total number of jobs in Sustainable and Energy Industries in Multnomah, Clackamas and Washington counties in 2004 was 22,497.

Industry	2001		2004		3 County Change	3 County % Change	West Coast % Change
	West Coast Employment	3 County Employment	West Coast Employ	3 County Employment			
Sustainable Industries less Energy	283,956	12,767	286,687	11,939	-828	-6.5%	1.0%
Energy Total	354,160	12,050	336,802	10,558	-1492	-12.4%	-4.9%
COMBINED TOTAL	638,116	24,817	623,489	22,497	-2320	-9.3%	-2.3%

Table 1
Sustainable Industries Wage Performance in the Portland Region from 2001 to 2004

NAICS	Industry	2001		2004		3 County Change	West Coast Change	3 County % Change	West Coast % Change
		West Coast Avg Wage	3 County Avg Wage	West Coast Avg Wage	3 County Avg Wage				
3334	HVAC & commercial refrigeration equipment manufacturing	\$40,643	\$41,535	\$41,135	\$41,612	\$77	\$492	0%	1%
3336	Turbine & power transmission equipment manufacturing	\$61,214	\$33,702	\$67,144	\$35,032	\$1,330	\$5,930	4%	10%
335	Electrical equipment & appliance mfg.	\$43,905	\$46,860	\$47,599	\$42,884	-\$3,976	\$3,694	-8%	8%
42393	Recyclable material merchant wholesalers	\$30,281	\$30,866	\$33,260	\$33,555	\$2,689	\$2,979	9%	10%
5413	Architectural & engineering services	\$61,041	\$55,962	\$61,606	\$57,471	\$1,510	\$564	3%	1%
54162	Environmental consulting services	\$55,389	\$45,989	\$53,223	\$53,621	\$7,631	-\$2,166	17%	-4%
5417	Scientific R&D services	\$74,874	\$50,009	\$83,337	\$62,293	\$12,284	\$8,463	25%	11%
562	Waste management & remediation service	\$44,239	\$37,933	\$50,717	\$42,731	\$4,798	\$6,479	13%	15%
Sustainable Industries Total		\$58,905	\$49,992	\$63,135	\$52,701	\$2,709	\$4,230	5%	7%

Source: Oregon Labor Market Information System Covered Employment and Wages; US Dept. of Labor Bureau

3 County = Clackamas, Multnomah & Washington

West Coast = California, Oregon & Washington

NAICS = North American Industrial Classification System

**Table 2
Energy Employment in the Portland Region from 2001 to 2004**

NAICS	Industry	2001		2004		3 County Change	3 County % Change	West Coast % Change
		West Coast Employment	3 County Employment	West Coast Employment	3 County Employment			
2211	Power generation and supply	23,484	1,388	24,181	1,398	10	1%	3%
3334	HVAC and commercial refrigeration equipment manufacturing	10,459	859	8,346	531	-328	-38%	-20%
3336	Turbine and power transmission equipment manufacturing	6,610	68	5,907	68	0	0%	-11%
3345	Electronic instrument manufacturing	137,863	5,764	121,588	4,546	-1,218	-21%	-12%
335	Electrical equipment and appliance mfg.	49,999	2,083	39,358	1,522	-561	-27%	-21%
5417	Scientific research and development services	111,144	1,685	115,044	1,980	295	18%	4%
54169	Other technical consulting services	14,601	203	22,378	513	310	153%	53%
Energy Total		354,160	12,050	336,802	10,558	-1,492	-12%	-5%

Source: Oregon Labor Market Information System Covered Employment and Wages; US Dept. of Labor Bureau

3 County = Clackamas, Multnomah & Washington

West Coast = California, Oregon & Washington

NAICS = North American Industrial Classification System

Table 3
Energy Industry Wage Performance in the Portland Region from 2001 to 2004

NAICS	Industry	2001		2004		3 County Change	West Coast Change	3 County % Change	West Coast % Change
		West Coast Avg Wage	3 County Avg Wage	West Coast Avg Wage	3 County Avg Wage				
2211	Power generation and supply	\$80,629	\$69,056	\$85,214	\$73,618	\$4,562	\$4,585	7%	6%
3334	HVAC and commercial refrigeration equipment mfg.	\$38,333	\$41,535	\$43,187	\$41,612	\$77	\$4,854	0%	13%
3336	Turbine and power transmission equipment mfg.	\$61,232	\$33,702	\$71,379	\$35,032	\$1,330	\$10,147	4%	17%
3345	Electronic instrument manufacturing	\$73,307	\$69,095	\$84,557	\$80,338	\$11,243	\$11,250	16%	15%
335	Electrical equipment and appliance mfg.	\$43,874	\$46,860	\$48,898	\$42,884	-\$3,976	\$5,024	-8%	11%
5417	Scientific research and development services	\$74,818	\$50,009	\$84,618	\$62,304	\$12,294	\$9,800	25%	13%
54169	Other technical consulting services	\$59,662	\$51,235	\$64,876	\$53,284	\$2,050	\$5,214	4%	9%
Energy Total		\$68,291	\$60,113	\$77,894	\$67,113	\$7,000	\$9,603	12%	14%

Source: Oregon Labor Market Information System Covered Employment and Wages; US Dept. of Labor Bureau

3 County = Clackamas, Multnomah & Washington

West Coast = California, Oregon & Washington

NAICS = North American Industrial Classification System

Workforce

Having looked at the number of jobs and accompanying wages, we would also like to review the kinds of jobs within each industry. Engineering training, electromechanical skills, design, and materials science backgrounds are often cited. Professional management experience within each of these industry areas are also typically in demand.

Energy industries – Electrical engineering (generally and specifically related to renewable energy systems and energy efficiency), electrical systems monitoring, transmission network repair, financial analysts, technical managers, silicon manufacturing

Green Building – Architectural design, development, landscape architecture, building systems energy management, knowledge of sustainable building materials, on site water management, LEED certified professionals.

Recycled Products – Engineering and materials science, knowledge of markets for recycled materials.

There is the need to increase the level of local talent graduating from Portland and Oregon universities. During BRE visits, a number of companies have stated that they have found it necessary to hire people from outside Oregon, or have hired employees that have recently moved to the area. This issue is clearly connected to external perceptions of the quality of life of the state. Resources for local schools are one area of concern.

Portland State University (PSU) and the University of Oregon have both devoted resources in the past 5 years to develop curricula that support sustainable industries, including certification in sustainable frameworks for professional development. PSU has made recent strides to expand its engineering school, including the construction and expansion of engineering facilities. The university is also engaged in a long-term effort to establish a research and development facility for photovoltaic materials, currently called the Northwest Center for Photovoltaic Excellence. Prof. Robert Doppelt at the U of O developed recommended strategies for the growth of sustainable companies in Lane County (2003).

Implementation

As with all of PDC's target industry work, the primary goals of strategy implementation are job retention and expansion, wealth creation and business support. The City of Portland and the state of Oregon enjoy a national and international reputation as locations where business and government are leaders in sustainable industry knowledge. PDC's partner agencies include the Office of Sustainable Development (OSD), City Hall staff (particularly Commissioner Dan Saltzman's office), Portland State University, the Oregon Natural Step Network, the Oregon Business Association and the Portland Business Alliance, among others.

OSD and PDC staff regularly collaborate and have increasingly looked for opportunities to cross reference clients, share resource information, etc. In 2006, the two agencies will formalize this relationship through a Memorandum of Understanding. This agreement will be reviewed and approved by the Sustainable Development Commission, the PDC Commission and City Council. Categories for Interbureau collaboration to support the growth of Sustainable Industries include:

- Campaign to increase national and international levels of awareness of leading Portland companies and regional resources
- Coordination of requests for information from local companies
- Joint staffing to the Economic Development Committee of the Sustainable Development Commission

Sustainable Industries business factors that PDC can help affect:

- Economic Development recommendations formulated by the Sustainable Development Commission and the SDC Economic Development Commission
- Development and distribution of a guide of Portland area companies in sustainable industry sub-categories
- Coordination of city policies with the Portland Business Alliance and its 2005 survey of PBA member priorities regarding sustainability
- City purchasing decisions to support local, sustainable companies
- Research and identification of import substitution opportunities
- State legislative action to support sustainable industries
- Policy discussions with educational institutions

Energy Industries

The city of Portland and the northwest region generally earned a reputation as a location for low-cost energy in the 20th century, due in part to the historical abundance of hydroelectric power. Portland is home to three major utilities and more recently, the Energy Trust of Oregon, as well as the Bonneville Power Administration and leading energy advocacy organizations. Regional leaders from Oregon, Washington, Idaho, and British Columbia have collaborated since 2002 to transform this leadership position to one based on “clean” or “smart energy” technologies⁴. The City of Portland and Portland’s Office of Sustainable Development determined in 2005 that all city consumed electricity would be generated from renewable resources by the year 2010.

Energy Industries business factors that PDC can help affect:

- Implementation of “test bed” facilities to demonstrate the use and effectiveness of energy technologies. This is a continuation of work begun by the Portland Business Alliance and its Smart Energy Industry Group in 2004.
- Inclusion of Energy Industries as part of Brand Oregon state-wide initiative
- Promotion of Portland and the Northwest as productive opportunity areas for investment capital
- Policy discussions with educational institutions regarding energy programs and commercialization of research products
-

Sustainable and Energy Industries business factors that are hard to influence:

- Price of electricity
- Availability of commercial space
- Competition from other “Green” cities
- Other market transformation process

Action Items for Sustainable Industries

- Visit with local companies and provide one-on-one business retention support.
- Provide grant assistance to 4-6 companies to adopt sustainable practices through the Sustainable Business Assistance program.
- Conduct Green Building Cost and Import Substitution study. This will be done in conjunction with private sector partners. The study will review 4-8 Portland buildings, and identify costs for the achievement of individual energy/LEED design “points.” The study will also determine the sourcing of utilized materials and services in an attempt to identify business opportunities for increased local provision of these items. PDC has partnered with the City of Portland Office of Sustainable Development to conduct the Green Building cost and import substitution study.

⁴ Powering up the Smart Grid: a Northwest Initiative for Job Creation, Energy Security and Clean, Affordable Energy. Climate Solutions. August 2005.

- Develop guide of Portland companies by industry subset for purpose of external promotion.

Action Items for Energy Industries

PDC activities in 04-05 that supported Energy Industries included collaboration with partners at the Oregon Business Association and Stoel Rives LLP, PGE and PacifiCorp. On 6/9/05, PDC organized a networking and resource sharing forum for Energy Technology companies.

- Winter 2006 Business Seminar – Potential topics include federal grantsmanship, federal patent protection, workforce gaps. The Energy Advisory Group will meet on 12/13/05 to review these and other topics.
- Participate in the Investing in Clean Energy in Oregon event September, 2005
- Assess Energy Technology company concerns. Survey area companies to determine what type of further networking and resource meetings will provide value. PDC will convene and sponsor these events
- Promote area energy companies and explore recruitment opportunities at appropriate national and NW regional trades shows - identify event with larger contact potential than PowerGen 2006
- Organization and sponsorship of 2nd Annual Energy industry event, Winter 2006

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Sustainable Industries Plan Participants

This document was reviewed by the following organizations:

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Energy Industries Plan Participants

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PacifiCorp

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Vestas American

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Appendix A
Top 50 (by revenue) Energy, Electric Services, Refuse Services,
Semiconductor and Related Firms

Business Name	Industry
Bonneville Power ADM	Electric Services
PacifiCorp Holdings Inc	Electric Services
Tektronix	Instruments To Measure Electricity
Northwest Natural Gas Company	Natural Gas Distribution
Fei Company	Analytical Instruments
Clark Public Utilities	Electric Services
Triquint Semiconductor Inc	Semiconductors and Related Devices
Wafertech LLC	Semiconductors and Related Devices
Trans Canada TGN System	Natural Gas Transmission
Lattice Semiconductor Corp	Semiconductors and Related Devices
Esi	Electrical Equipment and Supplies
Denton Plastics Inc	Refuse Systems
Pixelworks Inc	Semiconductors and Related Devices
Pngc Power	Electric Services
Merix Corporation	Printed Circuit Boards
Christenson	Electrical Work
Integrated Systems Group	Electrical Work
Wacker Semicdtr Holdg Corp	Semiconductors and Related Devices
Sentrol Industrial	Electrical Equipment and Supplies
U S Natural Resources Inc	Refrigeration and Heating Equipment
S E H America	Semiconductors and Related Devices
Cascade Microtech Inc	Instruments To Measure Electricity
Oeco LLC	Electronic Components, Nec
Waste Management	Refuse Systems
Clatskanie Pud	Electric Services
Sumitomo Elc Semicdtr Mtls	Semiconductors and Related Devices
Jae Oregon Inc	Electronic Connectors
Ppm Energy Inc	Gas and Other Services Combined
Radiall America	Electronic Connectors
Micro Power Electronics Inc	Electrical Equipment and Supplies
Maxtek	Semiconductors and Related Devices
Sure Power Industries	Engine Electrical Equipment
Tualatin Valley Water District	Water Supply
Matsushita Electronic Mtls	Printed Circuit Boards
Micro Systems Engineering Inc	Semiconductors and Related Devices
Westak of Oregon Inc	Printed Circuit Boards
Hazel Dell Sewer District Inc	Sewerage Systems
MTI Inc	Electronic Components, Nec
E C D	Process Control Instruments
Shimadzu USA Manufacturing	Analytical Instruments
Photon Kinetics Inc	Instruments To Measure Electricity
Browning-Ferris Inds Ore Inc	Refuse Systems
Container Recovery Inc	Refuse Systems
Encompass Materials Group	Semiconductors and Related Devices
Edt	Printed Circuit Boards
Teldata Inc	Instruments To Measure Electricity
Silicon Forest Electronics Inc	Printed Circuit Boards
Clackamas River Water	Water Supply
K B Recycling Inc	Refuse Systems
Coherent Group	Electromedical Equipment
Canby Utility	Electric and Other Services Combined

Appendix B
Top 50 (by employment) Energy, Electric Services, Refuse Services, Semiconductor & Related Firms

Business Name	Industry
Denton Plastics Inc	Recycled Plastics
Intel	Semiconductors and Related Devices
Tektronix	Instruments To Measure Electricity
Northwest Natural Gas Company	Natural Gas Distribution
Bonneville Power ADM	Electric Services
Wafertech LLC	Semiconductors and Related Devices
Merix Corporation	Printed Circuit Boards
Oeco LLC	Electronic Components, Nec
S E H America	Semiconductors and Related Devices
J D Ross Substation Complex	Administration of General EconPrograms
Precision Interconnect	Current-carrying Wiring Devices
I D T	Semiconductors and Related Devices
Microchip Technology Inc	Semiconductors and Related Devices
Sentrol Industrial	Electrical Equipment and Supplies
Fei Company	Analytical Instruments
Triquint Semiconductor Inc	Semiconductors and Related Devices
Integrated Systems Group	Electrical Work
Credence Systems Corporation	Instruments To Measure Electricity
Esi	Electrical Equipment and Supplies
Micro Systems Engineering Inc	Semiconductors and Related Devices
Lattice Semiconductor Corp	Semiconductors and Related Devices
Jae Oregon Inc	Electronic Connectors
Waste Management	Refuse Systems
Sharp McRlctronics of Americas	Electronic Parts and Equipment
Rockwell Cllins Flight Dynamics	Search and Navigation Equipment
Micro Power Electronics Inc	Electrical Equipment and Supplies
Cascade Microtech Inc	Instruments To Measure Electricity
Westak of Oregon Inc	Printed Circuit Boards
MTI Inc	Electronic Components, Nec
Intel	Semiconductors and Related Devices
Benchmark Electronics Inc	Printed Circuit Boards
LSI Logic	Electronic Parts and Equipment, Nec
Sure Power Industries	Engine Electrical Equipment
Tensolite Prcsn Hrns Assmby	Current-carrying Wiring Devices
Linear Technology	Semiconductors and Related Devices
Clark Public Utilities	Electric Services
Christenson Electric Inc	Relays and Industrial Controls
Moore Electronics Inc	Electronic Components
Christenson	Electrical Work
Leviton Manufacturing Co	Switchgear and Switchboard Apparatus
Trans Canada Gtn Systems	Natural Gas Transmission
Northwest Natural Gas	Natural Gas Distribution
Matsushita Electronic Mtls	Printed Circuit Boards
Silicon Forest Electronics Inc	Printed Circuit Boards
Flextronics Photonics Tpt Inc	Nonferrous Wiredrawing and Insulating
Design & Test Integratn	Instruments To Measure Electricity
Portland General Electric Co	Electric Services
Browning-Ferris Inds Ore Inc	Refuse Systems
Weyerhaeuser Company	Refuse Systems
Container Recovery Inc	Refuse Systems
Pixelworks Inc	Semiconductors and Related Devices