WORKSOURCE OREGON EMPLOYMENT DEPARTMENT

Oregon's Green Sectors

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Comparing Oregon's Green Sectors: Employment, Wages, Hours, and Worker Trends

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The Oregon Employment Department received a $1.25-million Labor Market Information Improvement Grant in December 2009 aimed at increasing the state's understanding of green jobs. One goal of the grant is to identify Oregon's green sectors and track employment and wages in those sectors over time. This report is an update to previous green sector analyses conducted over the past several months. This report includes analysis of all seven previously studied green sectors:

- Energy efficiency and weatherization
- Energy transmission
- Environmental technologies and services
- Green building and development
- Green transportation
- Green manufacturing
- Renewable energy production and generation

This analysis uses sector definitions from the Oregon Green Jobs Council – the group legislatively responsible for identifying high-demand green industries in Oregon. Detailed descriptions of each sector are available in Appendix A.

The firms in this and previous analyses were identified by a number of on-line lists and registries. This independent analysis of labor market information, although it discusses employees, is not a study of green jobs, but a study of all employees at the establishments identified. No effort was made to determine or calculate the net environmental impacts of the products produced or services provided. This study of firms is unique, and may not match other Employment Department data or official statewide employment changes over the same period.

The Oregon Employment Department utilizes two different sources to measure the number of employees in green sectors: the quarterly census of covered employment and wages (QCEW); and unemployment insurance wage records. Both sources include only workers covered by unemployment insurance, but the count of workers in wage records is typically larger than the official quarterly employment figure due to workforce turnover. The QCEW data includes only those employees who worked or received pay during the period which includes the 12th of the month. The wage record files include data for all employees who received pay at some time during the quarter.

Green Sector Employment Trends

Covered employment for the seven green sectors in Oregon totaled 45,311 in the fourth quarter of 2005. That figure rose to 46,172 by the fourth quarter of 2010, an increase of nearly 2 percent over the period. In the fourth quarter of 2010, green sector employment represented roughly 4

Table 1

Most Green Sectors Outperformed Oregon's Overall Economy in Employment Gains 4Q2005 to 4Q2010

Sector	Fourth Quarter Employment 2005	2010	Change	Percent Change
Green Building and Development	2,299	2,021	-278	-12%
All Sectors, Oregon Statewide	1,685,506	1,609,747	-75,759	-5%
Energy Efficiency and Weatherization	13,067	12,493	-574	-4%
Green Transportation	12,344	12,523	179	1%
Renewable Energy	10,548	10,756	208	2%
Energy Transmission	9,823	10,048	225	2%
Environmental Technologies and Services	3,862	4,510	648	17%
Green Manufacturing	1,329	2,160	831	63%

Source: Quarterly Census of Employment and Wages

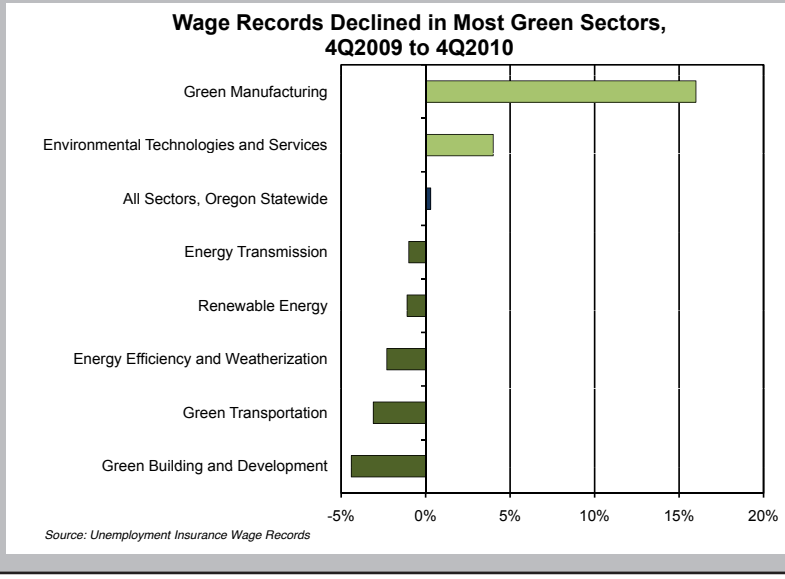
percent of all employment in Oregon. Most of the state's green sectors fared better between the fourth quarters of 2005 and 2010 than Oregon industries in general (Table 1). Oregon's entire economy lost 75,759 jobs (-5%) during the same five-year span.

The green manufacturing sector had the largest employment increase (+831 jobs or 63%) between the fourth quarters of 2005 and 2010. The environmental technologies and services sector experienced the second-largest gain (+648 jobs or 17%) over the period. Smaller gains occurred in energy transmission (+225), renewable energy (+208), and green transportation (+179); employment growth totaled 2 percent for each of these three sectors.

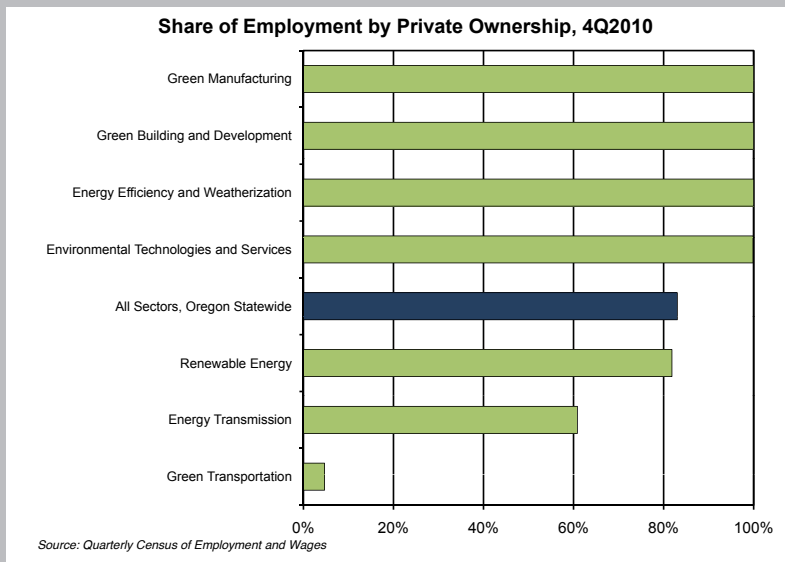
The energy efficiency sector experienced the largest nominal job loss (-574 jobs or 4%) between the fourth quarters of 2005 and 2010. However, the largest share of employment was lost in the green building and development sector (-278 jobs or -12%). Declines in these two sectors were likely tied to the commercial and residential construction industries, which took a particularly hard hit during the Great Recession that began in late 2007.

Unemployment insurance wage records serve as a second data source for analyzing changes between the fourth quarters of 2009 and 2010. Five of the seven green sectors in Oregon had a decline in wage records, while wage records in all sectors statewide increased (+0.3%) over the year (Graph 1). This could reflect a decline in sector employment, a drop in job turnover, or a combination of both. The green building and development sector had the largest decline (-4%) in wage records. Only two green sectors – green manufacturing (+16%) and environmental technologies and services (+4%) – had greater wage record increases than the total for all sectors statewide.

Graph 1



Graph 2



Employment Concentrations by Ownership, Industry, and Employer Class Size

The majority of jobs in six of the seven identified green sectors were at privately-owned establishments in the fourth quarter of 2010 (Graph 2). Four of the seven green sectors consisted entirely of employment at privately-owned establishments: green manufacturing; green building and development; energy efficiency and weatherization; and environmental technology and services. These sectors showed a greater share of private employment than seen in Oregon's overall economy (83%) for the quarter. The renewable energy sector fell close to the statewide figure for private employment (82%). The two main exceptions to this large employment in private ownership trend were the more evenly divided energy transmission sector (61% private) and the green transportation sector (5%).

Within each of the seven green sectors, the concentration of employment by industry varied widely in the fourth quarter of 2010 (Table 2). The energy transmission and green transportation sectors had the highest concentrations of employment within a single industry – 71 percent and 70 percent, respectively. For these two sectors, these single-industry concentrations seem intuitive; one would expect to see

Table 2

Each Green Sector's Most Prevalent Industry, 4Q2010

Green Sector	Most Prevalent Industry of Employment	Share of Sector Employment (%)
Energy Transmission	Electric Power Generation, Transmission, and Distribution	71%
Green Transportation	Executive, Legislative, and Other General Government	70%
Energy Efficiency and Weatherization	Specialty Trade Contractors	53%
Environmental Technologies and Services	Professional, Scientific, and Technical Services	41%
Green Building and Development	Professional, Scientific, and Technical Services	39%
Renewable Energy	Electric Power Generation, Transmission, and Distribution	38%
Green Manufacturing	Food Manufacturing	34%

Source: Unemployment Insurance Wage Records

most energy transmission sector employment in the associated electric power generation, transmission, and distribution industry. Similarly, the large share of green transportation employment in "other government" seems sensible, since many counties and municipalities operate public transit systems in the state. Other green sectors, such as green manufacturing and renewable energy, showed a greater dispersion of employment across industry sectors.

Table 3

Green Sectors Distribution of Employment by Employer Size Class, 4Q2010

	Number of Employees		
Green Sector	Under 10	10 - 99	100 or More
Renewable Energy	0%	1%	99%
Green Transportation	0%	9%	90%
Energy Transmission	0%	16%	84%
Green Manufacturing	2%	28%	70%
Environmental Technologies and Services	6%	41%	53%
All Sectors, Oregon Statewide	15%	34%	51%
Green Building and Development	8%	49%	43%
Energy Efficiency and Weatherization	12%	47%	41%

Source: Unemployment Insurance Wage Records, total may not equal 100 percent due to rounding

Although the concentrations of employment varied, some green sectors showed commonalities in main industry of employment. Both the environmental technologies and services and the green building and development sectors had their largest share of employment (roughly two-fifths) in the professional, scientific, and technical services industry. The energy transmission and renewable energy sectors also shared the same industry with the largest portion of employment.

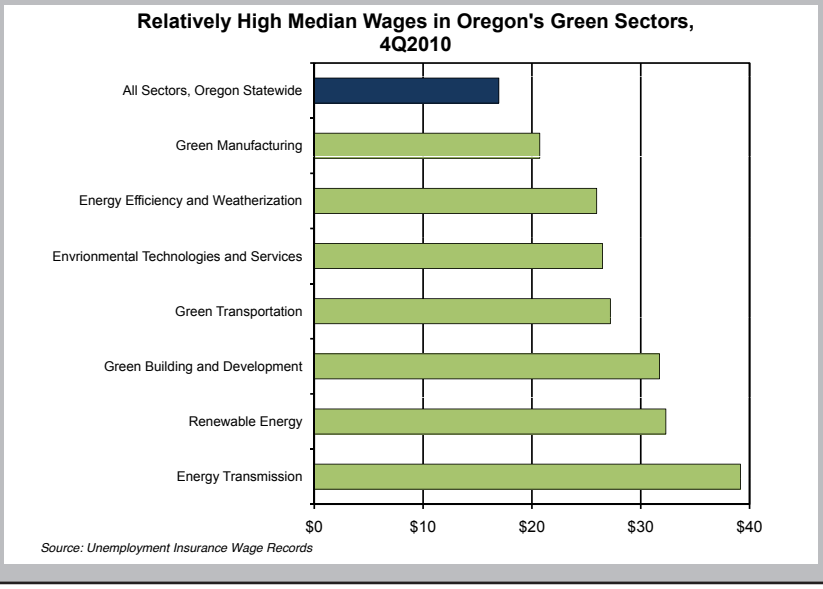
Green sector employment also tends to be concentrated in larger firms. In the fourth quarter of 2010, about one-half (51%) of employment in Oregon was in the three largest employer class sizes. This includes firms with 100 employees or more (Table 3). Five of the seven green sectors had a greater share of employment in these large employer class sizes than Oregon's overall economy. Nearly all (99%) employment in the renewable energy sector was located in the three largest employer class sizes. The green transportation (90%) and energy transmission (84%) sectors also showed a large portion of employment at firms with at least 100 employees. Exceptions included the green building sectors and energy efficiency sectors, where employment in the larger classes totaled 43 percent and 41 percent, respectively.

High Wages in Green Sectors

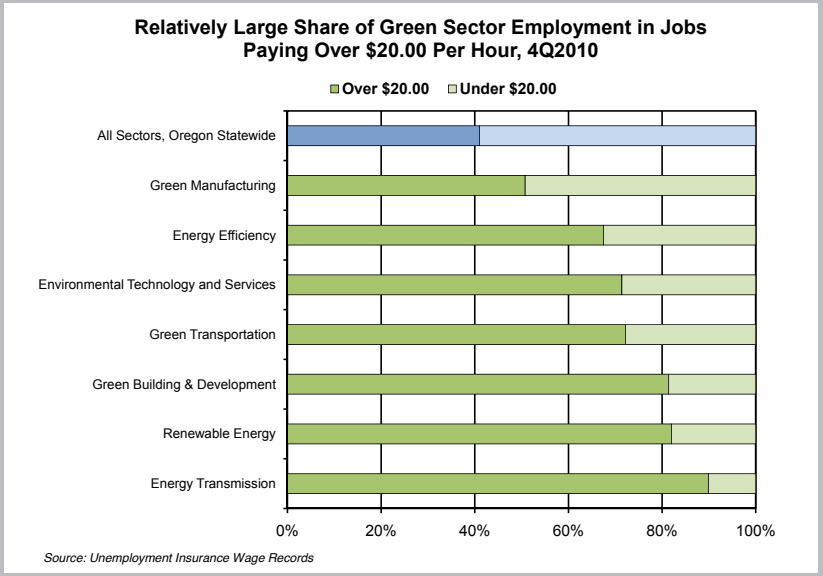
Wages paid at firms in green sectors during the fourth quarter of 2010 ranged from $34.4 million in the green manufacturing sector up to $195.4 million in the energy transmission sector. Each of the seven green sectors studied pay relatively high wages. In the fourth quarter of 2010, the median hourly wage for firms of all ownerships in all sectors across Oregon was $16.96 (Graph 3). Each green sector posted a higher median wage during the same quarter. The hourly median wage in Oregon's green sectors ranged from a low of $20.72 in green manufacturing to a high of $39.16 in energy transmission.

More broadly, the green sectors have a larger share of jobs paying at least $20.00 per hour than Oregon's economy overall. Forty-one percent of all workers at firms in Oregon had this level of hourly earnings during the fourth quarter of 2010 (Graph 4). In the energy transmission sector, nine out of ten workers earned at least $20.00 per hour. The renewable energy sector had the second-largest portion of workers earning at least $20.00 hourly (82%), followed closely by the green building and development sector (81%). The green manufacturing sector showed the lowest share of workers with earnings at or above $20.00 during this period, but still had a majority (51%) of workers with earnings at that rate.

Graph 3



Graph 4



Looking one step further, more than one-fourth (28%) of workers in energy transmission earned at least $40.00 per hour in the fourth quarter of 2010. Almost one-fourth of those in the renewable energy (23%) and green building and development (22%) sectors earned at least $40.00 per hour. In all sectors across Oregon, only 7 percent of workers had earnings at this level.

Within the green sectors, wages vary by employer class size. Generally, higher median wages occurred in larger employer class sizes during the fourth quarter of 2010. Statewide, the highest median wage – $17.15 per hour – was in the largest employer class size of 500 or more employees (Table 4). Similarly, the highest median wage for five of the seven green sectors occurred in the largest employer class size with jobs. Two sectors went against this trend. In the renewable energy sector, the smallest employer class size (less than five employees) showed the greatest hourly median wage, at $38.35. For energy efficiency and weatherization workers, firms with between 250 and 499 workers paid a slightly higher median wage ($32.89) than the largest employer class size ($32.43).

Between the fourth quarters of 2009 and 2010, the median wage for all workers rose in four green sectors (Graph 5): green building and development (7.9%); environmental technologies and services (7.2%); green transportation (3.5%); and energy efficiency and weatherization (2.5%). Three sectors saw declines in the median wage for all workers over the period. Renewable energy

Table 4

Median Wages by Employer Class Size, Oregon, 4Q2010

	Number of Employees							
Sector	**Under 5**	**5 - 9**	**10 - 19**	**20 - 49**	**50 - 99**	**100 - 249**	**250 - 499**	**500 or More**
Renewable Energy	$38.35	-	-	$32.33	$31.68	-	$20.77	$32.92
Energy Efficiency and Weatherization	$19.65	$19.96	$20.92	$24.29	$25.77	$31.31	$32.89	$32.43
Energy Transmission	$24.35	$24.70	$33.90	$37.76	$34.74	$34.65	$32.88	$42.10
Environmental Technologies and Services	$20.08	$21.32	$22.93	$25.25	$26.11	$25.82	$32.89	-
Green Building and Development	$24.41	$23.31	$21.26	$28.48	$30.70	$39.13	-	-
Green Manufacturing	$10.91	$15.56	$16.64	$18.65	$20.72	$18.80	$25.44	-
Green Transportation	$17.18	$11.71	$12.44	$16.82	$18.87	$21.54	$26.72	$29.37
All Sectors, Oregon Statewide	**$15.88**	**$15.00**	**$14.80**	**$15.25**	**$15.74**	**$15.87**	**$14.90**	**$17.15**

Source: Unemployment Insurance Wage Records

experienced the largest decline (-3.9%), while smaller losses occurred in energy transmission (-1.1%) and green manufacturing (-0.8%).

Full-Time Workers in Green Sectors

Within a quarter, workers with 350 hours or more are considered to be working full time. Oregon's green sectors had a larger share of full-time workers in the fourth quarter of 2010 than the broader state economy. A separate Employment Department wage record analysis showed that roughly two-thirds (68%) of all workers in Oregon worked 350 hours or more during the period. By comparison, 93 percent of renewable energy workers clocked in at least 350 hours, followed by the energy transmission sector at 90 percent (Table 5). Another three sectors had more than four-fifths of their workers on full-time hours: environmental technologies and services (83%); green manufacturing (82%); and green building and development (81%). The green transportation and energy efficiency and weatherization sectors posted the lowest share of full-time workers for the quarter (73% each), but still sat above the rate for all sectors statewide.

Full-time workers in four green sectors experienced favorable wage growth compared to all workers in their sectors (Graph 5). Full-time median wage growth in energy efficiency and weatherization outpaced the sector's all-worker gain. In the green manufacturing and energy transmission sectors, the median wage grew for workers at or above 350 hours in the quarter, while the median declined for all workers. Full-time renewable energy workers experienced a smaller decline than the rate for all workers. Full-time worker wage gains lagged the rate for all workers in green building and development, environmental technologies and services, and green transportation.

Longitudinal Trends of Workers in Green Sectors

In five of Oregon's green sectors, the majority of individuals working in the fourth quarter of 2010 also worked in the same sector during the fourth quarter of 2005. Roughly two-thirds of energy transmission (67%) and renewable energy (65%) workers in the fourth quarter of 2010 were in the same sector during both points in the five-year span. More than one-half of all workers in the green transportation (62%), green building and development (59%), and energy efficiency and weatherization (55%) sectors worked in the same sector. Green manufacturing (34%) and environmental technologies and services (46%) showed the lowest portions of fourth quarter 2010 workers in the same sector as five years earlier.

Those workers in the same green sector during the fourth quarters of 2005 and 2010 experienced a notable median wage increase over the period. The largest gains occurred in renewable energy (33%) and energy transmission (32%), followed by green manufacturing and green transportation (24% each), environmental technologies and services (22%), green building and development (20%), and energy efficiency and weatherization (18%). The median wage for these workers in the fourth quarter of 2010 also stood higher than the median for all workers in the same sector during the quarter (Graph 6). While not all workers who were present at both points in time may have remained in their sectors over the entire period, those who did would have a greater chance of receiving wage increases, and thus higher pay than newer workers in the

Table 5

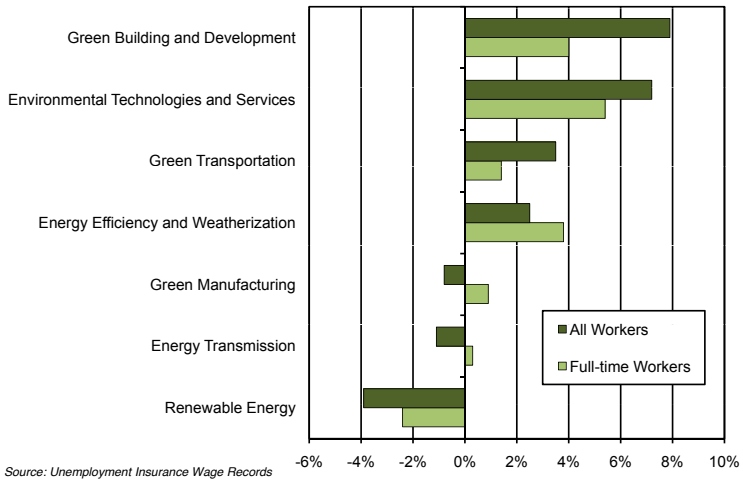
Full-Time Work More Prevalent in Green Sectors, Oregon, 4Q2010

Sector	Workers With 350+ Hours (%)
Renewable Energy	93%
Energy Transmission	90%
Envrionmental Technologies and Services	83%
Green Manufacturing	82%
Green Building and Development	81%
Energy Efficiency and Weatherization	73%
Green Transportation	73%
All Sectors, Oregon Statewide	68%

Source: Unemployment Insurance Wage Records

Graph 5

Median Wage Changes Mixed for Green Sector Workers in Oregon, 4Q2009 - 4Q2010

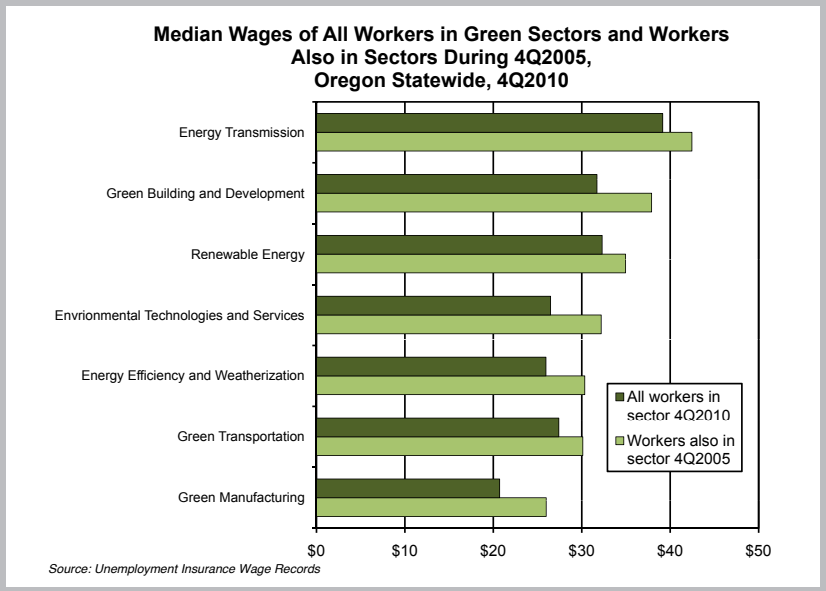


Source: Unemployment Insurance Wage Records

sector. The median hourly wage for the sector workers present at both periods in time showed the greatest difference from the all-worker median in green building and development (+$6.18) and green manufacturing (+$5.26). The smallest differences occurred in renewable energy (+$2.65) and green transportation (+$2.71).

Trends in the median number of hours worked were generally level for green sector workers present during both points in time. The green transportation sector experienced a decline of 5 percent in median hours worked over the period. The energy efficiency and weatherization sector saw a smaller decline (-1%). The median number of hours worked grew, but by less than 2 percent, in all other green sectors. There was little difference in the fourth quarter of 2010 between the median number of hours for sector workers also present in the fourth quarter of 2005 and the all-worker median in each green sector.

Graph 6



Conclusion

Between the fourth quarters of 2005 and 2010, five of the seven green sectors studied experienced covered employment gains. Six of the seven sectors outperformed Oregon's overall economy; statewide, 4.5 percent of all jobs were lost over the period. The two green sectors with employment losses – and statewide declines – were influenced in part by a link to construction, an industry that experienced dramatic job declines over the period. For example, 53 percent of all employment in the energy efficiency and weatherization sector during the fourth quarter of 2010 was in the specialty trade contractors industry.

Green sector employment in the fourth quarter of 2010 was more concentrated in privately owned firms and in larger employer size classes than overall employment in the state. Workers in green sectors earned higher median wages than workers in the overall economy during the fourth quarter of 2010. Moreover, the share of workers in each green sector with an hourly wage of $20.00 or more exceeded the rate in all sectors statewide by at least 10 percentage points, and by as much as 49 percentage points. This may be due in part to the occupational mix in Oregon's green sectors. Green sectors such as environmental technologies and services or green building and development have a notable share of employment in relatively high-paying professional occupations. The energy transmission and renewable energy sectors consist of both professional and high-skill occupations. By comparison, Oregon's overall economy has a larger share of service-related jobs, which pay relatively lower wages.

Among the green sectors, the green manufacturing and environmental technology and services sector showed the greatest employment gains, in terms of both covered employment and wage records. Two other green sectors stand out in terms of wages and hours. The energy transmission sector paid the highest median wage of the group in the fourth quarter of 2010, and had the largest share of workers earning at or above $20.00 per hour. The energy transmission sector also posted the largest share of workers in the fourth quarter of 2010 that had also worked in the sector during the fourth quarter of 2005. The renewable energy sector stood second among all the green sectors in these three areas. Similarly, the renewable energy and energy transmission sectors topped the group in terms of the number of median hours worked in the fourth quarter of 2010. However, these two sectors showed weak performance for the change in median hourly wages between the fourth quarters of 2009 and 2010.

Within the green sectors, workers who were present in their respective sectors during both the fourth quarter of 2005 and the fourth quarter of 2010 saw some earnings benefits compared to all workers in their sectors. The workers present in their respective sectors at both points in time experienced significant median wage gains – between 18 percent and 33 percent – over the five-year period. These workers also enjoyed a higher median wage than all workers in their sector during the latter period. If the workers present at both periods of time actually remained with their sector or employer for the entire five-year period, the wage gains may reflect pay raises over time. However, the workers present at both points in time experienced lesser median wage gains than all workers between the fourth quarters of 2009 and 2010 in three sectors: green building and development; environmental technologies and services; and green transportation. In addition, the fourth quarter 2005 workers in the same sectors five years later did not necessarily post a higher number of median numbers worked in the fourth quarter of 2010.

Appendix A: Oregon's Green Sectors, as defined by the Oregon Green Jobs Council

Energy Efficiency and Weatherization
- Weatherization and conservation retrofitting and remodeling and strategic energy management for industrial, commercial, and residential structures and dwellings.
- The capacity to reduce energy consumption and costs in commercial, industrial, public and residential buildings and infrastructure.

Energy Transmission
- Firms involved in the transmission of energy, such as local utility companies, as well as those researching and building advanced technologies for smart grid applications.

Environmental Technologies and Services
- Technologies, project developers, and service providers working in environmental protection and cleanup, waste and recycling, energy efficiency, water and wastewater, and sustainable business development practices.

Green Building and Development
- Firms involved in planning and producing energy efficient and environmentally sound homes, buildings, and communities.

Green Manufacturing
- Solar, wind, wave, metals, composites, recycling technologies, supply chain components, food products and processing, and lean/high performance practices. Increasingly existing manufacturing infrastructure is being utilized for green product manufacturing.

Green Transportation
- Firms involved in researching and producing electric vehicles, fuel cells, and advanced batteries; providing mass transit; or conducting emissions controls and other tests.

Renewable Energy Production and Generation
- Energy generation utilizing renewable energy technologies (solar, wind, biomass, geothermal, wave, bio-energy, small hydro, biofuels).
- Covers a wide variety of businesses, from small solar installer contractors to global wind technology and project developers.

Appendix B: Comparative Employment and Wage Data for Studied Sectors, 4Q2010

Employment and Wage Data for Green Sectors and Oregon Statewide, 4Q2010

	Employment			Wages	
Sector	Total	Private Ownership	Full-time (350+ hours)	Median	Pay Above $20/hr
All Sectors, Oregon Statewide	1,609,747	1,337,027	68%	$16.96	41%
Energy Efficiency and Weatherization	12,493	12,493	73%	$25.95	67%
Energy Transmission	10,048	6,114	90%	$39.16	90%
Environmental Technologies and Services	4,510	4,503	83%	$26.48	71%
Green Building and Development	2,021	2,021	81%	$31.72	81%
Green Manufacturing	2,160	2,160	82%	$20.72	51%
Green Transportation	12,523	587	73%	$27.21	72%
Renewable Energy	10,756	8,804	93%	$32.31	82%

Sources: Quarterly Census of Employment and Wages, and Unemployment Insurance Wage Records

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