

Vermont Department of Labor; Economic & Labor Market Information Division

# Analysis of Green Jobs Sector in Vermont

An Analysis of Available Data

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## Section 1: Introduction

This analysis was conducted as part of a Memorandum of Understanding (MoU) between the Vermont Department of Labor and Vermont Technical College in support of the Vermont Business Sector Analysis Project. The goal of that project is to develop strategies and tactics to align the state's workforce education and training resources to meet the needs of critical economic sectors for skilled workers. This report satisfies VDoL deliverable #2 of the MoU signed by both parties on or before May 14th, 2013.

### Defining Green

This report will analyze industry and occupation data related to green jobs in Vermont. Any assessment of the green labor market must first establish a definition of what is considered green. For the purposes of this report, the Economic & Labor Market Information Division (E&LMI) utilizes two definitions, one developed by the U.S. Bureau of Labor Statistics (BLS) and another created as part of the O\*NET collaborative.

According to the BLS, green jobs are either:

1. Jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources.
2. Jobs in which workers' duties involve making their establishment's production processes more environmentally friendly or use fewer natural resources. (U.S Bureau of Labor Statistics, 2012)

O\*NET research (Dierdorff et al, 2009) provides the following definition of the green economy:

“The green economy encompasses the economic activity related to reducing the use of fossil fuels, decreasing pollution and greenhouse gas emissions, increasing the efficiency of energy usage, recycling materials and developing and adopting renewable sources of energy.”

Rather than a general characterization of defining green jobs - as the BLS does above- O\*NET focuses on the greening of occupations. This is defined by O\*NET as follows:

“The greening of occupations refers to the extent to which green economy activities and technologies increase the demand for existing occupations, shape the work and worker requirements needed for occupational performance or generate unique work and worker requirements”

Using this definition, O\*NET created three general occupational categories:

*Green Increased Demand Occupations:* The impact of green economy activities and technologies is an increase in the employment demand for an existing occupation. However, this impact does not entail significant changes in the work and worker requirements of the occupation. The work context may change, but the tasks themselves do not. O\*NET identified 64 of these occupations.

*Green Enhanced Skills Occupations:* The impact of green economy activities and technologies results in a significant change to the work and worker requirements of an existing O\*NET – SOC occupation. This impact may or may not result in an increase in employment demand for the occupation. The essential purposes of the occupation remain the same but tasks, skills, knowledge and external elements such as credentials have been altered. O\*NET identified 60 occupations in this category.

*Green New and Emerging:* The impact of green economy activities and technologies is sufficient to create the need for unique work and worker requirements which results in the generation of a new occupation relative to the O\*NET taxonomy. This new occupation could be entirely novel or “born” from an existing occupation. O\*NET identified 46 occupations in this category.

A complete list of occupations in each category can be found at <http://www.onetcenter.org/green.html>. Note that not every identified occupation exists in large enough numbers to report in Vermont.

### **Analyzing the Prevalence of Green Jobs**

The following sections analyze available data on the prevalence of occupations and industries in Vermont that perform tasks related to conserving energy, reducing waste, and limiting nonrenewable resource use, collectively referred to as “green”.

*Section two* reviews secondary data collected from the BLS. It also analyzes E&LMI long-term growth projections of green occupations as defined by the O\*NET collaborative. After a brief recap of a green construction survey reported in deliverable 1, the section ends with a note on limitations of available data.

*Section three* provides an explanation and justification for two sets of primary data E&LMI plans to collect in order to further our understanding of the green labor market in Vermont. These include a survey of approximately 750 firms about the prevalence of green occupations and a detailed analysis of the supply of workers graduating from Vermont programs with appropriate skills for green occupations.

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## Section 2: Analysis of Available Data

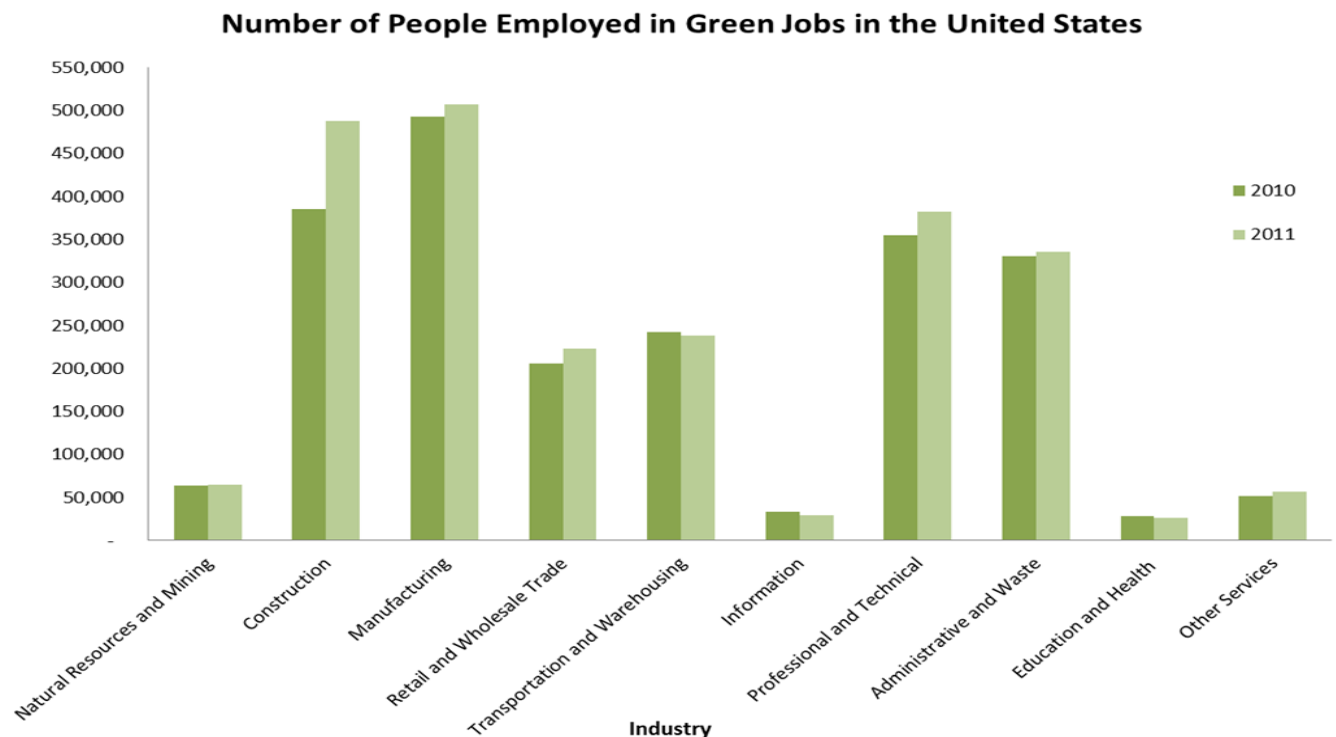
This reports analyzes data from two primary sources: the Green Goods and Services Survey of the Bureau of Labor Statistics, which provides detailed industry information; and the O\*NET collaboration of the US Employment and Training Administration, which provides detailed occupational information.

### Green Goods and Services Survey

The Green Goods and Services Survey (GGS) is a program administered by the U.S. Department of Labor's Bureau of Labor Statistics (BLS). This program aims to provide a national and state measure of employment related to producing goods or providing services that benefit the environment. The program was halted in 2013 as part of a series of federal budget reductions.

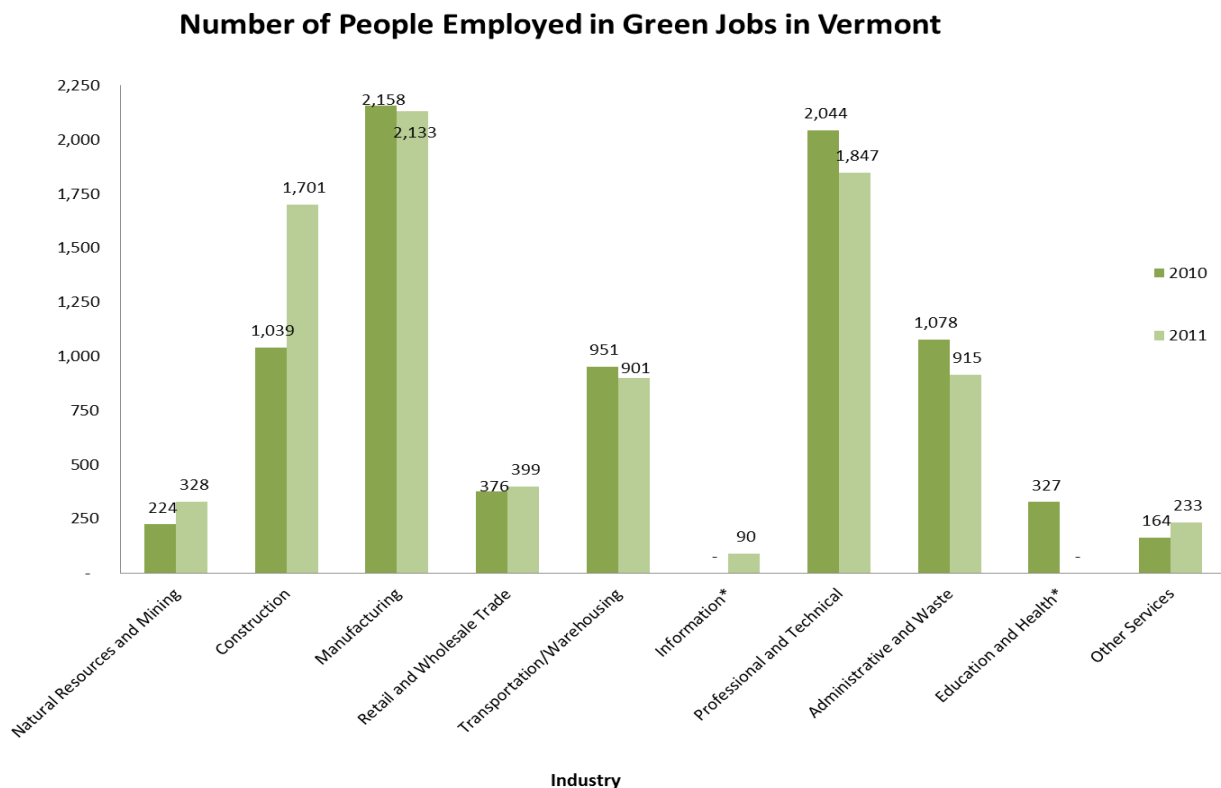
The GGS provides 2010 and 2011 green employment data for the U.S. and for each state. The survey reached approximately 120,000 business establishments each year. Nationwide, 2.6% of all employment was green in 2011. Vermont had the second highest concentration of green employment at 4.1% of all jobs, trailing only Oregon (4.3%). Including only private ownership employment, Vermont leads the nation with a concentration of 3.9%, well above the national concentration of 2.3%. In Vermont in 2011, 12,159 positions were considered green. Data for all 50 states can be found in *Appendix A*.

Chart 1: U.S. Employment in Green Jobs



In Vermont in 2011 the industry with the most employment in green jobs was Manufacturing (2,133), followed closely by Professional and Technical Services (1,847) and Construction (1,701). The highest concentrations of green employment in 2011 were in Professional and Technical Services (13.5% of all jobs in this sector), followed closely by Transportation and Warehousing (13.3%) and Construction (12.1%). Nationwide, Manufacturing accounts for the highest number of people employed in green jobs (507,168), followed by Construction (487,709) and Professional & Technical Services (381,981).

Chart 2: Vermont Employment in Green Jobs (\*data for both years not available for these industries)



### O\*NET Online

O\*NET Online is a web resource for occupational data, funded by United States Department of Labor, Employment and Training Administration Division, and developed by The National Center for O\*NET Development in North Carolina. O\*NET publishes national and state occupational data, as well as information on skills, credentials, and tasks associated with each occupation.

O\*NET is also a primary resource as a reference for which occupations are considered green. O\*NET decides which occupations are green by determining the extent to which green economy activities and technologies increase the demand for existing occupations, shape the work and worker requirements needed to do the job for these occupations, or create particular work and worker requirements. As

mentioned earlier, O\*NET puts an emphasis on the “greening” of occupations, or identifying the green tasks, skills, and knowledge associated with existing occupations. It identifies new and emerging green occupations as well. The complete list of O\*NET green occupations, recent rate of growth and projections is available in *Appendix B*.

O\*NET identifies 204 green occupations. 85 of those occupations are included in publicly available data for Vermont. The remaining occupations either do not exist in Vermont or exist in such small numbers that the data is suppressed for confidentiality reasons. The 85 occupations fall into fourteen 2-digit Major Groups within the Standard Occupational Classification system (SOC). Twelve of the Major Groups contain publishable data (the remaining two groups are suppressed to maintain confidentiality). The major green occupational groups with the highest number of jobs in Vermont in 2010 were Production occupations (6,879 jobs), Management occupations (6,313), Construction & Extraction occupations (6,136) and Office & Administrative Support (5,820). Table 1 below lists the major occupation groups, 2010 employment levels and projected growth.

*Table 1: Expected rates of growth of green occupations in Vermont by SOC major groups*

SOC	Major Occupation Group	2000	2010	2020	growth rate, 2010-2020
11	Management Occupations	3,733	6,313	6,594	0.4%
13	Business and Financial Operations Occupations	1,416	1,236	1,367	1.0%
15	Computer and Mathematical Occupations	N/A	712	860	1.9%
17	Architecture and Engineering Occupations	2,820	2,610	2,792	0.7%
19	Life, Physical, and Social Science Occupations	651	1,359	1,600	1.6%
27	Arts, Design, Entertainment, Sports, and Media Occupations	731	1,162	1,302	1.1%
41	Sales and Related Occupations	546	594	630	0.6%
43	Office and Administrative Support Occupations	6,541	5,820	6,052	0.4%
47	Construction and Extraction Occupations	5,653	6,136	6,934	1.2%
49	Installation, Maintenance, and Repair Occupations	2,596	2,675	2,932	0.9%
51	Production Occupations	8,814	6,879	7,389	0.7%
53	Transportation and Material Moving Occupations	10,117	8,289	9,198	1.0%

These 85 occupations accounted for 47,938 jobs in 2010, representing 13.5% of the 355,435 jobs in Vermont. Using 2010 – 2020 occupational projections, it is estimated that by 2020 these 85 occupations will account for 51,840 jobs in Vermont, an increase of 3,902. With 384,424 jobs projected for that year, these O\*NET green occupations will still constitute 13.5% of jobs in the state. Table 2 below uses O\*NET

data and occupational projections to detail all green occupations with expected growth rates greater than one percent.

Table 2: Fastest Growing Green Occupations in Vermont

SOC Code	Job Title	Employment		Annual Job Openings	Average Hourly Wage (OES May 2011)	Average Annual Growth Rate
		2010	2020			
47-3012	Helpers--Carpenters	247	380	20	\$13.07	4.4%
13-2052	Personal Financial Advisors	266	335	10	\$41.24	2.3%
49-9041	Industrial Machinery Mechanics	394	490	18	\$22.09	2.2%
17-2081	Environmental Engineers	249	297	11	\$37.99	1.8%
53-7081	Refuse and Recyclable Material Collectors	772	900	36	\$13.18	1.5%
51-4031	Cutting, Punching, and Press Machine Setters...	207	241	5	\$14.69	1.5%
17-1011	Architects, Except Landscape and Naval	392	455	14		1.5%
47-2221	Structural Iron and Steel Workers	75	86	3	\$17.32	1.4%
51-9012	Separating, Filtering, Clarifying, Precipitating, and Still Machine...	391	447	12	\$16.40	1.3%
47-2111	Electricians	1,334	1,522	55	\$19.28	1.3%
47-4011	Construction and Building	185	211	9	\$21.91	1.3%
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	577	658	19	\$16.77	1.3%
27-3031	Public Relations Specialists	874	991	35	\$24.29	1.3%
47-2131	Insulation Workers...	85	95	4	\$15.96	1.1%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	1,881	2,099	82	\$12.64	1.1%
11-3051	Industrial Production Managers	416	463	15	\$44.20	1.1%
11-9021	Construction Managers	2,250	2,503	39	\$39.25	1.1%
19-2041	Environmental Scientists and Specialists, Including Health	803	891	33	\$24.73	1.0%
11-2021	Marketing Managers	437	483	18	\$61.98	1.0%
51-2041	Metal Fabricators and Fitters	86	95	3	\$16.41	1.0%
19-3051	Urban and Regional Planners	192	212	4	\$26.67	1.0%
49-9098	Helpers-Installation, Maintenance & Repair Workers	144	159	9	\$12.11	1.0%

As table 2 indicates, the fastest areas of growth in green occupations are expected to be in assorted positions in Construction, Manufacturing, Management and Architecture & Engineering. At \$23.98, the



weighted average hourly wage in O\*NET green positions is almost four dollars above the weighted state occupational average wage of \$20.05 per hour<sup>1</sup>.

As stated in the introduction, O\*NET divides green occupations into three occupational categories: Green Increased Demand, Green Enhanced Skills and Green New & Emerging (see page 2 for definitions). The state of Vermont has no occupational data for occupations categorized as Green & Emerging. 20,232 are employed in Green Increased Demand occupations while 27,706 are employed in Green Enhanced Skills occupations. Wages for Green Enhanced Skills are considerably higher than both Green Increased Demand occupations and the average of all Vermont occupations. Table 3 compares wage and growth data for Green Increased Demand and Green Enhanced Skills occupations.

*Table 3: Comparison of Green Occupational Categories*

	2010 Employment	2020 Employment	Growth Rate	2011 Hourly Wage (OES)
<b>Green Increased Demand</b>	20,232	22,019	0.85%	\$20.58
<b>Green Enhanced Skills</b>	27,706	29,821	0.74%	\$26.43
<i>All Vermont Occupations</i>	<i>355,435</i>	<i>384,424</i>	<i>0.79%</i>	<i>\$20.71</i>

### **Survey: Demand for Green Practices in Construction**

As reported in MoU deliverable #1, the Vermont Department of Labor commissioned a survey of 777 Vermonters. The survey focused on residential construction and green building practices. The survey appeared to indicate a pent up demand for construction projects, perhaps due to the recent economic downturn. It found that 50% of Vermonters had put off a construction project for economic reasons in the past four years. Further, it found that 45% of Vermonters planned to undertake construction, remodeling or energy efficiency improvements in the next twelve months.

When Vermonters next undertake these projects, the survey indicates that energy efficiency and green building techniques will play an important role in decision making. 82.1% of respondents stated that they plan to put a significant emphasis (54.1%) or primary emphasis (28.0%) on efficiency and/or green techniques. A full report on these findings can be found in deliverable #1, *Analysis of June, 2013 Survey Results Regarding Construction and Green Practices* (VT Department of Labor, 2013).

<sup>1</sup> 2011 wage rate data from the Occupational Employment Statistics program

## Data Limitations

### Green Goods and Services Survey

In response to a reduction in funding, the Bureau of Labor Statistics has defunded the Green Goods and Services program indefinitely. Therefore, our analysis must rely on a dataset consisting of 2010 and 2011. In addition, the methodology used to get this data from businesses presents a challenge. The Bureau of Labor Statistics asked the businesses it surveyed *what percentage of their revenue came from the production of green goods and services*, rather than specifically about the business' green jobs. From this percentage of revenue, an estimate of the number of positions was produced.

Consequently, though this survey provides the most comprehensive industry-specific information for green jobs in Vermont, it is recognized that the methodology used to collect the data doesn't necessarily capture the full embodiment of the green jobs market. A strategy to address this concern can be found in the Next Steps section below.

### O\*NET Online

Because O\*NET focuses on green tasks, skills, and knowledge associated with an occupation, it may not provide an accurate reflection of which occupations are green. For example, though O\*NET considers Financial Analysts a green occupation, it doesn't necessarily follow that all financial analysts incorporate green skills or product in their tasks. With the inclusion of all these occupations as green, O\*NET is likely to overestimate the number of green jobs in Vermont. A strategy to address this concern can be found in the Next Steps section below.

## Section 3: Next Steps

### Demand for Qualified Workforce: Green Occupations Survey

In an effort to better understand the supply of green jobs in the state, E&LMI intends to distribute a survey to 2,000 businesses in Vermont with an estimated response rate of thirty five percent. The survey will elicit the number of employees at each firm that are tasked with efforts to conserve energy, reduce waste, or limit resources as their primary activity and the number tasked with such efforts as a portion of their activities. Data collection will begin in August, 2013 and be completed by the end of October. The results will provide an estimate of the supply of green jobs in Vermont across most industries, and an estimate of the number of firms within each industry that have green workers.

The survey will also include a request to respondents to participate in a more extensive follow-up telephone survey regarding green business practices. The results of this more in-depth survey will provide a snapshot of occupational information including skill and wage data for select green jobs in Vermont. This will enhance and inform the limited supply of data on green jobs in Vermont. It may also provide an avenue for future research.

### **Supply of Qualified Workforce: Educational Institutions Survey**

E&LMI will reach out to educational institutions across the state offer programs which provide training and/or education programs for green jobs. The survey will collect data concerning the number of participants in each program, how many people graduated from it in the years 2010, 2011, and 2012 and what certifications or degrees graduates received.

The results of this survey will be used to create an estimate of the current and future supply of trained workers for green jobs. This will be done using Classification of Instructional Programs (CIP) data for each program, cross-walking such data with Standard Occupational Classifications (SOC).<sup>2</sup> Combining the results of this effort with results from the Green Occupations Survey will enable an estimate of which green occupations will face a skilled labor shortage and which will face a surplus of skilled labor.

### **Conclusion**

Green jobs play an important role in Vermont's economy. Vermont has the second highest concentration of green jobs in the nation. The Professional and Technical Services industry leads the state with the highest concentration of green jobs. This industry also has the highest growth rate since the recession started in December of 2007 and is expected to continue growing. The industries with the most green jobs are Manufacturing, Construction, and Professional and Technical Services.

While the expected growth rate in green occupations in Vermont mirrors the expected growth for all employment, the wage findings are encouraging. Wages in green occupations average approximately four dollars more per hour than the state average of all occupations, and jobs with green enhanced skills average almost six dollars more per hour than the state average. Although employment in the green enhanced skills grouping is expected to grow slower than the overall state average, employment in green increased demand grouping is expected to grow faster. The extent to which Vermont needs the skill sets

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<sup>2</sup> Information about these coding systems can be found at <http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55> and <http://www.bls.gov/soc/> respectively

associated with these jobs – and the workers to do them – will be determined by the future research described in Section 3: Next Steps above.

### Works Cited

- Dierdorff, E. C., Norton, J. J., Drewes, D. W., & Kroustalis, C. M. (2009). *Greening of the World of Work: Implications for O\*NET - SOC and New and Emerging Occupations*. North Carolina State University. Raleigh, NC: US Department of Labor, Education and Training Administration.
- U.S Bureau of Labor Statistics. (2012). *Employment in Green Goods and Services - 2010*. Washington: Government Printing Office.
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Appendix A: Levels of Green Employment in All 50 States

State	Total, all ownerships					Private ownership				
	2010		2011		GGs employment change from: 2010 - 2011	2010		2011		GGs employment change from: 2010 - 2011
	GGs employment	GGs percent	GGs employment	GGs percent		GGs employment	GGs percent	GGs employment	GGs percent	
United States	3,243,533	2.5	3,401,279	2.6	157,746	2,342,562	2.2	2,515,200	2.3	172,638
Alabama	51,372	2.8	54,077	3	2,705	36,215	2.5	39,703	2.7	3,488
Alaska	11,999	3.8	12,119	3.8	120	5,591	2.4	5,893	2.4	302
Arizona	43,161	1.8	48,851	2.1	5,690	33,181	1.7	39,535	2	6,354
Arkansas	32,311	2.8	33,420	2.9	1,109	24,509	2.6	26,351	2.8	1,842
California	342,879	2.4	360,245	2.5	17,366	239,416	2	268,486	2.2	29,070
Colorado	72,657	3.3	72,629	3.3	-28	53,895	3	52,859	2.9	-1036
Connecticut	41,385	2.6	43,722	2.7	2,337	34,397	2.5	36,577	2.7	2,180
Delaware	8,973	2.2	9,872	2.4	899	6,440	1.9	7,331	2.1	891
Washington DC	33,742	4.9	35,799	5.1	2,057	10,570	2.4	11,115	2.4	545
Florida	108,948	1.5	117,433	1.6	8485	93,160	1.5	98,249	1.6	5089
Georgia	79,680	2.1	84,356	2.2	4,676	58,987	1.9	64,205	2	5,218
Hawaii	15,528	2.6	17,596	3	2068	9,483	2	11,425	2.4	1942
Idaho	23,676	3.9	24,250	4	574	14,515	2.9	15,138	3	623
Illinois	134,153	2.4	136,447	2.5	2294	103,244	2.2	105,751	2.2	2507
Indiana	68,108	2.5	70,156	2.5	2,048	58,720	2.5	61,159	2.6	2,439
Iowa	40,540	2.8	43,791	3	3251	32,946	2.7	35,879	2.9	2933
Kansas	26,339	2	25,632	2	-707	19,126	1.8	19,097	1.8	-29
Kentucky	40,726	2.4	43,027	2.5	2301	27,729	2	28,770	2	1041
Louisiana	43,808	2.4	44,373	2.4	565	32,970	2.2	33,328	2.2	358
Maine	15,352	2.7	16,951	2.9	1599	11,166	2.3	12,680	2.6	1514
Maryland	77,346	3.2	91,489	3.7	14,143	50,880	2.6	63,638	3.2	12,758
Massachusetts	84,198	2.7	88,924	2.8	4726	70,720	2.6	75,071	2.7	4351
Michigan	85,228	2.3	82,644	2.1	-2,584	71,473	2.2	69,116	2.1	-2,357
Minnesota	78,709	3.1	75,302	2.9	-3407	62,545	2.9	60,509	2.7	-2036
Mississippi	21,167	2	21,933	2	766	14,780	1.8	16,114	1.9	1,334
Missouri	65,271	2.5	68,534	2.7	3263	42,093	2	46,625	2.2	4532
Montana	14,596	3.5	14,306	3.4	-290	8,709	2.6	8,211	2.4	-498
Nebraska	20,896	2.3	22,392	2.5	1496	14,640	2	16,491	2.2	1851
Nevada	21,360	1.9	21,861	2	501	13,676	1.4	15,569	1.6	1,893
New Hampshire	14,011	2.3	16,244	2.7	2233	12,309	2.4	14,471	2.8	2162
New Jersey	73,411	2	81,018	2.2	7,607	53,449	1.7	61,160	1.9	7,711
New Mexico	22,884	2.9	24,337	3.1	1453	14,208	2.4	15,481	2.6	1273
New York	255,315	3.1	266,308	3.2	10,993	141,307	2	156,397	2.2	15,090
North Carolina	101,415	2.7	108,094	2.8	6679	77,036	2.5	83,017	2.6	5981
North Dakota	8,783	2.4	9,481	2.5	698	5,972	2.1	6,891	2.2	919
Ohio	129,063	2.6	137,143	2.8	8080	95,718	2.3	103,917	2.4	8199
Oklahoma	25,893	1.7	29,035	1.9	3,142	16,800	1.4	20,343	1.7	3,543
Oregon	60,878	3.8	68,709	4.3	7831	40,254	3.1	49,249	3.7	8995
Pennsylvania	160,494	2.9	167,397	3	6,903	129,372	2.7	136,557	2.8	7,185
Rhode Island	12,420	2.8	12,327	2.7	-93	9,557	2.5	9,401	2.4	-156
South Carolina	43,592	2.5	44,210	2.5	618	32,591	2.3	33,002	2.3	411
South Dakota	10,078	2.6	10,578	2.7	500	6,325	2	6,865	2.1	540
Tennessee	68,145	2.7	71,111	2.7	2,966	50,132	2.3	53,979	2.5	3,847
Texas	233,304	2.3	227,532	2.2	-5772	179,744	2.1	177,155	2.1	-2589
Utah	27,544	2.4	27,864	2.4	320	17,844	1.9	17,098	1.8	-746
Vermont	11,483	3.9	12,159	4.1	676	9,080	3.8	9,571	3.9	491
Virginia	96,490	2.7	107,773	3	11,283	65,142	2.3	74,990	2.6	9,848
Washington	95,769	3.4	101,593	3.6	5824	64,985	2.8	69,332	3	4347
West Virginia	14,626	2.1	16,221	2.3	1,595	7,931	1.4	9,013	1.6	1,082
Wisconsin	63,754	2.4	69,647	2.6	5893	52,328	2.3	57,318	2.5	4990
Wyoming	10,071	3.7	10,369	3.8	298	4,700	2.3	5,117	2.4	417

## Appendix B: O\*NET Green Occupations, Projected Rates of Growth and Wages

*See end for a glossary of terms*

SOC Code	Occupation	Vermont Employment			2020 Estimates					
		Count	Count	CAGR	Estimate	Annual Job openings			Wage	CAGR
		2000	2010	2000-10	2020	Due to growth	Due to net replacement	Total	Avg Hourly, OES 2011	2010-20
<b>11</b>	<b>Management Occupations</b>									
11-1021	General and Operations Managers	2,417	3,210	2.88%	3,145	0	60	60	\$50.00	-0.20%
11-2021	Marketing Managers	303	437	3.73%	483	5	13	18	\$61.98	1.01%
11-3051	Industrial Production Managers	544	416	-2.65%	463	5	10	15	\$44.20	1.08%
11-9021	Construction Managers	469	2,250	16.98%	2,503	25	14	39	\$39.25	1.07%
11-9121	Natural Sciences Managers	62	N/A	*						
<b>13</b>	<b>Business and Financial Operations Occupations</b>									
13-1021	Buyers & Purchasing Agents, Farm Products	53	70	2.82%	69	0	1	1	\$26.15	-0.14%
13-1022	Wholesale & Retail Buyers, Except Farm Products	671	456	-3.79%	473	2	12	14	\$22.39	0.37%
13-1151	Training and Development Specialists	N/A	446		528	8	8	16	\$26.09	1.70%
13-2051	Financial Analysts	280	444	4.72%	490	5	9	14	\$37.75	0.99%
13-2052	Personal Financial Advisors	412	266	-4.28%	335	7	3	10	\$41.24	2.33%
<b>15</b>	<b>Computer and Mathematical Occupations</b>									
15-1133	Software Developers, Systems Software	N/A	712	*	860	15	7	22	\$43.51	1.91%
<b>17</b>	<b>Architecture and Engineering Occupations</b>									
17-1011	Architects, Except Landscape and Naval	253	392	4.48%	455	6	8	14		1.50%
17-1012	Landscape Architects	173	N/A	*						
17-2041	Chemical Engineers	N/A	N/A	*						
17-2051	Civil Engineers	588	454	-2.55%	488	3	9	12	\$34.88	0.72%
17-2071	Electrical Engineers	264	407	4.42%	415	1	10	11	\$39.34	0.19%
17-2072	Electronics Engineers, Except Computers	801	216	-12.28%	214	0	5	5	\$42.81	-0.09%
17-2081	Environmental Engineers	100	249	9.55%	297	5	6	11	\$37.99	1.78%
17-2112	Industrial Engineers	273	397	3.82%	404	1	9	10	\$35.05	0.17%
17-2141	Mechanical Engineers	366	412	1.19%	433	2	13	15	\$39.49	0.50%
17-3024	Electro-Mechanical Technicians	N/A	53	*	53	2	13	15	N/A	0.00%
17-3025	Environmental Engineering Technicians	N/A	82	*	91	2	13	15	\$18.25	1.05%
17-3026	Industrial Engineering Technicians	175	83	-7.19%	86	2	13	15	\$24.10	0.36%

SOC Code	Occupation	Vermont Employment			2020 Estimates					
		Count	Count	CAGR	Estimate	Annual Job openings			Wage	CAGR
		2000	2010	2000-10	2020	Due to growth	Due to net replacement	Total	Avg Hourly, OES 2011	2010-20
<b>19</b>	<b>Life, Physical, and Social Science Occupations</b>									
19-1013	Soil and Plant Scientists	N/A	N/A	*						
19-1023	Zoologists and Wildlife Biologists	57	157	10.66%	172	2	4	6	\$30.92	0.92%
19-2021	Atmospheric and Space Scientists	N/A	N/A	*						
19-2031	Chemists	76	132	5.68%	135	0	4	4	\$26.67	0.22%
19-2041	Environmental Scientists and Specialists, Including Health	177	803	16.33%	891	9	24	33	\$24.73	1.05%
19-2042	Geoscientists, Except Hydrologists and Geographers	N/A	52	*	55	0	2	2	\$35.28	0.56%
19-2043	Hydrologists	62	N/A	*						
19-3051	Urban and Regional Planners	241	192	-2.25%	212	0	4	4	\$26.67	1.00%
19-4031	Chemical Technicians	100	75	-2.84%	75	0	1	1	\$27.76	0.00%
19-4091	Environmental Science and Protection Technicians, Including Health	116	N/A	*						
19-4093	Forest and Conservation Technicians	N/A	67	*	60	0	3	3	\$17.78	-1.10%
<b>27</b>	<b>Arts, Design, Entertainment, Sports, and Media Occupations</b>									
27-1021	Commercial and Industrial Designers	72	288	14.87%	311	2	9	11	\$24.78	0.77%
27-3022	Reporters and Correspondents	N/A	201	*	187	0	7	7	\$22.39	-0.72%
27-3031	Public Relations Specialists	659	874	2.86%	991	12	23	35	\$24.29	1.26%
<b>29</b>	<b>Healthcare Practitioners and Technical Occupations</b>									
29-9011	Occupational Health and Safety Specialists	N/A	129	*	133	0	4	4	\$30.91	0.31%
29-9012	Occupational Health and Safety Technicians	N/A	N/A	*						
<b>33</b>	<b>Protective Service Occupations</b>									
33-3031	Fish and Game Wardens	N/A	N/A	*						
		N/A	N/A							
<b>41</b>	<b>Sales and Related Occupations</b>									
41-4011	Sales Representatives, Wholesale & Manufacturing, Tech & Scientific Products	546	594	0.85%	630	4	14	18	\$38.81	0.59%



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		Count	Count	CAGR	Estimate	Annual Job openings			Wage	CAGR
		2000	2010	2000-10	2020	Due to growth	Due to net replacement	Total	Avg Hourly, OES 2011	2010-20
<b>43</b>	<b>Office and Administrative Support Occupations</b>									
43-4051	Customer Service Representatives	3,282	3,240	-0.13%	3,472	23	92	115	\$14.85	0.69%
43-5032	Dispatchers, Except Police, Fire, and Ambulance	483	357	-2.98%	382	2	7	9	\$17.92	0.68%
43-5061	Production, Planning, and Expediting Clerks	533	540	0.13%	556	2	14	16	\$20.55	0.29%
43-5071	Shipping, Receiving, and Traffic Clerks	2,243	1,683	-2.83%	1,642	0	43	43	\$14.86	-0.25%
<b>45</b>	<b>Farming, Fishing, and Forestry Occupations</b>									
45-2011	Agricultural Inspectors	N/A	N/A	*						
<b>47</b>	<b>Construction and Extraction Occupations</b>									
47-2011	Boilermakers	N/A	62	*	68	1	2	3	\$23.90	0.93%
47-2051	Cement Masons and Concrete Finishers	164	N/A	*						
47-2061	Construction Laborers	1,368	2,194	4.84%	2,401	21	18	39	\$14.51	0.91%
47-2073	Operating Engineers and Other Construction Equipment Operators	1,124	1,374	2.03%	1,374	18	28	46	\$17.69	0.00%
47-2111	Electricians	1,549	1,334	-1.48%	1,522	19	36	55	\$19.28	1.33%
47-2131	Insulation Workers, Floor, Ceiling, and Wall	N/A	85	*	95	1	3	4	\$15.96	1.12%
47-2181	Roofers	454	331	-3.11%	360	3	7	10	\$15.31	0.84%
47-2211	Sheet Metal Workers	346	396	1.36%	437	4	7	11	\$20.78	0.99%
47-2221	Structural Iron and Steel Workers	91	75	-1.92%	86	1	2	3	\$17.32	1.38%
47-2231	Solar Photovoltaic Installers	N/A	N/A	*	N/A					
47-3012	Helpers--Carpenters	601	247	-8.51%	380	13	7	20	\$13.07	4.40%
47-4011	Construction and Building Inspectors	120	185	4.42%	211	3	6	9	\$21.91	1.32%
47-4041	Hazardous Materials Removal Workers	N/A	N/A	*						
47-4061	Rail-Track Laying and Maintenance Equipment Operators	N/A	N/A	*						

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		2000	2010	2000-10	2020	Due to growth	Due to net replacement	Total	Avg Hourly, OES 2011	2010-20
<b>49</b>	<b>Installation, Maintenance, and Repair Occupations</b>									
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	918	986	0.72%	1,066	8	26	34	\$28.35	0.78%
49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment	125	128	0.24%	120	0	3	3	\$23.90	-0.64%
49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	563	586	0.40%	641	6	13	19	\$18.90	0.90%
49-9041	Industrial Machinery Mechanics	356	394	1.02%	490	10	8	18	\$22.09	2.20%
49-9044	Millwrights	106	N/A	*						
49-9051	Electrical Power-Line Installers and Repairers	363	437	1.87%	456	2	15	17	\$29.65	0.43%
49-9071	Maintenance and Repair Workers, General	N/A	2,976	*	3,198	22	55	77	\$17.12	
49-9098	Helpers--Installation, Maintenance, and Repair Workers	271	144	-6.13%	159	2	7	9	\$12.11	1.00%
<b>51</b>	<b>Production Occupations</b>									
51-1011	First-Line Supervisors of Production and Operating Workers	1,846	1,673	-0.98%	1,740	7	22	29	\$27.28	0.39%
51-2022	Electrical and Electronic Equipment Assemblers	774	N/A	*						
51-2041	Structural Metal Fabricators and Fitters	254	86	-10.26%	95	1	2	3	\$16.41	1.00%
51-2092	Team Assemblers	2,292	1,638	-3.30%	1,745	11	32	43	\$14.58	0.63%
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	449	577	2.54%	658	8	11	19	\$16.77	1.32%
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	706	207	-11.55%	241	3	2	5	\$14.69	1.53%
51-4032	Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	132	145	0.94%	150	0	1	1	\$16.27	0.34%
51-4041	Machinists	1,031	684	-4.02%	742	6	13	19	\$18.58	0.82%
51-8013	Power Plant Operators	96	243	9.73%	244	0	9	9	\$29.26	0.04%
51-8021	Stationary Engineers and Boiler Operators	79	80	0.13%	84	0	9	9	\$29.26	0.49%
51-9012	Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	169	391	8.75%	447	6	6	12	\$16.40	1.35%
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	185	155	-1.75%	169	1	5	6	\$15.29	0.87%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	1,575	1,000	-4.44%	1,074	7	22	29	\$17.16	0.72%

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		2000	2010	2000-10	2020	Due to growth	Due to net replacement	Total	Avg Hourly, OES 2011	2010-20
<b>53</b>	<b>Transportation and Material Moving Occupations</b>									
53-3021	Bus Drivers, Transit and Intercity	572	506	-1.22%	558	5	10	15	\$14.04	0.98%
53-3032	Heavy and Tractor-Trailer Truck Drivers	4,730	4,495	-0.51%	4,960	46	89	135	\$18.60	0.99%
53-7051	Industrial Truck and Tractor Operators	953	635	-3.98%	681	5	18	23	\$15.29	0.70%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	3,423	1,881	-5.81%	2,099	22	60	82	\$12.64	1.10%
53-7081	Refuse and Recyclable Material Collectors	439	772	5.81%	900	13	23	36	\$13.18	1.55%

### *Glossary of terms*

**SOC Code:** Standard Occupational Classification Code, the U.S. system of classifying occupations for purposes of data collection and comparison. It is designed to cover all occupations in which work is performed for pay or profit. The 2010 SOC includes 840 occupations.

**Count:** Number of jobs in Vermont within the SOC code during the noted time period.

**CAGR:** Compound Annual Growth Rate of employment in the SOC code.