Maine's Environmental and Energy Technology Sector: Economic Impact and Recent Growth

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MAINE'S ENVIRONMENTAL AND ENERGY TECHNOLOGY SECTOR: ECONOMIC IMPACT AND RECENT GROWTH*

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MAINE'S ENVIRONMENTAL AND ENERGY TECHNOLOGY SECTOR: ECONOMIC IMPACT AND RECENT GROWTH

EXECUTIVE SUMMARY

This report examines the economic impact of Maine's environmental and energy technology sector, and its growth between 2006 and the present. The analysis is based on information from a 2007 industry study and secondary data from a variety of sources. Key results of the present study are summarized below:

- In 2012, Maine's environmental and energy technology sector directly generated an estimated $847.5 million in output (i.e., sales revenue), supported 5,437 full- and part-time jobs, and provided $284.3 million in employee earnings.
- Maine's environmental and energy technology sector has an annual economic impact, including multiplier effects, of an estimated $1.4 billion in output, 10,529 full- and part-time jobs, and $452.7 million in labor income.
- The employment and labor income directly associated with businesses and other organizations in the environmental and energy technology sector have increased by 3.2 percent and 27.6 percent, respectively, since the analysis conducted in 2007. By comparison, total employment and payroll, measured in current dollars, for the overall Maine economy changed by -2.7 percent and 11.9 percent over the same period.
- Over 60 percent of the establishments in Maine's environmental and energy technology sector have fewer than 5 workers.
- Maine's environmental and energy technology sector is dominated by establishments located in the southern part of the state. Cumberland and York Counties are home to about one-half of industry establishments.
- Maine ranked 24th nationally in 2010 according to the percentage of businesses in the state that are part of the environmental and energy technology sector. The state's national ranking fell from 14th in 2004, suggesting that the environmental and energy technology sector grew in importance to the overall economy more so in other states than in Maine.
- Environmental services made up almost two-thirds of the Maine's environmental and energy technology sector in 2010, 30 percent of the businesses were involved in environmental and energy resources, and Maine is home to 21 companies that manufacture environmental products.
- The environmental and energy technology sector has grown in importance, compared to some of Maine's other large industries, since the 2007 study. The sector has increased its standing from 6th to 4th, using the same set of industries for comparison purposes, in terms of employment and overall employee compensation.

MAINE'S ENVIRONMENTAL AND ENERGY TECHNOLOGY SECTOR: ECONOMIC IMPACT AND RECENT GROWTH

1. INTRODUCTION

A 2007 study of Maine's environmental and energy technology sector found that the industry had a statewide economic impact, including multiplier effects, of an estimated $882.7 million in output, 9,650 full- and part-time jobs, and $330.9 million in labor income. Maine ranked 14th nationally based on the percentage of all businesses in the state that are part of the environmental and energy technology sector. Compared to other industries in Maine, the environmental and energy technology sector had higher total wages and salaries than the telecommunications and publishing industries, and overall employee compensation that was only 14 percent lower than the wages and salaries paid in the lodging (i.e., hotels and motels) sector. Information on the growth of Maine's environmental and energy technology sector, since the 2007 study, and its current economic impact is of interest to organizations that promote the industry (e.g., E2Tech Council of Maine), as well as other stakeholder groups related to the "green" and "clean technology" economies of the state and region.

The purpose of this study is to examine the current statewide economic impact of Maine's environmental and energy technology sector, and its recent growth. Economic impact is defined as the output (i.e., sales revenue), employment and labor income (e.g., wages and salaries) that are directly associated with environmental and energy

technology businesses (and organizations) in Maine, as well as the multiplier effects that are generated by the spending of companies that supply goods and services to the environmental and energy technology sector (i.e., indirect impacts) and the spending of workers who are directly or indirectly related to the industry (i.e., induced impacts). In addition to the economic impact analysis, this report presents an updated profile of the environmental and energy technology sector, along with comparisons to other states and other industries in Maine. The analysis is based on figures from the 2007 industry study and data from a variety of sources—e.g., U.S. Census Bureau and U.S. Bureau of Economic Analysis—that are used to examine the growth of Maine's environmental and energy technology sector.

A wide variety of businesses and organizations are part of the environmental and energy technology sector through their production, use, or promotion of goods and services. For the purposes of this study, we use the 14 industry segments identified by the *Environmental Business International* (EBI) organization to form our core definition of the sector. Using this framework will facilitate comparisons between Maine and other states, and allow for more accurate tracking of the environmental and energy technology sector's change over time. However, we acknowledge upfront that there are companies and organizations—outside of the 14 segments included by EBI—involved in environmental- and energy-related products, services and education.

TABLE 1. Overview of the Environmental and Energy Technology Industry

Industry Segment	Description
Environmental Services	
Environmental Testing & Analytical Services	Provide testing of "environmental samples" (soil, water, air and some biological tissues)
Water Treatment Works	Management and operation of wastewater treatment plants
Solid Waste Management	Collection, processing and disposal of solid waste
Hazardous Waste Management	Manage on-going hazardous waste streams, medical waste, nuclear waste handling
Remediation/Industrial Services	Physical cleanup of contaminated sites, buildings and environmental cleaning of operating facilities
Environmental Consulting & Engineering	Engineering, consulting, design, assessment, permitting, project management, O&M, monitoring, etc.
Environmental Equipment	
Water Equipment & Chemicals	Provide equipment, supplies and maintenance in the delivery and treatment of water
Instrument Manufacturing	Produce instrumentation for the analysis of environmental samples
Air Pollution Control Equipment	Produce equipment and technology to control air pollution
Waste Management Equipment	Equipment for handling, storing or transporting solid, liquid or hazardous waste; includes information systems

Table is continued on the following page.

TABLE 1. Continued

Industry Segment	Description
Process & Prevention Technology	Equipment and technology for in-process (rather than end-of-pipe) pollution prevention and treatment
Environmental Resources	
Water Utilities	Selling water to end users
Resource Recovery	Selling materials recovered and converted from industrial by-products or post-consumer waste
Environmental Energy Sources	Selling power and systems in solar, wind, geothermal, small-scale hydro, energy efficiency and DSM

Source: Environmental Business International, Inc.

Table 1 shows the 14 segments of the environmental and energy technology sector, combined into three categories of environmental services, environmental equipment and environmental resources. Environmental services consist of activities such as hazardous and solid waste management, environmental testing, and consulting and engineering services. The environmental equipment industry segment includes businesses that manufacture products used for air pollution control, handling and storing waste, and water treatment. The final broad category used by EBI to characterize the environmental and energy technology industry is environmental resources. This segment consists of businesses and organizations involved in resource recovery, energy conservation and environmental energy sources. Within EBI's framework, companies

and organizations involved in the production, transmission and promotion of energy (from non-traditional sources) are included in the category of environmental resources.

2. ECONOMIC IMPACT ANALYSIS

Table 2 presents information on the annual, as of 2012, economic impact of Maine's environmental and energy technology sector. The direct employment of 5,437 jobs and labor income of $284.3 million in wages and salaries are calculated using the direct employment and employee compensation figures from the 2007 study, along with industry employment and payroll data from *County Business Patterns* (U.S. Census Bureau) that we used to update the figures.[1] The specific industries (i.e., NAICS categories) included in the environmental and energy technology sector, which were used to update the economic impact analysis, are shown in Table 3.

TABLE 2. Annual Economic Impact of Maine's Environmental and Energy Technology Sector: 2012

	Output	Employment	Labor Income
Direct	$847.5 million	5,437	$284.3 million
Multiplier Effects	$573.9 million	5,092	$168.3 million
Total	$1,422 million	10,529	$452.7 million
Multiplier	1.68	1.94	1.59

[1] See Appendix A for a discussion of how environmental and energy technology companies were identified in the 2007 study.

TABLE 3. Bridge between Environmental and Energy Technology Segments and NAICS Industries

Segment	NAICS Categories
Environmental Services	221310 (Water Supply & Irrigation Systems), 221320 (Sewage Treatment Facilities), 541330 (Engineering Services), 541380 (Testing Laboratories), 541620 (Environmental Consulting Services), 541710 (Research and Development in the Physical, Engineering, & Life Sciences), 562111 (Solid Waste Collection), 562112 (Hazardous Waste Collection), 562211 (Hazardous Waste Treatment & Disposal), 562219 (Other Nonhazardous Waste Treatment & Disposal), 562910 (Remediation Services)
Environmental Equipment	333411 (Air Purification Equipment Manufacturing), 334512 (Automatic Environmental Control Manufacturing for Residential, Commercial, and Appliance Use), 334513 (Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables), 334515 (Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals), 334516 (Analytical Laboratory Instrument Manufacturing)
Environmental Resources	221119 (Other Electric Power Generation), 423930 (Recyclable Material Merchant Wholesalers), 541690 (Other Scientific and Technical Consulting Services), 562920 (Materials Recovery Facilities)

In some cases, a reasonably close match exists between a given EBI industry segment and a NAICS industrial category. In other cases, the EBI segment falls within a

relatively broad industrial category. For example, the EBI segment "environmental testing and analytical services" is part of the industrial category "testing laboratories" (NAICS category 541380). Thus, the growth rate of environmental and energy technology employment and earnings in our analysis may be influenced by companies that are in other related (mostly technical) fields.

In the area of environmental engineering, we were able to arrive at a fairly precise estimate of the environmental engineering firms contained within the broad NAICS category of engineering firms (NAICS category 541330). We used occupational-based employment information from the U.S. Bureau of Labor Statistics to find the percentage of engineers in Maine who are environmental engineers. This information shows that, as of 2010, 5.7 percent of the engineers in Maine were environmental engineers. We applied this proportion to the total number of engineering firms counted by *County Business Patterns* to arrive at an estimate of the number of environmental engineering firms in Maine.

Statewide employment grew by 3.2 percent in the NAICS industrial sectors listed in Table 3 between 2004 (the year for which data were available in the 2007 study) and 2010 (the most recent year for which data are currently available), which is shown by the growth in direct employment from 5,269 (in the 2007) to 5,437 jobs. Total statewide payroll in these sectors grew by 27.6 percent over the same period.[2] By comparison, total employment and payroll, measured in current dollars, for the overall Maine economy changed by -2.7 percent and 11.9 percent over the same period. The direct impact of

[2] The growth rates for employment and payroll in the environmental and energy technology sector are based on the individual (NAICS) industries for which data are available for both 2004 and 2010.

$847.5 million in sales output and the multiplier effects shown in Table 2 are estimated using an economic impact model (IMPLAN) of the Maine economy.[3]

The IMPLAN model is an input-output framework that traces the flows of expenditures and income through the Maine economy with a complex system of accounts that are uniquely tailored to the state.[4] Underlying these accounts is information regarding transactions occurring among industries located in Maine, the spending patterns of households, and transactions occurring between the state and the rest of the world. Some of the data sources used to develop the IMPLAN model and tailor it to the Maine economy include *County Business Patterns* of the U.S. Census Bureau, Regional Economic Information System (REIS) data and input-output accounts from the U.S. Bureau of Economic Analysis, and ES-202 statistics from the U.S. Bureau of Labor Statistics.

Results of the analysis presented in Table 2 show that, including multiplier effects, Maine's environmental and energy technology sector has an annual statewide economic impact of an estimated $1.4 billion in output, 10,529 full- and part-time jobs, and $452.7 million in labor income. The output multiplier of 1.68, defined as the ratio of total output ($1.4 billion) to direct output ($847.5 million), suggests that every $1.00 of revenue in the sector supports a total of $1.68 in statewide economic activity; that is, the "initial" $1.00 in revenue plus an additional $0.68. The employment multiplier of 1.94,

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[3] The estimate of $847.5 million in output is not directly comparable to the output figure reported in the 2007 study. This is because the output figure from 2007 is based on surveys of environmental and energy technology companies, while the output figure for 2012 is estimated using the IMPLAN model. The employment and labor income figures are directly comparable between the 2007 and current study.

[4] Version 3.0 of the IMPLAN model, which is updated from the version used in the 2007 study, has information on 440 sectors of the economy.

calculated as the ratio of total (10,529 jobs) to direct (5,437 jobs) employment, suggests that the economic activity associated with each person directly employed in the environmental and energy technology sector supports a total of 1.94 Maine jobs; that is, the person working in an environmental and energy technology business or organization, and an additional 0.94 full- or part-time jobs elsewhere in the state.

TABLE 4. Employment Size Distribution of Establishments in Maine's Environmental and Energy Technology Sector

Size Category	Percentage of Environmental and Energy Technology Establishments
1 to 4 employees	60.8%
5 to 9 employees	16.6%
10 to 19 employees	11.5%
20 to 49 employees	7.4%
50 to 99 employees	2.7%
100 to 249 employees	0.5%
250 or more employees	0.5%

Source: 2010 County Business Patterns, U.S. Census Bureau

Table 4 shows the employment size distribution of environmental and energy technology establishments in Maine as of 2010. This analysis is based on information from *County Business Patterns* of the U.S. Census Bureau on businesses operating in the industrial categories shown in Table 3.[5] Over 60 percent of the environmental and

[5] This information is not directly comparable to the distribution of establishments by employment size reported in the 2007 study, which was based—in part—by a survey of businesses and organizations in the environmental and energy technology sector.

energy technology establishments employed fewer than 5 workers, and another one-quarter of the companies had between 5 and 19 employees. Slightly less than four percent of the establishments employed 50 or more workers in 2010.

TABLE 5. Distribution of Establishments in Maine's Environmental and Energy Technology Sector by County

County	Percentage of Environmental and Energy Technology Establishments	Percentage of All Establishments	Relative Concentration
Androscoggin	4.2%	6.8%	0.62
Aroostook	4.0%	5.0%	0.79
Cumberland	37.2%	26.9%	1.38
Franklin	1.1%	2.0%	0.58
Hancock	4.6%	5.3%	0.86
Kennebec	8.3%	8.2%	1.01
Knox	1.8%	4.2%	0.42
Lincoln	2.8%	3.5%	0.81
Oxford	2.6%	3.3%	0.77
Penobscot	11.1%	10.4%	1.07
Piscataquis	0.8%	1.1%	0.71
Sagadahoc	4.5%	2.3%	1.91
Somerset	2.4%	2.9%	0.84
Waldo	2.2%	2.4%	0.90
Washington	1.7%	2.1%	0.78
York	10.8%	13.5%	0.80
total	100%	100%	

Source: 2010 County Business Patterns, U.S. Census Bureau

Table 5 shows the geographic distribution of Maine's environmental and energy technology businesses. This analysis also uses data from *County Business Patterns* of the U.S. Census Bureau.[6] Over 37 percent of the environmental and energy technology

[6] This information is not directly comparable to the geographic distribution of establishments reported in the 2007 study, which was based on a mailing list of businesses and organizations in the environmental and energy technology sector.

companies in Maine are located in Cumberland County and, with 11 percent located in York County, about one-half of the establishments are located in this two-county area of southern Maine. Another 20 percent of Maine's environmental and energy technology companies are located in Penobscot (11.1 percent) and Kennebec (8.3 percent) counties. Fewer than two percent of the environmental and energy technology companies are located in Piscataquis (0.8 percent), Franklin (1.1 percent), Washington (1.7 percent) and Knox (1.8 percent) Counties.

It is also informative to look at the geographic distribution of Maine's environmental and energy technology sector relative to the share of all business establishments by county. The last column of Table 5, labeled as "relative concentration," is the ratio of the share of environmental and energy technology establishments in a county divided by the percentage of establishments (located in the county) across all sectors of the economy. A relative concentration that is greater (less) than 1.0 indicates that a county has an abundance (deficit) of businesses in the environmental and energy technology sector. According to this measure, Sagadahoc and Cumberland Counties have the greatest relative abundance, while Knox and Franklin Counties have the largest deficits in the number of environmental and energy businesses.

3. COMPARISONS TO OTHER U.S. STATES

In this section of the report, we compare Maine to other states in terms of the proportion of establishments in the environmental and energy technology sector. For this analysis, we once again use *County Business Patterns* data from the U.S. Census Bureau on the number of business establishments in the NAICS categories shown in Table 3. As

described above, we use state-level occupational employment data on the proportion of engineers who are environmental engineers to estimate the number of environmental engineering firms from the broader NAICS category of engineering firms. The dataset we use in this analysis includes information that is comparable across all states and the District of Columbia.

TABLE 6. Composition of Maine's Environmental and Energy Technology Sector

Industry Segment	Number of Establishments	% of Estabs. in Sector	% of all Estabs. in Maine
Environmental Services	328	66.0%	0.81%
Environmental Equipment	21	4.2%	0.05%
Environmental Resources	148	29.8%	0.36%
Total	497	100.0%	1.23%

Source: 2010 County Business Patterns, U.S. Census Bureau

Table 6 shows the composition of Maine's environmental and energy technology sector by major segment of the industry. The entire sector has 497 establishments (not including sole proprietorships) as of 2010, which is equivalent to 1.23 percent of all establishments in Maine at that time. Using this measure of the relative size of the environmental and energy technology sector, we find that Maine ranks 24th nationally out of all states and the District of Columbia. As shown in Table 7, the top three U.S. states in terms of the proportion of establishments in the environmental and energy sector are California, Louisiana and Wyoming.

TABLE 7. Percentage of State's Establishments in the Environmental and Energy Technology Sector

State	Number of Estabs. in Sector	% of all Estabs. in State
California	17,264	2.03%
Louisiana	1,738	1.68%
Wyoming	340	1.68%
New Mexico	739	1.67%
Alaska	329	1.65%
Colorado	2,480	1.63%
Massachusetts	2,718	1.60%
District of Columbia	322	1.50%
Maryland	1,997	1.48%
Montana	527	1.46%
New Hampshire	543	1.45%
Nevada	846	1.43%
Oregon	1,495	1.39%
Utah	951	1.38%
Mississippi	809	1.36%
Virginia	2,545	1.32%
Delaware	314	1.29%
Washington	2,199	1.25%
Pennsylvania	3,696	1.24%
Texas	6,495	1.24%
Connecticut	1,109	1.24%
Arizona	1,635	1.24%
Hawaii	395	1.24%
Maine	**497**	**1.23%**
Vermont	263	1.23%
New Jersey	2,761	1.21%
Idaho	522	1.20%
Rhode Island	340	1.19%
Minnesota	1,684	1.16%
West Virginia	446	1.15%
North Carolina	2,503	1.15%
North Dakota	250	1.15%
Ohio	2,788	1.10%
Iowa	888	1.10%
South Dakota	276	1.08%
Indiana	1,553	1.07%

Table is continued on the following page.

TABLE 7. Continued

State	Number of Estabs. in Sector	% of all Estabs. in State
Florida	5,255	1.07%
Arkansas	692	1.06%
Kansas	786	1.06%
Alabama	1,049	1.06%
Kentucky	919	1.01%
Oklahoma	892	0.99%
Nebraska	510	0.98%
Georgia	2,129	0.98%
Illinois	3,066	0.98%
Michigan	2,133	0.97%
Wisconsin	1,309	0.94%
New York	4,656	0.90%
South Carolina	914	0.90%
Missouri	1,325	0.88%
Tennessee	1,130	0.86%

Source: 2010 County Business Patterns, U.S. Census Bureau

The share of environmental and energy technology companies in Maine has decreased compared to some other states since 2004, which is the year for which similar data were used in the 2007 study. At that time, Maine had 470 establishments in the industrial categories shown in Table 3, which is 27 fewer businesses than in 2010, but Maine ranked 14th out of 50 states in terms of the share of businesses in the environmental and energy technology sector. Using the data from 2010, Maine is positioned behind states such as Hawaii (which grew from 291 to 395 business), Arizona (1,187 to 1,635 businesses), and Connecticut (998 to 1,109 businesses). For Maine to have maintained its ranking in the top 15 states, it would have needed to have added about 90 businesses between 2004 and 2010, which is greater than its actual expansion of 27 establishments.

TABLE 8. Proportion of State's Establishments in the Environmental Services Industry Segment

State	Number of Estabs. in Segment	% of all Estabs. in State
Alaska	252	1.26%
New Mexico	542	1.23%
Massachusetts	1,835	1.08%
Maryland	1,381	1.03%
Colorado	1,552	1.02%
Wyoming	203	1.00%
Mississippi	590	1.00%
Louisiana	964	0.93%
Montana	325	0.90%
New Hampshire	328	0.88%
Utah	591	0.86%
Idaho	365	0.84%
California	7,120	0.84%
Vermont	179	0.83%
Connecticut	732	0.82%
Maine	**328**	**0.81%**
Washington	1,421	0.81%
Oregon	858	0.80%
Delaware	193	0.80%
Hawaii	254	0.79%
West Virginia	307	0.79%
Arizona	1,040	0.79%
New Jersey	1,804	0.79%
Rhode Island	224	0.79%
Pennsylvania	2,311	0.78%
District of Columbia	165	0.77%
Virginia	1,434	0.74%
North Carolina	1,592	0.73%
Texas	3,776	0.72%
South Dakota	179	0.70%
Nevada	399	0.67%
Indiana	971	0.67%
Alabama	661	0.67%
Ohio	1,663	0.66%
Arkansas	422	0.65%
Oklahoma	569	0.63%

Table is continued on the following page.

TABLE 8. Continued

State	Number of Estabs. in Segment	% of all Estabs. in State
Iowa	508	0.63%
Minnesota	901	0.62%
North Dakota	134	0.61%
Kansas	453	0.61%
Kentucky	545	0.60%
Michigan	1,309	0.60%
Georgia	1,295	0.60%
Nebraska	297	0.57%
South Carolina	576	0.56%
Florida	2,716	0.55%
Wisconsin	752	0.54%
Missouri	803	0.54%
Illinois	1,649	0.52%
Tennessee	672	0.51%
New York	2,627	0.51%

Source: 2010 County Business Patterns, U.S. Census Bureau

Looking again at Table 6, we find that 66 percent of Maine's environmental and energy technology establishments are included in the category of environmental services. With 0.81 percent of all of Maine's establishments in this segment, the state ranks 16th nationally—similar to 2004. As shown in Table 8, Alaska, New Mexico, and Massachusetts are the three U.S. states with the highest proportions of business establishments in this broad category of the environmental and energy technology sector.

The smallest segment of Maine's environmental and energy technology sector is involved in the manufacturing of environmental equipment. This category accounted for only 4.2 percent of the industry's establishments in 2010, or just 0.05 percent of the total number of establishments in Maine. The state ranks 29th nationally by this measure,

down from 25th in 2004, as shown in Table 9. The top three U.S. manufacturers of environmental equipment are Massachusetts, New Hampshire and Connecticut.

Table 6 shows that the environmental resources segment accounts for about 30 percent of the businesses in Maine's environmental and energy technology sector. Maine ranks 31st nationally in terms of the proportion of businesses in the state that are part of this broad segment of the industry. As shown in Table 10, the three places with the highest proportions of establishments in the category of environmental resources are California, District of Columbia, and Louisiana.

Environmental resources is the only segment of the environmental and energy technology sector in which the number of establishments declined in Maine, from 156 to 148 businesses, between 2004 to 2010. In 2004, Maine ranked 9th nationally (out of 50 states) in terms of the percentage of businesses in environmental resources, and the state's ranking fell to 31st (out of 50 states and the District of Columbia) in 2010. Maine's low ranking in the segment of environmental resources is due, in part, to the relatively small number of establishments in the "Other Scientific and Technical Consulting Services" (NAICS 541690) sector, which—as described above—includes some businesses that are not involved in environmental and energy technology. When this industrial category is removed from the environmental resources segment for all places, Maine has a ranking of 8th nationally in the combined sectors of "Other Electric Power Generation," "Recyclable Material Merchant Wholesalers," and "Materials Recovery Facilities."

TABLE 9. Proportion of State's Establishments in the Environmental Equipment Industry Segment

State	Number of Estabs. in Segment	% of all Estabs. in State
Massachusetts	289	0.17%
New Hampshire	63	0.17%
Connecticut	135	0.15%
California	976	0.11%
Minnesota	142	0.10%
Pennsylvania	289	0.10%
Michigan	204	0.09%
Ohio	235	0.09%
New Jersey	203	0.09%
Utah	61	0.09%
Rhode Island	25	0.09%
Colorado	128	0.08%
Oregon	90	0.08%
Wisconsin	113	0.08%
Arizona	105	0.08%
Texas	411	0.08%
Washington	136	0.08%
New Mexico	33	0.07%
Vermont	16	0.07%
Delaware	18	0.07%
Illinois	231	0.07%
Indiana	95	0.07%
Nevada	38	0.06%
Maryland	84	0.06%
Kansas	46	0.06%
Oklahoma	53	0.06%
Tennessee	72	0.05%
New York	280	0.05%
Maine	**21**	**0.05%**
Florida	250	0.05%
North Carolina	102	0.05%
Alabama	45	0.05%
Kentucky	41	0.05%
Virginia	87	0.05%
Iowa	35	0.04%
Missouri	63	0.04%

Table is continued on the following page.

TABLE 9. Continued

State	Number of Estabs. in Segment	% of all Estabs. in State
Idaho	17	0.04%
Georgia	80	0.04%
South Carolina	36	0.04%
Louisiana	36	0.03%
Montana	12	0.03%
Nebraska	17	0.03%
West Virginia	11	0.03%
Hawaii	9	0.03%
Arkansas	18	0.03%
South Dakota	7	0.03%
Mississippi	13	0.02%
Alaska	4	0.02%
Wyoming	4	0.02%
North Dakota	4	0.02%
District of Columbia	0	0.00%

Source: 2010 County Business Patterns, U.S. Census Bureau

TABLE 10. Proportion of State's Establishments in the Environmental Resources Industry Segment

State	Number of Estabs. in Segment	% of all Estabs. in State
California	9,168	1.08%
District of Columbia	157	0.73%
Louisiana	738	0.71%
Nevada	409	0.69%
Wyoming	133	0.66%
Virginia	1,024	0.53%
Montana	190	0.53%
Colorado	800	0.53%
North Dakota	112	0.51%
Oregon	547	0.51%
Florida	2,289	0.47%
Texas	2,308	0.44%
Minnesota	641	0.44%
Utah	299	0.43%
Iowa	345	0.43%
Delaware	103	0.42%
Hawaii	132	0.41%
New Hampshire	152	0.41%
Maryland	532	0.40%
Arkansas	252	0.39%
Kansas	287	0.39%
Nebraska	196	0.38%
Illinois	1,186	0.38%
Arizona	490	0.37%
North Carolina	809	0.37%
New Mexico	164	0.37%
Pennsylvania	1,096	0.37%
Kentucky	333	0.37%
Alaska	73	0.37%
Washington	642	0.36%
Maine	**148**	**0.36%**
South Dakota	90	0.35%
Ohio	890	0.35%
Massachusetts	594	0.35%
Mississippi	206	0.35%
Georgia	754	0.35%

Table is continued on the following page.

TABLE 10. Continued

State	Number of Estabs. in Segment	% of all Estabs. in State
Alabama	343	0.35%
New York	1,749	0.34%
Indiana	487	0.34%
West Virginia	128	0.33%
New Jersey	754	0.33%
Idaho	140	0.32%
Rhode Island	91	0.32%
Wisconsin	444	0.32%
Vermont	68	0.32%
Missouri	459	0.31%
Oklahoma	270	0.30%
South Carolina	302	0.30%
Tennessee	386	0.29%
Michigan	620	0.28%
Connecticut	242	0.27%

Source: 2010 County Business Patterns, U.S. Census Bureau

4. COMPARISONS TO OTHER SECTORS IN MAINE

In this section of the report, we compare Maine's environmental and energy technology sector to other key industries in the state. Unlike our earlier comparisons to similar sector in other states, which used establishment count data from *County Business Patterns*, this analysis uses information from Table 2 on the direct employment and earnings associated with Maine's environmental and energy technology sector. These estimates are compared to employment and earnings figures for other industries in Maine from the U.S. Bureau of Economic Analysis.

Table 11 presents total employment figures for selected industrial sectors in Maine. The industries were chosen to provide consistent points of reference to the environmental and energy technology sector. Table 11 is <u>not</u> a list of the largest employers in the state. It is also important to note that, as described earlier in the report, the environmental and energy technology sector consists of businesses from a variety of industries (see Table 2). With the exception of this sector, the employment figures presented in Table 11 pertain to individual industries. These caveats also apply to the employee compensation figures shown in Table 12.

With a direct employment of an estimated 5,437 workers, the environmental and energy technology sector falls between the "food manufacturing" and the "fabricated metal product manufacturing" industries. The environmental and energy technology sector employs fewer people than paper manufacturing, a traditional strength of the Maine economy, and the "hotels and motels" sector, which is a large part of Maine's tourism economy. On the other hand, the environmental and energy technology sector employs more workers than wood products manufacturing and telecommunications. The

environmental and energy technology sector's relative standing among the industries shown in Table 11 has increased since the 2007 study. At that time, the environmental and energy technology industry had the 6th largest employment among the same group of sectors—behind wood products manufacturing, forestry and logging, and the three sectors it lags behind today.

TABLE 11. Employment in Selected Maine Industries

Industry	Employment
Hotels and Motels	12,386
Paper Manufacturing	7,406
Food Manufacturing	5,941
Environmental and Energy Technology	**5,437**
Fabricated Metal Product Manufacturing	5,293
Wood Product Manufacturing	4,919
Forestry and Logging	4,707
Publishing Industries, except Internet	3,823
Telecommunications	2,352
Plastics and Rubber Products Manufacturing	2,157
Leather and Allied Product Manufacturing	1,598

Sources: Figures for industries other than the environmental and energy technology sector are from the U.S. Bureau of Economic Analysis (Total Full- and Part-Time Employment), 2010.

TABLE 12. Employee Compensation in Selected Maine Industries

Industry	Employee Compensation
Paper Manufacturing	$607.9 million
Fabricated Metal Product Manufacturing	$319.9 million
Hotels and Motels	$284.7 million
Environmental and Energy Technology	$284.3 million
Food Manufacturing	$234.3 million
Wood Product Manufacturing	$193.9 million
Telecommunications	$150.3 million
Publishing Industries, except Internet	$134.4 million
Forestry and Logging	$133.6 million
Plastics and Rubber Products Manufacturing	$122.7 million
Leather and Allied Product Manufacturing	$66.4 million

Sources: Figures for industries other than the environmental and energy technology sector are from the U.S. Bureau of Economic Analysis, 2010.

In Table 12, we present employee compensation figures for selected industrial sectors in Maine. The direct employee compensation associated with Maine's environmental and energy technology sector falls between the "hotels and motels" and the food manufacturing industries. Since the 2007 study, the environmental and energy technology sector has risen from 6th to 4th among the same group of industries in terms of overall employee compensation. The two sectors falling below the environmental and energy technology industry are food manufacturing and wood product manufacturing, and—whereas employee compensation amounts are almost identical in the current

analysis—wages and salaries in environmental and energy technology businesses were 14 percent lower than earnings in the "hotels and motels" sector in the 2007 study.

5. SUMMARY

The purpose of this study was to estimate the economic impact of Maine's environmental and energy technology sector, and to examine the industry's recent growth. Results of the analysis indicate that the environmental and energy technology sector has an economic impact, including multiplier effects, of an estimated $1.4 billion in output, 10,529 full- and part-time jobs, and $452.7 million in labor income. The employment and labor income directly associated with businesses and other organizations in the environmental and energy technology sector have increased by 3.2 percent and 27.6 percent, respectively, since a similar analysis was conducted in 2007.

The environmental and energy technology sector has a large share of small businesses—e.g., 77 percent have fewer than 10 employees—and Cumberland, Penobscot and York Counties each include more than 10 percent of Maine's environmental and energy technology establishments (the three counties are home to almost 60 percent of the total establishments in the sector). In terms of geographic concentration relative to all sorts of economic activities, Sagadahoc and Cumberland Counties have the greatest "overabundance" of establishments in the environmental and energy technology industry.

In 2010, the environmental and energy technology sector accounted for 1.23 percent of all businesses in the state, which is similar to the 1.21 percent industry share in 2004. Maine is currently ranked 24th nationally (out of 50 states and the District of

Columbia) according to this measure of the industry's relative importance to the state economy. Maine's national ranking fell from 14th (out of 50 states) in 2004 to 24th in the current analysis, suggesting that the environmental and energy technology sector grew in importance to the overall economy more so in other states than in Maine.

The environmental and energy technology sector fared well, however, compared to some of Maine's other large industries. Since the study conducted in 2007, the sector has increased its standing from 6th to 4th, using the same set of industries for comparison purposes, in terms of employment and overall employee compensation. For example, the environmental and energy technology sector is currently almost identical to the lodging industry in terms of employee compensation, whereas the overall amount of wages and salaries paid by environmental and energy technology companies was 14 percent lower than those paid by hotels and motels in the 2007 study.

REFERENCES:

Gabe, Todd and Caroline Noblet, "Economic Profile of the Environmental and Energy Technology Sector in Maine." Department of Resource Economics and Policy, University of Maine, Staff Paper 564, April 2007.

Noblet, Caroline and Todd Gabe. "Business Climate for Maine's Environmental and Energy Technology Sector." Department of Resource Economics and Policy, University of Maine, Staff Paper 565, November 2006.

APPENDIX A

The following information, excerpted from the 2007 report, explains how we identified businesses and other organizations in the environmental and energy technology sector. This information is relevant to the current study because the updated economic impact figures are based on the 2007 industry definition. The 2007 figures are updated to the present time based on the employment and payroll growth of establishments operating in the sectors shown in Table 3. Such an approach provides a broad definition of the environmental and energy technology sector—i.e., it includes companies that "self identify" based on their membership in E2Tech—and, at the same time, the use of a consistent set of industries allows for an accurate tracking of the sector's growth.

Information from the 2007 Report:

The first step of our analysis involved identifying the businesses and organizations that make up Maine's environmental and energy technology sector. This task is complicated by the scope and diversity of the industry, as evidenced by the 14 segments shown in Table 1, and the fact that some environmental and energy technology establishments fall outside of these segments. One key component of the environmental and energy technology sector in Maine consists of establishments that are associated with the *E2 Tech Council*. This industry group provided us with a membership roster and a list of businesses and organizations that have participated in their activities. The list included establishments that fall within EBI's 14 industry segments, as well as members

(e.g., non-profit educational organizations) that fit within a broader definition of the environmental and energy technology sector.

To expand our analysis beyond the *E2 Tech Council*, we supplemented their list with non-member businesses that operate within EBI's 14 industry segments. This involves matching the EBI segments to industrial (NAICS) categories that are commonly used to classify businesses. Next, we purchased a list of, and information about, companies in the selected NAICS categories from a private market research firm. Finally, we removed duplicate entries included on both lists.

End of Information Excerpted from the 2007 Study