Vermont Clean Energy

2015 INDUSTRY REPORT

Prepared by BW Research Partnership for the Vermont Department of Public Service

August 2015

Letter

We are pleased to report on the continued growth of the clean energy industry in Vermont over the past year. The survey conducted for this second annual report from the Clean Energy Development Fund (CEDF) describes changes in the workforce of firms and organizations researching, developing, manufacturing, distributing, or selling goods or services related to clean energy. The findings show that nearly five percent of the state's workforce now participates in clean energy activities. With the passage in May of H.40 (Act 56), the new renewable energy legislation, the State is poised for continued growth of this important part of the economy.

Once again, development of this survey was a collaborative effort between the Public Service Department, the Agency of Commerce and Community Development, the Department of Labor and industry representatives. The report identifies substantial clean energy activity in Vermont with a 9.8 percent expansion in the number of workers employed in the clean energy workforce over the past two years, and 6.2% this year alone. Employers surveyed indicated that they expect to add more than 1,000 additional employees in the coming year.

This year's report also includes findings that point to the role of clean energy finance in the state. This key element identified in the state's ***2011 Comprehensive Energy Plan*** is a necessary ingredient for continued growth of clean energy projects and companies. This report will help inform future Department and CEDF investments and program designs that foster energy efficiency measures and renewable energy development.

The Clean Energy Development Fund at the Public Service Department provides a key element in the state's financing picture helping to support deployment of renewable energy systems. Established in 2005 by the Vermont Legislature, the Fund is one of the department's most successful vehicles for implementing finance and other strategies to achieve the renewable energy goals put forward in the 2011 Comprehensive Energy Plan along with the state's legislative goals for greenhouse gas reduction and the CEDF's own goals.

We are pleased to see a thriving clean energy industry with many businesses employing so many Vermonters. The growth in jobs is contributing significantly towards the overall growth of the Vermont economy, and helping make our energy future more secure and economically vibrant. Next year, the department is planning to conduct a third iteration of this report. The data provided will help the state understand the economic and workforce implications of new energy policies enacted at the state and federal levels.

We welcome feedback and suggestions for supporting the state's clean energy enterprises.

Christopher Recchia, Commissioner
Public Service Department

Andrew Perchlik, Fund Manager
Clean Energy Development Fund

Executive Summary

Vermont remains committed to strengthening its economy with clean energy. With rate of growth at 9.8% since 2013, the sector comprises 2,519 business establishments employing 16,231 workers. 4.8% of all Vermont employees participate in the clean energy economy, and business owners are optimistic about future growth. Respondents project roughly 1,000 more workers by March 2016, a growth rate of 6.2%.

The state's clean energy sector supports the entire value chain of activities. Installation accounts for 6,855 (42%) clean energy workers, but sales and distribution has created 709 more jobs since 2014, a growth rate of 36.3%. While energy efficiency is the largest segment, employing 49% of the clean energy workforce, renewable energy workers expanded by 12.4% in the last year for an additional 565 employees. As in-state solar generation continues to grow, it remains a significant industry in Vermont; the sub-sector increased by 21.8% to 1,899 employees, or 37% of all renewable energy workers.

Vermont's clean energy market is dominated by small businesses; about 81% of establishments have 10 or fewer employees and 65.8% reported five or fewer. Only 27.4% of these businesses derive all of their revenue from clean energy activities, allowing an array of traditional industry segments like manufacturing, building trades, and professional services to seize opportunity in the clean energy market. A majority (74.3%) of these businesses report either increased or similar revenues to last year.

The state is poised to capture yet more benefits from its clean energy market with increased emphasis on a localized supply chain. While a majority (64.2%) of clean energy firms support local suppliers and vendors, 28% reported that fewer than half of their vendors and suppliers are in Vermont and nearly 8% reported no in-state suppliers.

Significant barriers to business growth are consumer perceptions of cost and insufficient incentive programs. Two-thirds of clean energy firms reported that customer concerns regarding high cost and lengthy paybacks for clean energy investments prevent adoption, and 10.4% of businesses specified that limited financing options deterred their customers. Establishments are largely aware that consumption is dependent on clean energy financial incentives, citing particularly energy efficiency programs, tax credits, and solar incentives as important drivers. Over half of business respondents would like more public program support in the form of rebates, tax credits, grant funding, or loans, to reduce upfront consumer costs.

Acknowledgements

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PSD convened an advisory group to offer input into development of this report and to help identify prospective clean energy companies to survey. We thank the following advisory group members for their time and contributions:

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Jonathan Dancing	Building Performance Professionals Association of Vt.
Robert Dostis	Green Mountain Power
Paul Frederick	Vermont Department of Forests, Parks and Recreation
Sam Swanson	Clean Energy Development Board
Brad Talbot	Vt. Licensed Plumbers Association
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Linda McGinnis	Energy Action Network
Mark Whitworth	Energize Vermont
Johanna Miller	Vermont Natural Resources Council

The PSD and CEDF would especially like to thank all employers in the state who responded to the survey. Your thoughtful input provided essential data upon which to build in the years ahead.

Biomass cover photo: Courtesy Biomass Energy Resource Center
Wind cover photo: Courtesy Georgia Mountain Community Wind Farm
Solar cover photo: Courtesy C. Recchia

Introduction: The Vermont Clean Energy Industry Landscape

The State of Vermont is a national clean energy leader. The *2015 U.S. Clean Tech Leadership Index* ranks Vermont sixth among the fifty states, and notes that the State is moving rapidly towards the top. The *Index* reports that "Vermont jumped three places from ninth in 2014…continuing its impressive climb from just 15th…overall two years ago. The tiny state…is the highest-placing eastern state in Technology at #5. Always a pacesetter in efficiency and its financing, Vermont lands at #3 in the Energy Intelligence and Green Buildings subcategory of Technology." [1]

Vermont has a long history of national leadership. The Green Mountain State was the first in the nation to create a statewide energy efficiency utility (EEU), enacting legislation in 1999 that created the utility and authorized an energy efficiency charge to support efficiency programs. Efficiency Vermont now serves the majority of the state and is operated by Vermont Energy Investment Corporation, in collaboration with a variety of partners.

Vermont law directs all electric and natural gas utilities to prepare and implement least cost integrated plans that involve strategies that include "comprehensive energy efficiency programs". Statutes require EEU budgets to be sufficient to realize "all reasonably available, cost-effective energy efficiency".

The results of initiatives like these have pushed Vermont to the top of national rankings. According to the *2014 State Energy Efficiency Scorecard* from the American Council for an Energy Efficient Economy (ACEEE), Vermont was tied with Oregon and Rhode Island as the nation's third most energy efficient state. Only Massachusetts and California scored better.[2]

Vermont's national leadership has a significant, in-state financial pay-off. In 2014, Vermonters saw a return of $2.60 for every dollar invested in energy efficiency programs, according to Efficiency Vermont. Moreover, homes and businesses that made efficiency investments last year are expected to reap over $178 million in "continued savings that last beyond 2014".[3]

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[1] *2015 U.S. Clean Tech Leadership Index* (CleanEdge, Inc., June 4, 2015)
[2] *2014 State Energy Efficiency Scorecard* (http://database.aceee.org/state/vermont)
[3] Efficiency Vermont website (https://www.efficiencyvermont.com/About-Us)

The State of Vermont has a variety of incentive and financial assistance programs to help citizens and business owners pay for investments in clean energy, including offerings through Efficiency Vermont and a Weatherization Trust Fund that provides roughly $6 million annually for assistance to low-income individuals.

Among the state's leading financing programs is the Sustainable Energy Loan Fund (SELF), administered by the Vermont Economic Development Authority (VEDA), in collaboration the Clean Energy Development Fund (CEDF), Efficiency Vermont, Vermont banks and others. Created by Act 87 of 2013, the SELF offers four different loan products for Vermonters, including:

- Small Business Energy Efficiency Loan Program
- Renewable Energy Loan Program
- Agricultural Energy Loan Program
- Energy Efficiency Loan Guarantee Program[4]

With the Sustainable Energy Loan Fund serving the finance needs of commercial enterprises, the state launched the *Thermal Energy Finance Pilot Program* to help homeowners gain greater access to financing to improve thermal efficiency in Vermont. Started in February 2014 and expanded in April 2015, the new "Heat Saver Loans" allow for the installation of high efficiency oil and propane boilers and furnaces, cold-climate heat pumps, solar hot water systems, central wood pellet systems, as well as weatherization activities.[5] The state's investment in the form of loan loss reserves, interest rate buy-down for customers, and other tools is expected to leverage up to $7 million to help customers reduce their heating bills.

One example of the State of Vermont's financial support for clean energy is the announcement in April 2015 of $1.9 million in new investments in Windham County. Through the Public Service Department's Clean Energy Development Fund (CEDF), $1.6 million was awarded to support "Windham Wood Heat"– a program that supports the installation of wood pellet/chip heating systems for schools and municipal buildings in the County. An additional $300,000 in CEDF funds was made available to support solar energy loans for residential projects in Windham County.

CEDF plays an important role in Vermont's overall efforts. The Fund's principal goal is to "promote the development and deployment of cost-effective and environmentally sustainable electric power and thermal energy or geothermal resources for the long-term benefit of Vermont consumers, primarily with respect to renewable energy resources."[6] CEDF offers a portfolio of grants, direct incentive payments, credit enhancements and other services.

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[4] 10 V.S.A. §280dd

[5] See Heat Saver Loans (http://publicservice.vermont.gov/topics/energy_efficiency/heatsaver_loans)

[6] 31 V.S.A. §8015

Through the end of 2013, it has awarded over $64 million for projects that leveraged an additional $196 million in other funding.[7]

While Vermont may be best known nationally for its highly ranked energy efficiency initiatives, the state's solar energy industry is generating some heat of its own. In 2014, Vermont was ranked in the top ten nationally in installed solar electric capacity per capita among the fifty states, according to the Solar Energy Industries Association (SEIA). SEIA also reported that $76 million was invested in solar installations in Vermont in 2014, a 63% increase over 2013.[8]

Finally, the State of Vermont is required by law (Act 40 of 2011) to "lead by example" in terms of its own energy usage. A 5% energy savings goal was set for state government, and the Vermont Department of Buildings and General Services created a strategic plan to guide its own decisions, and to serve as model for other agencies. In 2013, the State added requirements for life cycle cost analysis, and incorporating the use of renewable energy sources, energy efficiency and thermal energy conservation in new building construction or major renovations.[9]

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[7] *Evaluation of Vermont Clean Energy Development Fund*, NMR Group, Inc. & Energy Futures Group, Inc. February 25, 2015.

[8] State Solar Policy: Vermont (www.seia.org)

[9] *2014 State Energy Efficiency Scorecard* (http://database.aceee.org/state/vermont)

Vermont's Clean Energy Industry Overview

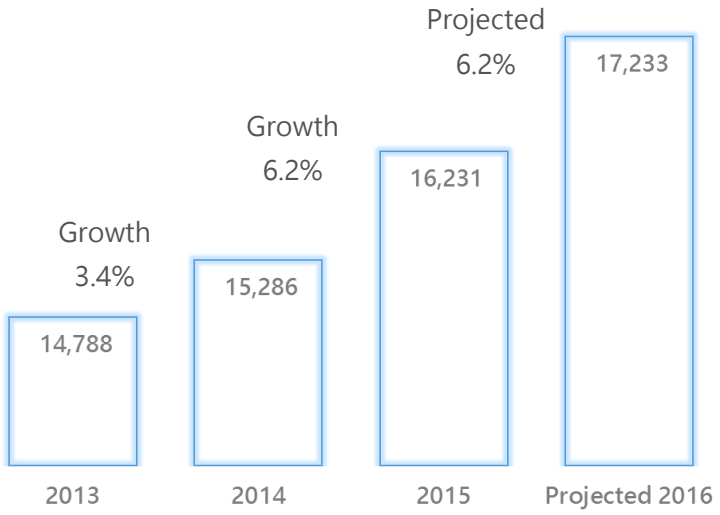
Vermont is home to a large, growing and important clean energy cluster

At the end of the first quarter of 2015, Vermont's clean energy cluster employed 16,231 clean energy workers at 2,519 business establishments across the Green Mountain State. Clean energy employment is up by a healthy 6.2% over 2014, a growth rate that is more than three times better than Vermont's overall employment growth rate of 1.8%.[10]

Vermont's strong employment growth in the last year builds on the baseline established in the 2014 report.[11] Vermont's clean energy workforce employs 1,443 more clean energy workers today than in 2013, a 9.8% growth rate over two years. Moreover, clean energy employment now accounts for approximately 4.8% of overall employment in the state, up from 4.3% in the first half of 2014.[12] The clean energy industry in Vermont is a significant, and growing, part of the state's economy.

Clean energy employers reported that this healthy growth will continue in the year ahead. Respondents expect to add more than 1,000 workers by the end of the first quarter of 2016, matching the 6.2% growth rate of this year. Thirty percent (30%) of employers expect to add clean energy workers in the year ahead, while two-thirds (67%) project steady employment. Only 3% of clean energy businesses predict lay-offs during 2015.

Figure 1: Vermont Clean Energy Cluster Employment Growth 2013-2016 (Projected)



[10] Current Employment Statistics, Vermont nonfarm payroll employment, February 2014-2015.

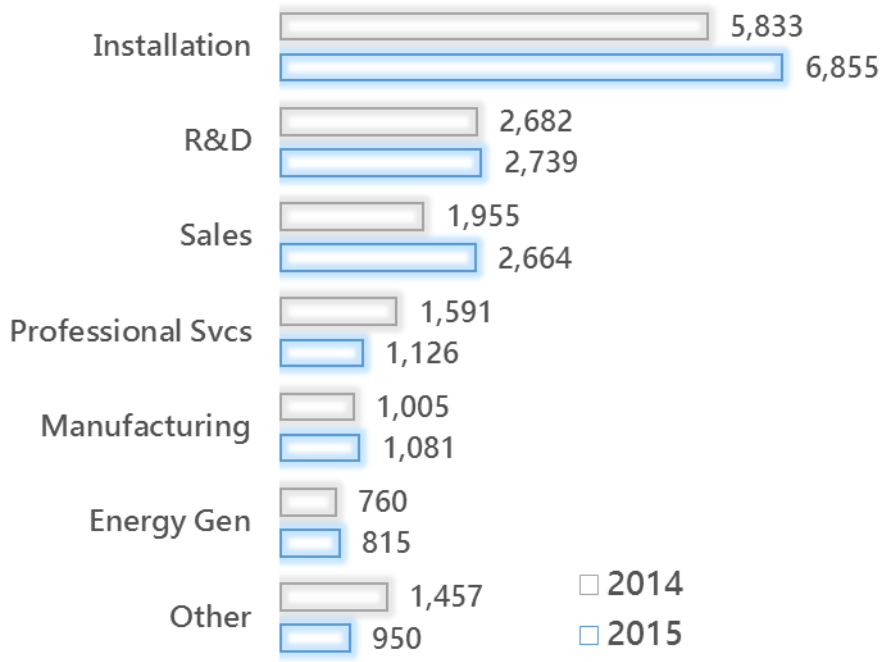
[11] *Vermont Clean Energy Industry Report 2014*. Vermont Public Service Department. June 2014. http://publicservice.vermont.gov/sites/psd/files/Topics/Renewable_Energy/CEDF/Vermont%20Clean%20Energy%20Industry%20Report%20FINAL.pdf

[12] Overall Vermont employment of 335,950, Vermont Department of Labor Economic and Labor Market Employment (ELMI) plus unincorporated woody and non-woody biomass sole proprietors.

Installation workers are the largest part of Vermont's clean energy workforce

In 2015, 6,855 Vermonters are working to insulate homes and businesses, install energy-efficient lighting and HVAC systems, put up solar panels and wind turbines, and more. This army of installation employees grew by 17.5% over the 2014 total, and accounts for 42% of the total clean energy workers in the state.

Figure 2: Employment Growth by Value Chain Activity 2014-2015



Among the other "value chain activities" in Vermont's clean energy cluster, sales and distribution employment was the growth leader by a large margin. The 2015 total of 2,664 sales workers represented an exceptionally rapid growth rate of 36.3% over 2014, suggesting that clean energy firms in Vermont were investing in hiring aimed at expanding their customer base, and increasing sales and revenues – hallmarks of an expanding deployment market.

Clean energy employment growth in other areas was more modest, compared to 2014 totals, but still far ahead of the overall state average. Clean energy manufacturing jobs, for example, grew by 7.6%. Manufacturing workers make up 6.7% of Vermont's total clean energy employment.

Although employment grew in most clean energy value chain activities from 2014 to 2015, there was a drop in the professional services category of 465 workers. “Professional services” includes a wide range of occupations, including lawyers, accountants, engineers, architects, and others.[13]

Half of Vermont’s clean energy workers are engaged in energy efficiency

Energy efficiency establishments employed 7,974 clean energy workers in 2015, an annual increase of 2.2%, and 49% of all Vermont clean energy workers.

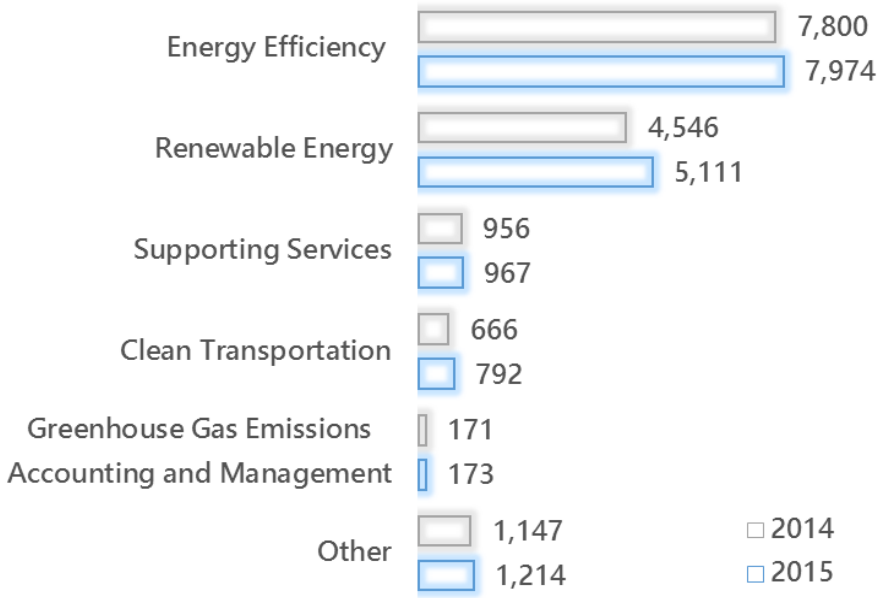
While energy efficiency employment grew only slightly, the number of renewable energy workers in Vermont expanded by a robust 12.4%, from 4,546 in 2014 to 5,111 in the 2015 survey. Renewable energy’s percentage of the Vermont clean energy workforce inched up to 31% from 30% in 2014.

The slower growth in efficiency may well be due to timing; due in part to the harsh winter in early 2015, overall construction employment declined by 6.1% in Vermont between January and February, during which the survey was in the field.[14] The slower growth in efficiency is likely connected to the decline of overall construction due to the heavy representation of traditional trade-related firms in the state’s energy efficiency sector (unlike renewables, which are more often “pure-play” clean energy).

[13] The 2015 numbers also showed a decline (-34.8%) in the number of clean energy workers in the “other” category. It appears that most of the decline in the “other” category can be attributed to respondents distributing workers among other value chain groupings, leaving fewer employees in the “other” category, while still leaving Vermont with a net increase.

[14] Current Employment Statistics, Bureau of Labor Statistics, Construction employment.

Figure 3: Employment Growth by Clean Energy Focus 2014-2015

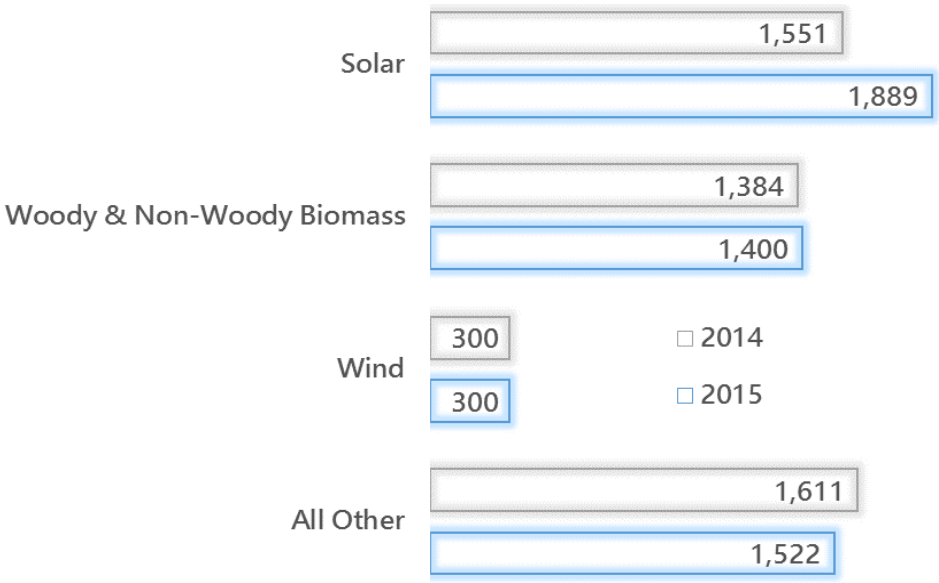


Vermont's solar energy workforce is growing rapidly, while other renewable energy categories are flat

Solar energy workers make up the largest, and fastest growing, part of Vermont's renewable energy sector workforce. Employment in solar power grew by 21.8% over the 2014 total, to 1,889 solar workers. Solar accounts for 37% of all renewable energy workers. Growth in solar employment mirrors the expansion of solar energy installation at Vermont homes and businesses from 2014 to 2015, a time during which Vermonters applied to install about 42 MW of new solar PV capacity.[15]

[15] Vermont Public Service Department

Figure 4: Employment Growth by Renewable Energy Technology 2014-2015



Employment in "woody and non-woody biomass", a clean energy sector of special focus in Vermont, grew by 1.2%, to a total of 1,400 Vermont workers. Future Vermont clean energy industry studies may seek to determine whether initiatives to foster advanced modern wood heat in the state play a role in contributing to employment growth.

Energy efficiency workers are involved in a wide range of different activities

The term "energy efficiency" covers a wide range of commercial and residential services, including HVAC/R (heating, ventilation, air conditioning, and refrigeration), lighting, insulation, building controls, and more. Although some firms specialize in just one of these customer sectors and technologies; many others offer a full range of energy efficiency (EE) services.

In an effort to understand which customer sectors and technologies most engage Vermont's energy efficiency workers, respondents provided information on the distribution of energy efficiency related labor hours.

Residential and commercial HVAC/building controls (combined) tops the list by engaging 33.8% of total EE work hours, followed by lighting work at 19%, and weatherization activities that accounted for 19.1% of labor hours.

Overall, residential EE work accounted for 55.5% of total work hours, with commercial activities taking up the remaining 44.5%.

Table 1: Reported Labor Hour Proportions by Energy Efficiency Sub-Technology

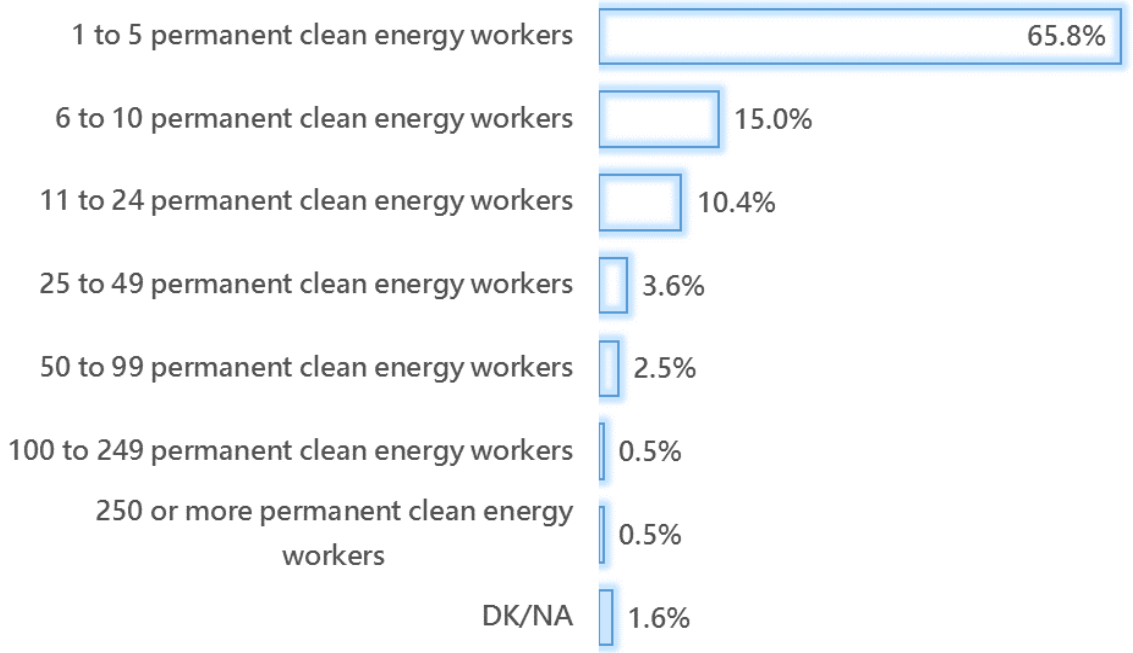
EE Sub-Technology	% of labor hours
Residential HVAC and building controls	18.4%
Commercial/industrial HVAC and building controls	15.4%
Residential weatherization/building envelope	15.2%
Commercial/industrial lighting	11.4%
Residential lighting	7.6%
Commercial/industrial weatherization/building envelope	3.9%
Other residential	14.3%
Other commercial/industrial	13.7%

The Clean Energy Market and Business Needs

Vermont's clean energy industry is dominated by small businesses

As with other parts of the Vermont economy, the majority of clean energy establishments are small firms, with 80.8% having 10 or fewer employees, and nearly two-thirds (65.8%) reporting five or fewer clean energy workers. Of the remaining percentage, the largest group of firms (10.4%) had 11-24 clean energy employees.

Figure 5: Percentage of Firms by Company Size



Overall revenue increased or stayed the same at 74% of clean energy firms

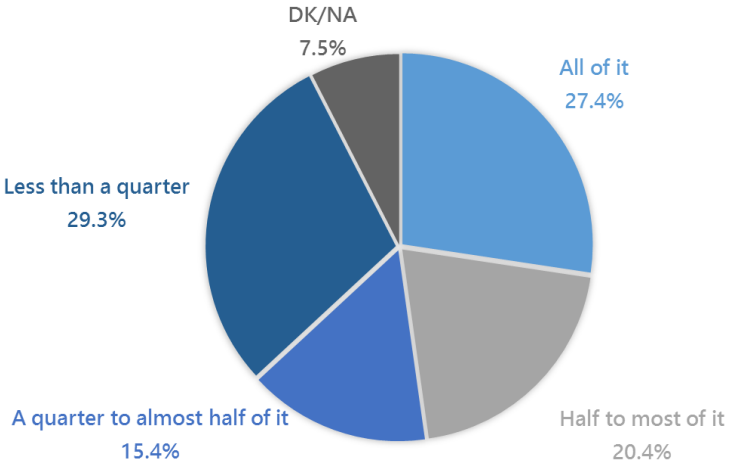
Nearly half (48.9%) of firms in Vermont that are involved in clean energy reported overall revenue growth in 2014 over the previous year, while revenues stayed the same at 25.4% of the industry's companies. Fewer than a fifth (18.7%) of firms said that overall revenues declined.

Most Vermont clean energy firms are involved in other business lines as well

Establishments in the state's clean energy industry rarely get all of their annual revenue from clean energy activities alone. In 2015, only 27.4% of firms reported that all of their revenue came from providing clean energy services. An almost equal percentage (29.3%) said that less than a quarter of revenues were generated by clean energy activities. In the middle, clean energy services accounted for 25-99% of revenues for 36% of companies in the industry.

The wide distribution of different levels of dependence on clean energy revenues illustrates an important point about Vermont's industry. Rather than a stand-alone "industry" in which all players provide only clean energy business lines, clean energy can be viewed as a "market" which offers new revenue opportunities for firms in traditional industries such as manufacturing, the building trades, and professional services.

Figure 6: Percent of Revenues from Clean Energy



Wages for clean energy workers are the same as for others at the same firm

Because many Vermont firms depend on clean energy business lines for only a portion of their revenues, businesses were asked if workers engaged in the clean energy activities of their firms earned more, less, or the same as others at the same company. Responses indicate that there is generally not a wage premium in Vermont for clean energy workers over others at the same company.

Only 8.7% of firms pay more to workers engaged in the clean energy portion of their business, while fully 81.7% pay the same to all. Most of the remainder (9.2%) didn't know if they paid more or less.

Vermont clean energy firms have strong supplier relationships in the state

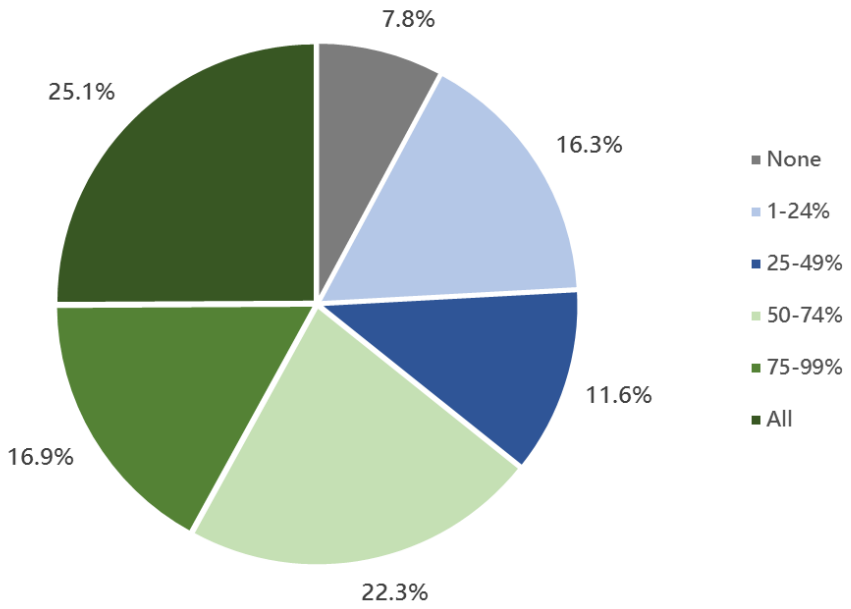
The clean energy industry in Vermont depends upon, and supports, a significant network of vendors and suppliers that provide goods and services needed for expanding energy efficiency, solar energy, clean transportation, and other clean energy options in the state.

A majority of clean energy firms (56.9%) report that over half of their vendors and suppliers are located in Vermont.

Although supplier relationships with Vermont vendors are strong, it's also clear that a significant amount of money is leaving the state, suggesting the possibility of market opportunities for Vermont companies to provide for the clean energy cluster. For example, 27.9% of clean energy firms say that fewer than half of their vendors and suppliers are in Vermont, and a small minority (7.8%) note that none of their vendors are in the Green Mountain State.

To secure greater benefits of Vermont's growing clean energy industry, economic development research could identify specific vendor and supplier needs currently not available (or cost effective) from Vermont vendors. This kind of data can help offer insights that may help inform strategies for supporting the growth of businesses in the clean energy market.

Figure 7: Percentage of Vendors/Suppliers Located in Vermont



Customer perception of the cost of clean energy may be a barrier to growth

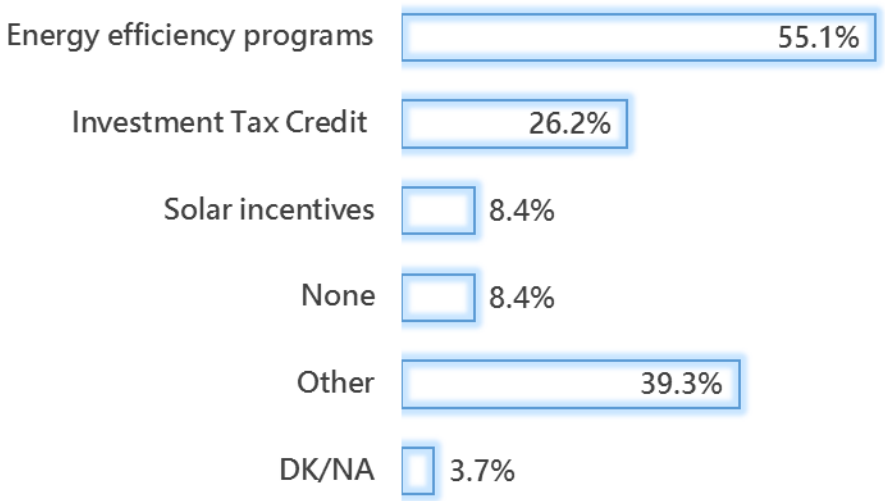
When asked to name "the biggest reason that a customer chooses not to proceed with a clean energy-related project or chooses a traditional alternative", fully two-thirds of clean energy companies (66.4%) said that customers in Vermont say that the cost is too high or the payback time for clean energy investments to pay for themselves is too long.

High cost to customers was the largest barrier to higher sales mentioned by survey respondents although 10.4% of firms reported that "a lack of financing options" was also hindering customer preferences for clean energy choices.

Companies report that customers are using clean energy incentive programs

Respondents were asked to name "any clean-energy specific incentives, rebates, tax credits or other programs your customers have used over the last 12 months". Firms could name more than one, so the totals in Figure 8 add to more than 100.
Energy efficiency programs were named the most often, followed by federal Investment Tax Credit then solar incentives. The "other" category included mention of many different options, but none of these earned more than 3% individually. It was notable than only 8.4% of respondents reported that they could not name any incentives or rebates used by their customers. The overwhelming majority of firms are aware of a role for incentive and support programs in driving customer behavior.

Figure 8. Incentive Programs used by Customers, as Reported by Firms



Vermont clean energy firms support programs that reduce customer costs

The Clean Energy Development Fund has historically provided financial support via the Small Scale Renewable Energy Incentive Program along with its grant program. When asked specifically about what kinds of support from the Vermont Clean Energy Development Fund would "help your business succeed", the most popular selections were aimed at initiatives that would reduce customer costs, or assist with financing.

- 19.0% called for **rebates** for solar PV, solar thermal, wind projects, biomass or other renewable energy systems.
- 16.6% selected **tax credits**.
- 15.7% recommended **grant funding**.
- 10.1% suggested **loans**.

All other options each earned mention from less than 10% of companies, including credit enhancements, internships, technical assistance, and other forms of support not typically associated with CEDF.

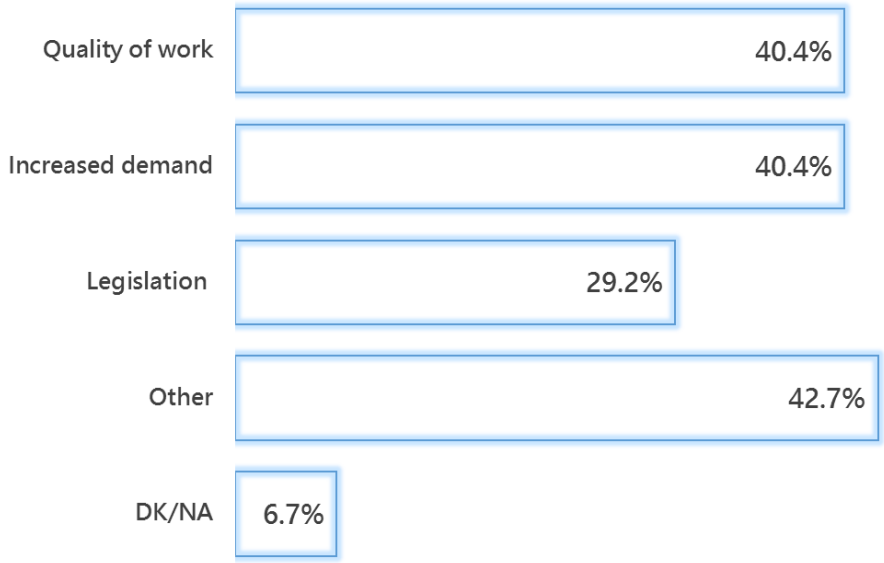
Increased demand and a reputation for quality drive business growth

When asked for "the three most important factors" accounting for business growth in the last twelve months, clean energy companies in Vermont noted that increased demand by customers, increased awareness of their company from improved marketing, a reputation for quality performance, and presence of supportive policies and incentive programs topped the list.

Because respondents were asked to name three factors, and all mentions of similar factors were grouped together, the percentages below total to more than 100%.

An array of factors were also mentioned, but none of the individual items in the "Other" category in Figure 9 (below) garnered mention from more than 2% of survey respondents.

Figure 9. Three Most Important Factors Driving Company Growth



Better marketing and advertising would push clean energy growth in Vermont

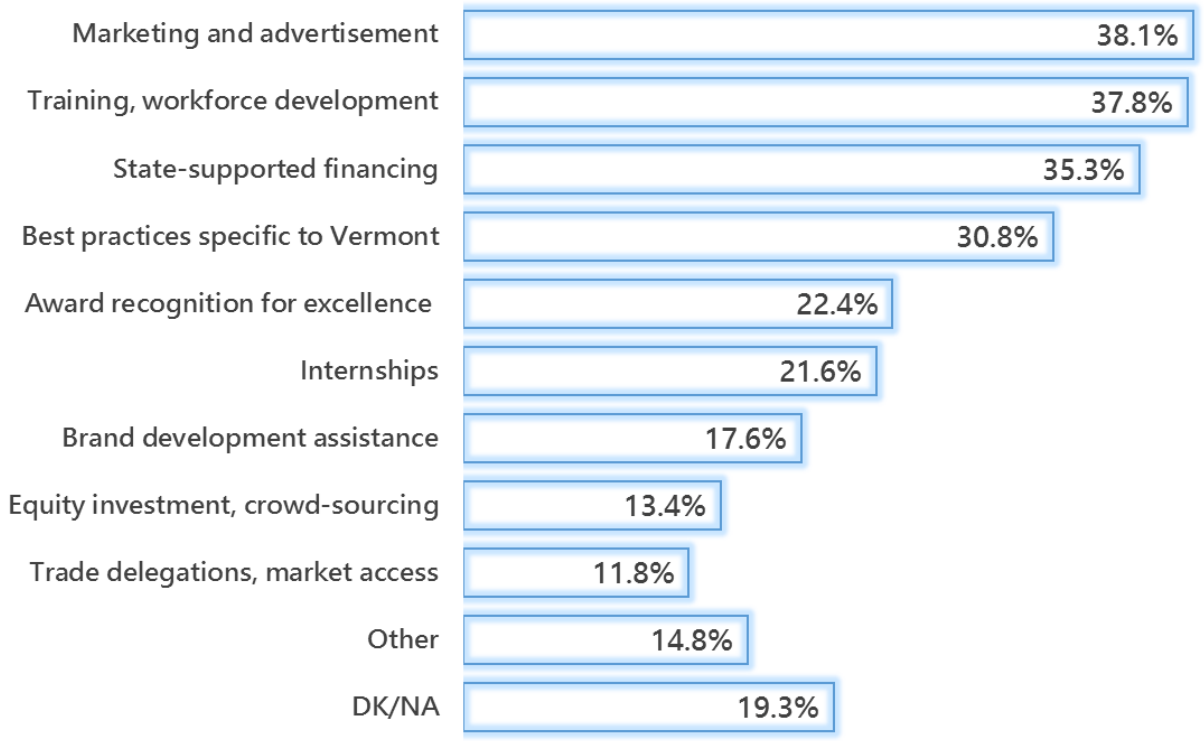
Vermont's clean energy firms were asked for suggestions about which forms of "business support" would best help accelerate the growth of the state's industry. Firms were allowed to select more than one item, so the numbers in Figure 10 (below) represent the percentage of firms who mentioned that item. These forms of support are not specific to the CEDF as are those described above.

At the top of the list (38.1%) was a call for marketing and advertising campaigns that would promote the goods and services of the state's clean energy industry to Vermonters, and contribute to strengthening the Vermont "brand". Of those who called for better marketing to support the state's brand, 46.3% were primarily energy efficiency firms, and 31.6% were mainly in the renewable energy space. The remaining 22% were distributed in small numbers across the remaining sectors.

Almost as many respondents to this question in the survey (37.8%) called for "access to customized training and workforce development", suggesting a need for help in upgrading the skills of both existing workers and aspiring job-seekers in an environment of additional hiring and rapid technological change.
Other forms of possible business support mentioned by more than 30% of clean energy firms included "greater access to state-supported finance" and "best practices specific to Vermont's market."

The call for best practices that are "Vermont-specific" suggests that clean energy firms in the state could use information and tool kits that help both themselves and their customers in efforts to understand how best to design, finance, install and maintain clean energy systems in Vermont's unique marketplace.

Figure 10: Business Support Suggestions



Clean Energy Industry Business Financing

Financing is a key component—and sometimes a barrier—to business and employment growth, especially in innovative and emerging clusters. With this in mind, the industry survey that provides data for the 2015 *Vermont Clean Energy Industry Report* included a larger number of questions about financing issues than in last year's inaugural report.

The term "financing" covers a range of finance and investment domains and audiences. Financing of clean energy projects, for example, encompasses retail loan products for home owners, bond funding for public projects, non-recourse borrowing for businesses, and other tools. Beyond project financing, firms also need access to funds for the immediate and long-term capital needs of their business. Survey questions touched on a wide range of financing issues for both clean energy firms, and their customers.

Beyond revenue, firms rely on personal funds and bank loans for financing

Clean energy firms in Vermont appear to largely rely on business revenues to finance operations and growth. Companies were asked which forms of financing they currently receive/depend upon, with the following percentages answering "yes" to current involvement in the following forms of financing:

32% Regular business loan from bank, credit union, local financial institution

24.5% Personal savings or credit

10.6% Grants

10% Loan/investment from family or friends

4.5% Investment by venture capital investors, social investors, or community development finance institutions

3.6% Government guaranteed business loan from a bank, credit union, local financial institution

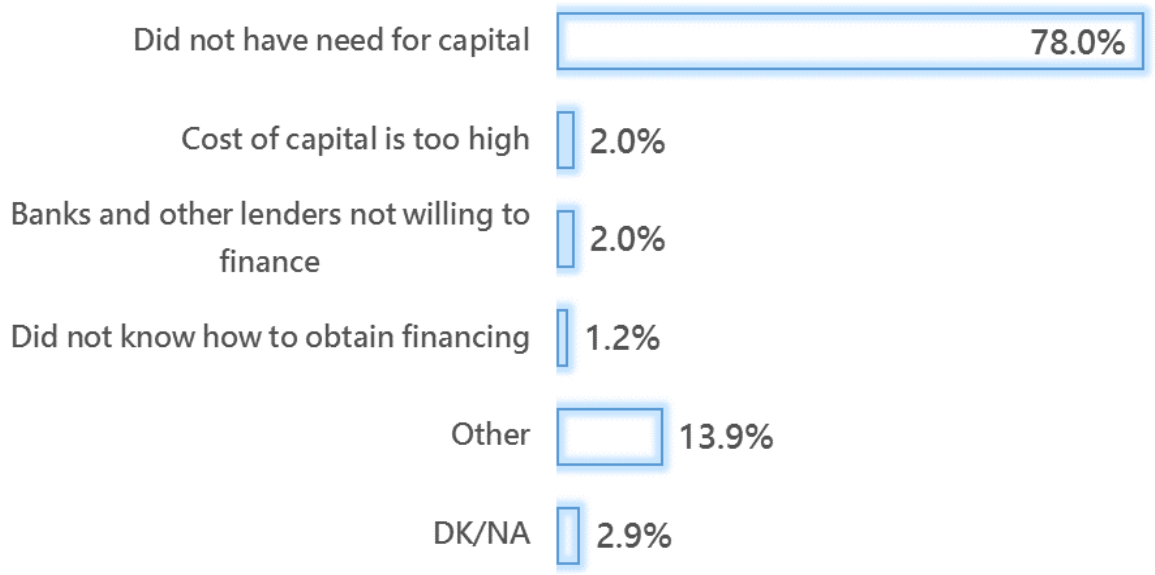
2.2% Regular business loan from a government agency

The majority of firms did not seek financing or found it easy to secure funds

More than two-thirds (68.2%) of companies said that they did not seek financing of any kind over the last twelve months, with only 22.8% of firms saying that they did. Of those that did seek financing, 86.6% succeeded in obtaining the funds sought and only 9.8% said they were unsuccessful. These numbers almost certainly reflect the very large percentage of Vermont clean energy companies that are very small enterprises, employing only fewer than 10 people, and often less than five. Businesses of this size are often financed exclusively by current revenues, supplemented by savings and/or an existing line of credit from a local bank.

When considering *why* they did not seek financing, the overwhelming response was a straight-forward one: there was no need for it. (Figure 11) Other possible reasons, such as high borrowing costs, rejection by lenders, or lack of knowledge about how to seek financing were mentioned by only 1-2% of firms, if they were mentioned at all.

Figure 11: Reason Financing was Not Pursued



When clean energy businesses in Vermont were asked to comment on their experiences with trying to obtain financing for their operations and expansion, the majority found limited barriers in the process, and were successful in obtaining the financing they were requesting in the end. Specifically, only one-third (32.9%) said that it was somewhat or very difficult to obtain financing, while the remainder said it was "somewhat" or very easy to secure funding, or were neutral.

Regular business loans from banks are the largest source of financing sought

Among the clean energy firms in Vermont that sought financing, the main type of financing sought (70.5%) was a regular business loan from a bank, credit union, or local financial institution. All other potential sources of funding were mentioned by small percentages of those who pursued any funding at all. For example, 5.3% of those seeking financing approached venture capitalists, social investors, or community development finance institutions. Equal percentages of those seeking funding (4.2% each) approached government lenders, or sought out government-guaranteed loans from banks and credit unions.

Conclusions

This study is the second analysis of the size and composition of Vermont's clean industry, and follows the same methodology of last year's *Vermont Clean Energy Industry Report 2014*. Based on detailed surveys of clean energy business establishments in every part of Vermont, and every sector of the clean energy industry, it is clear that the Green Mountain State continues to have a significant and growing industry of clean energy firms. The clean energy cluster is a rising contibutor to Vermont's overall economy.

For a state looking to expand its clean energy industry, the topline numbers are encouraging. Vermont is home to 16,231 clean energy workers at 2,519 establishments. This represents an employment increase of 6.2% in twelve months at a time when Vermont's overall annual employment rate increase was only 1.8%. Vermont's solar energy sector did particularly well, with exceptional employment growth of 21.8%.

Looking to the future, the state's clean energy employers are optimistic, projecting another 6.2% rise in total clean energy workers by April of 2016.

This year's industry survey reveals a clean energy industry that continues to have diverse employment representation across all parts of the value chain. Led by a particularly strong base of installation workers, the industry also has significant numbers of workers in research and development, and sales and distribution.

From a purely financial point of view, a large majority of clean energy firms report that total revenues were steady or rising over the last year, and that revenues from the clean energy portion of their firms contributed significantly to overall growth. The industry contributions to Vermont's overall economic health are multiplied through the money which clean energy firms spend on purchases from vendors and suppliers in the state.

Vermont's clean energy industry, like other sectors in the state's economy, is made up of many small businesses with fewer than 10 employees, and often less than five workers. Small businesses often rely on strong local markets to support and grow their businessses. It appears that there is ample room for growth in the state's internal clean energy market. Vermont has aggressive energy and climate change related objectives, including a goal of obtaining 90% of the state's energy needs from renewable sources by 2050.

In this year's survey, clean energy business owners and managers in Vermont were asked about actions that government might take to accelerate their growth and overall success. Among their responses, a leading message was a request for policies and programs which lower the costs borne by residential and commercial consumers when investing in clean energy alternatives.

In addition, clean energy firms asked for assistance with marketing and communications aimed at educating consumers about clean energy products and services, and promoting the Vermont "brand". Campaigns which help promote clean energy choices can help the industry as a whole, and individual businesses as well.

Finally, this second comprehensive report on Vermont's clean energy cluster had an increased focus on financing issues, with additional questions about existing sources of financing for both customers and businesses, the experience of companies seeking financing, and opinions about the availabiity of financing to accelerate future growth.

Responses to these questions from Vermont's clean energy businesses further strengthened the support for financing programs that help customers select, and pay for, clean energy options. For example, when asked to name incentives, rebates, credits and other programs "which your customers have used over the last 12 months", 89.7% of companies noted the use of such assistance by customers; especially focusing on energy efficiency programs, investment tax credits, and solar incentives.

With a variety of new clean energy finance initiatives rolling out in 2015, next year's survey offers an opportunity to provide additional data about specific customer finance needs in the market place, and how to effectively support them.

Overall, the state's clean energy industry is signficant and growing, generating thousands of good jobs for Vermonters. The potential for future growth is even greater, however, and with strong public/private partnerships aimed at helping consumers understand and choose clean energy options, Vermont can look forward to continued growth in this sector in 2016 and beyond.

Appendix A: Methodology

In March of 2015, BW Research Partnership conducted a survey of clean energy businesses in Vermont. To be included in the survey, participants were required to answer a number of screener questions to ensure that their organization: a) conducts activities directly related to the clean energy cluster; and b) employs workers in Vermont who spend at least some portion of their time conducting clean energy-related activities.

For the purposes of this report, a clean energy firm is defined as being directly involved with researching, developing, producing, manufacturing, distributing, selling or implementing components, goods or services related to renewable energy, energy efficiency or conservation, energy storage, greenhouse gas emission accounting/sequestration, and/or clean transportation (electric, hybrid, or biofuel vehicles) including supporting services such as consulting, finance, tax, and legal services related to clean energy.

Clean energy employees are defined as full-time and part-time permanent employees who support the clean energy portion of the business, including administrative staff and excluding interns and other temporary workers.

In order to accurately capture data from the sector, surveys were administered online and by telephone to a list of known employers as well as to a representative, clustered sample of companies from the NAICS industries identified by the Bureau of Labor Statistics and BW Research Partnership as being potentially related to the renewable energy, energy efficiency, and alternative transportation sectors. This NAICS listing is similar to those used in Massachusetts and Illinois, with a few minor modifications to reflect the uniqueness of each state's economy.[16]

The research team attempted approximately 8,100 telephone calls and sent over 750 emails to employers. The survey effort, with an overall combined margin of error for employment questions of approximately +/-2.82% to 4.71% at a 95% confidence interval, yielded 974 survey responses with an average of 14 minutes in length per completion.

Online surveys were programmed using Qualtrics survey software and were administered by BW Research Partnership to a list of businesses that were identified by Renewable Energy Vermont, various state agencies, and other advisory team members (the "known universe"). Telephone surveys were administered to the known universe and to a random sampling of businesses identified by NAICS code by Castleton Polling Group in Rutland, Vermont.

[16] The 2015 NAICS definition was refined from 2014, resulting in a more focused unknown sample. This resulted in higher industry incidence ("yes" to clean energy) and lower overall survey responses (fewer firms responding "no" to clean energy focus).