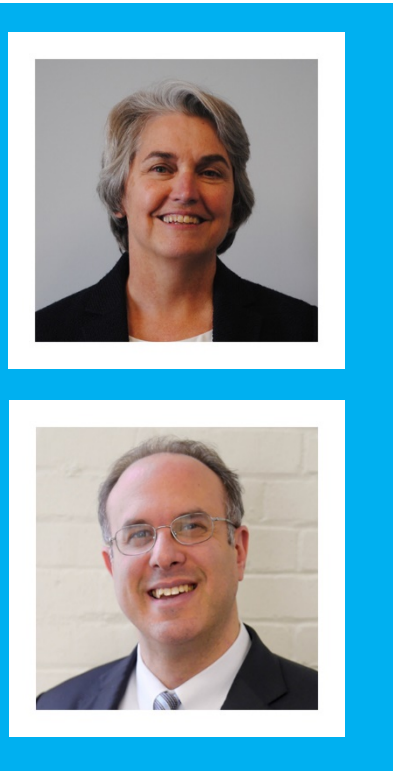


2019

Rhode Island Clean
Energy Industry Report

The Rhode Island Office of Energy Resources (OER) and the Executive Office of Commerce are pleased to present the 2019 Rhode Island Clean Energy Jobs Report. Today, we count more than 16,000 jobs in Rhode Island's clean energy economy, a 74 percent increase since 2014, when we began tracking this figure. There is sustained growth in the clean energy job market and this year, workers are spending a greater percentage of their time on clean energy tasks. The clean energy economy in Rhode Island is strong and there are more jobs on the way.

The Clean Energy Jobs report is a valuable tool for government policy makers because it helps identify where growth is occurring and what barriers may impede this growth. It also provides information on what skills training is needed in order to build a pipeline of talent, what sectors have gaps in workforce development opportunities, and how to more effectively match qualified workers with employers.



Over the past year, Rhode Island has continued to add large scale clean energy projects to its development queue, thanks to the Governor's leadership and her 1,000 MW by 2020 goal. Last summer, Rhode Island issued a request for proposals for up to 400 MW of clean energy. The response was overwhelming – Rhode Island received 41 bids for nearly 2,500 MW of carbon-free energy. National Grid is in the process of reviewing the proposals and plans to make its conditional selections this spring.

Last year, Governor Raimondo announced the selection of the Revolution Wind offshore wind farm, which will bring more than 800 jobs to Rhode Island. In an exciting update to this project, the Governor recently announced that Ørsted and Eversource, the companies behind Revolution Wind, have pledged \$4.5 million to support offshore wind education and supply chain development for the growing offshore wind industry in Rhode Island. Of those funds, \$3 million will be invested in higher education, led by the University of Rhode Island. Another \$1.5 million will go to the Rhode Island Department of Labor and Training and the Rhode Island Commerce Corporation to support the development of our offshore wind supply chain and workforce.

The Real Jobs Rhode Island program, led by the Rhode Island Department of Labor and Training, has provided essential job training opportunities for the solar industry as well as educational programming for middle and high school students who are planning to enter the growing offshore wind market. In the most recent round of funding, DLT announced the Fostering Fuel Talent partnership. This program will provide workforce training opportunities to the delivered fuel sector to retrain workers in energy efficiency and renewable heating and cooling careers.

We are thankful to Governor Raimondo, the General Assembly, and the Department of Labor and Training for helping to make Rhode Island a leader in clean energy and continuing to foster growth across this sector of our local economy.

Sincerely,

Handwritten signature of Carol Grant in black ink.

Carol Grant
Commissioner
Rhode Island Office of Energy Resources

Handwritten signature of Stefan Pryor in blue ink.

Stefan Pryor
Rhode Island Secretary of Commerce



Acknowledgments

This Clean Energy Industry Report is the fifth iteration in a series of reports conducted and written by BW Research Partnership, Inc. under commission by the Rhode Island Office of Energy Resources and the Renewable Energy Fund at Commerce RI. Thank you to the stakeholders who responded to the survey which resulted in the data summarized in this report.

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Introduction

This 2019 Rhode Island Clean Energy Report is the fifth in a series of similar reports conducted and executed by BW Research Partnership for the Rhode Island Office of Energy Resources. The report has evolved substantially over the many iterations, adding new metrics and improving upon economic analysis. This report sets out to understand future, past, and present employment in Rhode Island's clean energy industry broken out by different clean energy technologies as well as each value chain. Analysis of the opportunities and challenges surrounding the clean energy workforce including occupational data are recent and valuable additions to the report.

Rhode Island State government has listened to those saying that policy is important, stability matters, and siting, financing, and incentives are critical for the development of clean energy. In an effort to make these voices heard, government officials have worked to introduce new legislation to support the growth of the clean energy sector to create jobs, improve the quality of life of Rhode Island residents, and tackle the global threat of climate change.

Solar

The Brownfields Solar PV Program of Commerce RI's Renewable Energy Fund is offering \$1M in grants on a first-come, first-serve, rolling basis, in order to incentivize the development of solar PV projects utilizing net metering on brownfields – land areas that have been contaminated or scarred due to previous development.¹ The program is intended to utilize land that would otherwise be barren, thus reducing the environmental impact of developing new land. In addition, \$1 million in funding was recently allocated for a carport adder for the REF's Commercial Scale program.²

Solar siting policy has been at the foreground of current Rhode Island energy policy agenda, with a solar siting working group being formed and a House Bill introduced in late February.³ The Bill establishes solar siting ordinances to all towns or cities in Rhode Island. These ordinances are meant “to incentivize and promote development on brownfields, landfills, superfund sites, gravel pits, parking lots, and developed and previously disturbed lots and minimize impacts to environmental conservation and

¹ <https://commerceri.com/wp-content/uploads/2019/03/Brownfield-RFP-FINAL.pdf>

² <https://www.ri.gov/press/view/35538>

³ <http://webserver.rilin.state.ri.us/BillText/BillText19/HouseText19/H5789.pdf>

housing development,” similar to the aforementioned Brownfields Program.⁴ With established siting laws in place, the approval process will be clearer, making for a clearer project development process overall.

Offshore Wind

Home to the first and only offshore wind farm in the US, Rhode Island will welcome another in the near future, developed by Ørsted US Offshore Wind. This new project will add an additional 400 MW of generated capacity. For comparison, the recently completed Block Island Wind Farm is a 30 MW project; this new project will add more than 13 times more electric generating capacity. While this project ramps up, occupations like designers, engineers, and construction managers will be in high demand. Other occupations such as sales representatives, accountants, and trade, distribution, and transport workers will be needed to facilitate the development of this project. Finally, wind turbine technicians, construction laborers, and other installation workers will be needed to execute the plans. The Block Island Wind Farm created more than 300 direct jobs and was a fraction of the size of this new offshore wind project.⁵ Since there are currently 531 wind electric generation jobs in Rhode Island, the state should see significant job creation and opportunity for skilled workers.

Energy Efficiency

The Rhode Island state government has made growing the market for renewable thermal technologies a priority for future policy action. These technologies support local clean energy workers, reduce greenhouse gas emissions, and are cost effective. In addition, the Office of Energy Resources is supportive of building-energy disclosure policies that streamline the sharing of energy information with the real estate market. These policies are intended to help drive demand for energy efficiency improvements, often performed by local contractors.

Rhode Island continues to be a national leader in clean energy work through 2018, ranking third in the US on the American Council for an Energy-Efficient Economy’s state scorecard.⁶ Financial incentives and legislative support provided by the Office of Energy Resources contribute to this high ranking; the Rhode Island Efficient Buildings Fund provides low-interest loans for energy efficiency and renewable energy public building projects,⁷ and the Zero-Energy Buildings Working Group supports residential, commercial, and public entities during the state’s transformation to zero-energy buildings.⁸

The Clean Energy Internship program, debuting summer of 2019, is an effort to aid in the growth of clean energy careers. By subsidizing interns’ salaries, the Office of Energy Resources and the Renewable

⁴ <http://webserver.rilin.state.ri.us/BillText/BillText19/HouseText19/H5789.pdf>

⁵ <http://dwwind.com/project/block-island-wind-farm/>

⁶ <https://database.aceee.org/state/rhode-island>

⁷ <http://www.energy.ri.gov/RIEBF/>

⁸ <http://www.energy.ri.gov/high-performance-buildings/index.php>

Energy Fund seek to continue the proliferation of clean energy activity while building partnerships and talent pipelines between local clean energy businesses and students in Rhode Island.

OER, along with the Oil Heat Insitute of Rhode Island, was recently awarded a Real Jobs Rhode Island grant to help train delivered fuel workers – a workforce struggling with aging and lacking skilled talent – for the next generation of clean energy jobs related specifically to air source heat pumps, building weatherization, and integrated controls. This grant aims to be a catalyst for renewable energy and energy efficiency employment growth. READY 4 OFFSHORE WIND and the Business Network for Offshore Wind were awarded a Real Jobs Rhode Island grant to help create opportunities on the business side of clean energy industry development by educating businesses on the value chain and training businesses in project development.⁹

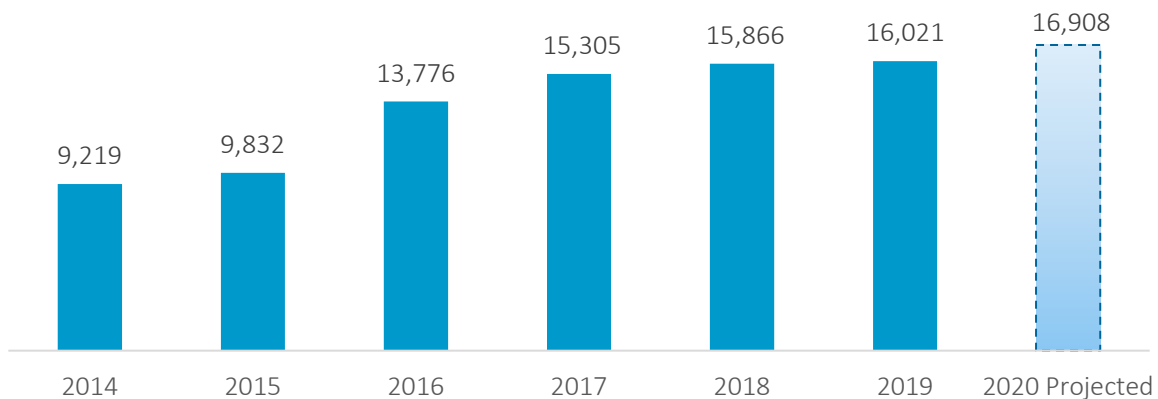
⁹ <http://www.dlt.ri.gov/realjobs/pdfs/IGPartnerships2019.pdf>



Industry Overview

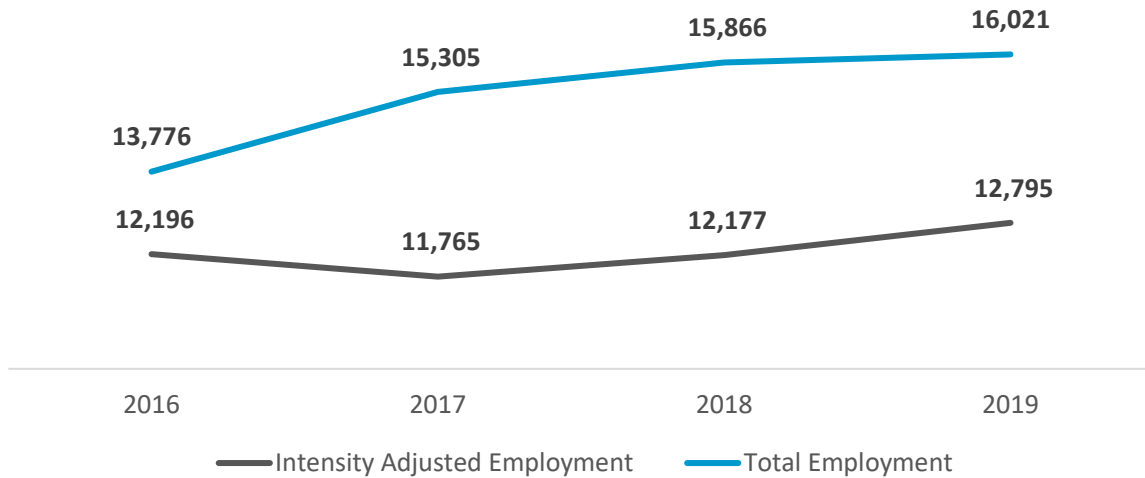
The Rhode Island clean energy economy is maturing, and the state remains a national leader in clean energy employment. This maturation is evident in the increasing efficiency and intensity of clean energy work in the state. Employment growth is now up 74% since the first Rhode Island Clean Energy Industry Report in 2014, but growth has slowed since 2017. Certainly, part of this slow down is attributed to overall labor market conditions – the unemployment rate is historically low and overall statewide employment growth has slowed. Another is the greater intensity of the work – more workers are spending a greater percentage of their total work time on clean energy goods and services.

Figure 1. Clean Energy Employment, 2014-2019, with 2020 Projections



The clean energy industry has added 155 jobs over 2018 for a growth rate of 1%. This is 50% higher than the statewide overall employment growth of 0.6%, but slower than prior years. Employers expect greater than 5% growth through 2019, which would add 887 jobs to the clean energy economy. Considering this large growth expectation, which does not include the new 400 MW offshore wind project recently awarded to Ørsted US Offshore Wind, Rhode Island should expect to return to much faster clean energy growth over the next several years.

Figure 2. Clean Energy Intensity-Adjusted Employment Growth, 2016-2019



The amount of time a worker spends on clean energy activities is important to consider. For instance, an HVAC installer might spend a portion of their time installing or maintaining traditional boilers and a portion on energy efficiency related activities, like installing high efficiency heat pumps. While the worker is still counted as “one”, and reported as such in employment metrics, the amount of clean energy work they do is variable. Incorporating this intensity metric; which accounts for the labor hours spent on clean energy activities, a very different growth picture emerges.¹⁰

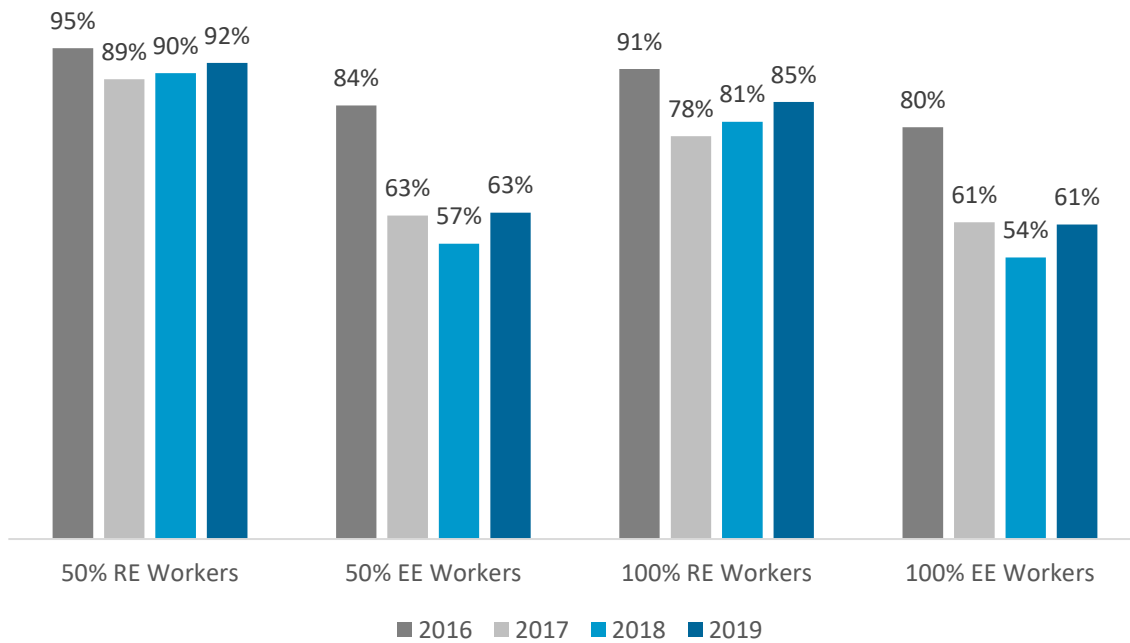
Intensity-adjusted employment has grown 5.1% over 2018, which is about five times the regular clean energy employment growth rate of 1% over the same period. To put it differently, clean energy work now represents a greater proportion of workers’ time – so activity, labor hours, and earnings associated with clean energy are all growing faster than the overall clean energy employment. Labor intensity growth rates are higher for those who spend all their time on clean energy activities compared to those who spend at least 50% of their time, meaning workers are increasingly becoming specialized in energy efficient and renewable energy technologies. Energy efficiency work is especially becoming more intense, with 10.5% growth for those who spend at least 50% of their time and 11.7% for those who spend all their time on energy efficient technologies. Renewable energy intensity has been strong over the years and growth has been steady, with over 2% growth for those spending at least 50% of their time and nearly 5% growth for those who spend all their time on renewable energy activities.

¹⁰ This intensity metric divides workers into three categories, those who spend all their time on clean energy related activities, those who spend at least 50% of their time on clean energy related activities, and those who spend less than 50% of their time on clean energy activities. A weight is then applied based on category, which allows comparisons between states and provides a more accurate reporting of clean energy activity.

Table 1. Clean Energy Employment Thresholds, 2016-2019

	Workers that spend at least 50 percent of their time				Workers that spend 100 percent of their time			
	2016	2017	2018	2019	2016	2017	2018	2019
Renewable Energy	95%	89%	90%	92%	91%	78%	81%	85%
Energy Efficiency	84%	63%	57%	63%	80%	61%	54%	61%

Figure 3. Clean Energy Employment Thresholds, 2016-2019





Clean Energy Technology Analysis

Energy efficiency remains the largest clean energy technology by employment, with nearly 9,400 workers, (59% of the industry) and largely unchanged since 2018.

Renewable heating and cooling is the next largest clean energy technology, representing 27% of the industry. Renewable heating and cooling continues to grow through 2018, adding 134 jobs (3.2% growth). Traditional HVAC employment is responsible for a large portion of this growth, adding 94 jobs (7.3% growth). High efficiency HVAC was also a source of strong growth, adding 51 jobs (2.5% growth).¹¹

Clean transportation is small but grew quickly at 15.4% over 2018. This sector added 42 jobs to support the development and expansion of electric vehicles, hybrids, and plug-in hybrids.

Renewable energy generation fell 2.9%, or 62 jobs lost, over 2018. This is due to national trends of declining solar energy generation employment. However, policy initiatives including the Brownfield Solar PV program and the solar siting working group may give solar employment a boost in the coming years. National reporting also suggests a turnaround, with employers reporting 7% expected growth over 2019 across the US.¹² Wind energy generation added 10 jobs over 2018, and is expected to grow rapidly as work commences on new offshore wind development.

¹¹ Traditional HVAC and High-efficiency HVAC installers differ in that HEHVAC systems often have very specific certifications or training requirements in order to properly install and maintain the equipment. Manufacturers often require such certifications for warranty purposes, and EPA has a specific credentialing program for ENERGY STAR heating and cooling (see: http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_hvac_contractors_become).

¹² The Solar Foundation, *National Solar Jobs Census 2018*. <https://www.thesolarfoundation.org/national/>

Figure 4. Clean Energy Industry Distribution by Technology, 2016-2019

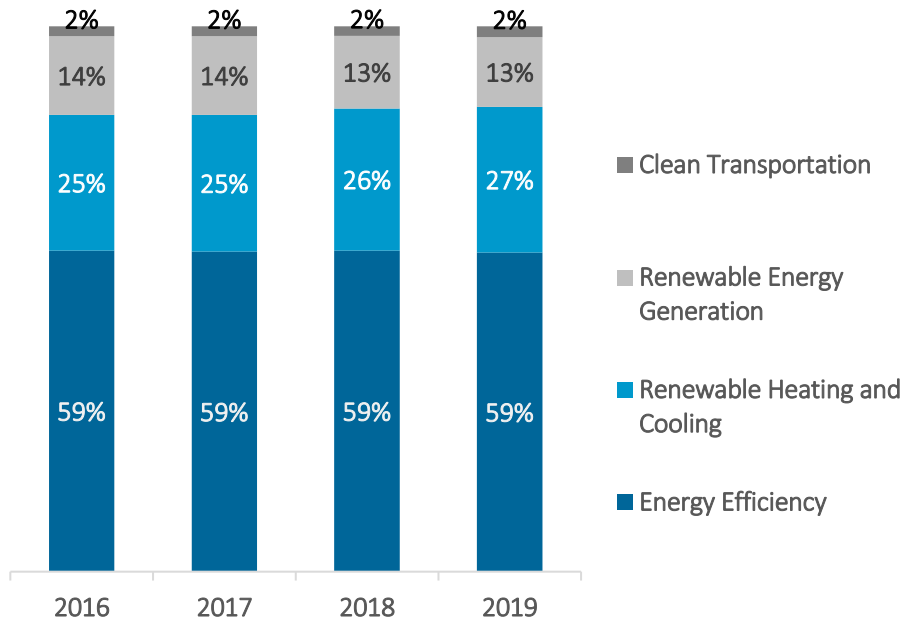


Figure 5. Clean Energy Employment Growth by Technology, 2015-2019

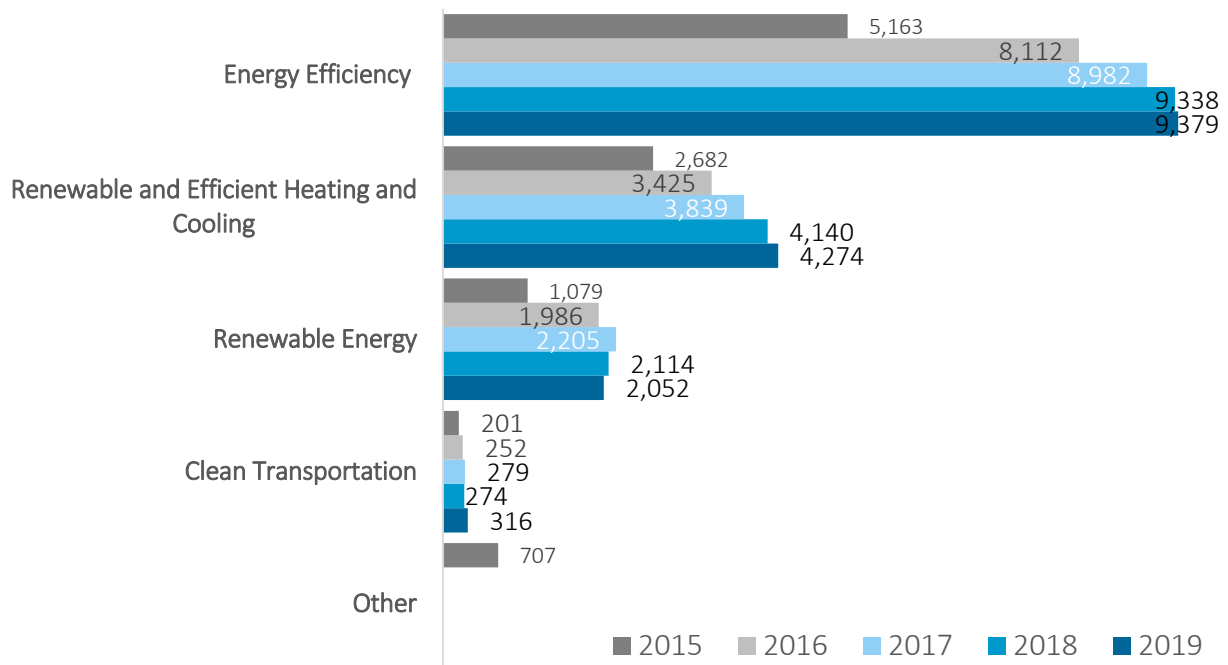


Figure 6. Energy Efficiency Subtechnology Distribution

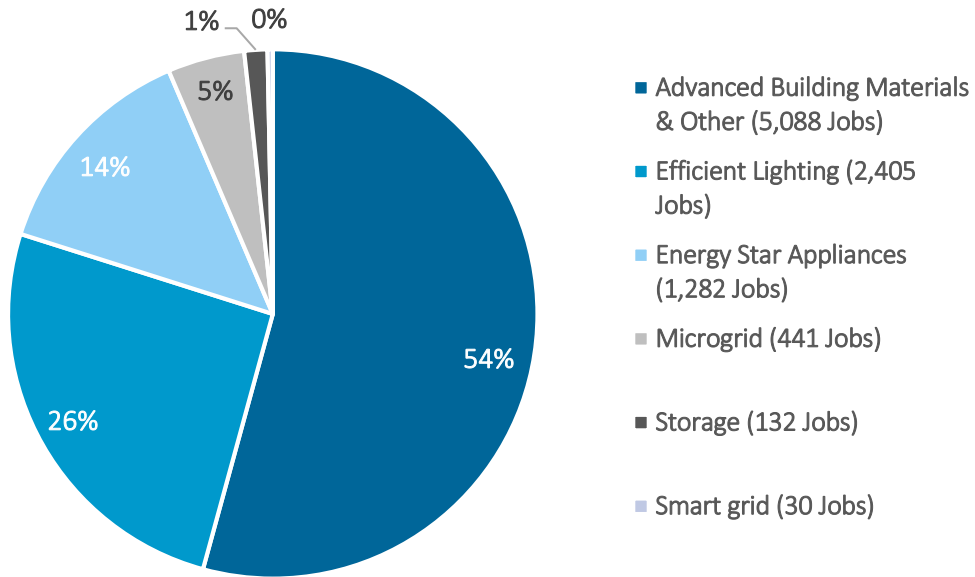
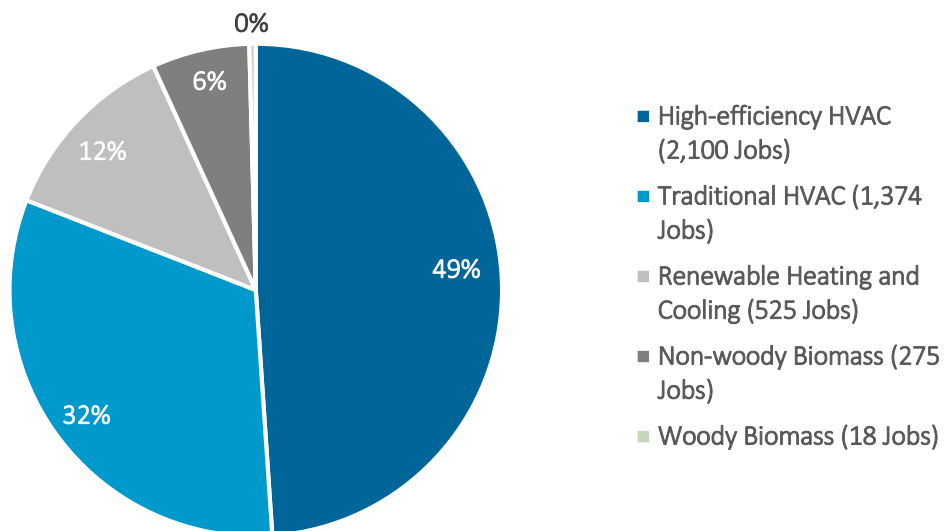


Figure 7. Renewable Heating and Cooling Subtechnology Distribution

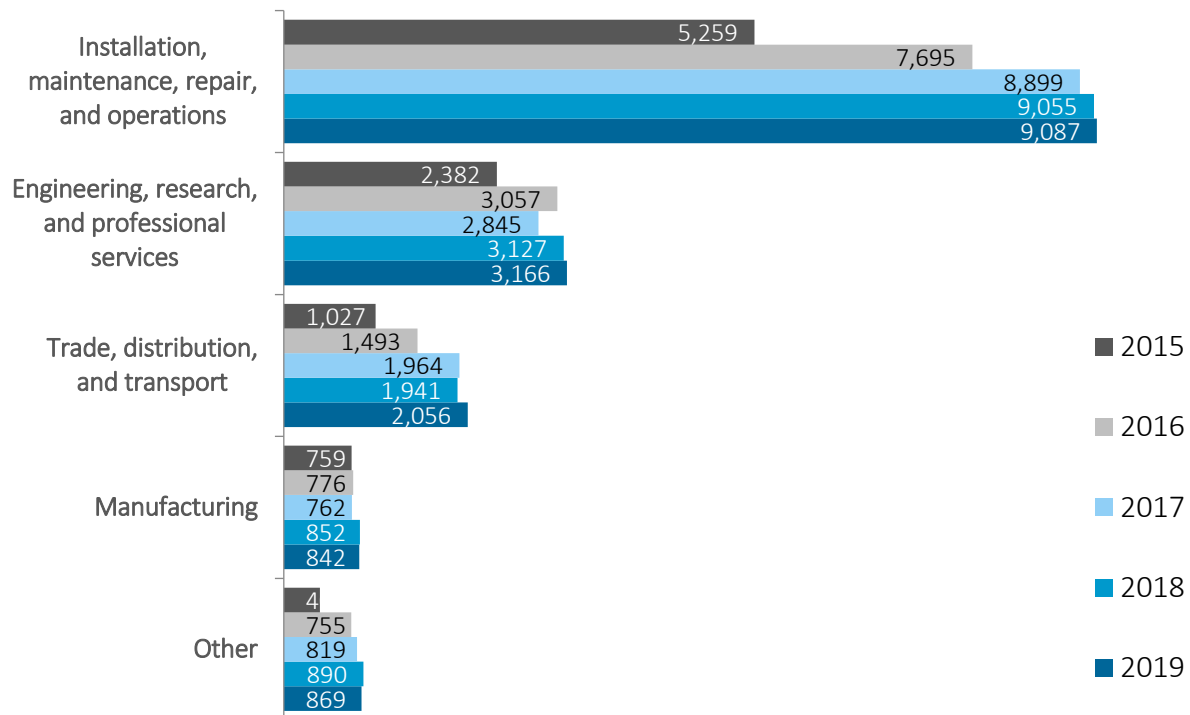




Clean Energy Value Chain Analysis

Installation, maintenance, repair, and operations remains the strong core of the clean energy value chain, employing nearly 9,100 workers in Rhode Island. This value chain has remained stable, adding 32 jobs (0.4% growth) over 2018. However, the intensity metric from earlier in the report, this minor growth does not capture the entire narrative, as installation, maintenance, repair, and operations workers are more focused on clean energy in their day-to-day activities, growing approximately 6% over 2018. Trade, distribution, and transport has experienced the largest growth over 2018, adding 115 jobs (5.9% growth) showing that the clean energy industry in Rhode Island is expanding. Engineering, research, and professional services employment has also grown 1.2%, adding 39 jobs to help support the facilitation of clean energy activities. These increases in trade, distribution, and transport and engineering, research, and professional services are likely to continue to grow, as the offshore wind project ramps up.

Figure 8. Clean Energy Employment by Value Chain, 2015-2019

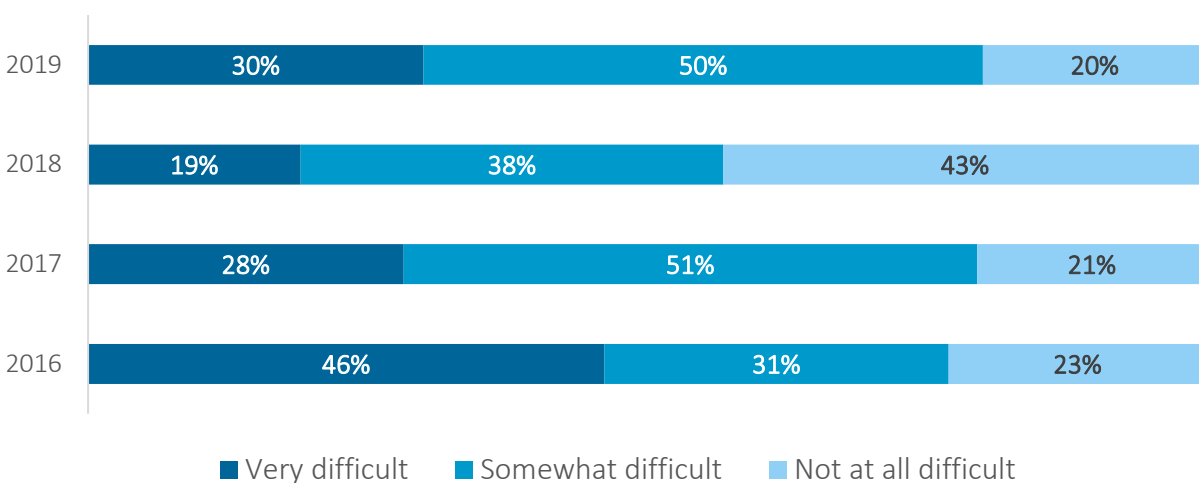


Workforce

This year's Clean Energy Industry Report is the first in the series to include an overall workforce analysis. The analysis details the challenges and opportunities in the clean energy workforce, particularly with regards to talent supply and demand and occupational wages, benefits, and other quality metrics. Analysis provided in the section should prove useful for workforce development groups, prospective clean energy workers, and clean energy policymakers.

Employer-reported information for their difficulty finding proficient talent provides valuable insights for policy development. Overall hiring difficulty over 2018 is the highest since 2016, with 80% of employers reporting difficulty hiring, up 40% from 2018. The occupations that are most difficult to hire in Rhode Island for are technicians/mechanical support, electricians/construction laborers, and sales, marketing, or customer service, similar to national trends in talent supply.¹³ The reasons employers cited for such difficulty are lack of experience, training, or technical skills, competition/small applicant pool, and insufficient qualifications (certifications or education).

Figure 9. Hiring Difficulty, 2016-2019



¹³ <https://www.usenergyjobs.org/2019-state-reports>

Wages, Benefits, and Other Quality Metrics

This report dives deeper into the wages, important areas of knowledge, skills and work activities of some of Rhode Island’s most in-demand, clean energy jobs. Wages in Rhode Island for clean energy workers are often at a premium to traditional workers, save for construction laborers and automotive techs. For example, an entry level HVAC installer working in the energy efficiency industry sector in Rhode Island makes on average about \$6.07/hour (36%) more than the average HVAC installer in Rhode Island. These premiums are less pronounced, but still evident, when workers move to higher pay tiers.

Table 2. Median Hourly Wages

	Renewable Energy Generation			Energy Efficiency		
	Entry	Mid	High	Entry	Mid	High
Sales Reps	\$30.31	\$42.04	\$69.79	\$26.92	\$38.79	\$63.92
Construction Laborers	\$14.39	\$19.60	\$29.22	\$13.82	\$19.09	\$28.84
Electricians	\$20.78	\$30.70	\$42.71	\$19.96	\$29.91	\$42.17
Automotive Service Technicians	\$13.57	\$20.69	\$28.69	N/A	N/A	N/A
HVAC Installer	\$17.46	\$25.35	\$37.16	\$16.87	\$24.47	\$36.84
Team Assemblers	\$12.10	\$16.52	\$26.30	\$11.05	\$15.10	\$24.91
Mechanical Insulation Workers	\$18.72	\$25.85	\$38.53	\$17.99	\$25.18	\$38.04

Table 3. Rhode Island Clean Energy Industry Premiums

	Renewable Energy Generation Premium			Energy Efficiency Premium		
	Entry	Mid	High	Entry	Mid	High
Sales Reps	74%	38%	21%	54%	27%	11%
Construction Laborers	-4%	-16%	-22%	-7%	-18%	-23%
Electricians	39%	31%	14%	34%	28%	13%
Automotive Service Technicians	13%	-2%	-9%	N/A	N/A	N/A
HVAC Installer	41%	21%	7%	36%	17%	6%
Team Assemblers	20%	11%	-2%	9%	2%	-8%
Mechanical Insulation Workers	26%	10%	3%	21%	8%	2%

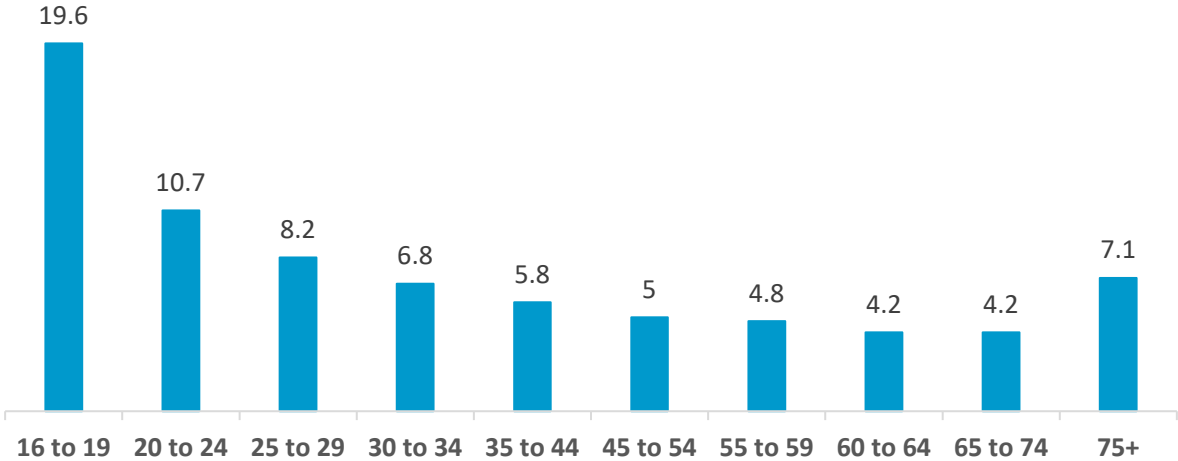
Occupations in the energy industry, such as HVAC installers or electricians, have been the subject of a narrative that describes them as low- or middle-skill jobs because they often do not require a college degree. While HVAC installers do not need a college education to do their jobs well, they certainly need specialized skills and significant experience to succeed. Clean energy workers often need to excel not only in technical aspects of the job, but in soft skills, problem solving, and management aspects as well. Although bachelor’s degrees are typically not necessary to these types of workers, they often need certifications, licenses, lots of experience, and a high school degree or equivalency. Therefore, it is important to note the importance of growing, well-paying jobs that do not require college, the pathways are often as long and complex – if not more so – than obtaining a four-year degree.

Appendix A: Career Cards includes more detail on levels of educational attainment, important work activities, and necessary skills and areas of knowledge for seven clean energy occupations to supplement the wage data provided above.

Talent Supply

Unemployment rates in Rhode Island are highest in young people ages 16 to 34, reaching rates nearly five times the statewide unemployment rate of 4.0%.¹⁴ Those with a high school education or less are also suffering from unusually high unemployment rates in Rhode Island, with high school graduates facing an unemployment rate more than double the state’s rate. It is important to consider these populations when strengthening existing and developing new training programs.

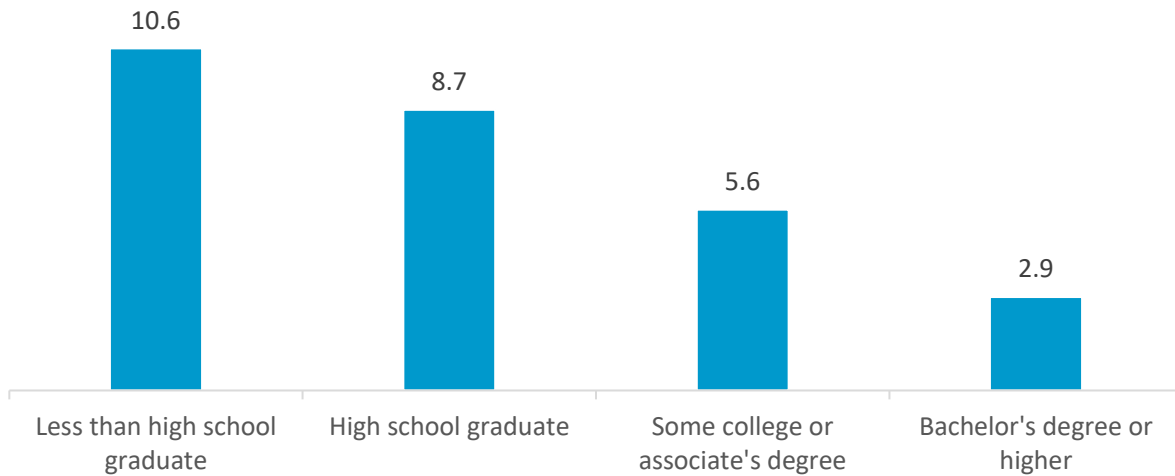
Figure 10. Unemployment Rates by Age¹⁵



¹⁴ BLS LAUS

¹⁵ ACS 2017 5 year estimates

Figure 11. Unemployment Rates by Educational Attainment¹⁶



Many different career and technical training programs are available in Rhode Island through the RI Department of Labor apprenticeship initiatives, Real Jobs Rhode Island, and the various community college campuses found in Providence, Kent, and Newport counties. The populations with the highest unemployment rates in Rhode Island, undereducated and young people, benefit from these types of programs that provide basic education and technical trainings. Apprenticeship programs and on-the-job training (OJT) programs also provide a way for unemployed or underemployed people to gain new skills without sacrificing financially. These programs are also helpful in creating talent pipelines and retaining talent in Rhode Island.

¹⁶ ACS 2017 5 year estimates



Conclusions

Rhode Island is a national leader in the clean energy industry, with consistent and strong employment growth and increases in clean energy work intensity. Clean energy policy is at the fore of Rhode Island government, setting the stage for future growth, innovation, and leadership in clean energies. While clean energy employment in Rhode Island has only grown 1% over 2018, clean energy activities have grown over 5% during that same period. This is evidence of the increase in the amount of workers who spend a majority or all their time performing clean energy related activities.

The energy efficiency sector of the clean energy industry continues to be the strong, steady core for clean energy employment, providing work for approximately 9,400 people. However, renewable energy generation in Rhode Island is expected to soon receive a boost with the incoming 400 MW offshore wind energy generation project and the increases in solar energy generation incentives and policy.

Despite continuous growth in both numbers and intensity, employers are having an increasingly difficult time hiring new workers. Talent shortages due to lack of trainings or lack of education can be addressed through the proliferation of vocational trainings, expanding pre-apprenticeship programs with local unions and employers, and making sure internship programs are reaching the correct demographics. These learn-as-you-work programs also facilitate talent retention in Rhode Island by creating career pipelines for younger and less-educated workers.

Rhode Island is expecting significant and sustained future clean energy growth. In order for this growth to be fully realized, talent shortages must be addressed. Creating and expanding partnerships with workforce development programs will be necessary for clean energy work to flourish. With the appropriate efforts, Rhode Island will make progress towards carbon reduction and sustainability goals, create new economic opportunity for unemployed residents, and continue to grow the state economy.

Appendix A: Career Cards

Appendix A: Career Cards provides insightful information about wages, wage premiums, levels of educational attainment, necessary areas of knowledge, skills, and important work activities for seven clean energy industry occupations. The career cards also include occupations that employers most often draw talent from and occupations that workers are typically promoted to.

Automotive Service Technician

Renewable Energy Generation Median Hourly Wage			Renewable Energy Generation Premium		
Entry	Mid	High	Entry	Mid	High
\$13.57	\$20.69	\$28.69	13%	-2%	-9%

Reported Educational Attainment Levels	Common Certifications	
Master's Degree	0%	Manufacturer-specific certifications
Post-Baccalaureate Certificate	0%	Automotive Service Excellence (ASE) certification
Bachelor's Degree	0%	
Associate's Degree (or other 2-year degree)	6%	
Some College Courses	2%	
Post-Secondary Certificate	49%	
High School Diploma or equivalent (GED)	29%	
Less than a High School Diploma	14%	

Necessary Areas of Knowledge	Necessary Skills	Important Detailed Work Activities
Mechanical	Repairing	Inspect vehicles to determine overall condition.
Customer and Personal Service	Trouble-shooting	Record information about parts, materials or repair procedures.
Computers and Electronics	Quality Control Analysis	Estimate costs for labor or materials.

Adjacent Occupations
Bus and Truck Mechanics and Diesel Engine Specialists (49-3031.00)
Motorcycle Mechanics (49-3052.00)
Outdoor Power Equipment and Other Small Engine Mechanics (49-3053.00)
Motorboat Mechanics and Service Technicians (49-3051.00)
Recreational Vehicle Service Technicians (49-3092.00)

Feeder Occupations: Interns

Promoted to: Lead mechanic

Construction Laborer

Renewable Energy Generation Median Hourly Wage			Energy Efficiency Median Hourly Wage		
Entry	Mid	High	Entry	Mid	High
\$14.39	\$19.60	\$29.22	\$13.82	\$19.09	\$28.84

Renewable Energy Generation Premium			Energy Efficiency Premium		
Entry	Mid	High	Entry	Mid	High
-4%	-16%	-22%	-7%	-18%	-23%

Reported Educational Attainment Levels		Common Certifications	
Master's Degree	0%	Occupational Safety and Health Administration (OSHA) certification	
Post-Baccalaureate Certificate	1%	North American Board of Certified Energy Practitioners (NABCEP) certification	
Bachelor's Degree	0%	International Code Council (ICC) certification	
Associate's Degree (or other 2-year degree)	0%		
Some College Courses	0%		
Post-Secondary Certificate	6%		
High School Diploma or equivalent (GED)	70%		
Less than a High School Diploma	23%		

Necessary Areas of Knowledge	Necessary Skills	Important Detailed Work Activities
Building and Construction	Active Listening	Direct vehicle traffic.
Customer and Personal Service	Coordination	Clean work sites.
Mechanical	Operation and Control	Signal equipment operators to indicate proper equipment positioning.

Adjacent Occupations
Highway Maintenance Workers (47-4051.00)
Rock Splitters, Quarry (47-5051.00)
Helpers--Carpenters (47-3012.00)
Painters, Construction and Maintenance (47-2141.00)
Loading Machine Operators, Underground Mining (53-7033.00)

Feeder Occupations: Helpers, Students
Promoted to: Crew lead, Supervisor, Manager

Electrician

Renewable Energy Generation Median Hourly Wage			Energy Efficiency Median Hourly Wage		
Entry	Mid	High	Entry	Mid	High
\$20.78	\$30.70	\$42.71	\$19.96	\$29.91	\$42.17

Renewable Energy Generation Premium			Energy Efficiency Premium		
Entry	Mid	High	Entry	Mid	High
39%	31%	14%	34%	28%	13%

Reported Educational Attainment Levels		Common Certifications	
Master's Degree	0%	State licensure	
Post-Baccalaureate Certificate	0%	North American Board of Certified Energy Practitioners (NABCEP) certification	
Bachelor's Degree	8%	Occupational Safety and Health Administration (OSHA) certification	
Associate's Degree (or other 2-year degree)	4%	Electrical Journeypersons License	
Some College Courses	4%		
Post-Secondary Certificate	59%		
High School Diploma or equivalent (GED)	18%		
Less than a High School Diploma	8%		

Necessary Areas of Knowledge	Necessary Skills	Important Detailed Work Activities
Building and Construction	Trouble-shooting	Plan layout of construction, installation, or repairs.
Mechanical	Installation	Install electrical components, equipment, or systems.
Mathematics	Repairing	Test electrical equipment or systems to ensure proper functioning.

Adjacent Occupations
Heating and Air Conditioning Mechanics and Installers (49-9021.01)
Plumbers (47-2152.02)
Solar Photovoltaic Installers (47-2231.00)
Wind Turbine Service Technicians (49-9081.00)
Refrigeration Mechanics and Installers (49-9021.02)

Feeder Occupations: Apprentices, Installers

Promoted to: Master electrician, Journeyman, Foreman, Project Manager

HVAC Installer

Renewable Energy Generation Median Hourly Wage			Energy Efficiency Median Hourly Wage		
Entry	Mid	High	Entry	Mid	High
\$17.46	\$25.35	\$37.16	\$16.87	\$24.47	\$36.84

Renewable Energy Generation Premium			Energy Efficiency Premium		
Entry	Mid	High	Entry	Mid	High
41%	21%	7%	36%	17%	6%

Reported Educational Attainment Levels	Common Certifications
Master's Degree	0%
Post-Baccalaureate Certificate	0%
Bachelor's Degree	7%
Associate's Degree (or other 2-year degree)	16%
Some College Courses	6%
Post-Secondary Certificate	55%
High School Diploma or equivalent (GED)	13%
Less than a High School Diploma	4%
	US EPA certification
	North American Technician Excellence (NATE) certification

Necessary Areas of Knowledge	Necessary Skills	Important Detailed Work Activities
Mechanical	Trouble-shooting	Repair pipes to stop leaking.
Building and Construction	Repairing	Test electrical circuits or components for proper functioning.
Customer and Personal Service	Equipment Maintenance	Service heating, ventilation or air-conditioning (HVAC) systems or components.

Adjacent Occupations
Plumbers (47-2152.02)
Electricians (47-2111.00)
Elevator Installers and Repairers (47-4021.00)
Refrigeration Mechanics and Installers (49-9021.02)
Maintenance and Repair Workers, General (49-9071.00)

Feeder Occupations: Service tech, Helper, Installer, Apprentice

Promoted to: Crew lead, Senior service tech, Project supervisor

Sales Representative

Renewable Energy Generation Median Hourly Wage			Energy Efficiency Median Hourly Wage		
Entry	Mid	High	Entry	Mid	High
\$30.31	\$42.04	\$69.79	\$26.92	\$38.79	\$63.92

Renewable Energy Generation Premium			Energy Efficiency Premium		
Entry	Mid	High	Entry	Mid	High
74%	38%	21%	54%	27%	11%

Reported Educational Attainment Levels	
Master's Degree	1%
Post-Baccalaureate Certificate	7%
Bachelor's Degree	35%
Associate's Degree (or other 2-year degree)	9%
Some College Courses	38%
Post-Secondary Certificate	5%
High School Diploma or equivalent (GED)	6%
Less than a High School Diploma	0%

Necessary Areas of Knowledge	Necessary Skills	Important Detailed Work Activities
Customer and Personal Service	Speaking	Develop content for sales presentations or other materials.
Sales and Marketing	Reading Comprehension	Develop proposals for current or prospective customers.
Mathematics	Persuasion	Prepare sales or other contracts.

Adjacent Occupations
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products (41-4011.00)
Real Estate Sales Agents (41-9022.00)
Advertising Sales Agents (41-3011.00)
Energy Brokers (41-3099.01)
Assessors (13-2021.01)

Team Assembler

Renewable Energy Generation Median Hourly Wage			Energy Efficiency Median Hourly Wage		
Entry	Mid	High	Entry	Mid	High
\$12.10	\$16.52	\$26.30	\$11.05	\$15.10	\$24.91

Renewable Energy Generation Premium			Energy Efficiency Premium		
Entry	Mid	High	Entry	Mid	High
20%	11%	-2%	9%	2%	-8%

Reported Educational Attainment Levels	Common Certifications
Master's Degree	0%
Post-Baccalaureate Certificate	0%
Bachelor's Degree	0%
Associate's Degree (or other 2-year degree)	4%
Some College Courses	4%
Post-Secondary Certificate	86%
High School Diploma or equivalent (GED)	6%
Less than a High School Diploma	0%
	Welding certification

Necessary Areas of Knowledge	Necessary Skills	Important Detailed Work Activities
Production and Processing	Coordination	Evaluate quality of materials or products.
Education and Training	Speaking	Package products for storage or shipment.
English Language	Critical Thinking	Read work orders or other instructions to determine product specifications or materials requirements.

Adjacent Occupations
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders (51-4122.00)
Paper Goods Machine Setters, Operators, and Tenders (51-9196.00)
Sawing Machine Setters, Operators, and Tenders, Wood (51-7041.00)
Food and Tobacco Roasting, Baking, and Drying Machine Operators and Tenders (51-3091.00)
Cleaning, Washing, and Metal Pickling Equipment Operators and Tenders (51-9192.00)

Feeder Occupations: Assembler, Technician, General labor
Promoted to: Supervisor, Senior technician, Service manager

Mechanical Insulation Workers

Renewable Energy Generation Median Hourly Wage			Energy Efficiency Median Hourly Wage		
Entry	Mid	High	Entry	Mid	High
\$18.72	\$25.85	\$38.53	\$17.99	\$25.18	\$38.04

Renewable Energy Generation Premium			Energy Efficiency Premium		
Entry	Mid	High	Entry	Mid	High
26%	10%	3%	21%	8%	2%

Reported Educational Attainment Levels	
Master's Degree	0%
Post-Baccalaureate Certificate	0%
Bachelor's Degree	0%
Associate's Degree (or other 2-year degree)	0%
Some College Courses	0%
Post-Secondary Certificate	2%
High School Diploma or equivalent (GED)	68%
Less than a High School Diploma	29%

Necessary Areas of Knowledge	Necessary Skills	Important Detailed Work Activities
Building and Construction	Operation and Control	Cut carpet, vinyl or other flexible materials.
Mechanical	Operation Monitoring	Measure materials or objects for installation or assembly.
Customer and Personal Service	Coordination	Install insulation in equipment or structures.

Adjacent Occupations
Fence Erectors (47-4031.00)
Plasterers and Stucco Masons (47-2161.00)
Helpers--Brickmasons, Blockmasons, Stonemasons, and Tile and Marble Setters (47-3011.00)
Laborers and Freight, Stock, and Material Movers, Hand (53-7062.00)
Tile and Marble Setters (47-2044.00)

Appendix B: Geographic Distribution of Clean Energy Jobs

County	2016 Employment	2017 Employment	2018 Employment	2019 Employment
Bristol County	444	638	439	457
Kent County	2,282	2,586	2,756	2,840
Newport County	1,313	1,603	1,461	1,515
Providence County	8,046	8,424	9,058	9,471
Washington County	1,690	2,054	1,762	1,738

Appendix C: Methodology

The 2019 Rhode Island Clean Energy Industry Report uses publicly available data from the 2019 U.S. Energy and Employment Report (USEER) on Rhode Island Energy employment produced by BW Research Partnership for the Energy Futures Initiative (EFI) and the National Association of State Energy Officials (NASEO). The full 2019 USEER report can be found at: <https://www.usenergyjobs.org/>. These public data are refined and customized for Rhode Island based on additional analyses conducted on behalf of the Rhode Island Office of Energy Resources and Commerce Rhode Island by BW Research Partnership.

The 2019 USEER survey in Rhode Island resulted in more than 3,500 calls and more than 100 business establishments participating in the survey. These responses were used to develop incidence rates among industries as well as to apportion employment across various industry categories in ways currently not provided by state and federal labor market information agencies. The margin of error is +/- 9.71 percent at a 95 percent confidence level. For more details on the USEER methodology, please see: <https://www.usenergyjobs.org/>.