Summary of Massachusetts Clean Energy Center's Workforce Needs Assessment for the City of Lawrence

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Allison Moe

National Renewable Energy Laboratory

Notice

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National Renewable Energy Laboratory
15013 Denver West Parkway
Golden, CO 80401
303-275-3000 • www.nrel.gov

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Background

In July 2023, the Massachusetts Clean Energy Center (MassCEC) published an employment report titled "Powering the Future: A Massachusetts Clean Energy Workforce Needs Assessment."[1] This report was intended to support the State in meeting its 2030 decarbonization goals by identifying both existing workforce and training resources as well as gaps and barriers that need to be addressed in order to scale the State's workforce to meet future demand.

This summary was completed as part of the US Department of Energy's Communities LEAP (Local Energy Action Program) pilot at the request of the Lawrence Stakeholders Coalition (LSC). NREL technical assistance staff, with an expertise in workforce development, reviewed the MassCEC report and summarized findings that support the coalition's goal to understand workforce development resources, opportunities, and gaps in their community. The LSC is led by Browning the Green Space in partnership with Groundwork Lawrence, All In Energy, and the City of Lawrence and has a goal to "Reduce energy burden and create well-paying local jobs and businesses by increasing the distribution and use of sustainable technologies such as heat pumps, community and rooftop solar, and weatherization." This report supports the community's priority to facilitate the creation of jobs and businesses associated with solar energy, electrification, and energy efficiency to drive economic development. Understanding the local workforce and existing training programs and identifying gaps is a first step toward meeting the potential electrification workforce demands.

Baseline Analysis

Figure 1. Massachusetts Northeast Region (MassCEC 2023 p. 113)

Lawrence is located in Essex County, which makes up the majority of what is referred to in the MassCEC report as the Northeast Region. According to the MassCEC report, there were an estimated 15,000 clean energy jobs in the region in 2022, representing 3.3% of all jobs in the region. The report's definitions of clean energy jobs define clean energy workers as workers who spend all or some of their time working in clean energy technology areas.[2] More than two thirds of these clean

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[1] BW Research Partnership, Inc., Slipstream and the Massachusetts Clean Energy Center. 2023. *Powering the Future: A Massachusetts Clean Energy Workforce Needs Assessment*. https://www.masscec.com/resources/massachusetts-clean-energy-workforce-needs-assessment

[2] Keyser, David, Marie Fiori, Betony Jones, Hugh Ho, Shrayas Jatkar, Kate Gordon, Gina Copland-Newfield, Carla Frisch, and Christy Veeder. 2023. *United States Energy and Employment Report 2023*. Department of Energy's Office of Energy Jobs. https://www.energy.gov/sites/default/files/2023-06/2023%20USEER%20REPORT-v2.pdf

energy jobs (10,697) were in energy efficiency, including both new construction and existing building retrofits. The MassCEC report defines "energy efficiency jobs" as those in traditional energy efficiency (e.g., production and installation of insulation/air sealing, ENERGY STAR appliances, and efficient lighting), demand management (e.g., smart grids and energy storage), and clean heating and cooling (production, installation, and maintenance of high efficiency and ENERGY STAR rated heating and cooling systems).[3] Another, approximately, 26% of the jobs (3,778) were in renewable energy.

While there are data from the Bureau of Labor Statistics for solar photovoltaic (PV), heating, ventilation and air conditioning (HVAC), and insulation workers, there are no such data specifically for home energy performance or weatherization workers that upgrade the envelopes and appliances within residential buildings. These jobs are categorized under other occupations, such as insulation or construction workers. As a result, job counts and projections that isolate and quantify energy efficiency jobs by occupation are challenging to estimate. Table 1 reflects key occupations related to solar and building energy.

There are currently 53 training programs in the Northeast Region relevant to the clean energy workforce, approximately three-quarters of which are at vocational and technical high schools. On a region-wide basis, there are gaps in program availability for some environmental justice populations (defined in state statute by the criteria of race, income, and language) closer to Boston. There are three training providers located in Lawrence (Lawrence High School, Lawrence Training School, Inc., and Youth Build), which offer programs related to construction and high-performance buildings, and one in manufacturing. The Greater Lawrence Technical School in Andover also offers programs in general construction, high-performance buildings, and manufacturing. The full inventory is available online in the [Report's workbook](.).

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[3] Massachusetts Clean Energy Center.2022. *2022 Massachusetts Clean Energy Industry Report*. https://www.masscec.com/resources/2022-massachusetts-clean-energy-industry-report
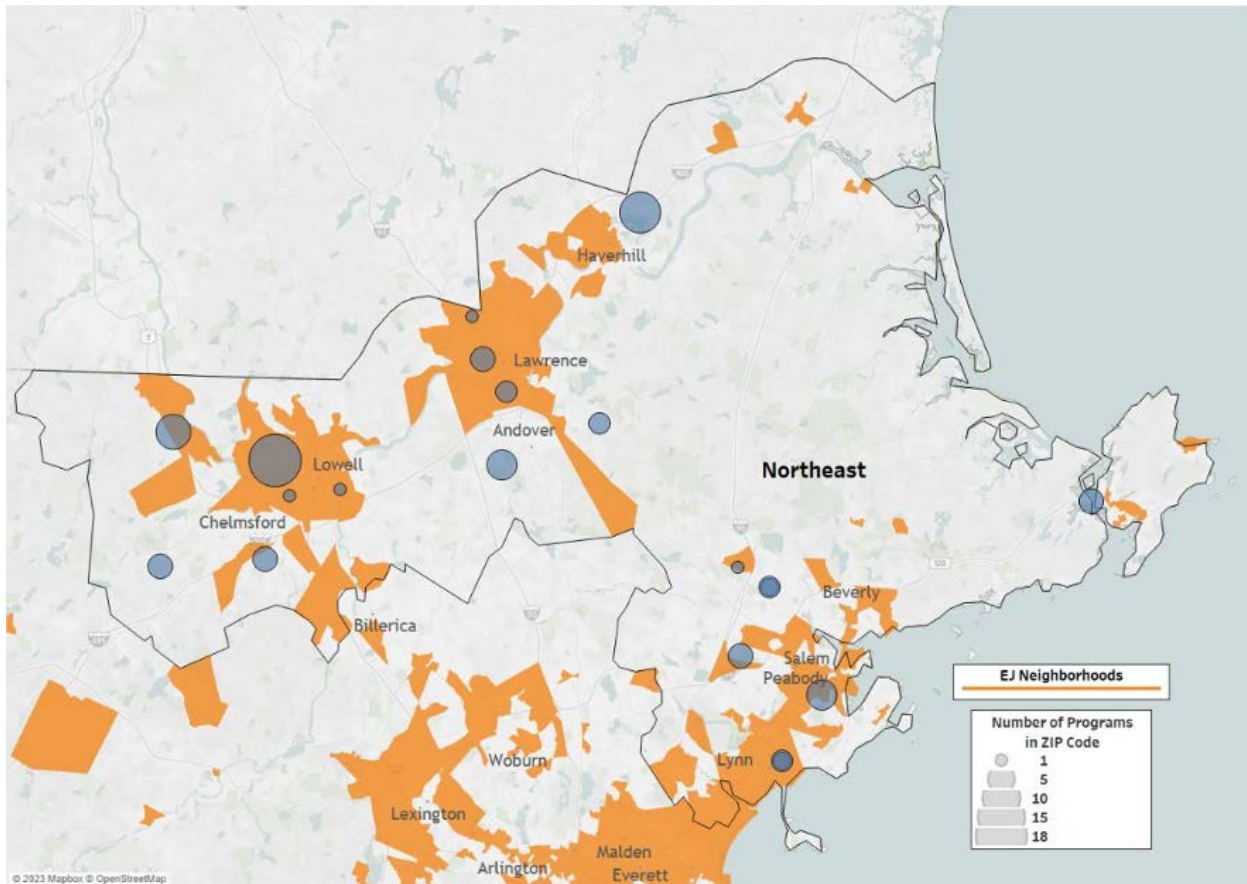
Figure 2. Training Programs and Environmental Justice Neighborhoods in the Northeast Region (MassCEC 2023 p. 114)

Future Projections and Gap Analysis

The report estimates that the Northeast Region would need to add 4,296 additional clean energy jobs by 2030 to meet the State's goals for the region – a 29% increase. However, there is huge variation between technology sectors. To meet the State's goals, Northeast Region jobs in energy efficiency, demand management, and clean heating and cooling would need to grow by an estimated 23% (2,500 jobs), while jobs in alternative transportation would need to more than double, from about 500 jobs to just over 1,000. The occupations with highest anticipated need for growth include electricians (68% growth projected), solar PV installers (40% growth), and construction laborers (33% growth).

Table 1: Solar energy and building energy efficiency jobs future projections and gap analysis.

Select Occupations	2022 Jobs	2030 Additional Projected Jobs Needed	% Increase
Electricians	932	637	68%
Solar PV Installers*	266	105	40%
Construction Laborers	999	329	33%
First Line Supervisors of Construction Trades and Extraction Workers	542	189	35%
Insulation Workers	548	139	25%
Heating, Ventilation, Air Conditioning and Refrigeration Mechanics and Installers	550	92	17%

*Solar PV installers require an electrician's license to work in Massachusetts.

Finding workers is a challenge across many industries in the current economy. In the clean energy sector, Massachusetts lost nearly 13,000 clean energy jobs between 2020 and 2021 in response to the COVID-19 pandemic. Despite 45% of those jobs being re-established by the Fall of 2022, the clean energy workforce has not returned to pre-pandemic levels, making it even harder to meet the anticipated demand for workers by 2030.

Next Steps

The majority of existing training programs in Lawrence and the region are through the state's high schools and technical schools. As noted in the report, there are no community college or union job training opportunities for the occupations in Table 1. The report recommends that this gap be addressed, particularly given the need for electricians and HVAC workers.

Northern Essex Community College has a campus in Lawrence but offers no trades or engineering-related programs. It does offer a Home Inspection Certificate program which includes introductions to structural, electrical, plumbing and HVAC concepts. One area of potential expansion would be for the program to incorporate energy auditing education and/or certification, which is an occupation necessary to the expansion of home energy retrofit work. The report's workbook lists certificates and associate degrees in engineering, construction, electrical, energy auditing and weatherization offered in other Northern Essex Community College locations.

According to a report by the Brookings Institution, most entry-level jobs in the energy efficiency and clean energy industries do not require post-secondary degrees (beyond a high school diploma) or are often based on post-secondary certifications and applied training, which can be offered through community colleges, private or nonprofit training providers, and/or online.[4] The MassCEC report highlights that solar PV installers require an electrician's license to work in Massachusetts.

Community colleges can develop training programs with existing workforce partners to meet this need. The examples of existing programs provided below could be used to model and adapt programs already in and around Lawrence.

The City or other funded organizations would need to determine what specific program types to create (HVAC, Electrical, Solar, Energy Efficiency) based on anticipated local investments and/or policies or programs, and subsequently identify what occupations would be impacted by those investments and how to meet those workforce needs through training programs and recruitment. More information on occupations supported by energy efficiency investments can be found in the [Clean Energy Employment Impacts and Occupational Analyses: Building Envelope and Electrification Upgrades](#) report [prepared by ICF](#) [5] for the Communities LEAP program.

The following are examples of clean energy training programs outside of the Lawrence region that could serve as models for program development within the Lawrence region.

Table 2: Existing Training Program Examples

	Location	Description
Community Colleges		
[Bristol Community College – Electrical Engineering](#)	Fall River; New Bedford	This program prepares students to work as technicians in many positions in solar energy, industrial manufacturing, research and development laboratories, field service, technical writing, and technical sales.
[Bristol Community College – Solar Energy Certificate](#)	Fall River; New Bedford	This certificate is designed to help individuals understand solar power. Students learn about design requirements,

[4] Muro, Mark Adie Tomer, Ranjitha Shivaram, and Joseph Kane. 2019.*Advancing Inclusion Through Clean Energy Jobs*. HYPERLINK "https://www.brookings.edu/wp-content/uploads/2019/04/2019.04_metro_Clean-Energy-Jobs_Report_Muro-Tomer-Shivaran-Kane.pdf"https://www.brookings.edu/wp-content/uploads/2019/04/2019.04_metro_Clean-Energy-Jobs_Report_Muro-Tomer-Shivaran-Kane.pdf

[5] Brown, Mitch, Aaron Lazelle, Bill Prindle, Eliza Johnston and Ridah Sabouni. 2023. *Clean Energy Employment Impacts and Occupational Analyses: Building Envelope and Electrification Upgrades*. ICF Incorporated. https://www.nrel.gov/docs/fy23osti/86711.pdf

		installation guidelines, materials, and resources.
[Bunker Hill Community College – Electrical Technician course](#)	Boston/Online	This course provides an intensive overview of electrical maintenance. You will learn skills needed to work as an electrical technician, including math, inspection, safety, quality, electrical systems, automation, motor controls, and assembly.
[Greenfield Community College – Renewable Energy/Energy Efficiency Program](#)	Greenfield	These RE/EE classes provide students with the knowledge and skills needed for entry-level employment opportunities in the renewable energy/energy efficiency field, as well as broader understanding of the scientific, economic, and political context of the industry.
[Quinsigamond Community College – HVAC Certificate](#)	Worcester	The QCC HVAC/refrigeration (R) program provides successful graduates with the skills needed to enter the HVAC/R field as entry-level technicians who can install, maintain, and repair a wide variety of HVAC/R equipment.
[Roxbury Community College – Center for Smart Building Technology](#)	Boston	This 100-hour program will equip students with Smart Building Technology and Energy Efficiency knowledge and skills.
[Springfield Technical Community College – Electrical Apprenticeship Program](#)	Springfield	Springfield Technical Community College and the Gould Construction Institute have a joint partnership to offer an electrical apprenticeship program. The apprenticeship provides four levels of instruction that comply

		with current regulations of the Board of Electrical Examiners.
Springfield Technical Community College – HVAC Certificate	Springfield	This one-year program prepares students to work in industries such as energy auditing, HVAC systems design, HVAC equipment troubleshooting and repair, and power plants operation.
Springfield Technical Community College – Energy Systems Technology	Springfield	This course of study prepares students to work in various energy fields such as energy auditing, HVAC systems design, HVAC equipment troubleshooting and repair, building management systems and microprocessor controls, and power plants operation.
Bristol Community College – Electrical Engineering	Fall River; New Bedford	This program prepares students to work as technicians in many positions such as solar energy, industrial manufacturing, research and development laboratories, field service, technical writer, and technical sales.
Other Programs		
Cape & Islands Self-Reliance Corporation – Land-based and offshore wind training	Cataumet	This program offers consulting to entities looking to set up an offshore wind training program.
Green Jobs Academy – Training for the Weatherization Assistance Program	Marlborough	This program offers online and in-person training for weatherization installers, crew chiefs and energy auditors. It also offers basic building science and advanced blower door training.

[Northeast Sustainable Energy Association – Building Energy Masters Series](#)	Online	In collaboration with its partner HeatSpring, the Masters Series offers access to the self-paced Master of Building Science.
[Powercorps Boston – building operations](#)	Boston	This program provides skills to support the transition to energy efficiency and carbon reduction in Boston buildings. It is a partnership between PowerCorpsBOS, Roxbury Community College's Center for Smart Building Technology, and A Better City (ABC).

Training Program Examples – Other US Locations

[Bright Solar Futures](#)

The Philadelphia Energy Authority runs a "3-year, 1080-hour solar energy Career and Technical Education (CTE) vocational program. The first of its kind in the nation, the program trains students in solar and battery storage installation, design, sales, weatherization, construction basics, and job site safety. BSF, funded with grants from the U.S. Department of Energy's Solar Energy Technologies Office and PECO, ensures access to solar careers for young Philadelphians, growing a diverse and more equitable workforce that will help make national climate priorities a reality."

[Building Green Futures, Pennsylvania College of Technology](#)

The Pennsylvania College of Technology's Clean Energy Center is a Weatherization Training Center that has launched a three-week collaborative training program. The training includes Building Science Principles education and certification, OSHA 10, as well as career coaching and wrap-around services such as childcare, safety clothing, and travel reimbursement. Community partners help recruit diverse participants, and employer partners offer job shadowing, field visits, and networking opportunities.

[Center for Energy and Environment Minnesota Home Energy Career Training](#)

The Center for Energy and Environment in Minneapolis, Minnesota worked with their utility (Xcel Energy) to develop their Home Energy Career Training geared towards underrepresented groups. This five-week paid training program includes building science education that prepares students for the Building Science Principles credential, hands-on installation training from industry/employer partners, and job site safety training. Trainees are also eligible for transportation assistance through their community partners. At the end of the training, graduates can be placed in a four-month paid internship that includes health insurance with either their utility partner or the local weatherization agency.

[Climate Careers & Opportunity Build Programs](#)

The Rising Sun Center for Opportunity in Richmond, CA offers 4–6-week part time paid energy

efficiency and construction skills training for low-income youth (ages 15-22). Rebuilding Together East Bay North supports them through MC3 Apprenticeship-readiness program (NABTU). Trainees have opportunities for employment with partners for up to 1 year. The program is funded by multiple sources, including WIOA funding.

Knight Green Jobs Training Center
The Energy Coordinating Agency (ECA) in Pennsylvania runs the Green Jobs Training Center, which "prepares unemployed/underemployed young people, returning citizens, veterans, and older workers looking to re-tool their skills to enter the growing clean energy workforce. ECA offers industry-driven training that includes classroom theory, hands-on training, and field experience. We equip our graduates with portable and stackable credentials recognized nationwide and are committed to diversifying the building and energy trades. Our Energy Auditor and Solar PV Installer programs are accredited by the Interstate Renewable Energy Council (IREC), and in 2013 ECA's Training Center was recognized as IREC's 3i Clean Energy Training Program of the Year."

Conclusion

The Northeast Region of Massachusetts, where the City of Lawrence is located, is host to clean energy jobs that represent about 3.3% of all jobs in the region and is home to 53 training programs relevant to the clean energy workforce. Due to the COVID-19 pandemic, however, a substantial number of clean energy jobs were lost and have not been replaced in their entirety, making it harder than before for the state to reach its 2030 decarbonization goals. To close the gap and achieve the goals, the Northeast Region would need a 29% increase in clean energy jobs by 2030 from the 2022 baseline. The highest occupation increases are needed for electricians (68%) and solar PV installers (40%); HVAC workers (17%) are also key to reach the state's goals. The City of Lawrence is home to 3 training programs through the State's high schools and technical schools. As most entry-level jobs in the residential energy efficiency and clean energy industries do not require post-secondary degrees and are often based on certifications, there is potential to help address the job gap through the expansion and addition of training programs, such as in the Northern Essex Community College's Lawrence campus. Existing clean energy training programs elsewhere could be used as models for new training programs in Lawrence and anticipated local investments or programs and policies could help determine what specific trainings are needed in the area.