Report from the Massachusetts Special Commission to Study the Impacts on the Fossil Fuel Workforce

DECEMBER 2025

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Acknowledgments

This report is the culmination of contributions from numerous individuals and organizations. The Special Commission on Fossil Fuel Workforce (Commission) extends its gratitude to all who participated, providing the insights, expertise, and support that were essential to the completion of this report and its recommendations.

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- La Colaborativa (Chelsea), for showcasing job training and workforce development programming and the holistic approach taken to ensure community members have the support and preparation needed to secure careers.
- Joint Apprenticeship Training Program of International Brotherhood of Electrical Workers (IBEW)/Northeast Electrical Contractors Association (NECA Boston), for providing a tour of the training center and detailed information on apprentice programs, curriculum development, and training approach.
- Massachusetts Bay Transportation Authority (MBTA) Everett Main Repair Facility (Everett) for providing data and background on the evolution of training initiatives and programs that create pathways for its workforce as MBTA transitions from internal combustion engine (ICE) bus fleets to hybrid and electric fleets.

- Eversource gas training facility (Shrewsbury) where gas workers and technicians receive hands-on instruction about safety, monitoring, inspection, repair, and installation processes and procedures; Eversource active gas pipeline repair and replacement worksite (Marlborough).
- National Grid active gas pipeline replacement worksite (Woburn).

These contributions helped shape the information, findings, and recommendations included in this report.

Executive Summary

This Executive Summary provides an overview of the genesis, mission, and objectives of the Special Commission on the Fossil Fuel Workforce (Commission). It also provides information on the context in which the Commission conducted its work, the data it collected and analyzed, the opportunities and challenges of the energy transition for policymakers, employers, and workers, and the Commission's findings and recommendations.

Overview of the Special Commission on the Fossil Fuel Workforce

The Commission, established under Section 109 of *An Act promoting a clean energy grid, advancing equity, and protecting ratepayers* (S.2967), was charged with studying the impact of the transition from fossil fuels to clean energy on workers and industries in Massachusetts. Its mandate was to assess fossil fuel workforce impacts, identify ways to expand access to clean-energy employment and training opportunities, and report findings and recommendations to the Massachusetts General Court—or legislature—by December 31, 2025. The legislation also identified the composition of the 21 Commission members, including directly designating members, and providing the Governor of the Commonwealth of Massachusetts and the President of the Massachusetts AFL-CIO with appointments. (See *Appendix A* for statutory language).

Objectives of the Commission

Based on legislative direction, the Commission established the following objectives to guide its work:

1. Provide a clear understanding of the existing fossil fuel workforce, including occupations.
2. Identify future energy jobs needed over the next ten years, both fossil fuel and clean energy.
3. Provide a high-level mapping of current workforce to future needs.
4. Provide an understanding of current workforce needs and existing/available skilled workforce.
5. Provide an overview of existing apprenticeship and other training programs.
6. Identify major barriers and opportunities to pathways to good-paying energy careers.
7. Create a set of actionable recommendations for policymakers, educators, and employers.

To conduct its work, the Commission undertook a comprehensive process to understand the pace, scale, and impact of transitioning from a reliance on fossil fuels to a more electrified energy future powered by renewable and clean energy.

Policy Context for Commission Report and Workforce Implications

The Commission found that policy decisions at both the federal and state levels help shape Massachusetts' workforce transition. Since the Commission began its work, major policy and tax law changes at the federal level disrupted clean energy investment and have injected uncertainty into the pace of project development and deployment for some sectors. Federal rollbacks of tax credits for wind, solar, electric vehicles (EVs), and energy efficiency have negatively impacted investment, and the federal government issued stop-work orders for existing offshore wind projects and halted the issuance of new project permits that were expected to employ thousands of workers.[1]

By contrast, state actions—including the *Mass Leads Act* to accelerate climatetech, updates to the Solar Massachusetts Renewable Target (SMART) program, new energy storage procurements, expansion of Mass Save and geothermal programs, grid-modernization and EV-charging investments, state facility and product procurement targets, and statewide siting and permitting reforms—are helping to sustain momentum and stabilize clean-energy job opportunities.

At the same time, federal immigration enforcement actions have created instability in reaching and accessing some communities and individuals to engage and bring into the energy workforce, while creating supply chain, worker availability, and other challenges. These disruptions ripple across the economy. U.S.-born workers in complementary roles lose jobs, businesses face higher costs, and consumers pay more. For Massachusetts, this compounds uncertainty for workforce planning in energy and related sectors.

The net effect is a more uneven employment landscape for both fossil fuel and clean energy than was initially anticipated by the Commission. Certain clean-energy fields, especially energy efficiency, solar, geothermal, energy storage, nuclear, and fusion, will continue to grow due to strong state leadership, or, in some cases, gaining federal support. Offshore wind, however, faces policy-driven headwinds delaying scale-up of new facilities and thus job creation.

This underscores the need for Massachusetts to align workforce training and retention strategies with realistic expectations about which sectors are most likely to remain stable or grow over the next five to ten years, while maintaining flexibility to respond quickly as federal priorities shift and technology innovation advances.

[1] Georgetown Climate Center. "Understanding Recent Federal Actions | Offshore Wind Development." June 25, 2025. https://www.georgetownclimate.org/articles/admin-actions-restrict-wind-development.html

Balancing Workforce Challenges and Energy System Needs

Studies have found that the state's greenhouse gas emissions mandates and associated reduction pathways will not result in the elimination of all fossil fuel use and, subsequently, jobs.[2] For example, hard-to-electrify sectors such as manufacturing, health care, life sciences, and certain subsectors of transportation and electricity generation will continue to rely on fossil fuels for some time. This ongoing reliance requires a highly skilled workforce to maintain the safety and reliability of the infrastructure and systems needed to deliver these fuels and support operations. Gas utilities, fuel distributors, power plant operators, and service station workers, for example, will continue to be essential as clean energy grows and the overall energy sector transitions.

The transition to net zero by 2050 will reduce overall fossil fuel employment, with varying degrees of additional training, support, and assistance needed to provide pathways into other energy careers, depending on job classification and certification needs. Some occupations, such as Massachusetts Bay Transportation Authority (MBTA) bus mechanics, are already transitioning via on-the-job training to hybrid and electric vehicles,[3] while others, such as natural gas utility jobs, have unique roles and direct links to essential safety functions, making on-the-job training more challenging. The Commission's analysis found that while it cannot predict with certainty the exact timing of major workforce transitions, we should not assume any occupation will no longer exist in the next five to ten years.

The region's growing energy demand—driven by residential and commercial electrification, industrial needs, and possible new data centers—makes this balance especially important. The Independent System Operator of New England (ISO-NE) has emphasized that the loss or delay of major clean energy resources amid rising demand could put strain on the system. Planning should therefore focus on identifying which jobs can transition more easily, which face higher barriers or challenges, and how to ensure workers in both categories are supported. The goal for all energy workers is to find career pathways that build on the wages and benefits many of the fossil fuel workforce receives today.

Policymakers must therefore pursue a dual strategy over the next five to ten years: ensuring the current fossil fuel workforce to safely and reliably maintain and operate existing systems and infrastructure, while simultaneously building a robust pipeline of clean energy workers. This approach centers on people, recognizing that behind every "energy job" are individuals

[2] Mass.gov. "Massachusetts Clean Energy and Climate Plan for 2050." 2022. https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-plan-for-2050

[3] Massachusetts Bay Transportation Authority. "Bus Electrification." 2025. https://www.mbta.com/projects/bus-electrification

and families whose livelihoods depend on thoughtful planning, and protects the Commonwealth's energy reliability and public safety.

The Current Workforce

According to the Massachusetts Clean Energy Center (MassCEC) report *Powering the Future: A Massachusetts Clean Energy Workforce Needs Assessment* (MassCEC *Workforce Needs Assessment*), Massachusetts employed approximately 44,200 fossil fuel workers statewide in 2022.[4] These workers include, for example, gas line mechanics, petroleum and fuel distribution staff, power plant operators, service station attendants, and technicians in motor vehicle and pipeline maintenance. They maintain the infrastructure that provides essential heat, power, and fuel for many Massachusetts' households and businesses.

Each occupation will transition at a different pace, reflecting varied certifications, skills, training needs, and compensation structures, with some covered by collective bargaining agreements. Gas utility pipeline maintenance, for instance, is expected to remain stable through at least 2030. These unionized, highly skilled workers can shift into related pipeline work such as geothermal with additional training. Fuel truck drivers, often holding commercial driver's licenses (CDLs), may be able to transition to other trucking roles, while mechanics will need retraining to service hybrid and electric vehicles. Massachusetts has the opportunity to plan carefully, minimize abrupt displacement, and preserve institutional knowledge while preparing workers for new roles.

Massachusetts' clean energy workforce is currently larger than today's fossil fuel workforce and is expanding. As of 2023, the state employed approximately 115,300 clean energy workers across energy efficiency and clean heating/cooling, renewable generation, clean transportation, and other sectors. Energy efficiency and clean heating/cooling represent the largest share (approximately 76,200 workers), followed by renewable generation (about 29,300), and clean transportation (about 9,400).[5] As these occupations grow, and others are added, it will be critical to ensure that the skills, certifications, and years of experience of the existing fossil fuel workforce are recognized and that efforts are made to seamlessly translate their skills into jobs of equivalent compensation and pathways.

[4] Massachusetts Clean Energy Center. "Powering the Future: A Massachusetts Clean Energy Workforce Needs Assessment." July 2023. https://www.masscec.com/resources/massachusetts-clean-energy-workforce-needs-assessment

[5] Massachusetts Clean Energy Center. "2024 Massachusetts Clean Energy Industry Report." 2024. https://reports.masscec.com/2024/

Opportunities

While the challenges and complexities of the transition are real, the Commission found that it also presents opportunities for Massachusetts' workers and economy. The MassCEC *Workforce Needs Assessment* initially projected the need for 38,000 additional clean energy workers by 2030.[6] However, based on industry gains through 2024, the revised estimate is approximately 29,000 workers by 2030.[7, 8]

Recent changes in federal tax policy for solar, wind, and EVs, coupled with a federally imposed pause on offshore wind will likely alter the pace of this growth overall and within various occupations. However, Massachusetts' state policies and actions will drive continued growth across key sectors, including energy efficiency and smart building management, geothermal drilling and installation, solar deployment and maintenance, offshore wind operations (for existing projects), energy storage deployment and long-duration storage innovation, transportation electrification, grid modernization, and advanced nuclear and fusion development, among others. By leveraging its strengths in research, engineering, construction, operations, and precision manufacturing, the Commonwealth can position itself not only as a leader in developing and deploying these technologies but also as a producer, capturing greater economic value and expanding overall competitiveness through in-state manufacturing of heat pumps, battery components, fusion technology, and grid equipment.

The energy transition also offers a chance to correct historic workforce imbalances by expanding access for women, people of color, environmental justice (EJ) communities, and formerly incarcerated individuals, with wraparound supports such as stipends, child care, transportation assistance, and language access playing a critical role in enabling participation and improving retention in training and apprenticeships. At the same time, unions are indispensable partners, bringing established training infrastructure, strong safety cultures, and proven pathways into family-sustaining careers, while shaping curricula, upholding apprenticeship quality, and aligning training with employer demand to ensure the Commonwealth's goals for reliability, affordability, and equity are met.

[6] Massachusetts Clean Energy Center. "Powering the Future: A Massachusetts Clean Energy Workforce Needs Assessment." July 2023. https://www.masscec.com/resources/massachusetts-clean-energy-workforce-needs-assessment

[7] This estimate accounts for updated job growth data, changes in clean energy sector definitions (exclusion of woody biomass, but addition of bioenergy, hydropower, hybrid EV, and plug-in EV), and alignment between workforce needs and employment estimates).

[8] Massachusetts Clean Energy Center. "2024 Massachusetts Clean Energy Industry Report." 2024. https://reports.masscec.com/2024/

Challenges

Despite momentum, barriers remain. Shifts in federal tax policy, tariffs, and funding are creating uncertainty for investors and driving up construction and related costs. At the same time, current siting, permitting, electric interconnection, and inspection processes and procedures can slow projects and contribute to higher unemployment in certain trades, including among building trades and electricians. Many union-run apprenticeships and training programs are already oversubscribed, even as homeowners and some employers struggle to find workers with specific skills. More aligned and accelerated processes for siting, permitting and interconnection, for example, would enable faster placement of trained workers, allowing for other individuals to participate in these programs.

Similarly, fragmented licensing and certification requirements, such as inconsistent geothermal well-drilling standards across municipalities, create unnecessary barriers, slowing work and job creation. Greater coordination between agencies and standardized requirements would ensure that curricula, worker training, and employer hiring practices remain aligned, predictable, and supportive of the Commonwealth's clean energy future.

Awareness is another challenge. Many schools still emphasize college as the only path, overlooking high-wage, high-demand trade careers. State initiatives such as MassEducate, MassReconnect, the Equity Workforce Training and Climate-Critical Training programs, GROW Apprenticeship, and the Career Technical Initiative are broadening access to education plus industry-recognized credentials and sector-based job training. [9, 10, 11] Utility programs like National Grid's Clean Energy Academies and Eversource's Electric Power Utility Technology program provide direct pathways into skilled, good-paying energy careers, and MassCEC's new *Massachusetts Climate Careers: Powering the Future* curriculum gives educators classroom-ready tools to introduce students to energy career options. Yet financial and logistical barriers—child care, transportation, and language access—continue to limit participation, particularly for lower-income and underrepresented workers. Building on the Healey-Driscoll Administration's workforce agenda to attract, retain, and develop talent, stronger outreach and work supports are essential to ensure Massachusetts develops not only a ready workforce, but an equitable one.

[9] Massachusetts Clean Energy Center. "Equity Workforce Training Implementation Grants." 2025. https://www.masscec.com/program/equity-workforce-training

[10] Massachusetts Clean Energy Center. "Climate-Critical Workforce Training, Equipment & Infrastructure Grants." 2025. https://www.masscec.com/program/climate-critical-workforce-training

[11] Commonwealth Cooperation. "Career Technical Initiative." 2025. https://commcorp.org/program/career-technical-initiative/

Creating Pathways through Apprenticeship, Training, and Certification

Supporting a smooth and equitable transition for fossil fuel workers, while creating opportunities for new entrants to build and operate a safe and reliable energy system, requires clear pathways for training, apprenticeships, and certification. Massachusetts benefits from a strong foundation across these areas, with over 675 active registered apprenticeship programs serving nearly 10,000 apprentices in industries such as construction, IT, and clean energy, among others.[12]

Apprenticeships provide multi-year, paid, "earn-while-you-learn" models that lead to nationally recognized credentials. Pre-apprenticeships introduce individuals to basic trade skills and connect directly to registered programs. Training programs, offered by community colleges, career technical education schools, unions, employers, and workforce development agencies, range from short-term workshops to longer vocational courses, while certification programs validate specialized knowledge, such as solar installation or safety licensing. Together, these pathways create a comprehensive system to support retraining, upskilling, and specialization in the clean energy workforce. However, their sheer number and variation can create challenges for workers, educators, and employers in identifying the most effective route to careers.

Lessons from Past Transitions

The decline of coal in the 20th century illustrates the risk of an unmanaged transition. Coal miners, after decades of struggle to achieve safer conditions, fair pay, and retirement benefits through union advocacy, saw livelihoods diminish as employment declined. Many workers in new energy sectors had to start from scratch, without collective bargaining rights or clear guidance in how to translate skills and training into available careers.[13]

The closure of the Mystic Generating Station (Everett, MA) in 2024, however, demonstrates a different approach to managing workforce transition. Mystic employed approximately 110 full-time workers, most represented by Utility Workers Union of America (UWUA) Local 369. Through advanced planning, these workers were offered redeployment within Constellation Energy (the former owner of the Mystic Generating Station), decommissioning work, or voluntary separation packages and outplacement services.[14] This case illustrates the

[12] Massachusetts Clean Energy Center. "Powering the Future: A Massachusetts Clean Energy Workforce Needs Assessment." July 2023. https://www.masscec.com/resources/massachusetts-clean-energy-workforce-needs-assessment

[13] U.S. Energy Information Administration. "U.S. production of all types of coal has declined over the past two decades." April 8, 2025. https://www.eia.gov/todayinenergy/detail.php?id=64924

[14] U.S. Energy Information Administration. "New England utility closes import-dependent gas-fired power plant, keeps LNG import option." June 24, 2024. https://www.eia.gov/todayinenergy/detail.php?id=62404

importance of proactive transition strategies, skills mapping, and redeployment planning to ensure continuity and fairness.

A just and equitable transition, therefore, requires proactive, data-driven planning and work to ensure that new clean energy jobs are equal to or better than the fossil fuel jobs being replaced in terms of wages, benefits, and safety, and ensure that all communities have access to securing them. The state can enable this by, for example, including labor standards and community engagement requirements into state- and utility ratepayer-supported projects to protect workers, expand opportunities, and help maintain a stable, skilled labor pool across legacy and emerging energy systems.

Conclusion

The Commonwealth's energy transition is underway—but whether it is just and equitable will depend on the choices of policymakers, employers, and educators, alike. A balanced strategy is required: sustaining and valuing the fossil fuel workforce to ensure the reliability and safety of today's energy system, while expanding, diversifying, and strengthening the pipeline for clean energy careers with clear advancement pathways in the future.

The recommendations presented here are designed to ensure that the energy transition strengthens, rather than weakens, the livelihoods of Massachusetts workers and their families. With intentional policies, strong labor standards, and coordinated planning, Massachusetts can model a transition that is both environmentally sustainable and economically just—delivering energy reliability, affordability, and opportunity for all communities.

"Effective programs are designed in close collaboration with employers, unions, and industry associations to ensure that the skills being taught match the roles most needed, whether in energy efficiency retrofits, offshore wind, grid modernization, or electric vehicle infrastructure. This alignment will depend on regularly updating workforce projections to reflect changing technologies, project pipelines, and policy-driven demand. Equally important is conducting realistic assessments of how policies, at both the state and federal levels, will translate into actual job creation, including the timing, scale, and types of roles generated. Without this grounding, training investments risk oversupplying certain skills while leaving critical shortages elsewhere. By continuously linking workforce development strategies to verified demand, Massachusetts can maximize the impact of its programs, avoid mismatches between training and employment opportunities, and ensure that both transitioning fossil fuel workers and new entrants are prepared for sustainable, high-quality careers."

Kristen Gowin
Executive Manager, National Electrical Contractors Association of Greater Boston
Commissioner, Special Commission on the Fossil Fuel Workforce

Summary of Recommendations of the Commission to Policymakers

Recommendation	Description
Expand Investment in Clean Energy Registered Apprenticeships	Commit targeted investment to expand registered apprenticeship opportunities in clean energy sectors (solar, geothermal, energy storage, EV charging, building decarbonization). Support program capacity, curriculum modernization, equipment needs, and employer partnerships. Pair with policies requiring or incentivizing apprentice utilization and labor standards on publicly funded projects.
Prioritize Underrepresented Workers and Work Supports in Registered Apprenticeship Expansion	Dedicate a portion of the registered apprenticeship investment to outreach, recruitment, and retention strategies for women, people of color, EJ communities, and formerly incarcerated people. Provide wraparound support (stipends, child care, transport, language).
Require Contractor Disclosure for State Funded Work	Require contractors on state funded work to disclose use of labor agreements, prevailing wage, and registered apprenticeships. Create a state-supported database linked to program websites listing trade licenses and registered apprenticeship participation. Look to California standards for guidance.
Develop Employer-driven 5- and 10-year Fossil Fuel Workforce Outlook	Convene employers (via MassCEC and Office of Energy Transformation) to understand workforce needs, with recommendations on retention, training, retirement, and knowledge transfer. For Department of Public Utility regulated companies, require plans within 18 months, updated biennially.
Improve Workforce-needs Data Reporting	Disclose registered apprenticeship data (employment on public projects, retention rates). Publish reports on workforce needs, retirements, job creation, and wage/benefit projections tied to fossil fuel and clean energy investments.
Establish a Dashboard to Streamline Training Program Access	Create a state-sponsored dashboard aggregating registered apprenticeship, training, and certification programs. Include application information, prerequisites, skills gained, and career outcomes. Fund Executive Office of Labor and Workforce Development (EOLWD), Executive Office of Energy and Environmental Affairs, MassCEC, Department of Elementary and Secondary Education, and Department of Higher Education to build a skills/certification mapping tool.
Align Licensure and Certification Requirements	Authorize Division of Occupational Licensure to develop standard non-licensure certifications for municipalities. Certifications should feed into licensed trades and support pre-apprenticeship and career advancement.
Assess Workforce Impacts of Policy Changes to Inform Planning	Require workforce impact assessments (job creation/losses) to accompany policies and programs that advance clean energy and reduce emissions.

Recommendation	Description
Prioritize Use of In-House Utility Workforce for Ratepayer Funded Projects	Work with utilities to prioritize use of in-house workforce for new energy systems (e.g., geothermal networks). Provide support to utilities for training in-house workforce on new, clean energy technologies.
Expand Registered Apprenticeship Tax Incentives	Expand Registered Apprenticeship Tax Credit (RATC) to include new occupations, such as Geothermal Drilling Operators, Millwrights, Pile Driver Operators, Logisticians/Project Managers, First Line Supervisors. The RATC provides 50% of apprentice wages up to $4,800, for up to two years for occupations approved by EOLWD.

FULL REPORT

Introduction

What is the Special Commission on the Fossil Fuel Workforce?

The Special Commission on the Fossil Fuel Workforce (Commission) was formed by Section 109 of *An Act promoting a clean energy grid, advancing equity, and protecting ratepayers* (S.2967). The statute states that "there shall be a special Commission to study the impacts on the fossil fuel workforce caused by public and private efforts to reduce greenhouse gas emissions and transition from fossil fuels to clean energy. The Commission shall seek to measure and monitor the impact on fossil fuel workers and industries and examine ways to increase access to employment, training, and workforce opportunities in clean energy industries and related fields."[15] (The full legislative text can be found in *Appendix A. Section 109 of An Act promoting a clean energy grid, advancing equity and protecting ratepayers (S.2967)*.)

The Commission was tasked with reviewing and reporting on the impacts of the energy transition on fossil fuel workers and industries, while identifying strategies to expand access to employment, training, and workforce opportunities in the growing clean energy sector and related fields. Per statute, the Commission is required to submit findings and recommendations to the Massachusetts General Court—or legislature—by December 31, 2025.

The legislation outlines the structure and leadership of the Commission, which is co-chaired by the Massachusetts Undersecretary of Labor and Workforce Development, Josh Cutler, and the Executive Director of the Massachusetts Office of Energy Transformation (OET), Melissa Lavinson. See Table 1 below for Commission member designations and appointments.

Table 1. Commission Members

Designated Seat	Member	Affiliation
Co-Chair – Commissioner Department of Energy Resources (DOER) or designee	Melissa Lavinson, co-chair	Executive Director, Office of Energy Transformation
Co-Chair – Secretary of Executive Office of Labor and Workforce Development (EOLWD) or designee	Josh Cutler, co-chair	Undersecretary of Labor and Workforce Development

[15] Massachusetts General Court. "An Act Promoting a Clean Energy Grid, Advancing Equity and Protecting Ratepayers." November 20, 2024. https://malegislature.gov/Laws/SessionLaws/Acts/2024/Chapter239

Designated Seat	Member	Affiliation
Secretary of Economic Development or Designee	Commissioner Sarah Wilkinson	Commissioner of Division of Occupational Licensure (DOL) and Office of Public Safety and Inspections (OPSI), Executive Office of Economic Development (EOED)
Undersecretary (US) of Environmental Justice (EJ) and Equity or Designee	María Belén Power	Undersecretary of Environmental Justice & Equity
Chief Executive Officer (CEO) of Massachusetts Clean Energy Center (MassCEC) or Designee	Jennifer Applebaum	Managing Director of Workforce Development, MassCEC
Governor appointed: Representative of employer in gas utility sector	Nikki Bruno	Vice President, Thermal Solutions and Operational Services at Eversource Energy
Governor appointed: Representative of employer in electric power generation sector	Chris Sherman	Senior Vice President at Cogentrix Energy, LLC
Governor appointed: Representative of employer in renewable electricity sector	Kristen Gowin	Executive Manager, National Electrical Contractors Association of Greater Boston (NECA)
Governor appointed: Representative of employer in energy efficiency sector	Abel Vargas	President, Valley Home Insulation
Governor appointed: Representative of employer in clean transportation sector	Amy McGuire	Senior Director, Market Development at Highland Electric Fleets
Governor appointed: Representative of employer in clean heating sector	Lawrence Lessard	Director, Achieve Renewable Energy, LLC
Governor appointed: Representative of higher education university with expertise in labor policy and fossil fuel or clean energy workforce	Mark Melnik	Director, Economic & Public Policy Research at UMass Donahue Institute

Designated Seat	Member	Affiliation
Governor appointed: Representative of higher education university with expertise in labor policy and fossil fuel or clean energy workforce	John Cook	President, Springfield Technical Community College
President AFL-CIO appointed: Representative of employees in gas utility sector	Steve Finnigan	Sub District Director, United Steelworkers (USW)
President AFL-CIO appointed: Representative of employees in electric power generation sector	Daniel Leary	President, Utility Workers Union of America (UWUA) Local 369
President AFL-CIO appointed: Representative of employees in clean energy sector	Dave Keating	International Representative, International Brotherhood of Electrical Workers (IBEW) Region 2
President AFL-CIO appointed: Representative of employees in clean energy sector	Harry Brett	International Representative, United Association (UA)
President AFL-CIO appointed: Representative of employees in transportation sector	Michael Vartabedian	Assistant Directing Business Representative, International Association of Machinists and Aerospace Workers (IAM)
President Massachusetts Building Trades	Frank Callahan	President, Massachusetts Building Trades Unions (MBTU)
US Environmental Justice and Equity appointed: Representative of environmental justice community	Greandoll Oliva	Youth Leader in Chelsea and Community Organizer, GreenRoots
US Environmental Justice and Equity appointed: Representative of environmental justice community	Ana Sofia Amieva-Wang	Senior Program Director, La Colaborativa

Commission Work and Objectives

Building on legislative direction, the Commission established the following objectives to guide its work:

1. Provide a clear understanding of the existing fossil fuel workforce, including occupations.
2. Identify future energy jobs needed over the next ten years, both fossil fuel and clean energy.
3. Provide high-level mapping of current workforce to future needs.
4. Provide an understanding of current workforce needs and existing/available skilled workforce.
5. Provide an overview of existing apprenticeship and other training programs.
6. Identify major barriers and opportunities to pathways to energy careers.
7. Create a set of actionable recommendations for policymakers, educators, and employers.

The Commission undertook a comprehensive process to understand the pace, scale, and impact of transitioning from a reliance on fossil fuels to a more electrified energy future powered by renewable and clean energy. This work involved extensive engagement with stakeholders, including labor unions, businesses, training partners, and community members to gather on-the-ground insights and perspectives.

For example, the Commission heard directly from stakeholders at its meetings, including the Barr Foundation, Emerald Cities, the Fountain Fund, and National Grid. It also conducted five site visits to engage with and directly observe existing training and workforce development programs from community-based organizations and employers working in diverse aspects of the energy industry (e.g., mechanics, gas pipeline workers, heating, ventilation, and air conditioning (HVAC) technicians, electric workers, geothermal).[16] The Commission as a whole met nine times over the course of 2025, with all meetings open to the public, to review information, data, and analyses, share perspectives, and discuss current energy sector practices and workforce needs. Discussions focused on current needs and status, skill sets, future trends, and impacts of evolving policies at the state and federal levels on the pace and timing of the workforce transition.[17]

Report Focus

This report presents the findings of the Commission on the current and future state of Massachusetts' energy workforce. It begins with an overview of the existing energy workforce, including fossil fuel and clean energy employment, and outlines projected changes over the next decade. The report then explores the role of apprenticeships and workforce training

[16] In-person site visits were made to: La Colaborativa (Chelsea), the IBEW/NECA Joint Apprenticeship Training Center (Boston), MBTA Everett Main Repair Facility (Everett), Eversource Gas Training Facility (Shrewsbury) and worksite (Marlborough), and National Grid Gas Replacement Worksite (Woburn).
[17] All Commission meetings were held in hybrid format (in person and virtual), with a link for the public to listen and ask questions. Meeting minutes and all meeting materials were posted on the Commission website: https://www.mass.gov/info-details/commission-on-fossil-fuel-workforce-meeting-materials

programs in supporting the transition of workers impacted by the shift from fossil fuels to a more electrified, low-carbon energy system. It next highlights key challenges and opportunities in this transition, including common barriers to accessing energy jobs, particularly among underrepresented populations. Based on this analysis, the report concludes with a set of recommendations for policies and initiatives to support fossil fuel workers and ensure an equitable and inclusive energy workforce.

Defining and Understanding the Energy Workforce

At the outset, the Commission acknowledged that the energy workforce encompasses far more than those engaged directly in building, installing, operating, and maintaining energy systems. While these skilled trades and technical roles are essential, energy workers also include those designing, engineering, inspecting, manufacturing, delivering, and providing the business, financial, and administrative support that keeps the sector running. This broad definition ensures that all the individuals whose livelihoods depend on the energy system are recognized.

For purposes of this report, the Commission used the definition of the fossil fuel workforce from the MassCEC. MassCEC defines this workforce as workers active in, for example, fossil fuel-based transportation, fossil fuel-based power generation, petroleum fuels, natural gas storage, and natural gas delivery. In practice, this includes individuals who are natural gas utility employees, oil and fuel delivery drivers, power plant operators and technicians, pipeline maintenance crews, mechanics, and others in related fields. It also extends to those performing engineering, administrative, and business functions such as safety and compliance, finance, accounting, human resources, and regulatory compliance that support fossil fuel industries.

The Commission also used the MassCEC definition of clean energy worker: a person who spends some portion of their time working in renewable and low-carbon energy, energy efficiency, clean transportation, or other carbon management technologies. Examples of these workers include solar and wind installers, geothermal drillers, electricians, construction workers, energy efficiency specialists, and battery technicians, as well as the engineers, designers, inspectors, manufacturers, and logistics professionals who make projects possible.[18]

By understanding the full scope of the energy workforce and using these inclusive definitions, Massachusetts can more accurately assess the full scope of job impacts during the energy transition, capturing not only the frontline technical and craft workforce but also the wide array of professional, support, and business roles that underpin the state's energy system.

[18] Massachusetts Clean Energy Center. "2024 Massachusetts Clean Energy Industry Report." 2024. https://www.masscec.com/resources/2024-massachusetts-clean-energy-industry-report

Overview of the Current Energy Workforce

As Massachusetts advances toward a clean energy economy, it faces both opportunities and challenges for its workforce. The shift towards clean energy will impact workers in fossil fuel sectors while creating new openings in expanding clean energy fields. The fossil fuel workforce has long been central to powering the state and maintaining critical infrastructure for Massachusetts' gas, power generation, delivered fuel, and petroleum systems. According to the MassCEC report, *Powering the Future: A Massachusetts Clean Energy Workforce Needs Assessment* (MassCEC *Workforce Needs Assessment*), there were approximately 44,200 fossil fuel workers statewide in 2022.[19]

As of the end of 2023, Massachusetts employed approximately 115,300 clean energy workers across renewable energy, clean transportation, energy efficiency, demand management, and clean heating and cooling sectors.[20] The energy efficiency, demand management and clean heating and cooling sector represents the largest share—approximately 76,200 jobs—including occupations such as HVAC technicians, building energy auditors, and insulation technicians. Renewable energy (including, for example, solar, wind, other renewable energy generation sources, and geothermal) supports roughly 29,300 workers, including occupations such as solar photovoltaic installers, wind turbine service technicians, and geothermal engineers, pipefitters, and welders.[21] Clean transportation, including electric, hybrid, and hybrid plug-in vehicle services and other clean transportation, employs about 9,400 workers.[22] *Appendix B. Industry Definitions and Employment Numbers* provides additional details on the occupations and jobs conducted by both fossil fuel and clean energy workers.

According to the MassCEC *Workforce Needs Assessment*, clean energy employment had been expected to grow more than 35% by 2030, or nearly 38,000 new workers, driven by the state's climate and clean energy goals, with this growth concentrated in approximately 20 high-demand occupations. These projections, however, are likely to be impacted by changes to federal tax policies and associated federal actions that have stopped new offshore wind

[19] Massachusetts Clean Energy Center. "Powering the Future: A Massachusetts Clean Energy Workforce Needs Assessment." July 2023. https://www.masscec.com/resources/massachusetts-clean-energy-workforce-needs-assessment

[20] Massachusetts Clean Energy Center. "2024 Massachusetts Clean Energy Industry Report." 2024. https://www.masscec.com/resources/2024-massachusetts-clean-energy-industry-report

[21] Massachusetts Clean Energy Center. "2024 Massachusetts Clean Energy Industry Report." 2024. https://www.masscec.com/resources/2024-massachusetts-clean-energy-industry-report

[22] Massachusetts Clean Energy Center. "2024 Massachusetts Clean Energy Industry Report." 2024. https://www.masscec.com/resources/2024-massachusetts-clean-energy-industry-report

development and curtailed support for solar, electric vehicles (EVs), and energy efficiency.[23, 24] Some are estimating that these changes could either reduce this anticipated growth or result in actual job losses by 2035 in some sectors, like offshore wind.[25]

Key Considerations

Throughout its work, the Commission identified and kept a series of key considerations in mind to guide its analysis and recommendations. These considerations reflect both the immediate needs of today's workforce and the long-term requirements of a successful, equitable, and durable transition.

As Massachusetts transitions toward its net zero emissions mandates, as established by the state legislature, the state must maintain the safety and reliability of the existing energy system while simultaneously preparing for a new one. This dual responsibility requires intentional planning to avoid disruptions and to ensure continuity of service, even as fossil fuel infrastructure is phased down. The closure of the Mystic Generating Station, for example, demonstrated the importance of proactive workforce planning, where redeployment, retraining, and clear pathways were provided for workers.[26]

At the same time, new energy industries must be built with a clear vision of workforce needs. This means mapping out the skills required for in-demand jobs, aligning training and apprenticeship programs, and providing workers with opportunities for advancement. Offshore wind Project Labor Agreements (PLAs), such as Vineyard Wind's agreement with regional building trades, show how intentional commitments can generate high-quality careers, diversify the workforce, and ensure strong safety and wage standards from the outset. By contrast, industries where training is inconsistent illustrate the potential risks to workers and public safety and of meeting consumer expectations.

To ensure the energy transition benefits both workers and the state, new clean energy jobs should reflect the same high standards achieved in existing unionized energy workforces: fair wages, strong benefits, safety protections, and structured career ladders.

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[23] Energy Innovation. "Economic impacts of the U.S. "One Big Beautiful Bill Act" Energy Provisions on Massachusetts." July 4, 2025. https://energyinnovation.org/wp-content/uploads/OBBBA-impacts-on-Massachusetts.pdf

[24] Mass.gov. "Governor Healey responds to Trump Administration's cancellation of $34 million for Salem offshore wind terminal." August 29, 2025. https://www.mass.gov/news/governor-healey-responds-to-trump-administrations-cancellation-of-34-million-for-salem-offshore-wind-terminal

[25] Molly Farrar. "'It's a big blow': Planned offshore wind manufacturing plant that earned Somerset a visit from Biden is canceled." *Boston.com.* January 23, 2025. https://www.boston.com/news/environment/2025/01/23/its-a-big-blow-planned-offshore-wind-manufacturing-plant-that-earned-somerset-a-visit-from-biden-is-canceled/

[26] U.S. Energy Information Administration. "New England utility closes import-dependent gas-fired power plant, keeps LNG import option." June 24, 2024. https://www.eia.gov/todayinenergy/detail.php?id=62404

Examples of Policies and Actions Demonstrating Pathways for Union Labor in Clean Energy

Geothermal

Pipefitters with UA locals are building geothermal projects statewide including at Smith College, the Holyoke Soldiers' Home, and UMass Amherst. As of September 2025, workers earned $81.56 per hour in total compensation (wages, pension, health, and welfare).[27] Apprenticeship funds are built into these rates, supporting training for the next generation. Governor Healey's proposed *An Act Relative to Energy Affordability, Independence and Innovation* would require utilities to prioritize use of in-house labor on ratepayer funded thermal energy network projects and ensure that outsourced work pays prevailing wage or uses union labor, reinforcing strong labor standards in the clean energy transition.

Solar, Storage, and Efficiency

Electricians with IBEW Local 103 and NECA earn $61.86 per hour in wages, with total compensation of $105.11 including healthcare and pension.[28] They have delivered hundreds of clean energy projects across Massachusetts—ranging from solar installations to battery storage facilities and efficiency upgrades.

Offshore Wind

Offshore wind has set a new benchmark for energy careers. Vineyard Wind's 2021 PLA with the Southeastern Massachusetts, Cape Cod, and Islands Building Trades Unions secured fair wages, benefits, safety standards, and created over 1,400 construction jobs.[29] The PLA also funded Building Pathways South, a pre-apprenticeship program connecting local and underrepresented workers to registered apprenticeships.

Equity must also be in front of mind for workforce development and the transition. Reports from the Barr Foundation highlight that women and people of color remain underrepresented in energy careers, despite opportunities for entry.[30] Expanding inclusive pathways requires coordinated action among unions, employers, training providers, and community organizations to remove systemic barriers, with models already existing.[31]

[27] UA Local 51. "Pipefitting." 2025. https://ualocal51.com/training?pID=what-is-pipefitting
[28] Union Pay Scales. "IBEW Electrician Pay Scales." 2025. https://unionpayscales.com/trades/ibew-electricians/
[29] Vineyard Wind. "Report Shows Vineyard Wind Far Exceeded Job Creation And Economic Output Projections During Development And Early Construction Period." February 16, 2023. https://www.vineyardwind.com/press-releases/2023/2/16/report-shows-vineyard-wind-far-exceeded-job-creation-and-economic-output-projections-during-development-and-early-construction-period
[30] The Barr Foundation. "Access to Clean Energy Jobs: Expanding Opportunities." 2023. https://www.barrfoundation.org/wp-content/uploads/2025/03/BF_CleanEnergyWrkfrce_Rprt_r3.pdf
[31] Building Pathways South. "Home." n.d. https://www.buildingpathwayssouth.com/

Finally, the Commission recognized that achieving a just and equitable transition will require consistent and reliable public policies that avoid the "start-stop" cycles that have historically disrupted, and are currently disrupting, energy investment and workforce planning. For example, the Commission faced added complexity in its work due to shifting federal policies, the loss of anticipated federal funds for clean energy projects, and broader economic uncertainty, both because of tariffs and immigration enforcement. As the state develops and advances energy policies, considering and analyzing the effects of policies on the relevant workforce is critical to establishing a baseline understanding of impacts and needs.

Implications of Policy on Pace and Focus of the Workforce Transition

The Commission found that policy is a powerful tool for shaping economic growth, energy development, and job creation. Well-designed policies can accelerate investment, speed the deployment of clean energy technologies, and ensure that new jobs are high-quality and sustainable. Conversely, abrupt policy changes can disrupt progress, slow private investment, and create instability in both energy markets and the labor force.

During the Commission's deliberations, federal policy moved away from advancing clean energy. Key shifts included, for example, the accelerated phase-out or elimination of tax credits for renewable energy, energy efficiency technologies, and EVs; the rollback of programs supporting clean energy and clean transportation; the withdrawal of planned offshore wind lease areas; stop work orders for existing offshore wind projects; and reduced grant funding for critical infrastructure and programs.[32] At the same time, federal energy policy increasingly emphasized the maintenance and expansion of fossil fuel systems while maintaining and providing new support for nuclear, fusion energy, hydropower, and geothermal technologies.[33]

These federal actions have had a tangible impact on Massachusetts and the broader clean energy economy. They are expected to slow the pace of deployment in critical sectors such as offshore wind, solar, and energy efficiency, thereby dampening private investment and constraining the anticipated scale of job creation. The stop-and-start nature of policy not only undermines investor confidence but also complicates workforce planning, making it harder for training programs, unions, and employers to align skills with future labor demand.

[32] Amalia Huot-Marchand. "Trump's war on wind, solar rattles clean energy industry." *The Hill.* August 26, 2025. https://thehill.com/policy/energy-environment/5469700-trump-clean-energy-rollback-impact/
[33] The White House. "Reinvigorating the Nuclear Industrial Base." May 23, 2025. https://www.whitehouse.gov/presidential-actions/2025/05/reinvigorating-the-nuclear-industrial-base/

Examples of Federal Actions Impacting the Clean Energy Sector and Associated Job Growth

- **Rollback of Clean Energy Tax Credits in the One Big Beautiful Bill Act (OBBBA)**[34]
  - Phasedown or elimination of federal Investment Tax Credit (ITC) for solar.
  - Reduction in Production Tax Credit (PTC) support for wind.
  - Rollback of credits for energy efficiency upgrades and EVs.
  - Limits on transferability and monetization provisions supporting financing.
  - Repeal of bonus credits for prevailing wage.
- **Trump Administration Executive Orders**
  - Rescinding federal climate guidance and directing agencies to prioritize fossil fuel development.[35]
  - Weakening federal procurement standards for energy efficiency and renewable adoption across federal facilities.[36]
  - Revising vehicle fuel-economy and emissions standards, undermining EV deployment.[37]
- **Congressional & Administrative Actions**[38]
  - Reducing funding for U.S. Department of Energy (DOE) loan guarantees, renewable research and development (R&D), and efficiency programs.
  - Repealing or limiting appliance and building efficiency standards (lighting, HVAC, industrial motors).
  - Imposing tariffs on imported solar panels and products needed to build clean energy and related infrastructure.
  - Blocking offshore wind leasing and permitting processes and issuing stop work orders.
  - Weakening of U.S. Environmental Protection Agency (EPA) enforcement and policies, affecting renewable integration and grid decarbonization.

[34] Valerie Volcovici and Nichola Groom. "US House targets big climate, clean energy rollbacks in budget proposal." *Reuters*. May 13, 2025. https://www.reuters.com/sustainability/climate-energy/us-house-targets-big-climate-clean-energy-rollbacks-budget-proposal-2025-05-12/

[35] The White House. "Unleashing American Energy." January 20, 2025. https://www.whitehouse.gov/presidential-actions/2025/01/unleashing-american-energy/

[36] The White House. "Unleashing American Energy." January 20, 2025. https://www.whitehouse.gov/presidential-actions/2025/01/unleashing-american-energy/

[37] The White House. "Unleashing American Energy." January 20, 2025. https://www.whitehouse.gov/presidential-actions/2025/01/unleashing-american-energy/

[38] Xan Fishman, Zahava Urecki, Jack McGee, Daniel Elizalde. "2025 Reconciliation Debate: One Big Beautiful Bill Act Energy Provisions." *Bipartisan Policy Center*. July 28, 2025. https://bipartisanpolicy.org/explainer/2025-reconciliation-debate-one-big-beautiful-bill-act-energy-provisions/

Recent setbacks illustrate the challenge. Prysmian Cable cancelled plans for a manufacturing plant in Somerset, eliminating an anticipated 250 high-paying, ongoing jobs.[39] With the slashing of incentives for solar and wind, ending bonus credits tied to prevailing wage and apprenticeships, and imposing strict sourcing rules for battery storage as a result of the OBBBA, analysts project Massachusetts could lose 3,700 of its anticipated jobs by 2035.[40] Federal funding cuts have also compounded lost job potential. For example, the EPA's Solar for All program, which was set to deliver $156 million, nearly 3,000 jobs, and lower energy bills for 29,000 households, was cancelled by the Trump Administration in August.[41, 42] Soon after, the U.S. Department of Transportation revoked a $34 million grant to redevelop Salem's port for offshore wind, wiping out 800 expected near-term jobs.[43]

In addition, shifts in federal immigration enforcement have created major instability in labor markets across the country. Large-scale deportations and workplace raids directly reduce the available labor supply and disrupt industries that rely heavily on immigrant labor. These disruptions ripple outward, affecting U.S.-born workers in complementary roles, driving up costs for businesses, and creating uncertainty for local economies.

For example, immigrant workers often fill essential, entry-level roles.[44] When this labor supply is abruptly reduced, employers scale back operations, lowering demand for and employment of other workers in complementary roles. Industries with a high concentration of immigrant labor, such as construction and segments of clean-energy installation, are especially vulnerable. Enforcement actions in these sectors create bottlenecks and delays, drive up operating costs, strain supply chains, and ultimately lead to higher consumer prices.[45] For Massachusetts, where

[39] Molly Farrar. "'It's a big blow': Planned offshore wind manufacturing plant that earned Somerset a visit from Biden is canceled." *Boston.com.* January 23, 2025. https://www.boston.com/news/environment/2025/01/23/its-a-big-blow-planned-offshore-wind-manufacturing-plant-that-earned-somerset-a-visit-from-biden-is-canceled/

[40] Energy Innovation. "Economic impacts of the U.S. "One Big Beautiful Bill Act" energy provisions on Massachusetts." July 4, 2025. https://energyinnovation.org/wp-content/uploads/OBBBA-impacts-on-Massachusetts.pdf

[41] Mass.gov. "Trump administration threatens EPA's $156 million Solar for All award to Massachusetts." August 7, 2025. https://www.mass.gov/news/trump-administration-threatens-epas-156-million-solar-for-all-award-to-massachusetts

[42] United States Environmental Protection Agency. "Greenhouse Gas Reduction Fund." September 30, 2025. https://www.epa.gov/aboutepa/greenhouse-gas-reduction-fund#solar-for-all

[43] Mass.gov. "Governor Healey responds to Trump Administration's cancellation of $34 million for Salem offshore wind terminal." August 29, 2025. https://www.mass.gov/news/governor-healey-responds-to-trump-administrations-cancellation-of-34-million-for-salem-offshore-wind-terminal

[44] Cloe East. "The Labor Market Impact of Deportations." *Brookings*. September 18, 2024. https://www.brookings.edu/articles/the-labor-market-impact-of-deportations/

[45] Ben Zipperer. "Trump's deportation agenda will destroy millions of jobs: Both immigrants and U.S.-born workers would suffer job losses, particularly in construction and childcare." *Economic Policy Institute*. July 10, 2025. https://www.epi.org/publication/trumps-deportation-agenda-will-destroy-millions-of-jobs-both-immigrants-and-u-s-born-workers-would-suffer-job-losses-particularly-in-construction-and-child-care/.

immigrant workers are a vital part of the energy and construction workforce, these policies add another layer of complexity to building a stable, inclusive clean energy economy.[46]

While federal energy and immigration policies are leading to instability and cost increases, Massachusetts has continued to advance policies to meet state statutory requirements and mitigate federal impacts, including supporting the technologies and energy sources necessary to grow the clean energy economy. This includes, for example, enacting comprehensive energy infrastructure siting and permitting reform to get projects built faster, using the *Mass Leads Act* to accelerate funding of climatetech innovations, and issuing requests for proposals (RFPs) to procure clean energy and energy storage. Also essential is implementing a $4.5 billion energy efficiency program through Mass Save and issuing updated regulations for the Solar Massachusetts Renewable Target (SMART) program, which targets an additional 1,800 MW of solar through 2026. The state also launched network geothermal pilots and is making $46 million in funding available to support the strategic buildout of EV charging infrastructure.

The Healey-Driscoll Administration also filed the *Energy Affordability, Independence and Innovation Act* in May 2025, which would accelerate geothermal development, require utilities to implement demand side management and flexible interconnection strategies, expand energy procurement opportunities, and remove barriers to next-generation nuclear technologies.[47]

During this time, the Massachusetts Department of Public Utilities (DPU) released regulations to phase down infrastructure investment in the natural gas distribution system, including requiring the gas companies to pursue non-pipeline alternatives, like targeted electrification and geothermal.[48] Concurrently, the legislature passed legislation to establish a pilot allowing up to ten municipalities to prohibit natural gas hookups for new construction and major renovations,[49] and authorized the Massachusetts Department of Energy Resources (DOER) to update the Stretch Energy Code for buildings.[50]

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[46] Aaron Reichlin-Melnick. "Trump's Immigration Actions Are Taking a Toll on Local Economies – Here's What the Data Says So Far." *American Immigration Council.* August 27, 2025. https://www.americanimmigrationcouncil.org/blog/immigration-toll-on-local-economies-what-the-data-says/

[47] Mass.gov. "The Energy Affordability, Independence, and Innovation Act." May 2025. https://www.mass.gov/info-details/the-energy-affordability-independence-and-innovation-act

[48] Mass.gov. "Department of Public Utilities Issues Order 20-80." December 6, 2023. https://www.mass.gov/news/department-of-public-utilities-issues-order-20-80

[49] Mass.gov. "Municipal Fossil Fuel Free Building Demonstration Program." 2025. https://www.mass.gov/info-details/municipal-fossil-fuel-free-building-demonstration-program

[50] Mass.gov. "Stretch Energy Code Development." 2025. https://www.mass.gov/info-details/stretch-energy-code-development

Examples of Massachusetts Actions Supporting Clean Energy Sector Growth

- Issuing RFPs to procure energy storage, per statute.[51]
- Updating the SMART program.[52]
- Enacting comprehensive siting and permitting reforms for clean energy projects.[53]
- Approving Electric Sector Modernization Plans (ESMPs) and Capital Improvement Plans (CIPs) from electric distribution companies.[54]
- Implementing the next three-year Mass Save energy efficiency program, with an emphasis on supporting equitable workforce development strategies and energy efficiency and affordability.[55]
- Requiring gas companies to pursue non-pipeline alternatives and targeted electrification programs.[56]
- Introducing legislation to:
    - Accelerate geothermal development and ensure a trained and skilled workforce exists to support it;
    - Require utilities to develop comprehensive load management plans and flexible interconnection programs;
    - Provide flexibility into the types of energy the state can procure and when it can procure it; and
    - Remove barriers to next-generation nuclear energy development.[57]

The Commission recognizes Massachusetts' efforts and actions to continue to advance policies that drive fossil-free technologies, especially solar, energy efficiency, geothermal, and emerging alternatives like advanced nuclear and fusion energy, while reducing fossil fuel use.

[51] Joshua Rosen and Zachary Gerson. "MA Files Draft RFP for 1,500 MW Energy Storage, DPU Requests Comments by May 30." *Foley Hoag.* May 21, 2025. https://foleyhoag.com/news-and-insights/blogs/energy-and-climate-counsel/2025/may/ma-files-draft-rfp-for-1500-mw-energy-storage-dpu-requests-comments-by-may-30/
[52] Mass.gov. "SMART 3.0 Program Details." 2025. https://www.mass.gov/info-details/smart-30-program-details
[53] Mass.gov. "Energy Infrastructure Siting and Permitting Reforms." 2025. https://www.mass.gov/info-details/energy-infrastructure-siting-and-permitting-reforms
[54] Mass.gov. "Electric Sector Modernization Plans (ESMPs)." 2025. https://www.mass.gov/electric-sector-modernization-plans-esmps
[55] Mass Save. "Leading the way to a sustainable and equitable clean energy future." October 31, 2024. https://www.masssave.com/about-us/three-year-plan
[56] The Commonwealth of Massachusetts Department of Public Utilities. "Petition of Fitchburg Gas and Electric Light Company d/b/a Unitil (gas), pursuant to G.L. c. 25, § 21, for approval by the Department of Public Utilities of its Three-Year Energy Efficiency Plan for 2025 through 2027." November 4, 2024. https://www.masssave.com/-/media/Files/PDFs/Three-Year-Plan/Notices/DPU--24-142-Notice_Unitil-Gas.pdf
[57] Mass.gov. "The Energy Affordability, Independence, and Innovation Act." 2025. https://www.mass.gov/info-details/the-energy-affordability-independence-and-innovation-act

Massachusetts' energy transition and the workforce that supports it are at a critical inflection point. Continued, equitable progress will require accelerating sectors under state leadership and sustaining or expanding those supported by federal funding. It will also depend on ensuring that all residents can access new opportunities through intentional planning, outreach, and efforts to remove barriers faced by historically underrepresented and at-risk communities.

Energy Jobs

This section examines the current fossil fuel workforce, identifies the occupations most susceptible to disruption, and explores future energy jobs needed over the next ten years. Given time and budget constraints, the Commission did not undertake new data collection, analysis, or modeling for this report. Instead, it relied on existing data and information sources. The MassCEC *Workforce Needs Assessment* was the primary resource for estimates of the current fossil fuel and clean energy workforce and projections to 2030.[58] This information was supplemented with data from Lightcast, a labor analytics database that sources from the Bureau of Labor Statistics (BLS) for salary and demographics information, and the U.S. Energy & Employment Jobs Report (USEER). All data are best estimates and are used to understand broadly the current workforce employed, composition, trends, and the pace of change for the fossil fuel and broader energy workforce. *Appendix C. Sources of Data and Information for Report* provides a more detailed overview of sources used and attributes of each.

Analysis of Top Energy Occupations in Massachusetts

To supplement the MassCEC data, the Commission, working in collaboration with the Massachusetts Department of Economic Research, analyzed 2024 Lightcast data to identify a total of approximately 161,000 energy jobs in Massachusetts. The methodology for calculating total energy jobs is described in *Appendix D. Methodology for Estimating Total Energy Jobs.* The table below provides a listing of the top 30 occupations employed within the energy sector, fossil fuel and non-fossil fuel. The table below outlines these occupations with trend and drivers, based on Commission members' expertise. Definitions for each occupation are available on the BLS website.

[58] Massachusetts Clean Energy Center. "Powering the Future: A Massachusetts Clean Energy Workforce Needs Assessment." July 2023. https://www.masscec.com/resources/massachusetts-clean-energy-workforce-needs-assessment

Table 2. Top 30 Occupations in Energy Industry by Number Employed

Occupation	2024 MA Employment in Energy	Trend & Drivers, Based on Commission Expertise
Electricians	16,596	Expected growth, although slowed due to federal cuts to clean energy incentives/existing workforce capacity.
Pipelayers, Plumbers, Pipefitters, and Steamfitters	15,850	Expected growth due to transferability to clean energy roles, assuming relevant and sufficient training provided.
Automotive Technicians and Repairers	15,258	Expected gradual growth as EV maintenance expands, requiring new technical skills.
Passenger Vehicle Drivers	9,734	Expected stability. Potential implications from vehicle automation over the long-term.
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	8,026	Expected growth due to electrification of heating. Pace and timing uncertain.
Cashiers	6,651	Expected decline due to automation and shift to digital payment systems.
Line Installers and Repairers	4,938	Expected growth due to grid modernization and electrification.
First-Line Supervisors of Construction Trades and Extraction Workers	4,638	Expected steady growth as energy infrastructure and clean energy construction expands.
General and Operations Managers	4,363	Expected growth as infrastructure, engineering/construction, and clean energy firms scale operations.
Construction and Building Inspectors	4,023	Expected growth due to expansion of clean energy and energy retrofit projects, energy code enforcement, and infrastructure upgrades/expansion.
Environmental Scientists and Geoscientists	3,280	Expected growth tied to expanded energy siting, in general, and geothermal, specifically, along with environmental review.
Driver/Sales Workers and Truck Drivers	2,462	Expected stability.
Office Clerks, General	2,389	Expected stability; with increasing automation risk over longer term.
Electrical, Electronics, and Electromechanical Assemblers	1,895	Expected growth with expansion of energy-related manufacturing.

Occupation	2024 MA Employment in Energy	Trend & Drivers, Based on Commission Expertise
First-Line Supervisors of Mechanics, Installers, and Repairers	1,831	Expected growth due to increased demand for electrification work.
Insulation Workers	1,765	Expected growth from weatherization, energy efficiency, energy code implementation, geo and other thermal energy, and nuclear/fusion energy over longer term.
Laborers and Material Movers	1,625	Expected steady demand tied to construction and retrofit activity.
Miscellaneous Protective Service Workers	1,542	Expected stability; some growth in energy infrastructure projects.
Customer Service Representatives	1,498	Expected stability with growing focus on clean energy program support.
Power Plant Operators, Distributors, and Dispatchers	1,473	Expected gradual decline as fossil generation retires.
Logisticians and Project Management Specialists	1,451	Expected growth as clean energy projects expand statewide.
First-Line Supervisors of Sales Workers	1,445	Expected stability; potential growth in clean energy product markets.
Environmental Engineers	1,444	Expected growth with focus on emissions reduction, site design and permitting, and site remediation.
Construction Managers	1,429	Expected growth due to increased infrastructure and clean energy and building retrofit projects.
Helpers, Construction Trades	1,414	Expected steady demand from energy efficiency, solar, and electrification work.
Secretaries and Administrative Assistants	1,349	Expected stability; decline mid-to-longer term due to automation impacts.
Bookkeeping, Accounting, and Auditing Clerks	1,334	Expected stability; decline mid-to-longer term due to automation impacts.
Construction Laborers	1,320	Expected growth tied to infrastructure, clean energy projects, and building retrofit projects.
Sales Representatives, Wholesale and Manufacturing	1,258	Expected stability.
Electrical and Electronics Engineers	1,230	Expected growth driven by electrification and grid innovation and expansion.

Over the next five years, the Commission believes most job classifications relevant to Massachusetts' energy workforce are projected to remain stable, with some growing and others declining slightly. This underscores the need 1) to maintain a reliable, skilled fossil fuel workforce to ensure the continued safe and reliable operations of existing energy infrastructure, while 2) readying the workforce to access opportunities expected for HVAC technicians, pipefitters, drillers, electricians, engineers, construction, and other skilled trades.

Expanded opportunities are driven by anticipated growth in solar, building decarbonization, energy efficiency and demand management, electric grid buildout, and geothermal/non-fossil thermal energy. Notably, electric grid expansion and automation, and geothermal energy are anticipated to present growth opportunities, especially for drillers, pipelayers/fitters, electricians, HVAC, IT, data scientists, geo scientists, engineers, and related occupations. These trends highlight the importance of strategic workforce planning and investment, including retention, understanding current and existing skills, program pathways, and needs.

Overview of Existing Fossil Fuel Workforce

The Commission examined the size, composition, and roles of Massachusetts' fossil fuel workforce as defined by the BLS (e.g., full-time equivalents employed in direct fossil fuel-related occupations). Workforce trends are shaped by state and federal policies. The MassCEC *Workforce Needs Assessment* projected a gradual transition away from fossil fuels alongside strong growth in clean energy sectors. In the near term, significant disruptions for fossil fuel workers, especially those in gas utility infrastructure, are not expected. Pipeline maintenance and construction are projected to remain generally stable through 2030, with roles such as gas utility workers, pipefitters, and steamfitters needed.

Natural Gas Workers

Massachusetts' natural gas utility workforce is a key part of today's energy system. Approximately 3,000 in-house employees at National Grid, Eversource, and other utilities maintain and operate this infrastructure. Their roles span meter services, pipeline construction and maintenance, instrumentation and regulation, and liquefied natural gas facilities. This number does not include the many hundreds of outside contractors or managerial staff who also support gas distribution operations.

In addition to workers supporting the gas distribution network, there are also those who support the natural gas transmission network. These workers operate high-pressure pipelines that move gas from production or import points to regional distribution networks. They

maintain compressor stations, monitor pipeline integrity, regulate pressure and flow, and manage system balancing.

Most of the utility employees are members of 15 local unions, affiliated with the USW, the UWUA, and IBEW. These employees are covered by collective bargaining agreements leading to high wages and holistic benefits. Utilities also rely heavily on outside contractors for pipe replacement, leak surveys, mapping, and excavation work. Many of these contractors are non-union, and data on their pay, benefits, and unionization rates is limited.

Collectively, this workforce ensures safe and reliable service by building, maintaining, and operating the gas transmission and distribution networks that supply nearly half of Massachusetts households with home heating. In addition to delivering gas to homes, commercial and industrial customers also rely on this network, with nearly 40% of total natural gas consumed in the state going to these customers.[59] Finally, their work also supports aspects of power generation, with approximately 51% of New England's electricity (or net energy for load) coming from natural gas in 2024.[60]

For in-house union employees, job stability has been high. More than 95% remain in their roles until retirement, and turnover is rare.[61] As Massachusetts moves to decarbonize, uncertainty around timelines, policy direction, and company transition plans has created challenges. Many employees are concerned about abrupt shifts without a clear pathway into new opportunities.

Training and Qualifications

Training and qualification requirements are rigorous for gas workers. Employees must meet federal Operator Qualification (OQ) standards set by the Pipeline and Hazardous Materials Safety Administration (PHMSA). Each gas company maintains its own OQ plan, defining the covered tasks workers must perform and the training requirements to ensure compliance with federal regulations. The result is a workforce uniquely skilled in natural gas operations, whose expertise is highly specific and not easily transferable to other sectors. The system of training ensures safety and reliability but also ties workers closely to the continued operation of fossil fuel systems.

Much of this expertise is gained through long-term mentorship and hands-on practice. Workers advance through the ranks by shadowing senior technicians, union field trainers, and experienced working leaders who pass down practical knowledge. Workers gain seniority and classification increases over time, allowing them to progress into higher-paying jobs. The

[59] U.S. Energy Information Administration. "Natural Gas Consumption by End Use." October 31, 2025. https://www.eia.gov/dnav/ng/NG_CONS_SUM_DCU_SMA_A.htm
[60] ISO New England. "Resource Mix." January 19, 2025. https://www.iso-ne.com/about/key-stats/resource-mix
[61] Mass.gov. "2025 Massachusetts Workforce Data Report & Dashboard." 2025. https://www.mass.gov/info-details/2025-massachusetts-workforce-data-report-dashboard

knowledge transfer from veteran to apprentice is an essential feature of the industry, and one that would be difficult to replicate if the workforce underwent an abrupt transition.

Gas-Related Construction Workers

Gas-related construction workers form another important segment of the fossil fuel workforce. Trades such as plumbers, pipefitters, and operating engineers regularly work on projects involving natural gas installations. Wages for unionized construction workers are strong, and when paired with health and pension benefits, this makes careers in gas construction attractive and stable. As demand for fossil fuel projects is expected to decline, efforts will be needed to ensure that clean energy construction jobs can offer comparable pay and benefits to attract and retain skilled workers.

Training and Qualifications

The building trades have shown resilience and adaptability as the energy transition is advancing. Apprenticeship programs that once focused almost exclusively on gas installations now include training for geothermal systems and other renewable technologies. Workers can learn new skills through the same unions, retaining their healthcare, pensions, and bargaining rights while transitioning into different applications, helping workers pivot into clean energy roles without losing the protections and quality standards that have defined their careers.

Spotlight: Eversource Shrewsbury Training Center Site Visit – Building the Skilled Workforce for a Safe and Reliable Gas System

The Commission visited Eversource's Shrewsbury Training Center, a dedicated facility that prepares employees for a broad range of responsibilities across the natural gas system—from maintaining underground infrastructure to ensuring safe and reliable service for customers. Training is at the core of Eversource's workforce strategy. Each year, between 1,100 and 1,200 employees complete training at the center, with recertification required every three years under the federal OQ rule. Managers and supervisors are also required to maintain active qualifications in their areas of expertise. The certification process is rigorous, with exams carrying a 3% to 5% failure rate. Although the Shrewsbury site does not train electric employees, there is notable collaboration between Eversource's gas and electric divisions to share expertise and align workforce development.

Eversource is also investing in future talent pipelines through long-standing partnerships with community colleges. For more than two decades, the company has worked with Bunker Hill Community College to operate a two-year associate degree program that includes a 12-month internship. The program has achieved a 91% post-graduation employment rate and guarantees graduates interviews for line helper positions. In Connecticut, Eversource

supports a 12-week lineworker certification program that provides an accelerated entry pathway into the field. Free community college has further expanded access to these programs by covering the full cost of tuition and fees and providing low-income students assistance for books and supplies. These supports lower financial barriers and broaden the pool of candidates able to pursue energy-sector careers.

In addition to touring the training center, the Commission observed an active worksite where Eversource crews were replacing a leaking pipe in a residential neighborhood. Commission members viewed the exposed pipeline following excavation, examined the source of the leak, and heard directly from workers about the repair process and steps required to restore service safely. This field visit offered valuable first-hand perspective on the technical complexity, safety requirements, and challenges involved in gas pipeline work.

Combustion Engine Mechanics & Fuelers

Internal combustion engine (ICE) mechanics and fuelers are a core segment of Massachusetts' fossil fuel workforce, especially within the Massachusetts Bay Transportation Authority (MBTA).

At the MBTA, for example, these employees maintain and repair diesel and gasoline bus fleets and related systems daily, and ensure safe, on-time operations for hundreds of thousands of riders. The workforce is strongly unionized. International Association of Machinists (IAM) Local 264 represents a large share of bus maintenance mechanics, technicians, and fuelers. Boston Carmen's Union Amalgamated Transit Union (ATU) Local 589 represents additional maintenance classifications and frontline transit roles. Recent MBTA labor agreements with these and other unions underscore the role of collective bargaining in securing fair wages, benefits, and safety standards. As the MBTA and other fleets move toward electrification, these workers remain essential in the near term. With deliberate planning, maintenance mechanics can transition into electric-fleet service roles while preserving union representation, wages, and career continuity.

Training and Qualifications

MBTA mechanics and fuelers, for example, develop skills through a combination of in-house, joint labor-management training and union apprenticeship/upgrade programs (IAM 264 and ATU 589), supplemented by original equipment manufacturer (OEM) coursework. Core competencies include diesel powertrain diagnostics, braking and suspension, emissions controls, HVAC, hydraulics, and preventive maintenance, along with the Massachusetts Department of Transportation (MassDOT) and facility safety protocols. Fuelers are trained in hazardous-materials handling, spill prevention, fueling procedures, and yard safety; many roles require a commercial driver's license (CDL) and applicable endorsements.

As the fleet transitions, the MBTA's in-house curriculum has added EV-specific modules: high-voltage and battery safety, electric drivetrains and power electronics, battery management systems, charger operations and maintenance (O&M), diagnostic software, thermal management, and high-voltage rescue procedures. These courses are delivered on paid time as skill "upgrades," protecting seniority, wage steps, and benefits. The model mirrors a broader workforce approach: workers stay in the same union, under the same contract, while cross-training from internal-combustion to electric systems, maintaining job quality and safety standards and ensuring that experience built over decades continues to anchor reliability as technology changes.

Spotlight: MBTA Bus Service Center Site Visit – Maintaining the Fleet of the Future in Everett, MA

The Commission toured the MBTA Everett Main Repair Facility, which is dedicated to preparing technicians who maintain the MBTA's fleet of buses, including ICE, hybrid electric, and all-electric vehicles.

As the MBTA expands its use of hybrid and electric buses, the skills required of its workforce, particularly mechanics, drivers, and fuelers, are evolving. Fuelers, for example, are traditionally responsible for refueling buses, checking fluid levels, and performing basic service tasks at the end of each shift. However, as electrification progresses, the demand for conventional fueling decreases, reshaping job roles across the board.

In response to this transition, the MBTA, in collaboration with the IAM, has modernized its technician training program. The curriculum includes essential training in battery installation, electric bus maintenance, and safe charging procedures, all while maintaining the agency's strong emphasis on safety and reliability.

Key takeaways from the site visit included:

- Approximately 50 individuals complete the technician training each year, with small cohorts of 5-6 trainees per instructor.
- The program is open to all applicants, including current MBTA fuelers, with acceptance requiring passing an entrance exam that demands a strong foundation in automotive mechanics.
- Demand for qualified technicians will likely increase as the MBTA's electric fleet grows. The MBTA indicated that electric buses require similar or more frequent service needs compared to traditional ICE buses.

The shift to electric buses is expected to create opportunities for new technicians and expanded positions. It also raises concerns about job displacement, particularly for fuelers. Those in fueler roles are encouraged to apply to the technician program, however, not all will pass the entrance exam or complete the training. Commission members discussed the

potential for developing an intermediary role, below that of technician, for these workers. Such a position could involve performing minor repairs, decal application, and light servicing, which could retain valued employees who may not transition into full technician roles.

The MBTA's bus technician training program stands as a strong example of how transit agencies can proactively support workforce transitions through targeted training, upskilling, and collaborative labor partnerships.

Delivered Fuels (Heating Oil, Propane, Diesel/Gasoline Transport)

Massachusetts' delivered fuels workforce includes, for example, tanker and bobtail truck drivers (heating oil/propane), dispatchers, service technicians, terminal/yard staff, and safety/compliance personnel. Many fuel transport and delivery drivers are organized under Teamsters (e.g., Boston-area Teamsters Local 25 and the national Teamsters Tankhaul Division covering liquid/gas transport).[62] As a benchmark for scale only, Massachusetts has a total of 32,170 heavy and tractor-trailer truck drivers registered across industries (a broad category that includes fuel drivers, so only a subset of these workers would be directly impacted).[63]

Training & Qualifications

Core credentials include a CDL with Hazardous Materials (H) and Tanker (N) endorsements, plus Transportation Security Administration (TSA) security vetting for the H endorsement. Drivers also must comply with Massachusetts CDL requirements, including classes and endorsement requirements. Drivers serving marine/port fuel terminals (e.g., taking deliveries from marine facilities) typically need a Transportation Worker Identification Credential (TWIC) for unescorted access to secure maritime areas, issued by TSA. In propane, technicians and drivers commonly complete National Propane Gas Association (NPGA)/Propane Education and Research Council's (PERC) Certified Employee Training Program (CETP). Massachusetts also runs programs that require Occupational Safety and Health Administration (OSHA)-10 safety training for apprentices.

Natural Gas Power Plants (Generation O&M)

The natural gas generation workforce in Massachusetts spans control-room operators, auxiliary/plant operators, technicians, electricians, mechanics, and fuel/terminal interface staff. These roles are heavily unionized, commonly represented by the UWUA Local 369 (covering thousands of utility and generation workers statewide, including fossil fuel-fired power plants)

[62] Teamsters Union Local 25. "Oil Program." 2025. https://teamsterslocal25.com/oil-program/
[63] U.S. Bureau of Labor Statistics. "Occupational Employment and Wage Statistics, May 2023 53-3032 Heavy and Tractor-Trailer Truck Drivers." May 2023. https://www.bls.gov/oes/2023/may/oes533032.htm

and IBEW locals (electric utility/generation crafts).[64] International Union of Operating Engineers (IUOE) Local 877 also represents stationary engineers and maintenance workers at power plants and large boiler facilities across Massachusetts and New England.[65] Recent history underscores union presence at major sites (e.g., UWUA Local 369 at the Mystic Generating Station) and the sector's reliance on collective bargaining for staffing, safety, and retention.[66]

Training and Qualifications

Plant operators and maintenance staff typically combine employer operational joint training, union apprenticeship/upgrade training (UWUA/IBEW/IUOE), and OEM coursework. Massachusetts requires licensure for many boiler/pressure-vessel roles (e.g., Fireman & Engineer licenses), with the Boiler & Pressure Vessel Program administering exams and renewals. State law mandates continuing education for certain boiler licenses every five years.[67] Common safety training is also required, including those related to general industry topics, electrical safety, lockout/tagout, confined-space, and high-energy system procedures. While North American Electric Reliability Corporation (NERC) system operator credentials apply to grid control centers (not most plant operators), many Massachusetts plants still require plant-specific qualifications, OEM certificates (e.g., gas turbine), and documented competencies aligned with facility environmental, health, and safety programs. In Massachusetts, the IUOE-aligned stationary engineering pathway (including career technical education Stationary Engineering programs recognized by the Department of Elementary & Secondary Education (DESE)) provide feeder skills for boiler and plant operations careers.[68]

Insulators

Insulators, formally known as mechanical insulation workers, play a critical role in Massachusetts' energy and building systems. They install and maintain insulation on pipes, ductwork, boilers, tanks, and other mechanical equipment to reduce heat loss, control condensation, improve energy efficiency, and enhance fire and noise protection. Much of their work has traditionally been tied to fossil fuel–based infrastructure, such as gas and steam pipelines, fossil-fired power plants, and heating systems in commercial and residential buildings. In Massachusetts, most insulators are represented by the Heat & Frost Insulators & Allied Workers Local 6, headquartered in Boston. Local 6 covers a wide range of projects,

[64] Utilities Workers Union of America Local 369. "The Current Spring 2024 Newsletter." May 2024. https://uwua369.org/wp-content/uploads/2024/05/UWUA_SpringNL.pdf
[65] IUOE Local 877. "Home." n.d. https://iuoelocal877.com/
[66] MyPlan.com. "Power Plant Operators." 2025. https://www.myplan.com/careers/power-plant-operators/salary-by-city-51-8013.00.html?sort=a&sort_order=a&st=MA
[67] Mass.gov. "Boiler & Pressure Vessel Program Licensing & Exams." 2025. https://www.mass.gov/info-details/boiler-pressure-vessel-program-licensing-exams
[68] Massachusetts Department of Elementary and Secondary Education. "Stationary Engineering." October 3, 2024. https://www.doe.mass.edu/ccte/cvte/cte-families/programs.html?section=40-479999

including hospitals, universities, manufacturing plants, and energy-infrastructure sites.[69] Membership is estimated at several hundred workers, with wage and benefit packages negotiated through collective bargaining agreements that also fund apprenticeships and ongoing skills development. As energy systems shift, the same expertise insulators bring to fossil-based systems can be applied to emerging non-fossil technologies, providing opportunities in the clean-energy transition.

Training and Qualifications

Becoming a skilled insulator typically requires a multi-year, registered apprenticeship that combines classroom instruction with on-the-job training. Apprentices learn how to measure, cut, and fit insulation materials, apply vapor barriers, install protective jacketing, and work with specialized systems such as fire-stopping and hazardous-material remediation. Safety training is integral, especially when dealing with older asbestos-based insulation. The skills developed through this training are highly transferable across both fossil fuel and non-fossil fuel energy work. Insulators who once focused on gas pipelines, steam systems, and oil-fired boilers can apply similar methods to geothermal loops, district-energy networks, and advanced electrified heating and cooling systems. Moreover, the trade's expertise is applicable to emerging sectors like advanced nuclear and fusion energy, where extensive piping, containment systems, and heat-transfer equipment also require specialized insulation. Because insulation is a universal requirement for mechanical systems regardless of energy source, insulators are well-positioned to transition seamlessly into the Commonwealth's next generation of energy projects.

Conclusion

The Commission's review of Massachusetts' fossil fuel workforce makes clear that the state is home to a highly skilled, unionized labor force whose work underpins both the reliability of today's energy system and the success of tomorrow's clean energy transition. Across gas utility operations, construction trades, combustion engine mechanics, fuel delivery drivers, insulators, and natural gas power plant operators, workers demonstrate deep technical expertise, strong collective bargaining protections, and rigorous training systems rooted in certifications and licenses. These qualifications safeguard public safety, but they can also create barriers to mobility: most credentials are industry- or employer-specific, meaning that skills earned over decades are not easily transferable into new energy careers. Without intentional action, workers risk losing wages, benefits, and seniority if forced to "start over" in unfamiliar fields.

Certification and licensing systems are both an asset and a constraint. They are critical, ensuring quality and safety in high-stakes work, but they can also lock workers into fossil-specific roles.

[69] Insulators Local Union 6. "Home." 2025. https://insulators6.org/

Policymakers therefore have a critical role to play in making certification and licensing systems more transferable, without compromising worker or public safety. By aligning licensing requirements, creating equivalencies across fossil and clean energy fields, establishing expedited pathways into new technologies, and maintaining strong union representation and collective bargaining, the state can lower the barriers for experienced workers to move into emerging industries while maintaining high standards.

At the same time, the existing system must continue to operate safely and reliably for decades while new infrastructure is built. Gas pipelines must be maintained, power plants staffed, vehicles fueled, and customers served. This reality requires retaining the current workforce and ensuring that employees who remain in fossil fuel roles are not penalized for being among the last to transition. Their work is essential for public safety, reliability, and affordability. Retention strategies such as bridge incentives, early retirement options, or commitments to retrain younger workers will be critical to maintaining a sufficient workforce and ensuring safe service.

Opportunities do exist to demonstrate how transitions can succeed. The MBTA's shift from diesel to electric buses illustrates that when workers remain in their union, under the same contract, and with the same wages and benefits, retraining can occur smoothly without sacrificing job quality. Similar models anchored in cross-training, in-sourcing, and collective bargaining can guide utilities and employers as they expand into thermal networks, electrification projects, or new generation technologies.

To realize these opportunities, Massachusetts should pursue a deliberate and coordinated approach to workforce transition. This includes:

- Targeted reskilling in growth sectors such as EVs, ductwork, heat pumps, and geothermal.
- Employer-engaged registered apprenticeships that create clear pathways from fossil fuels to clean energy roles.
- Support services to address barriers like cost of training, access to child care, or transportation.
- Career navigation tools that help workers assess their skills, explore new careers, and map the next practical steps.

Taken together, these strategies emphasize that the workforce transition should be gradual, deliberate, and worker-centered. With intentional planning, robust state support, and alignment between unions, employers, educators, and policymakers, Massachusetts can safeguard its current workforce while building the next generation of clean energy jobs, and serve as national model for how to achieve a just, inclusive, and sustainable energy transition.

Future Energy Jobs Needed Over the Next Ten Years

Understanding the evolving landscape of energy employment is essential to ensuring a just and equitable workforce transition. This section outlines the future energy sector and associated jobs that are expected to emerge and expand over the next ten years.

Non-Fossil Thermal Energy

Non-fossil thermal energy refers to technologies that generate and deliver heat without burning fossil fuels. This includes both standalone and networked geothermal systems,[70] which draw on heat stored beneath the Earth's surface, and electrified district steam systems, such as Vicinity Energy's eSteam™ plant in Cambridge, which uses a 42-MW electric boiler powered by renewable electricity to provide carbon-free steam.[71] Massachusetts is at the forefront of this transition, hosting the nation's first utility-owned thermal energy network (TEN) pilot in Framingham, developed by Eversource. That system now serves approximately 37 buildings, the majority residential, and has moved into full operations.[72]

At the campus scale, Boston University's (BU) Center for Computing & Data Sciences ("Jenga" building) demonstrates the potential of deep geothermal: 31 boreholes drilled 1,500 feet underground provide more than 300 tons of heating and cooling capacity, covering close to 90% of the building's thermal load.[73] Smith College launched a campus-wide energy project in 2022 to eliminate on-site fossil fuel heating by 2030, which includes 72 boreholes drilled to depths of about 800 feet. These systems were built with workers represented by UA and IBEW locals.

There are also numerous, smaller, commercial-scale geothermal installations, many completed with open-shop labor. These systems span the size range between residential-scale and campus-type installations and typically have capacities well less than 1 MW. For example, Workbar in Arlington converted an underutilized 1880s mill building into a work sharing space.[74] In Chelmsford, a newly constructed, 130,000 square foot self-storage facility is

[70] Moones Alamooti. "Geothermal energy has huge potential to generate clean power – including from used oil and gas wells." October 16, 2025. *Modern Sciences*. https://modernsciences.org/geothermal-clean-power-abandoned-wells-egs-potential-october-2025/

[71] International District Energy Association. "Electrifying Boston and Cambridge's Steam System: Vicinity eSteamTM Provides Carbon-free Thermal Energy." December 19, 2024. https://www.districtenergy.org/blogs/district-energy/2024/12/19/electrifying-boston-and-cambridges-steam-system-vi

[72] Eversource. "Geothermal Pilot Project in Framingham." 2025. https://www.eversource.com/residential/about/transmission-distribution/projects/massachusetts-projects/geothermal-pilot-project

[73] Boston University. "Take a Look Inside BU's Newest CDS Building." January 24, 2024. https://www.bu.edu/cas/take-a-look-inside-bus-newest-cds-building/

[74] Achieve Renewable Energy. "Achieve is Proud Winner of the 2018 NY-GEO Top Job Competition." April 9, 2018. https://achieverenewable.com/achieve-winner-2018-ny-geo-top-job-competition/

leveraging geothermal to heat and cool the facility, while Plummer Youth Promise in Salem completed installation of a geothermal system for a four-building campus.[75, 76] Meanwhile, at the residential level, there are an estimated 8,000 to 10,000 installations with geothermal systems throughout the state, based on polling with the New England Geothermal Professional Association (NEGPA).

Jobs in this sector span drilling crews, pipefitters, equipment operators, insulators, electricians, and building trades laborers, as well as operations and maintenance technicians once systems are in service.

Projects like Eversource's Framingham, BU, Smith College, Vicinity Energy's eSteam, Workbar, and Plummer Youth Promise illustrate how different scales of non-fossil thermal energy can be deployed across the state. They also highlight the economic development opportunity: as more campuses, communities, and utilities adopt these systems, demand will rise for skilled workers in drilling, piping, pump houses, controls, and large-scale heat pumps. For example, a recent workforce analysis underscores the significant job potential tied to Massachusetts' non-fossil thermal energy transition.

According to a study by Cornell University's ILR School, "Thermal Utility Networks," which encompass district and other shared non-fossil thermal energy systems, could support nearly 14,850 direct jobs across Massachusetts. In addition, scaling up additional heat pumps for building decarbonization is projected to generate tens of thousands more direct jobs, reflecting the labor intensity of installation, wiring, and ongoing maintenance of these technologies.[77]

These projections align with reporting from WGBH, which highlighted that Massachusetts may ultimately require more than 600 geothermal drilling crews, each consisting of two to three workers, to meet statewide deployment potential.[78] While this estimate points to future labor demand rather than current employment levels, it illustrates the scale of workforce growth anticipated. Additionally, commercial geothermal projects continued to receive the same federal incentives under the OBBBA as they did prior to its enactment.[79] Together, these

[75] NY-GEO. "Top Jobs 2019." n.d. https://www.ny-geo.org/top-jobs-2019/
[76] MassDevelopment. "$6M Revamps Plummer Campus in Salem." June 12, 2025. https://massdevelopment.com/news/6m-revamps-plummer-campus-in-salem/
[77] Cornell University. "Building the Clean Energy Commonwealth: A Climate Jobs Roadmap for Massachusetts." May 22, 2024. https://www.ilr.cornell.edu/sites/default/files-d8/2024-05/Building%20the%20Clean%20Energy%20Commonwealth.pdf
[78] Hannah Loss. "New program trains geothermal drillers to meet growing need in Massachusetts." *WGBH*. September 4, 2024. https://www.wgbh.org/news/local/2024-09-04/new-program-trains-geothermal-drillers-to-meet-growing-need-in-massachusetts
[79] Maria Gallucci. "Geothermal survives in 'big, beautiful' budget bill — but hurdles remain." *Canary Media.* July 9, 2025. https://www.canarymedia.com/articles/geothermal/enhanced-trump-bill-tax-credits

suggest that non-fossil thermal energy has the potential to create tens of thousands of high-quality jobs across construction, drilling, piping, utility operations, and heat pump deployment.

Training & Qualifications

Training in non-fossil thermal energy requires a blend of existing trade skills and new specialty modules. Drilling and loop-field construction relies on heavy equipment operators and drillers trained in rotary/hydraulic systems, well grouting, trenching, and High-Density Polyethylene (HDPE) fusion. Pipefitters and HVAC technicians are essential for installing distribution mains, pump houses, and heat-exchange equipment, drawing on long-standing competencies in chilled water, steam, and hydronic systems. Electricians handle power distribution, switchgear, medium-voltage feeders, and protection/relaying systems required to connect large heat pumps or electrified boilers to the grid. Operations and maintenance roles cover loop monitoring, pumping systems, water chemistry, metering, and seasonal optimization, like work already performed by gas-utility and district-steam employees.

Much of this skill set is transferable, but additional training is required. Gas-utility workers, for example, already have deep experience in excavation safety and pipeline operations, which can map directly onto the requirements of networked geothermal. Electricians accustomed to large commercial wiring and grid interconnections can readily transition to installing and maintaining high-voltage equipment for central heat pump plants or electric steam boilers. At the same time, bridge training is necessary in areas such as ground-loop hydraulics, geothermal system controls, and high-voltage boiler safety.

Massachusetts' union apprenticeship and training infrastructure is well positioned to meet growing clean-energy workforce demands, with UA Local 537 and other building trades funding training through collectively bargained contributions and already integrating geothermal and thermal-network modules into apprenticeship and journeyperson programs, while IBEW Local 103/NECA have added coursework on renewable integration, grid modernization, and high-voltage systems—allowing workers to gain new competencies without leaving their unions, losing seniority, or sacrificing family-sustaining wages and benefits. This approach is already visible across the state: union pipefitters installed geothermal systems at the Isabella Stewart Gardner Museum in 2012 and at BU's "Jenga Building" roughly five years ago, and today at least 150 pipefitters and apprentices are working on projects at Smith College, UMass Amherst, and the Holyoke Soldiers' Home. At the same time, polling by NEGPA indicates upward of 1,000 open-shop jobs—spanning drillers, HVAC technicians, sheet-metal technicians, engineers, and

designers—supporting components of geothermal installations, demonstrating the breadth of workforce demand as Massachusetts expands clean-energy construction.[80]

Prioritizing training for existing gas utility employees to take on new clean-energy applications is essential to keeping them under the same collective bargaining agreements and retaining wages, benefits, and working conditions. Utilities will need to expand their workforces to maintain safe gas-system operations while cross-training employees in new skills, supported by state funding to offset added training and staffing costs. When outsourcing is necessary, utilities should rely on contractors that pay prevailing wages and use registered apprenticeship programs. Governor Healey's *Energy Affordability, Independence, and Innovation Act* (H.4144) codifies this approach by requiring prevailing wages for outsourced work on certain utility-scale thermal energy networks, embedding strong labor standards and workforce equity into the clean-energy transition.

The Commission also identified a range of state and nonprofit initiatives that are preparing the next generation of clean-energy workers. MassCEC and DESE recently launched the Clean Energy Innovation Career Pathway for high-school students, providing hands-on learning and employer partnerships in a rapidly growing sector, alongside MassCEC's Students & Young Adults Equity Workforce Career Awareness & Training grants, which offer up to $600,000 for programs serving underrepresented groups including EJ communities, tribal communities, low-income families, and former fossil fuel workers. NEGPA, the International Ground Source Heat Pump Association (IGSHPA), and major geothermal manufacturers are also expanding access to training and work-based learning opportunities. Complementing these efforts, HEET is advancing the Clean Energy Legacy Transition (CELT) Community Geothermal Learning and Training initiative to establish a Center of Excellence for geothermal in Massachusetts, building long-term training capacity to support a skilled workforce.[81, 82]

[80] Cornell University. "Building the Clean Energy Commonwealth: A Climate Jobs Roadmap for Massachusetts." May 22, 2024. https://www.ilr.cornell.edu/sites/default/files-d8/2024-05/Building%20the%20Clean%20Energy%20Commonwealth.pdf

[81] Mass.gov. "Healey-Driscoll Administration Announces Clean Energy Innovation Career Pathway for High School Students." April 27, 2023. https://www.mass.gov/news/healey-driscoll-administration-announces-clean-energy-innovation-career-pathway-for-high-school-students

[82] Massachusetts Clean Energy Center. "Students and Young Adults Career Awareness and Training." 2025. https://www.masscec.com/program/students-and-young-adults-career-awareness

Expanded Opportunities for Geothermal Drilling and Drillers

Massachusetts is scaling up geothermal deployment to decarbonize building heating and cooling, and that expansion is creating a demand for skilled geothermal drillers. According to the Geothermal Drilling Association (GDA), nationwide there are only about 15,000 geothermal drillers. With competition for rigs and contractors growing across the country, Massachusetts will need to expand its labor pool by recruiting new entrants (including transitioning existing workers and attracting new workers), right-skilling existing tradespeople (drillers, well drillers, heavy-equipment operators, and HVAC technicians), and retaining experienced operators.

There are efforts in Massachusetts related to this training that provide insight on needs going forward, including HEET's September 2024 two-week drilling program in Boston, Holyoke Community College's geothermal certificate, and IGSHPA-approved courses.

Geothermal drilling rigs are operated by crews of 2-4 workers. One of these workers must be licensed by the Massachusetts Department of Environmental Protection (MassDEP) under its Well Driller Program. To become a licensed driller requires training, experience, and successful completion of an exam. Currently, drillers are licensed either for all drilling types or for installation of environmental monitoring wells. As of the writing of this report, MassDEP is in the public comment process for new drilling regulations that include a new Geothermal Driller category.

To scale drilling capacity and the associated workforce in Massachusetts, the state will need, among other things:

- Standardized credentials and stackable certifications.
- Equipment and simulation access.
- Cross-trade bridging programs.
- Licensing, insurance, and truck/rig operator requirements.
- Employer incentives and placement guarantees.

As of 2025, new geothermal drilling rigs and support equipment cost more than one million dollars. This is a significant barrier to expanding training that might be lessened via financing incentives or other state support.

Solar

Massachusetts is a national leader in solar energy, with more than 5,400 MW of installed capacity as of 2025.[83] Growth has been driven by rooftop, community, and utility-scale projects, supported by the SMART program, net energy metering (NEM), and the state's

[83] Solar Energies Industry Association. "State Overview – Massachusetts." 2025. https://seia.org/state-solar-policy/massachusetts-solar/

renewable portfolio programs. The Solar Energy Industry Association (SEIA) also found that Massachusetts is home to more than 450 solar-related companies, including 175 installers/developers and 205 other firms, and supports approximately 11,600 jobs.[84]

The federal policy environment adds some uncertainty to the industry's growth. Recent changes to tax incentives and the phasing out of bonus credits tied to prevailing wage and registered apprenticeship requirements risk slowing investment and growth, particularly in higher wage jobs. To maintain previously anticipated levels of growth, Massachusetts must rely increasingly on state-level policy tools to sustain momentum and maintain job quality.

Workforce data identify both opportunities and challenges. Workers need skills and training in wiring, switchgear, grid interconnection, large-scale electrical systems, and general construction. Many of these are transferable from other occupations and existing jobs.

Training and Qualifications

Most individuals entering the solar workforce via non-union pathways typically move in through short-term training programs, community-college credentials, or employer-sponsored courses rather than formal craft-trade apprenticeships. For example, programs offered by Bunker Hill Community College align with the educational prerequisites to sit for the North American Board of Certified Energy Practitioners (NABCEP) Photovoltaics (PV) Installation Professional exam, providing modules in installation, design, electrical fundamentals, OSHA safety, and system commissioning.[85] Although Massachusetts does not require a distinct solar contractor license, obtaining NABCEP certification remains a widely recognized marker of competence and is considered a strong credential by many installers and employers.[86]

Apprenticeship programs offer a key component of workforce readiness. Registered apprenticeship curricula, driven by unions and contractors, have begun incorporating modules on solar installations, grid integration, system commissioning, and other renewable-specific skills. This allows workers from other trades (e.g. electricians, roofers, laborers) to pivot into solar without losing their underlying craft identity, apprenticeship benefits, or seniority. By anchoring new technologies on existing trade skills and infrastructure, Massachusetts can ensure that solar growth delivers both clean energy and stable, high-wage employment opportunities.

[84] Solar Energies Industry Association. "MA Solar." September 2025. https://seia.org/wp-content/uploads/2025/09/Massachusetts.pdf
[85] Bunker Hill Community College. "NABCEP Certification – PV Installation Professional." 2025. https://careertraining.bhcc.edu/training-programs/nabcep-certification-pv-installation-professional/
[86] NABCEP. "Associate Program." n.d. https://www.nabcep.org/certifications/associate-program/

Offshore Wind

Massachusetts is a national leader in offshore wind, with more than 3,240 MW currently under contract through successive procurements.[87] In September 2024, Massachusetts and Rhode Island jointly awarded nearly 2,900 MW of new capacity, with Massachusetts selecting about 2,675 MW across three projects.[88] These commitments build on projects already underway, including Vineyard Wind 1 (806 MW), which has begun delivering electricity to the grid and is expected to be in full operation in 2026.[89] A Massachusetts infrastructure assessment estimated that offshore wind port and facilities development has the potential to create more than 27,000 job-years of local employment.[90] These estimates underscore the transformative potential of offshore wind for both the Commonwealth and the region.

The Trump Administration's work-stoppage orders on federally leased projects and halting of leasing and permitting for new projects has created immediate uncertainty for the industry, just as offshore wind was poised to scale and create thousands of high-wage jobs. At the same time, the OBBBA rolled back tax incentives and bonus credits tied to prevailing wage and registered apprenticeship requirements, undermining the financial models many projects relied on. Together, these actions have triggered project delays and cancellations, chilled investment, and disrupted workforce pipelines and anticipated employment. The outlook for offshore wind is uncertain in the near term, with strong state commitments colliding with federal headwinds that threaten to slow deployment and curtail jobs over the next five years.[91]

Additionally, major port investments in New Bedford and Salem, designed to serve as hubs for offshore wind construction and staging, have also been delayed or downsized as developers recalibrate. Education and training programs at Bristol Community College, Massachusetts Maritime Academy, and union-run pre-apprenticeship initiatives remain critical to preparing workers, but the uncertainty has made long-term workforce planning and program investment difficult.

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[87] New England For Offshore Wind. "Massachusetts for Offshore Wind." 2025. https://www.newenglandforoffshorewind.org/states/massachusetts/

[88] Mass.gov. "Massachusetts and Rhode Island Announce Largest Offshore Wind Selection in New England History." September 6, 2024. https://www.mass.gov/news/massachusetts-and-rhode-island-announce-largest-offshore-wind-selection-in-new-england-history

[89] Mass.gov. "Vineyard Wind, America's First Large-Scale Offshore Wind Farm, Delivers Full Power from 5 Turbines to the New England Grid." February 22, 2024. https://www.mass.gov/news/vineyard-wind-americas-first-large-scale-offshore-wind-farm-delivers-full-power-from-5-turbines-to-the-new-england-grid

[90] Massachusetts Clean Energy Center. "Massachusetts Offshore Wind Ports & Infrastructure." 2022. https://www.masscec.com/resources/massachusetts-offshore-wind-ports-infrastructure

[91] Miriam Wasser. "What's up with offshore wind in New England? Here's a map." *WBUR*. October 1, 2025. https://www.wbur.org/news/2025/10/01/map-offshore-wind-projects-new-england-vineyard-southcoast-revolution-south-fork

Training and Qualifications

Offshore wind development requires an expansive and coordinated workforce of, for example, engineers and planners, oceanographers and environmental specialists, port and logistics personnel, and highly trained offshore construction and installation crews to design, stage, and build projects safely and efficiently. These workers need both traditional engineering and construction skills and specialized offshore competencies. The Building Trades, including Laborers, Ironworkers, Pile Drivers, and Operating Engineers, are essential to turbine foundations, marine construction, and port facilities. On the electrical side, IBEW Local 223, IBEW Local 103, and NECA contractors bring deep expertise in grid interconnection, high-voltage cabling, and substation work. In addition, workers on offshore wind projects must obtain internationally recognized Global Wind Organisation (GWO) safety training and certification, which must be renewed every two years to remain valid.[92]

Apprenticeship programs are aligning training with offshore wind needs by adding modules on marine safety, offshore cabling, and high-voltage transmission. MassCEC has supported this effort through its Offshore Wind Works program, providing grants to unions, training providers, and infrastructure support to ensure Massachusetts develops a highly trained offshore wind workforce.[93] This builds on electricians' existing expertise in commercial and grid work, ensuring they can adapt seamlessly to offshore projects. The union model guarantees high skill standards and strong wages, benefits, and safety protections, making offshore wind a pathway to stable, family-sustaining careers. With intentional planning, Massachusetts can ensure that as offshore wind expands again, it anchors both economic growth and high-quality employment across the state, positioning the workforce to be ready and prepared the moment projects accelerate.

Energy Storage

Energy storage is playing an increasingly central role in Massachusetts' clean energy transition, enabling grid modernization, renewable energy integration, and peak load management. Battery Energy Storage Systems (BESS) are being deployed alongside solar and wind to improve grid reliability, resilience, and affordability.[94] As of 2023, the state had surpassed 2,000 MW of

[92] Global Wind Organisation. "Why training standards?" 2025. https://www.globalwindsafety.org/trainingstandards/why-training-standards

[93] Massachusetts Clean Energy Center. "Offshore Wind Works – Workforce Training & Development Grants." 2025. https://www.masscec.com/program/offshore-wind-works-workforce-training-development-grants

[94] Abb.us. "Battery Energy Storage Systems (BESS) Basics." 2025. https://electrification.us.abb.com/battery-energy-storage-systems-bess-basics

installed BESS capacity across both utility-scale and behind-the-meter systems, according to the MassCEC and DOER *Charging Forward: Energy Storage in a Net Zero Commonwealth* report.[95]

This deployment includes large-scale projects developed by utilities such as Eversource, National Grid, and Unitil, as well as municipal light departments in Holyoke, Sterling, Wakefield, and Ashburnham. Behind-the-meter storage, installed at homes, businesses, and industrial sites, has expanded rapidly through incentive programs such as ConnectedSolutions, Clean Peak Standard, and SMART, which have enabled thousands of solar-plus-storage systems across the state.[96]

The Commission notes that the business landscape supporting this growth is diverse. Dozens of certified solar-and-storage installers operate in Massachusetts, including firms such as Boston Solar and Valley Solar serving residential and commercial markets, while advanced technology companies including Form Energy (Somerville), Ambri (Marlborough), 24M Technologies (Cambridge), Fourth Power (Middleton), and Enel North America (Andover) are developing next-generation long-duration technologies. Together, these companies and contractors form a robust ecosystem that anchors Massachusetts as both a deployment hub and an innovation leader in energy storage.

Energy storage currently provides approximately 5,400 jobs across engineering, electrical trades, construction, software development, supply chain, and project management.[97] Employment is expected to grow significantly, as *An Act promoting a clean energy grid, advancing equity and protecting ratepayers* (S. 2967) mandates procurement of 5,000 MW of storage capacity by 2030. DOER and the state's Electric Distribution Companies (EDCs) released a coordinated RFP on July 31, 2025, to advance this requirement.[98]

Training and Qualifications

Energy storage projects draw upon multiple skilled trades and technical disciplines. Licensed electricians, including those trained through IBEW Local 103 and other union apprenticeship programs, play a central role in installing storage systems, switchgear, and high-voltage interconnections. Pipefitters and HVAC technicians support thermal management systems,

[95] Mass.gov. "Charging Forward: Energy Storage in a Net Zero Commonwealth." 2025. https://www.mass.gov/guides/charging-forward-energy-storage-in-a-net-zero-commonwealth
[96] Mass Save. "ConnectedSolutions." 2025. https://www.masssave.com/residential/programs-and-services/connectedsolutions
[97] Massachusetts Clean Energy Center. "2024 Massachusetts Clean Energy Industry Report." 2024. https://www.masscec.com/resources/2024-massachusetts-clean-energy-industry-report
[98] Massachusetts Department of Energy Resources. "Request for proposals for long-term contracts for energy storage projects." July 31, 2025. https://macleanenergy.com/wp-content/uploads/2025/08/83e_rfp_round-1_final_08-4-2025.pdf?utm

while software engineers and technicians provide digital controls, analytics, and cybersecurity essential for grid integration.

Looking ahead, the Commission highlights that long-duration storage technologies (iron-air, liquid-metal batteries, and other emerging chemistries) will require specialized training in chemical handling, advanced manufacturing, and utility-scale operations.

Transportation Electrification

Massachusetts is accelerating the transition to electric transportation, with nearly 140,000 battery electric and plug-in hybrid vehicles on the road as of 2025, double the number from just two years prior. The state is on track to exceed its goal of 200,000 EVs by the end of 2025, with a longer-term target of 900,000 EVs by 2030. In 2023, EVs accounted for 12.5% of all new vehicle registrations, underscoring the rapid growth of adoption.[99]

Transit electrification is also advancing. The MBTA has ordered 15 electric buses, with 9 already in service. The Worcester Regional Transit Authority is also bringing electric buses into its fleet.[100, 101] The Fairmount commuter rail line is slated to operate battery-electric trains by 2028–2029, representing a major milestone in decarbonizing public transit. Meanwhile, MassDOT is expanding highway charging infrastructure and municipalities such as Worcester are deploying curbside and garage-based charging stations.[102]

The Commission finds that a growing network of companies in Massachusetts are supporting this EV value chain, from charging infrastructure and installation to fleet operations, battery integration, and software development. The Commission notes, however, that recent federal actions—including pauses to the National Electric Vehicle Incentive (NEVI) and CFI (Charging and Fueling Infrastructure) programs, elimination of the federal EV tax credit, and rollbacks of EPA emissions standards—have created uncertainty and slowed deployment in certain areas.[103]

Despite these headwinds, Massachusetts continues to advance state-level initiatives that maintain market growth and workforce opportunity, including through the MOR-EV program. Additionally, Massachusetts invested $46 million through Fiscal Year (FY) 2027 for EV charger

[99] Mass.gov. "2024 Massachusetts Climate Report Card - Transportation Decarbonization." 2025. https://www.mass.gov/info-details/2024-massachusetts-climate-report-card-transportation-decarbonization
[100] Mass.gov. "2024 Massachusetts Climate Report Card - Transportation Decarbonization." 2025. https://www.mass.gov/info-details/2024-massachusetts-climate-report-card-transportation-decarbonization
[101] Worcester Regional Transit Authority. "Home." 2025. https://therta.com/
[102] Mass.gov. "FHWA Approves MassDOT Plan for EV Charging Stations on Major Highway Corridors in Massachusetts." September 20, 2022. https://www.mass.gov/news/fhwa-approves-massdot-plan-for-ev-charging-stations-on-major-highway-corridors-in-massachusetts
[103] "Trump Rollback on clean Energy Subsidies Stalls Major Solar, Wind, Projects and Manufacturing Plans." *Fast Company*. July 7, 2025. https://www.fastcompany.com/91373984/clean-energy-subsidies-solar-wind-manufacturing

build-out, requiring new commercial buildings with more than fifteen parking spaces to include at least one EV-ready space, and directing the state's utilities to propose alternative DC fast-charging rates and account for EV impacts in grid-modernization plans. Concurrently, the MBTA has plans to order hundreds of new electric buses and build out the infrastructure to support them.

Training and Qualifications

Electrified transportation requires both traditional trades and new technical skillsets. Electricians are central to installing and maintaining charging stations, upgrading electrical distribution systems, and integrating vehicles into smart-grid operations. Automotive technicians are being retrained to service EV drivetrains, high-voltage battery systems, and power electronics.

The transition also affects workers historically focused on mechanical and fueling roles. At the MBTA, for example, diesel mechanics and fuelers are being retrained to service propulsion batteries, inverters, and depot charging systems as the bus fleet shifts to electric. Similar transitions are underway in municipal and regional transit authorities, as well as in private fleets. The Commission highlights that without structured retraining pathways, these workers risk displacement, but with targeted programs they can be retained and transitioned into high-demand technical roles.

The Commission emphasizes that transportation electrification not only creates new jobs but also provides a pathway for existing workers in mechanics and fueling to transition into secure, high-paying positions in the clean energy economy.

Energy Efficiency

Massachusetts is a national leader in energy efficiency, with programs and policies that reduce energy demand and create substantial employment opportunities. According to MassCEC, energy efficiency-related programs in the state support approximately 76,200 jobs across efficiency, weatherization, demand management, and clean heating and cooling industries.[104] These roles range from energy auditing and building science to weatherization, HVAC installation, insulators, and demand management services. However, several of these growing subsectors, including residential HVAC installation and weatherization, offer limited union representation or individuals trained through registered apprenticeship programs.

Massachusetts' success has been driven in large part by policy frameworks such as building energy codes, including Stretch Codes for higher efficiency standards, state incentives, and

[104] Massachusetts Clean Energy Center. "Powering the Future: A Massachusetts Clean Energy Workforce Needs Assessment." July 2023. https://www.masscec.com/resources/massachusetts-clean-energy-workforce-needs-assessment

Mass Save, which is delivered through the state's utilities and other program administrators.[105] These state-level policies have continued to expand opportunities even as the Trump Administration rolls back federal programs, policies, and tax credits supporting energy efficiency. Massachusetts' programs, such as the nation-leading Mass Save program, are expected to continue, thereby maintaining or expanding employment in the sector over time.

Massachusetts' energy efficiency strategy is not only about reducing energy consumption, but also about ensuring equitable access to benefits and opportunities. To maximize the impact of public investment, the state must ensure that resources and programs serving low-income ratepayers also create high-quality employment rather than reinforcing a low-wage industry. Options to strengthen quality include requiring public grants to meet certain labor standards or creating classifications for contractors, such as a "quality contractor list," to feature those that demonstrate commitments to registered apprenticeship programs and job quality standards.

Training and Qualifications

Workforce development is a core component of Massachusetts' approach to energy efficiency. Training and qualifications in this sector typically include certifications in building science, energy auditing, and HVAC system installation and maintenance. As Massachusetts scales up its efficiency programs, ensuring that contractors and workers are equipped with proper training, certifications, and pathways into apprenticeships will be critical for maintaining quality, safety, and equitable opportunities across the sector.

MassCEC administers a wide range of workforce development initiatives supported by Mass Save, DOER, MassDEP, and state budget appropriations, all designed to prepare for a projected 38% growth in workforce needs by 2030. For more than a decade, MassCEC's paid internship program has placed students with clean energy employers, strengthening long-term readiness and retention across the sector.[106]

Programs such as the Mass Save Clean Energy Pathways internship offer young adults aged 18–25 hands-on experience with energy efficiency contractors, while the Workforce Training Grant provides up to $7,500 per individual and $50,000 per organization for training in HVAC, weatherization, energy auditing, and building-science certifications. Both initiatives place

[105] Mass.gov. "2025 Massachusetts Building Energy Codes." 2025. https://www.mass.gov/info-details/2025-massachusetts-building-energy-codes

[106] Massachusetts Clean Energy Center. "Powering the Future: A Massachusetts Clean Energy Workforce Needs Assessment." July 2023. https://www.masscec.com/resources/massachusetts-clean-energy-workforce-needs-assessment

special emphasis on EJ communities, ensuring that the transition to a clean energy economy creates equitable access to career opportunities.[107, 108]

In addition to traditional efficiency roles, new job categories are emerging around building energy management systems (BEMS), building optimization, and smart energy technologies. Massachusetts is home to leading firms in this space, including Schneider Electric (with headquarters in Boston) and Sense (based in Cambridge), which provide cutting-edge tools for managing, optimizing, and monitoring building energy use. This creates growing demand for technicians and specialists who can install, operate, and maintain advanced digital controls, sensors, and optimization platforms. These jobs blend electrical, IT, and data analysis skills and require training in both hardware installation and software management. As buildings become more electrified and connected, demand for workers who can manage energy management software, real-time monitoring, and predictive analytics will expand significantly, adding to the diverse set of career pathways within the energy efficiency sector.

Smart Grid/Grid Modernization

Massachusetts has cultivated a robust smart grid ecosystem to enable the energy transition. Anchored by policies such as the ESMPs, the ecosystem includes advanced metering infrastructure (AMI), automated distribution technologies, and systems designed to integrate distributed energy resources (DERs) like solar, storage, and electric vehicles. Utilities including Eversource, National Grid, and Unitil are making major multi-billion-dollar investments in grid automation, resilience upgrades, and digital tools to improve grid visibility and reliability. By 2028, all electric customers served by these major utilities are expected to have AMI fully deployed, enabling far greater insight into system operations and unlocking new tools to better manage and operate the grid for the benefit of ratepayers.[109]

The sector already supports thousands of jobs across design, cybersecurity, data analytics, infrastructure development, line work, meter service, substations, and grid upkeep, and growth is projected over the next decade. These workers are often represented through collective bargaining agreements by unions such as the IBEW Local 420, Local 457; the UWUA Local 369; and IUOE — supporting job quality, stability, and pathways as the system modernizes.

[107] Mass Save. "Clean Energy Pathways." 2025. https://www.masssave.com/trade-partners/clean-energy-pathways
[108] Commonwealth Corporation. "Workforce Training Fund Program." 2025. https://commcorp.org/program/workforce-training-fund-program/
[109] Colin Gibbs. "Good things come to those who wait: Massachusetts set to be national example with AMI 2.0." *Utility Dive*. February 20, 2024. https://www.utilitydive.com/spons/good-things-come-to-those-who-wait-massachusetts-set-to-be-national-exampl/707172/

Training and Qualifications

The transformation of utility distribution-system operations and control rooms demands a new blend of skills, as workers must now become adept in real-time monitoring, digital communications networks, cybersecurity, data analytics, and grid-edge automation. This evolution creates opportunities for fossil fuel power plant workers—such as control room operators—to transition into advanced grid operations roles by up-skilling to manage digital platforms and DER orchestration, ensuring that existing expertise in system safety and monitoring is preserved while new competencies in digital tools are added.

At the same time, new categories of smart grid jobs are emerging. Distribution automation technicians are needed to manage sensors, switches, and remote-controlled devices that improve grid resilience, while control room operators are evolving into grid management specialists responsible for overseeing Distributed Energy Resource Management Systems (DERMS) and real-time analytics. Cybersecurity analysts and data scientists are increasingly in demand to secure critical grid infrastructure and harness the vast quantities of data generated by smart meters and sensors, and DER aggregator specialists are emerging to manage portfolios of distributed resources such as solar, storage, and demand-response assets to provide grid services. These roles vary in pay and union representation, but many, particularly those tied to utility operations, are supported by collective bargaining agreements, helping to ensure stable, high-quality employment as the sector grows.

Advanced Nuclear and Fusion Energy

Massachusetts hosts an advanced nuclear and fusion energy ecosystem spanning research reactors, private-sector fusion R&D and manufacturing, and decommissioning operations that together support high-quality jobs across trades, technicians, and professional roles. Commonwealth Fusion Systems (CFS)—the MIT-spinout building high-temperature-superconducting magnet–based tokamak systems—now reports 1,000+ employees at its Devens campus, anchoring a supply chain for precision fabrication, magnets, cryogenics, quality, and manufacturing engineering.[110] Massachusetts also operates two research reactors that underpin education, training, and industry collaboration: the MIT Research Reactor (MITR-II) in Cambridge and the UMass Lowell Research Reactor.[111] These research reactors not only provide hands-on operations but also license student operators through the U.S. Nuclear Regulatory Commission (NRC)—an on-ramp that directly feeds the regional talent pipeline.[112]

[110] Commonwealth Fusion Systems. “Home.” 2025. https://cfs.energy/
[111] Massachusetts Institute of Technology Nuclear Reactor Laboratory. “The Reactor at MIT.” 2025. https://nrl.mit.edu/reactor/
[112] UMass Lowell. “Nuclear Energy.” 2025. https://www.uml.edu/Research/Energy/research/nuclear-energy.aspx

Historically, nuclear energy production provided high-wage employment in Massachusetts during the operating years of Pilgrim Nuclear Power Station (Plymouth) and Yankee Rowe (Franklin County). Prior to Pilgrim's 2019 retirement, a University of Massachusetts study quantified its regional impact at ~585 direct plant jobs and ~590 secondary jobs (with high wages and comprehensive benefits),[113] while documentation for Yankee Rowe shows hundreds of regional jobs tied to the plant's operations and supply chain in the early 1990s.[114] Today, Pilgrim's decommissioning, led by Holtec Decommissioning International, continues to employ a mix of union craft labor and site staff.[115]

Training & Qualifications

Workforce needs to support advanced nuclear and fusion energy span areas such as construction, operations, insulation, maintenance, radiation protection, Quality Assurance/Quality Control (QA/QC), security, manufacturing, and digital/controls. Critically, many of these jobs do not require a four-year college degree. Federal and industry guidance highlight accessible pathways into well-paid nuclear roles such as reactor operator, radiation protection technician, welder/inspector, and instrument and controls technician, which typically rely on apprenticeships, associate degrees, stackable credentials, and employer training rather than bachelor's degrees.[116] At the same time, national workforce planning points to sizable talent demand for advanced reactors over the next two decades, reinforcing the need for Massachusetts to expand pipelines that include both degreed engineers and skilled trades.[117]

Massachusetts' two research reactors provide distinctive hands-on operator training and licensure pathways that few states can match. UMass Lowell runs a formal Reactor Operator Training curriculum and maintains an NRC-recognized operator licensure and requalification program, while MITR-II offers student operator opportunities and extensive experimental

[113] Jonathan G. Cooper. "The Pilgrim Nuclear Power Station Study." *University of Massachusetts Amherst.* April 2015. https://plymouth-ma.gov/DocumentCenter/View/1413/UMass-Center-for-Economic-Development---Pligrim-Power-Station-Study-April-2015-PDF

[114] John R. Mullin and Zenia Kotval. "The Closing of the Yankee Rowe Nuclear Power Plant: The Impact on a New England Community." *University of Massachusetts Amherst.* October 1997. https://hdl.handle.net/20.500.14394/31869

[115] Holtec. "Pilgrim Decommissioning." 2025. https://holtecinternational.com/company/divisions/hdi/our-fleet/pilgrim/

[116] U.S. Department of Energy. "7 Nuclear Careers that Don't Require an Engineering Degree." November 13, 2024. https://www.energy.gov/ne/articles/7-nuclear-careers-dont-require-engineering-degree

[117] Nuclear Energy Institute. "Nuclear Energy Industry Workforce Strategic Plan." October 2023. https://www.nei.org/getmedia/c0802a32-be56-4bac-b62a-81cab624fd1e/Workforce-Strategic-Plan.pdf

facilities—together supplying real-world reactor operations experience, procedure discipline, and nuclear safety culture that transfer directly to both fission plants and fusion facilities.[118]

In the fusion energy segment, CFS's Devens campus is building out manufacturing lines and integrated test facilities that require technicians/assemblers, welders, machinists, cryogenics and vacuum techs, high-power electrical and power-electronics specialists, controls technicians, Environmental Health and Safety (EHS)/radiation protection staff, logistics, and facilities operations—creating multiple entry points for workers with high-school diplomas, certificates, or associate degrees as well as bachelor's and graduate-level engineers. Unions like UA Local 4 and the MBTU represent some of these workers today. Public job postings and company updates consistently show demand across manufacturing, supply-chain, and technical operations, reflecting a blend of traditional industrial skills and emerging fusion-specific competencies.[119]

Decommissioning of the Pilgrim facility continues to serve as an employment and training arena in Massachusetts, where highly regulated radiological work, heavy construction, demolition, waste packaging/transport, and site restoration rely on union craft labor (including those represented by Operating Engineers of North America; IBEW; the United Brotherhood of Carpenters and Joiners of America; and the International Association of Bridge, Structural, Ornamental and Reinforcing Iron Workers) and specialized contractors. Recent reporting and advisory-panel records demonstrate that decommissioning cycles can extend for years, supporting jobs across laborers, operators, electricians, ironworkers, teamsters, carpenters, radiation protection technicians, and security—while also reinforcing the need for consistent worker engagement and safety oversight.[120]

Together, these pipelines—from research-reactor operator licensure through fusion manufacturing and plant operations to decommissioning—position Massachusetts to capture nuclear, advanced nuclear, and fusion energy opportunities. With state support for new advanced nuclear, including provisions in the pending *Energy Affordability, Independence, and Innovation Act* (H.4144), and fusion energy systems, and deliberate alignment of apprenticeships, union partnerships, and stackable credentials, the state can expand accessible, high-wage careers while advancing safe, reliable, carbon-free energy.

[118] UMass Lowell. "ENGY.4190 Nuclear Reactor Operator Training (Formerly 24.419)." n.d. https://www.uml.edu/catalog/courses/engy/4190
[119] Commonwealth Fusion Systems. "Devens Events & Updates." 2025. https://cfs.energy/devens-campus/updates
[120] Holtec. "FAQs: Pilgrim Decommissioning." 2025. https://holtecinternational.com/communications-and-outreach/pilgrim-decommissioning-faqs/

Manufacturing

Massachusetts has built a strong and diversified clean energy economy, creating tens of thousands of good jobs in construction, installation, and services among the many industries reviewed in this report. However, most of these jobs are tied to applying technologies developed and manufactured elsewhere. Massachusetts has an opportunity to expand manufacturing not only fusion energy and BESS technology, but also technologies like Ground Source Heat Pumps (GSHPs).

Unlike heavy industrial equipment, GSHPs are built from common components—compressors, pumps, fans, and controls—that can be sourced through existing supply chains and assembled locally. This is a natural fit for Massachusetts' strengths in design engineering, precision manufacturing, and innovation. A package of studies, pilot programs, and public-private partnerships would help map the supply chain, identify competitive advantages, and jump-start demonstration projects that prove the viability of local manufacturing.

By expanding beyond installation alone to include innovation across emerging energy sectors such as thermal energy, solar, wind, energy storage, transportation electrification, energy efficiency, smart grid, advanced nuclear, and fusion energy, Massachusetts can accelerate job creation in the energy sector, expand its leadership in clean energy technology, and strengthen its economy for the long term, despite federal headwinds.

Conclusion

Massachusetts is entering a decisive decade for clean energy and workforce transformation. Across non-fossil thermal networks, solar, offshore wind, energy storage, transportation electrification, efficiency, grid modernization, and advanced nuclear and fusion energy, the state has both the policy framework and labor capacity to generate tens of thousands of new, high-quality jobs. Many of these roles draw directly on the skills of existing trades—pipefitters, electricians, insulators, drillers, and operators—while creating new technical pathways in digital controls, advanced manufacturing, and clean-technology innovation. With strong apprenticeship systems, union partnerships, and targeted state investments, Massachusetts can ensure that this rapid growth delivers not just cleaner energy, but also stable, family-sustaining careers accessible to workers from every community.

At the same time, the transition requires careful planning and deliberate equity. Federal policy uncertainty has created headwinds in sectors like offshore wind and EV deployment, but Massachusetts' state-level commitments, coupled with robust training infrastructure and industry leadership, position the state to stay on course. By including prevailing wage standards in state and utility ratepayer funded work, expanding apprenticeships, and aligning new training modules with emerging technologies, Massachusetts can both protect existing workers

and prepare the next generation for clean energy careers. In doing so, Massachusetts will not only decarbonize its energy system but also anchor inclusive economic growth, proving that the path to net zero can strengthen both the grid and the middle class.

Overview of Wages and Benefits

Comparing wages and benefits across jobs in existing fossil fuel industries and emerging clean energy industries is key to understanding how the energy transition will affect Massachusetts' fossil fuel workforce, and was a directive of the legislation establishing the Commission. Due to timing and funding constraints for this report, the data on wages and benefits in this section was provided by the unions represented on the Commission and an internet search of publicly available information. (All sources are noted.)

Based on the information provided, the Commission found that wages vary widely across the fossil fuel workforce depending on years of experience, geographic location, union representation, certifications, and more. Workers supported by collective bargaining agreements typically receive higher pay and stronger benefit packages than those workers not supported by collective bargaining agreements.

More specifically, natural gas field workers earn between $52 and $57 per hour on average, with comprehensive healthcare and retirement contributions negotiated through collective bargaining agreements. Wages for unionized construction workers are strong: members of Plumbers and Gasfitters Local 12, for example, earn $71.74 per hour, with apprentices starting at $25 and progressing to more than $50 per hour by their fifth year. Automotive maintenance mechanics average roughly the high-$50s per hour, and fuelers progress to the low-$30s per hour after a year, with healthcare and pension benefits under union contracts. Truck drivers earn a median wage of $29.15 per hour across industries, although specialized "fuel driver" postings and wage surveys indicate $30–$42 per hour is common for hazmat/tanker roles in the state. [121, 122] Power plant operators in Massachusetts earn around $46–$50 per hour, consistent with national BLS profiles placing power-generation operators among the higher-paid production occupations.[123] Localized estimates show similar ranges across the Boston, Worcester, and Springfield metro areas.[124]

[121] U.S. Bureau of Labor Statistics. "Occupational Employment and Wage Statistics." 2025. https://data.bls.gov/oes/#/home

[122] U.S. Bureau of Labor Statistics. "Heavy and Tractor-trailer Truck Drivers." 2025 https://www.bls.gov/ooh/transportation-and-material-moving/heavy-and-tractor-trailer-truck-drivers.htm?utm_source=chatgpt.com

[123] My Plan.com "Power Plant Operators." 2025. https://www.myplan.com/careers/power-plant-operators/salary-by-city-51-8013.00.html?sort=a&sort_order=a&st=MA

[124] U.S. Bureau of Labor Statistics. "Occupational Employment and Wage Statistics." 2025. https://data.bls.gov/oes/#/home

Among clean energy occupations, electricians represent the largest workforce in Massachusetts. IBEW Local 103 electricians earn $61.86 per hour in wages and about $105 per hour in total compensation, reflecting the skills necessary to perform in electrical distribution, switchgear, and substation work to enable electrification and the addition of clean generation technologies, solar, wind, and storage.[125] In geothermal, wages are competitive with other construction and utility occupations under union contracts. For example, UA Pipefitters Local 537 workers supporting the build out of geothermal systems on campuses around Massachusetts earn base wages above $65 per hour, with total packages exceeding $100 per hour once pensions and health benefits are included.[126] Prevailing-wage schedules also recognize geothermal drilling, piping, and HVAC-R classifications with rates ranging from the mid-$60s to over $100 per hour depending on craft and experience.[127]

In addition to electricians, other jobs supporting energy storage include equipment operators and mechanical installers and typically fall in the $40–$50 per hour base range, with $70–$90 per hour total packages depending on locality. Mechanics and operators working in transportation electrification earn $30–$40 per hour base wage range, with strong benefit packages tied to union contracts.

While the solar sector supports approximately 11,600 jobs in Massachusetts, several positions pay less than those in established unionized fossil fuel-driven trades. [128] Job postings for solar installers in Massachusetts show wages as low as $25 per hour, with limited benefits or training included, while other installers are paying more competitive wages (upwards of $55 per hour), with benefits and career pathways.[129]

Overall, wage and benefit comparisons reveal both the opportunities and challenges of Massachusetts' clean energy transition. While traditional fossil fuel and unionized construction trades provide high, stable compensation and strong benefits, some emerging clean energy jobs currently offer lower wages and fewer worker protections. Policymakers can use these insights to guide investments, labor standards, and workforce programs that ensure clean energy growth delivers family-sustaining jobs and equitable opportunities for both current and future workers.

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[125] Boston Public Health Commission. "Prevailing Wage Rates." July 24, 2024. https://www.boston.gov/sites/default/files/file/2025/03/Prevailing%20Wage.pdf
[126] City of Everett. "Prevailing Wage Rates." June 12, 2025. https://cityofeverett.com/wp-content/uploads/2025/06/25-11-PWS-20250611192220.pdf
[127] Boston Public Health Commission. "Prevailing Wage Rates." July 24, 2024. https://www.boston.gov/sites/default/files/file/2025/03/Prevailing%20Wage.pdf
[128] Solar Energy Industries Association. "State Overview – Massachusetts." 2025. https://seia.org/state-solar-policy/massachusetts-solar/
[129] Indeed.com. "Solar Installer." 2025. https://www.indeed.com/q-solar-installer-l-massachusetts-jobs.html?vjk=cc34d9defbcbf891

Apprenticeships, Training, and Certification Programs

Supporting a smooth and equitable transition for fossil fuel workers and creating accessible opportunities for the current and next generation to build, maintain, and operate a safe and reliable energy system requires careful planning. This includes developing thoughtful, skills-based training and assessment programs that provide education, hands-on experience, and operational knowledge needed in a changing energy landscape. The Commission's first step was to understand the wide range of training pathways available, the structure and purpose of each, and how they are delivered across Massachusetts.

For example, a registered apprenticeship is a formal, paid training program that combines on-the-job learning with classroom instruction, culminating in a nationally recognized industry credential. These programs are typically multi-year, employer-driven, and regulated by state or federal agencies. In contrast, pre-apprenticeship programs are short-term, preparatory pathways that introduce individuals, often those just entering the workforce, to the basics of a trade. They focus on foundational skills and often partner with registered apprenticeship programs to create a seamless entry point.

Training and certification programs offer additional pathways that differ in structure and purpose. Training programs range from short-term skills workshops to longer vocational or academic courses and are typically offered by community colleges, technical schools, or workforce development agencies (with unions and employers also providing training programs to members). Certification programs are designed to validate specific technical knowledge or qualifications through a recognized credential, such as a technician license or safety certification. Understanding how these pathways differ helps educators, employers, and policymakers to design and promote opportunities that respond to the demands of an evolving workforce and energy future.

Apprenticeships – Multi-year, paid, earn-while-you-learn programs (often union-affiliated) that lead to journeyperson status in licensed trades such as electricians, pipefitters, and HVAC professionals. Massachusetts has one of the most robust apprenticeship systems in the country, with approximately 620 active registered apprenticeship programs serving nearly 10,000 apprentices across industries including construction, IT, and clean energy.[130]

Workforce training programs – Flexible, often introductory programs that help jobseekers explore careers, build foundational skills, or transition from other industries. Graduates may move directly into entry-level roles, seek certification, or apply for apprenticeships. In

[130] Mass.gov. "Massachusetts Registered Apprenticeship." 2025. https://www.mass.gov/massachusetts-registered-apprenticeship

Massachusetts, licensing and certification for energy-related fields are governed through a mix of state-level regulation and local oversight, with credentials structured around both task-specific and technology-specific requirements.

Certification programs – Shorter, skills-specific credentials (e.g., solar installation, energy auditing) often required by employers or licensing boards. MassCEC identified 900 training programs relevant to clean energy occupations available to residents of Massachusetts. Several of these are highlighted in the report, with a full list available in the MassCEC Clean Energy Workforce Data Workbook.

Together, these pathways form a comprehensive approach that supports retraining, upskilling, entry, advancement, and specialization in energy careers. At the same time, the sheer number of programs, training opportunities and varying certification and licensing requirements can make it challenging for existing and potential employers, transitioning fossil fuel workers, and new entrants to clearly identify and navigate the most effective pathway both into a field and how to hire for needs.

This section examines the landscape of various apprenticeship, pre-apprenticeship, training and certification programs within Massachusetts.

Registered Apprenticeship Programs in Massachusetts

Overseen by the U.S. Department of Labor (U.S. DOL) or state apprenticeship agencies, registered apprenticeship programs typically require at least 2,000 hours of hands-on training and 150 hours of related instruction annually. Massachusetts has one of the most robust registered apprenticeship systems in the country, with approximately 676 active registered apprenticeship programs serving nearly 10,000 apprentices across a range of industries, including construction, healthcare, education, IT, and clean energy.[131]

These apprentice programs are run by distinct entities (or sponsors), such as companies, unions, or associations, and are registered through the state's Division of Apprentice Standards (DAS). These sponsors oversee program administration, apprentice agreements, classroom and on-the-job training, wage progression, and regulatory compliance.[132] Registered apprenticeship program participants earn wages that grow progressively as they gain more experience and receive a nationally recognized credential upon successful completion.

[131] Mass.gov. “Massachusetts Registered Apprenticeship.” 2025. https://www.mass.gov/massachusetts-registered-apprenticeship

[132] Mass.gov. “Information for Apprentices." 2025. https://www.mass.gov/information-for-apprentices

Employers in certain expansion occupations can qualify for the state Registered Apprenticeship Tax Credit (RATC) for each registered apprentice hired.[133] An expansion occupation is an industry that has not traditionally utilized an apprentice model and that the EOLWD determines to be critical to a region's labor market economy. These include occupations in clean energy (e.g. solar PV installers, refrigeration / air conditioning technicians, wind turbine service technicians, geothermal technicians, etc.). A full list of eligible occupations can be found on Mass.gov.

Massachusetts has a significant number of registered apprenticeship sponsors and active apprentices in energy and energy-adjacent fields, with the number of apprentices specifically focused on clean energy continuing to grow. The largest occupational areas tied to the energy workforce, including both fossil fuel and clean energy sectors, are electricians, HVAC and refrigeration technicians, and pipefitters. Together, these three trades account for approximately 3,900 active registered apprentices.

Geothermal is a promising area for apprenticeship development in Massachusetts. NEGPA has expressed interest in launching a geothermal apprenticeship program, potentially the first in the nation. A grant program supporting the creation of new clean energy apprenticeships would enable organizations like NEGPA to advance this effort.

Data also indicates high rates of retention for individuals who complete apprenticeship programs. For instance, Massachusetts reports an approximate 94% employment retention rate when an apprenticeship ends.[134]

Getting Connected to Registered Apprenticeships

Registered apprenticeships play an important role in training and employing skilled labor in the energy industry, making it important to understand how individuals access these opportunities. People discover apprenticeships through a variety of channels, including online platforms like state websites, national databases, and industry job boards. Traditional methods, such as flyers in schools, community centers, and unemployment offices, remain useful, especially for those with limited internet access.

Schools and training institutions, including career and technical high school programs, pre-apprenticeships, community colleges, and vocational schools, help connect students to apprenticeship sponsors. Word of mouth through friends, family, educators, and colleagues is especially influential in established trades. Community organizations, workforce agencies, and

[133] Mass.gov. "Apply for a Registered Apprentice Tax Credit (RATC)." 2025. https://www.mass.gov/how-to/apply-for-a-registered-apprentice-tax-credit-ratc
[134] Commonwealth Corporation. "Workforce Training Fund Program." 2025. https://commcorp.org/header_program/workforce-training-fund-program/.

labor unions also play a key role, offering outreach through job fairs, workshops, and information sessions to reach underserved populations. Additionally, many individuals already working in related fields learn about apprenticeship opportunities through their employers or industry networks.

Spotlight: Site Visit to The Joint Apprenticeship Training Center – Essential Workforce Skill Building and Training in Dorchester, MA

To better understand the role of registered apprenticeship programs in preparing Massachusetts' workforce for the clean energy transition, the Commission visited the Greater Boston Joint Apprenticeship Training Center (JATC or the Center). This state-of-the-art facility has trained more than 600 apprentices in its five-year Electrical Construction Program and more than 100 in its five-year Telecommunications Program. The 56,000-square-foot center features thirteen classrooms, eleven hands-on shops, computer and drafting labs, seminar spaces, administrative offices, and an auditorium. Apprentices attend classroom instruction one day a week and spend the remaining four workdays on active job sites, gaining real-world experience. To earn their journeyperson license, apprentices must complete 8,000 hours of on-the-job training and 600 hours of classroom instruction, typically over five years. The JATC accepts individuals of all ages (current apprentices range from 24 to 63 years old) and applicants must be at least 18 to apply.

For 2025, the JATC received 2,500 applications but was only able to accept around 100, reflecting high demand and the JATC's commitment to ensuring job placements. The JATC is actively expanding clean energy training, supported by a MassCEC grant. A clean energy pre-apprenticeship program is also hosted onsite. While the limited number of apprenticeship spots helps to maintain job placement rates, it also reveals a disconnect between projected electrician demand and current job availability. Additionally, Journeyperson electricians could experience higher unemployment rates due to federal policy changes cutting tax incentives for clean energy projects. Although some apprentices pursue master-level certification to enter the residential market, the broader outlook remains uncertain. Identifying opportunities to close gaps to match more apprentices with needs of the residential market could help boost near-term employment and allow the program to expand, ensuring a ready pipeline of workers for the future.

Training and Pre-Apprenticeship Programs

There are a wide range of workforce training and development programs designed to prepare residents for careers in clean energy, electrification, offshore wind, and grid modernization. These programs, distinct from formal apprenticeships, often focus on short- to medium-term skill development and are delivered through partnerships between community colleges, career

technical education schools, nonprofits, workforce boards, and employers. While workforce training programs and registered apprenticeships often share the common goal of preparing individuals for high-quality careers, they differ in structure and duration. Per above, registered apprenticeships are long-term, employer-sponsored pathways that combine paid on-the-job training with classroom instruction and lead to an industry-recognized credential. In contrast, workforce training programs are typically more flexible, can serve a broader range of participants, and may include vocational courses, certificate programs, and short-term skill-building workshops. These pathways are particularly effective for new entrants to the labor force, individuals exploring new careers or transitioning between careers with similar skill sets, and those from historically under-represented communities.

Pre-apprenticeship programs play an important role within this broader training ecosystem. These short-term (typically 1–3 months) training courses provide participants with foundational, hands-on experience in specific industries and are often designed in partnership with registered apprenticeship programs to create a seamless transition into long-term employment pathways. One key example is the pre-apprenticeship program offered through the JATC of Greater Boston, a partnership between IBEW Local 103 and the NECA Greater Boston Chapter. This program (Clean Energy Pre-Apprenticeship Program) targets individuals aged 18-24 and introduces participants to the electrical industry with a focus on clean energy infrastructure such as EV charging stations, solar and wind power, and battery storage systems.[135, 136] Another notable example is the clean energy construction pre-apprenticeship program developed by MassCEC, the MassHire North Shore Workforce Board, and the MassHire North Shore Career Center. Offered through Essex North Shore Agricultural and Technical School, the program prepares individuals interested in entering the construction trades with a clean energy focus.[137]

MassCEC directs significant resources toward training, equity, and career readiness in the clean energy sector.[138] For examplle, its Offshore Wind Works Program has invested nearly $15 million since 2017 in training infrastructure, certifications, and internships, while Climate-Critical Workforce Training and Equipment Grants provide up to $800,000 per organization for

[135] Boston JATC. “Home.” 2025. https://bostonjatc.com/
[136] Massachusetts Clean Energy Center. “IBEW Local 103 JATC – Clean Energy Electrical Pre-apprenticeship Program.” 2025. https://cleanenergyeducation.org/programs/ibew-local-103-jatc-clean-energy-electrical-pre-apprenticeship-program/
[137] Essex North Shore. “Home.” 2025. https://essexnorthshore.org/
[138] Massachusetts Clean Energy Center. “Equity Workforce Training Implementation Grants.” 2025. https://www.masscec.com/program/equity-workforce-training

curriculum and lab development in areas like distributed energy, smart grids, and electrification.[139, 140, 141]

MassCEC also runs long-standing career-entry programs, including the Clean Energy Internship Program, which has placed more than 5,800 interns with over 600 companies since 2011, leading to more than 1,000 permanent hires.[142] Complementary initiatives, such as Mass Save Clean Energy Pathways, further expand access to the sector. The program provides full-time, paid, three-month internships aimed at boosting the energy efficiency workforce. The recently launched Climate Service Corps, administered by MassCEC, provides grant funded programs targeting 18- to 24- year-olds from underrepresented communities to receive clean energy career training, wrap-around supports, and pathway services.[143]

MassCEC works collaboratively with EOLWD and Commonwealth Corporation in sector-based job training, especially through the Career Technical Initiative, the Workforce Competitiveness Trust Fund, and the Workforce Training Fund. For example, the Career Technical Initiative marked its fifth year as a program in 2025—a training program that supports adult learners by leveraging over 30 vocational technical schools statewide for evening classes often taught by school faculty and in partnership with area employers. The Career Technical Initiative is funded by the state budget through EOLWD and administered by Commonwealth Corporation. Since January 2023, the Healey-Driscoll Administration has awarded over $17.6 million for grants through this program to train more than 2,000 jobseekers for clean energy occupations such as HVAC, electricians, and plumbers. Together, these efforts, supported by a statewide directory of hundreds of training opportunities, illustrate how MassCEC is building an inclusive pipeline of skilled workers to power Massachusetts' clean energy sector.[144] For more information, see *Appendix E. Examples of MassCEC Workforce Development Programs in Climate-Critical Training & Education*.

[139] Massachusetts Clean Energy Center. "Offshore Wind Works-Workforce Training and Development Grants." 2025. https://www.masscec.com/program/offshore-wind-works-workforce-training-development-grants
[140] Massachusetts Clean Energy Center. "Offshore Wind Works-Workforce Training and Development Grants." 2025. https://www.masscec.com/program/offshore-wind-works-workforce-training-development-grants
[141] Massachusetts Clean Energy Center. "Offshore Wind Works-Workforce Training and Development Grants." 2025. https://www.masscec.com/program/offshore-wind-works-workforce-training-development-grants
[142] Massachusetts Clean Energy Center. "Clean Energy Internship Program." 2024. https://www.masscec.com/sites/default/files/documents/2024%20-%20Students%20-%20College%20Internship%20Program%20.pdf
[143] Massachusetts Clean Energy Center. "MassCEC Launches Climate Service Corps to Build Next-Generation Clean Energy Workforce." September 26, 2025. https://www.masscec.com/press/masscec-launches-climate-service-corps-build-next-generation-clean-energy-workforce
[144] Mass Save. "Clean Energy Pathways." 2025. https://www.masssave.com/trade-partners/clean-energy-pathways

Certifications and Licenses

In Massachusetts, licensing and certification for energy-related fields are governed through a combination of state-level regulation and local oversight, with credentials structured around both task-specific and technology-specific requirements (See *Appendix F. Examples of Agencies and Levels of Licensing*). For example:

- Commercial HVAC professionals advance through a tiered pathway (apprentice, technician, and contractor). For pipefitting and refrigeration systems greater than 10 tons, this is overseen by the DOL and the OPSI, with local authorities responsible for related plumbing and HVAC permits.[145] Residential HVAC professionals typically have a less organized progression pathway; these workers are generally trained at career technical education high schools, community colleges, and private training providers. The most common certification universally required for this career path is EPA 608, although many will also need a Hot Works certification.[146, 147] HVAC workers often pursue the North American Technician Excellence (NATE) certification, a nationally recognized credential that validates their technical knowledge and competence in installing, maintaining, and troubleshooting HVAC systems.[148]
- Electricians follow a similar progression, from journeyperson to master, requiring formal education, hours of supervised work, and local permitting and inspection through municipal Inspectors of Wires.[149]
- Hoisting operators are licensed through OPSI via examinations and biennial renewals, with limited local involvement.[150]
- Geothermal well drillers must be certified and registered through MassDEP's Well Driller and Underground Injection Control (UIC) programs, while system designers/installers often hold technology-based credentials (e.g., IGSHPA).[151]

[145] Ashley Henshaw. "Massachusetts HVAC license and insurance requirements." *Next Insurance.* February 5, 2024. https://www.nextinsurance.com/blog/hvac-license-in-massachusetts/?utm
[146] United States Environmental Protection Agency. "Section 608 Technician Certification Requirements." December 13, 2024. https://www.epa.gov/section608/section-608-technician-certification-requirements
[147] Mass.gov. "Welding, Cutting & Other Hot Works." 2025. https://www.mass.gov/info-details/welding-cutting-other-hot-works
[148] U.S. Department of Energy. "North American Technician Excellence." https://www.energy.gov/eere/buildings/north-american-technician-excellence
[149] Mass.gov. "Apply for an individual electrical or systems license." 2025. https://www.mass.gov/how-to/apply-for-an-individual-electrical-or-systems-license?utm
[150] Mass.gov. "Hoisting Licensing and Exams." 2025. https://www.mass.gov/hoisting-licensing-and-exams?utm
[151] Massachusetts Department of Environmental Protection. "Guidelines for Ground Source Heat Pump Wells." December 2013. https://www.mass.gov/doc/guidelines-for-ground-source-heat-pump-wells/download

- Solar installations require contractor registration through DOL, coordination with licensed electricians, and compliance with municipal permitting and code enforcement; although not mandated, certifications like NABCEP are widely respected.[152]
- Automotive and mechanical trades are regulated through a patchwork of agencies and local standards depending on specialty.

Local jurisdictions play a critical role in enforcement, issuing building permits, performing structural reviews (especially for rooftop solar), and requiring Construction Supervisor Licenses and Home Improvement Contractor (HIC) registrations for general contracting.

The coexistence of multiple licensing and certification layers, task-based for trade functions and technology-based for system-specific expertise, can make navigating requirements complex. Programs designed to help mid-career workers transition or to bring new workers into the field need to clearly explain what is required and what work participants will be qualified to perform upon completion. As technologies advance, use cases evolve, and industry standards shift, Massachusetts may need to reconsider and streamline its training, certification, and licensing systems to reduce confusion and enable skills-based transitions, while maintaining high levels of safety and performance standards.

Task Based Licensing: Licenses are tied to specific tasks or scopes—e.g., "Refrigeration Technician" for handling refrigerant systems, "Journeyperson Electrician" for general wiring, "Hoisting Engineer" for crane operation. Each requires education, experience, and exam tailored to that task.

Technology Based Licensing/Certification: Focuses on mastery of technologies or systems (e.g., GSHP installation, solar PV system design). For example, geothermal installers/designers need certification from the IGSHPA and Canadian Standards Association (CSA) focused on the existing American National Standards Institute (ANSI)/CSA/IGSHPA North American Standard (CSA/ANSI/IGSHPA C448 Series:25, "Design and installation of ground source heat pump systems for commercial and residential buildings"), reflecting competence in specific technology rather than generic trade skills.

Workforce Retention and Development Strategies for a Transitioning Industry

As Massachusetts transitions its energy system, the state faces a dual challenge: maintaining the safe, reliable operation of existing fossil fuel infrastructure while building a diverse, ready, clean energy workforce to meet future needs. Achieving this requires both retention and

[152] LumberFi. "Solar Licensing Requirements in Massachusetts." 2025. https://www.lumberfi.com/wiki/solar-licensing-solar-massachusetts?utm

reskilling of experienced workers and equitable access to training and career pathways for new entrants. The Commission has identified areas of focus, including developing retention strategies that protect institutional knowledge while preparing workers for emerging opportunities, identifying systemic barriers to accessing programs and opportunities, providing clarity and coordination among training and upskilling pathways, expanding early career awareness, and better aligning certifications and licenses to meet emerging needs. This section provides an overview of each area, high-level recommendations to address, and examples of existing initiatives.

Retaining the Fossil Fuel Workforce During the Transition and Training for Future Jobs

Maintaining a skilled fossil fuel workforce is essential for system safety, reliability, and continuity as the energy system evolves. Workers in utility operations, infrastructure maintenance, and fuel distribution will remain critical. However, risks such as perceived job insecurity, an aging workforce, lack of clear post-2030/2035 pathways, and increasing attrition threaten stability.

The Commission recommends strategies that include:

- **Retain-and-train programs** – Allow incumbent workers to stay in current roles while gaining clean energy skills (e.g., retraining bus fuelers to service diesel, hybrid, and electric fleets).
- **Service continuity incentives** – Financial bonuses for critical positions like control room operators and emergency responders.
- **Bridge-to-retirement supports** – Phased retirement and partial pension options to keep experienced workers engaged.
- **Cross-sector knowledge transfer** – Structured mentorship from fossil fuel workers to clean energy entrants.

Developing and implementing these strategies requires targeted engagement with major fossil fuel employers, gas utilities, pipeline companies, fuel distributors, and collaboration with labor unions, existing workforce participants, and policymakers. The Commission determined that an important first step is to support employers in major fossil fuel and clean energy industries as they develop longer-term workforce transition plans, and to convene with emerging industries to understand current skill sets and future needs.

Addressing Barriers to Access

Workforce entry into energy careers, whether through registered apprenticeships, certifications, or training programs, is often hindered by structural and financial obstacles. A

recurring challenge is what is known as the "experience paradox," in which jobseekers need hands-on experience to get hired but require employment to gain that experience. New entrants frequently find that even after completing training or pre-apprenticeship programs, they face a steep learning curve in apprenticeships due to insufficient exposure to diverse, real-world job sites.

Stronger integration of practical learning (simulations, real-world projects, and job site visits) into vocational school and pre-apprenticeship curricula can help address this. Students at La Colaborativa, for example, recommended a structured pipeline that front-loads essential theory and certifications, followed by immersive practical application and observation.[153]

Financial barriers also remain a major hurdle. Many participants cannot afford unpaid training, the tools necessary to participate in programs, or the loss of income during education. Paid learning opportunities, stipends, and wraparound supports such as meals, transportation, and child care would make participation more accessible, particularly for lower-income individuals.

Many workers are unaware of opportunities and pathways; this is particularly acute in currently underrepresented groups, including women and people of color. Finally, addressing soft skills, financial literacy, and networking opportunities alongside technical training can help prepare participants for and provide access to employment and career opportunities.

Spotlight: Site Visit to La Colaborativa – Building Equitable Workforce Pathways in Chelsea, MA

The Commission visited La Colaborativa, a community-based organization in Chelsea, Massachusetts. La Colaborativa is focused on advancing economic opportunity for historically underserved residents through workforce training, wraparound services, and advocacy. The organization serves up to 500 individuals each day and offers free training programs in clean energy and other high-demand industries. These programs are intentionally designed to reduce barriers to participation by including supports like English for Speakers of Other Languages (ESOL), digital literacy, and stipends to help offset food, housing, and child care costs.

The Commission's visit highlighted several strengths of La Colaborativa's model. The organization maintains an 85% job placement rate by designing its training programs around actual job openings in close collaboration with employers. A hands-on HVAC pre-apprenticeship program, conducted in partnership with Franklin Cummings Tech, drew 90

[153] Abt Associates. "Implementing Registered Apprenticeship Programs: Experiences of 10 American Apprenticeship Initiative Grantees." December 2021. https://www.dol.gov/sites/dolgov/files/ETA/publications/ETAOP%202022-05_Implementing%20RAPs%20Experiences%20of%2010%20AAI%20Grantees%20Report.pdf

applicants for just 12 available spots, reflecting strong community demand for skilled trade opportunities. Youth development programs for ages 14–18 help cultivate early interest in trades and serve as on-ramps into adult pre-apprenticeship programs. To close the digital divide, La Colaborativa partners with the Massachusetts Broadband Institute to provide free laptops, routers, and one year of internet access to participants. These initiatives are bolstered by a whole-family approach to retention and support, recognizing that household stability is essential to workforce success.

La Colaborativa continues to respond to complex, interconnected barriers affecting its community. Language access remains one of the most significant obstacles to employment for the communities it serves, making ESOL and digital literacy offerings critical. To expand accessibility, these services are now offered online for those unable to attend in person. Additionally, limited access to preventative healthcare has led many residents to rely on emergency rooms for basic care. In response, La Colaborativa is collaborating with Mass General Brigham to build dedicated preventative care spaces within its Chelsea location. Grounded in community trust and responsive outreach strategies, such as canvassing and word of mouth, La Colaborativa serves as a model for delivering equity-focused, scalable workforce solutions rooted in lived experience.

Building Early Career Awareness

The Commission identified early education as another area of focus. Commission members agreed that educators and school counselors are key influencers in shaping career decisions, yet many schools present college as the primary or sole pathway, often omitting vocational, apprenticeship, and trade careers. This limits awareness of high-paying, essential roles in the energy sector.

Trade careers can be both financially and professionally rewarding. For example, a union journeyperson in Massachusetts earns an average of $129,960 annually, significantly more than the state average salary of $83,000.[154, 155] Career technical education students often out-earn their college-educated peers. For example, a 2022 Massachusetts study found career technical education healthcare graduates earned $5,491 more annually than their traditional high school counterparts. [156, 157]

[154] Union Pay Scales. “IBEW Electrician Pay Scale.” 2025. https://unionpayscales.com/trades/ibew-electricians/
[155] U.S. Bureau of Labor Statistics. “Occupational Employment and Wage Statistics.” May 2024. https://data.bls.gov/oes/#/area/2500000
[156] Lincoln Tech. “How Long Do Trade Schools Take? Details and Time Frames.” October 11, 2024. https://www.lincolntech.edu/news/skills-gap/how-long-do-trade-schools-take-learn-details-and-timeframes
[157] Jill Barshay. “Proof Points: Shop class sometimes boosts college going, Massachusetts study finds: College-versus-earnings tradeoff for construction and other fields”. *The Hechinger Report.* September 19, 2022. https://hechingerreport.org/proof-points-shop-class-sometimes-boosts-college-going-massachusetts-study-finds/

Changing perceptions is critical. For example:

- Training educators and counselors on the value of trade careers.
- Hosting in-class presentations from trade professionals and programs.
- Organizing site visits and hands-on demonstrations.
- Collaborating with organizations like Massachusetts Girls in Trade to spark early interest among young women for professional opportunities in the trades.

National Grid's Clean Energy Academies (covering Energy Infrastructure, Clean Energy Careers, and Clean Energy Tech) demonstrates the impact of such approaches. So far, 983 students have participated statewide, 130 have graduated from the Energy Infrastructure Academy, and 81 have been hired by National Grid or partners.

In fall of 2023, Governor Healey launched the MassReconnect program to provide free community college to those who are 25 years or older and offers a stipend of $600 for supplies. The program requires a high school diploma or alternative (e.g., HiSET, GED). A year later, MassEducate was launched by the Healey-Driscoll Administration, in partnership with the legislature, to provide community college free of charge to students of all ages and incomes in Massachusetts.[158] Due in large part to the early success of these two programs, Massachusetts community college enrollment grew by 11.4% in the last year and has grown nearly 40% since 2022.[159] Students are eligible for the program if they have completed high school, lived in Massachusetts for a year or longer, and are legal residents. MassEducate also provides a stipend of up to $1,200 for books and supplies in addition to covering all tuition and fees.[160] Finally, the previously mentioned Clean Energy Innovation Career Pathway from MassCEC and DESE is designed to build early career awareness by exposing students and young adults to clean energy industries, providing hands-on learning, mentorship, and career exploration opportunities.[161] These programs provide essential educational and training pathways for the future workforce, especially for those facing financial difficulties or other barriers to access.

At the same time, the sheer number of programs and options and how to access them presents a challenge. Providing educators and school counselors with information on energy careers, required skills and education, available programs and the application process is critical. To

[158] Mass.gov. "Free Community College." 2025. https://www.mass.gov/info-details/free-community-college
[159] Mass.gov. "Healey-Driscoll Administration Announces Public Higher Education Enrollment Has Returned to Pre-Pandemic Levels." October 28, 2025. https://www.mass.gov/news/healey-driscoll-administration-announces-public-higher-education-enrollment-has-returned-to-pre-pandemic-levels
[160] Mass.gov. "Free Community College." 2025. https://www.mass.gov/info-details/free-community-college
[161] Mass.gov. "Healey-Driscoll Administration Announces Clean Energy Innovation Career Pathway for High School Students." April 27, 2023. https://www.mass.gov/news/healey-driscoll-administration-announces-clean-energy-innovation-career-pathway-for-high-school-students

support this need, MassCEC recently launched *Massachusetts Climate Careers: Powering the Future*, the first statewide clean energy career awareness curriculum for high school students.[162] Designed for educators and school counselors, the free resource provides lesson plans, real-world examples, engaging videos, and career exploration tools that highlight diverse pathways into the clean energy and climatetech sector.[163] By equipping schools with accessible, classroom-ready materials, the curriculum helps ensure that students are introduced early to high-growth, high-wage career opportunities beyond the traditional college track.

Aligning Licensing and Certification

The Commission identified licensing and certification as another area of focus and recommends that requirements in Massachusetts be reviewed and adapted to meet the evolving needs of the clean energy transition. This is both to support the redeployment of the existing fossil fuel workforce and to provide clarity for new entrants and employers. Currently, inconsistencies across the state's 351 municipalities, such as varying geothermal well-drilling requirements, create unnecessary complexity and delay project timelines.

Fragmented standards can make it harder for workers to understand the credentials they need, for training providers to design aligned curricula, and for employers to hire qualified talent efficiently. Fostering greater inter-agency coordination, for example, between the DOL, MassDEP, and local jurisdictions, could help enable more aligned and future-focused licensing and certification processes that maintain worker, public, and system safety. This could help ensure training programs match regulatory requirements statewide, and give both workers and employers a clear, more predictable pathway to hiring and employment.

Conclusion and Recommendations

The Commission found that Massachusetts' clean energy transition will succeed only if workforce strategies balance two priorities: sustaining the current fossil fuel workforce while preparing a diverse, skilled talent pipeline for the future that leverages and evolves existing programs and pathways to timely meet in-demand needs. For example, early career awareness, barrier removal, and targeted retention are essential to ensuring equitable access to quality jobs. Similarly, aligning training and apprenticeship programs with in-demand jobs requires a

[162] Massachusetts Clean Energy Center. "MassCEC Launches First-of-its-Kind Clean Energy Career Awareness Curriculum." April 15, 2025. https://www.masscec.com/press/masscec-launches-first-its-kind-clean-energy-career-awareness-curriculum

[163] Massachusetts Clean Energy Center. "MassCEC Launches First-of-its-Kind Clean Energy Career Awareness Curriculum." April 15, 2025. https://www.masscec.com/press/masscec-launches-first-its-kind-clean-energy-career-awareness-curriculum

deliberate and data-driven approach that considers both current labor market trends and the anticipated impacts of clean energy policies.

Policy decisions at both federal and state levels directly shape workforce outcomes. Federal rollbacks have slowed investment and job creation, while state actions like the SMART program, energy efficiency, and storage procurements have sustained progress. Massachusetts' leadership is essential to provide worker and sector stability and drive investment in clean energy jobs.

Below are ten recommendations from the Commission for action by policymakers:

1) **Expand Investment in Clean Energy Registered Apprenticeships**: The Commonwealth should commit to a targeted annual investment to expand registered apprenticeship opportunities in clean energy sectors (e.g., solar, geothermal, energy storage, EV charging infrastructure, and building decarbonization). This funding should support program capacity, curriculum modernization, and expansion of employer partnerships to ensure alignment with projected job growth in the coming decade. It should also be paired with policies requiring or incentivizing registered apprentice utilization and labor standards on publicly funded projects (e.g., state, ratepayer).

2) **Prioritize Underrepresented Workers and Work Supports in Clean Energy Registered Apprenticeship Expansion**: Dedicated outreach, recruitment, and retention strategies should be established to increase access for historically underrepresented populations, including, for example, women, people of color, EJ communities, and formerly incarcerated individuals. This should include wraparound supports such as stipends, child care, transportation assistance, and language access to remove barriers to participation.

3) **Energy Work Contractor Database**. Require disclosure by contractors of use of labor-peace agreements, PLAs, collective bargaining agreements, prevailing wage, and registered apprentices, for state funded work. This should include work funded by state programs including, but not limited to, Mass Save and SMART. This disclosure should be made through an Energy Work Contractor Database to ensure consumers, workers, and other stakeholders can identify responsible employers that are using highly-skilled and trained workers. The information should be linked to the webpages of the programs for which the Qualified Contractor list applies. The information provided should be regularly updated and identify, at a minimum, 1) all necessary Massachusetts trade licenses held, and 2) whether the contractor actively participates in a state- or federally-recognized registered apprenticeship program. Policymakers can look to California's Energy

Transition Recommendations for standards for "responsible employers" for additional guidance.

4) **Develop an Employer-driven Five- and Ten-year Fossil Fuel Workforce Needs Outlook.** Convene employers of fossil fuel workers and develop a five- and ten-year outlook for their workforce needs, via the MassCEC and OET. This should include recommendations for retention and training, service continuity incentives, bridge-to-retirement programs, and cross-sector knowledge transfer. For companies regulated by the DPU, require that plans must be developed within 18 months and updated every two years.

5) **Improve Data Reporting.** The state should disclose additional registered apprenticeship data, including the number of apprentices employed on public projects and their retention rates, and publish reports to help align training investment with publicly funded energy projects. These plans should include projections on workforce needs, anticipated retirements, job creation, and wage and benefits projections tied to both publicly funded fossil fuel and clean energy investments.

6) **Establish a Dashboard to Promote Access to Programs.** Streamline and promote access to all available energy registered apprenticeship, workforce training, and certification programs in Massachusetts, including creating a state-sponsored dashboard to help aggregate and publicize across industries. This should include information on how to apply for programs, prerequisites needed, and skills gained and opportunities available after successful program completion. This can be done by leveraging and expanding EOLWD, EEA, MassCEC, DESE, and DHE efforts to advance an associated skills and certification mapping tool for energy-related jobs.

7) **Align Licensure and Certification Requirements.** Authorize the DOL to develop standard, non-licensure certifications for energy-related work for use by municipalities to align requirements and create more predictable pathways to hiring and employment. All certifications should serve as pathways into licensed trades, supporting pre-apprenticeship training and career advancement toward state-licensed occupations.

8) **Assess Impacts on Energy Workforce of Policy Changes**. When implementing policies that require reporting on associated greenhouse gas reductions, the implementing agency/program should also include information, at a high level, on workforce changes, including those related to potential job creation and job losses.

9) **Prioritize Use of In-house Utility Workforce for Ratepayer Funded Projects.** Work with the state's regulated utilities to prioritize the use of in-house workforce, where feasible. This should especially apply if utilities engage in new forms of energy, such as geothermal energy networks or loops. The utilities should be funded to train their in-house workforce to perform these jobs.

10) **Expand Clean Energy Tax Incentives.** Expand eligibility for the existing RATC which provides employers with a refundable tax credit worth 50% of an apprentice's wages, up to $4,800 per apprentice. The credit can be claimed for the same apprentice for up to two consecutive years, if eligible. It is recommended to add additional clean energy related occupations, including: Geothermal Drilling Operators (47-5021), Millwrights (49-9044), Pile Driver Operators (47-2072), Logisticians and Project Management Specialists (13-1080), and First Line Supervisors of Construction Trades and Extraction Workers (47-1010).

Appendices

Appendix A. Section 109 of An Act promoting a clean energy grid, advancing equity and protecting ratepayers (S.2967)

"There shall be a special commission to study the impacts on the fossil fuel workforce caused by public and private efforts to reduce greenhouse gas emissions and transition from fossil fuels to clean energy. The commission shall seek to measure and monitor the impact on fossil fuel workers and industries and examine ways to increase access to employment, training and workforce opportunities in clean energy industries and related fields. The commission shall consist of: the secretary of labor and workforce development or a designee, who shall serve as co-chair; the commissioner of energy resources or a designee, who shall serve as co-chair; the secretary of economic development or a designee; the director of environmental justice and equity or a designee; the executive director of the Massachusetts clean energy technology center or a designee; 8 members to be appointed by the governor, 1 of whom shall be a representative of employers in the gas utility sector, 1 of whom shall be a representative of employers in the electric power generation sector, 1 of whom shall be a representative of employers in the renewable electricity sector, 1 of whom shall be a representative of employers in the energy efficiency sector, 1 of whom shall be a representative of employers in the clean transportation sector, 1 of whom shall be a representative of employers in the clean heating sector and 2 of whom shall work in or be affiliated with a higher education university with educational expertise in labor policy and the fossil fuel or clean energy workforce and 5 of whom shall be recommended by the president of the Massachusetts AFL-CIO, 1 of whom shall be a representative of employees in the gas utility sector, 1 of whom shall be a representative of employees in the electric power generation sector, 2 of whom shall be representatives of employees in the clean energy sector and 1 of whom shall be a representative of employees in the transportation sector; the president of the Massachusetts Building Trades; and 2 representatives of environmental justice communities appointed by the director of environmental justice and equity.

The work of the commission shall include, but not be limited to, identifying workers currently employed in the energy sector by industry, trade and job classification, including an analysis of wage and benefit packages and current licensing, certification and training requirements. The commission shall recommend education and training programs to enhance re-employment opportunities within the energy sector and services to support dislocated workers displaced from jobs within the energy sector as a result of public or private efforts to reduce greenhouse gas emissions or transition from fossil fuels to clean energy and advancements in clean energy technology. The commission shall, not later than December 31, 2025, issue a report, including any plans and recommendations, to the clerks of the senate and house of representatives."

Appendix B. Industry Definitions and Employment Numbers

Industry/Sector and Definition	# Employed in MA
Fossil Fuels: Workers active in fossil fuel motor vehicles, natural gas generation, other fossil fuel generation, petroleum fuels, natural gas, and natural gas distribution.	**44,191** (2022)*
Clean Energy: Any technology that either reduces or eliminates greenhouse gas emissions from the generation, distribution, and consumption of electricity and fuels. The major sectors of the clean energy industry include Renewable Energy Generation; Energy Efficiency and Demand Management, Clean Heating and Cooling; Clean Transportation; and Other Sectors.	**115,291** (2024)
Energy Efficiency and Demand Management: Goods and services that reduce electricity demand, including energy efficiency upgrades to existing buildings (retrofitting and retro-commissioning) and installation of ENERGY STAR Appliances. Includes Energy Storage, Advanced and Recycled Building Materials, Demand Response Services, Smart Grid, Micro Grid, Other Grid, Other Grid Modernization, Water and Wastewater Technologies related to Conserving Energy, EVs, ENERGY STAR Appliances, LED, CFL, and Other Efficient Lighting, and Other Energy Efficiency. **Clean Heating and Cooling:** This refers to businesses that are involved with heating, ventilation, and air conditioning (HVAC) from renewable energy sources or perform work that increases the energy efficiency of HVAC systems. This includes Solar Thermal, High-Efficiency Air-Source Heat Pumps, HVAC and Building Controls, GSHPs, Biofuels and Renewable Combined Heat and Power, Clean, High Efficiency, and ENERGY STAR Heating and Cooling.	**76,161** (2024)
Renewable Energy Generation: Any businesses that are involved in the manufacturing, sale, installation, or research and development of renewable electricity generation technologies. Includes Solar, Wind, Hydropower, and Other Renewable Energy Generation.	**29,257** (2024)
Clean Transportation: Non-fossil fuel-related vehicles, including EVs, Hybrid Electric Vehicles, Plug-In Hybrid Vehicles, and Other Clean Transportation.	**9,363** (2024)

*The Commission elected to use 2022 data from the MassCEC Workforce Needs Assessment, determining that it was sufficiently recent and that replicating the complex analysis was not feasible given limited resources.

Appendix C. Sources of Data and Information for Report

Source	Uses	Limitations
Massachusetts Clean Energy Workforce Needs Assessment	Overview of current fossil fuel occupations and wages, workforce trends through 2030, and information on future energy jobs.	The report was published in 2023, with data collected prior to 2023. Modeling in this report goes through 2030. The report focused heavily on clean energy jobs, with limited data on fossil fuel jobs.
Lightcast	Lightcast is a private data analytics company that was used for sourcing number of people employed by occupation within specified industries, per NAICS codes, and for wage and demographics data by occupation.	Lightcast is used strictly for sourcing data, not for analysis; it does not have a specific focus on energy jobs.
U.S. Bureau of Labor and Statistics (BLS)	Retrieved a list of industries within the energy sector.	Information from BLS could not be filtered by industry; the Commission therefore supplemented this data with information from Lightcast.
U.S. Energy & Employment Jobs Report (USEER)	Estimates of employees in energy sector by technology category for 2023.	Data in this report is from 2023.
Labor Unions (IBEW, UWUA, MBTU)	Labor unions represented on the Commission provided regional employment numbers and wage information within the energy sector.	Each union counts employment numbers differently (i.e. some include retirees while others do not, some include members who live in Massachusetts but work out of state or vice versa, etc.). Employment numbers are an estimate and can fluctuate due to employment fluctuations.
Expertise of Commission Members	Relied on the expertise of Commission members for determining displacement risk level for the top energy jobs in the next five and ten years.	The Commission engaged other resources/experts with relevant questions to supplement Commission-provided insight and data.

Appendix D. Methodology for Estimating Total Energy Jobs

To estimate the total number of energy-related jobs in Massachusetts, the Commission and the Massachusetts Department of Economic Research (MassDER) used a two-step methodology. The approach combined (1) an industry-based "staffing patterns" analysis of sectors directly engaged in energy production, distribution, and related services, and (2) an occupation-based expansion that captured additional energy workers employed outside those core industries. This dual approach attempts to account in the analysis for both direct energy employment and energy-related work performed in other parts of the economy.

Step 1. Identifying Core Energy Industries and Creating a Staffing Patterns Report

Working in collaboration with MassCEC, the Commission first identified the industries most directly involved in energy related activities. Using six-digit North American Industry Classification System (NAICS) codes, MassCEC and MassDER defined 51 industries to represent the "direct energy sector." Examples include Plumbing, Heating, and Air-Conditioning Contractors (238220), Electrical Contractors and Other Wiring Installation Contractors (238210), Gasoline Stations with Convenience Stores (457110), and Fossil Fuel Electric Power Generation (221112). The full list of industries can be found below.

NAICS	Description
211120	Crude Petroleum Extraction
211130	Natural Gas Extraction
212114	Surface Coal Mining
212115	Underground Coal Mining
213111	Drilling Oil and Gas Wells
213112	Support Activities for Oil and Gas Operations
213113	Support Activities for Coal Mining
221111	Hydroelectric Power Generation
221112	Fossil Fuel Electric Power Generation
221113	Nuclear Electric Power Generation
221114	Solar Electric Power Generation
221115	Wind Electric Power Generation
221116	Geothermal Electric Power Generation
221117	Biomass Electric Power Generation
221118	Other Electric Power Generation
221121	Electric Bulk Power Transmission and Control
221122	Electric Power Distribution
221210	Natural Gas Distribution
221330	Steam and Air-Conditioning Supply
237120	Oil and Gas Pipeline and Related Structures Construction
237130	Power and Communication Line and Related Structures Construction
238210	Electrical Contractors and Other Wiring Installation Contractors
238220	Plumbing, Heating, and Air-Conditioning Contractors
324110	Petroleum Refineries
324199	All Other Petroleum and Coal Products Manufacturing
325120	Industrial Gas Manufacturing
333131	Mining Machinery and Equipment Manufacturing
333132	Oil and Gas Field Machinery and Equipment Manufacturing
333242	Semiconductor Machinery Manufacturing
333414	Heating Equipment (except Warm Air Furnaces) Manufacturing
333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing
333611	Turbine and Turbine Generator Set Units Manufacturing
334413	Semiconductor and Related Device Manufacturing
335139	Electric Lamp Bulb and Other Lighting Equipment Manufacturing
335311	Power, Distribution, and Specialty Transformer Manufacturing

NAICS	Description
335910	Battery Manufacturing
423610	Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers
424710	Petroleum Bulk Stations and Terminals
457110	Gasoline Stations with Convenience Stores
457120	Other Gasoline Stations
457210	Fuel Dealers
485111	Mixed Mode Transit Systems
485112	Commuter Rail Systems
485113	Bus and Other Motor Vehicle Transit Systems
485119	Other Urban Transit Systems
485210	Interurban and Rural Bus Transportation
485410	School and Employee Bus Transportation
486110	Pipeline Transportation of Crude Oil
486210	Pipeline Transportation of Natural Gas
486910	Pipeline Transportation of Refined Petroleum Products
486990	All Other Pipeline Transportation

A staffing patterns report describes the occupational composition of industries, i.e., the distribution of employment across occupations within a NAICS code or a group of NAICS codes. For example, a staffing patterns report for the Fossil Fuel Electric Power Generation industry (NAICS 221112) shows how employment is distributed among power plant operators, electrical power-line installers and repairers, electrical engineers, and other occupations within that industry. By applying staffing pattern data across the group of 51 identified direct energy industries, we estimated the total number of jobs within the core energy sector.

Step 2. Capturing Direct Energy Occupations Outside Core Industries

While the staffing patterns report covers employment within explicitly energy-related industries, certain occupations perform essential energy work even when employed outside those industries. To capture this additional employment, the Commission identified 18 direct energy occupations that were considered energy-related *regardless of industry context*.

For example, an electrician employed by a residential construction company is not counted within our core group of energy industries but nonetheless performs energy-related work (e.g., wiring for solar-ready homes or installing electric vehicle chargers). Including such workers ensures a more comprehensive estimate of the total energy workforce.

The 18 direct energy occupations incorporated into the total employment count from outside the core energy industries were:

- Electricians
- Pipelayers, Plumbers, Pipefitters, and Steamfitters
- Heating, Air Conditioning, and Refrigeration Mechanics and Installers
- Line Installers and Repairers

- Power Plant Operators, Distributors, and Dispatchers
- Sheet Metal Workers
- Welding, Soldering, and Brazing Workers
- Construction and Building Inspectors
- Insulation Workers
- Wind Turbine Service Technicians
- Derrick, Rotary Drill, and Service Unit Operators, Oil and Gas
- Environmental Scientists and Geoscientists
- Environmental Engineers
- Stationary Engineers and Boiler Operators
- Roustabouts, Oil and Gas
- Environmental Science and Geoscience Technicians
- Petroleum Engineers
- Automotive Technicians and Repairers

Employment for these occupations was aggregated from Lightcast 2024 data across all industries in Massachusetts, then added to the staffing-pattern-based estimates from Step 1 to generate a fuller picture of energy employment statewide.

Step 3. Integration and Quality Assurance

The final dataset combines employment from the 51 energy industries and supplemental employment from the 18 direct energy occupations. Overlaps were reviewed and adjusted to avoid double counting. Lightcast 2024 data served as the primary source for occupational employment by industry.

Appendix E. Examples of MassCEC Workforce Development Programs in Climate-Critical Training & Education

In support of the Commonwealth's 2030 decarbonization goals and the 2050 net zero commitment, MassCEC's Workforce Development Division provides a suite of comprehensive programs and initiatives that address Massachusetts' clean energy workforce needs inclusive of increased career awareness, new entrant worker training, upskilling for existing and transitioning workers, and business development support for climate-critical underrepresented businesses with an emphasis on MWBEs. These programs provide essential support to the state's broader decarbonization strategies and cohere with many of the key workforce development recommendations outlined in EEA's Clean Energy and Climate Plans (CECPs). With 65% of clean energy job growth projected across just 20 occupations, many of which will also see greater demand across other industries, MassCEC is focused on strategically deploying state resources to prevent shortages in trained workers by expanding the pipelines for new entrants and creating more inclusive practices for advancing current workers. MassCEC has a directory of

380 education and training opportunities related to all types of energy roles for those looking for current opportunities.

Career Awareness & Talent Pipeline Growth

The following programming supports the next generation of clean energy workers by increasing career awareness, work-based learning, and developing in-demand skills.

Clean Energy Internship Program:[164] This program connects employers to the next generation of workers by facilitating the placement of Massachusetts post-secondary students and recent graduates who are considering career opportunities in clean energy. The program provides paid full-time summer internships and paid part-time academic year internships across the state. Within the internship program, support is also offered for technical trades occupations by offering a more flexible, year-round, subsidized on-the-job training experience open to vocational high school students and young adults participating in technical training programs. More than 600 internships are funded each year across hundreds of clean energy businesses across the state.

Equity Young Adult Career Pathways:[165] These multi-year awards prioritize career exploration, early skill development, and work-based learning to expand and diversify the pipeline of young adults to meet the growing demand for new entrants across climate-critical occupations. Grantees include partnerships with school districts, workforce boards, community-based organizations, and training providers. Within the Equity Workforce Young Adult Career Pathways program, the Massachusetts Climate Service Corps is a signature program that includes grants and technical assistance support to organizations that can build and scale career pathway programs tied to occupations in the energy efficiency and clean heating and cooling sector for young people ages 18-24.[166] Key elements of the program include paid work-based and service-learning, career exploration, industry-aligned training, and off-ramp support into longer term training and employment.

Equity Through Access & Support

These funds target critical gaps in the workforce with a focus on programming that expands diversity and inclusion through upskilling current workers and attracting, training, and supporting new workers.

[164] Massachusetts Clean Energy Center. "Clean Energy Internships." 2025. https://www.masscec.com/clean-energy-internships
[165] Massachusetts Clean Energy Center. "Students and Young Adults Career Awareness and Training." 2025. https://www.masscec.com/program/students-and-young-adults-career-awareness
[166] Massachusetts Clean Energy Center. "Climate Service Corps." 2025. https://www.masscec.com/program/climate-service-corps

Equity Workforce Training Program:[167] This program supports the scaling and diversifying pipelines for climate-critical training for priority populations, which includes Environmental Justice populations, current and former fossil fuel workers, individuals residing within a low-income community, members of federally recognized and state-acknowledged tribes within Massachusetts communities, and others underrepresented in the clean energy workforce. Awards go up to $1.2 million and may span one to three years in program duration. Planning and capacity awards provide a maximum of $50,000 and $150,000, respectively and provide resources and guidance for innovation and expansion. Eligible lead applicants include community-based entities (often referred to as community-based organizations) such as community action partnerships, environmental justice organizations, neighborhood revitalization organizations, advocacy groups, affordable housing providers, affordable housing developers, and non-profits; post-secondary educational institutions, K-12 School Districts, comprehensive and vocational high schools, vocational schools offering a career technical initiative evening program; trade and labor entities, trade associations, unions, or other coalitions of businesses and clean energy businesses, non-profit and for-profit; federally recognized and state-acknowledged tribes; workforce development organizations, non-profit and for-profit; and MassHire Workforce Boards and Career Centers.

Climate Careers Fund:[168] A dedicated fund, through public-private partnership with Social Finance, with the capability to provide zero-interest, zero-fee loans for living expenses and tuition gaps which could help participants access and persist in high-quality training for in-demand climate careers like HVAC/R technicians, electricians, energy auditors, and EV mechanics, by flexibly covering individuals' specific needs.

Strategic Support to Small Businesses

This programming expands the creation and success of climate-critical small businesses with an emphasis on MWBEs, resulting in economic opportunity and increased diversity among clean energy employers.

Climate-Critical Under-represented Business Support (CUBS):[169] This program is funded through the Equity Workforce Program and assists Massachusetts-based MWBEs and other underrepresented businesses entering and expanding in fields that are critical to meeting the Commonwealth's climate goal of reaching net zero emissions by 2050. This program supports business and job growth by breaking down barriers to launching and growing businesses in the

[167] Massachusetts Clean Energy Center. "Equity Workforce Training Implementation Grants." 2025. https://www.masscec.com/program/equity-workforce-training

[168] Social Finance. "Massachusetts Climate Careers Fund." 2025. https://socialfinance.org/work/massachusetts-climate-careers-fund/

[169] Massachusetts Clean Energy Center. "Climate-Critical Underrepresented Business Support." 2025. https://www.masscec.com/program/climate-critical-underrepresented-business-support

climate-critical space. Grantees provide a strategic mix of training, business development, and support services.

Training Provider Capacity and Advancement

Climate-Critical Training Equipment, Infrastructure, and Capacity:[170] This funding ensures training programs, direct partners, and local and regional system-level partners have the capacity and resources to expose and train new workers and incumbent workers to current technology. These grants increase access to modern, relevant training equipment and infrastructure, providing up to two years of direct funding and technical assistance support to organizations that can build and scale career pathways and upskilling opportunities to help Massachusetts residents access and advance in climate-critical priority occupations. The program currently includes dedicated strands that support relevant career pathway training, climate-critical upskilling for incumbent workers, and equipment infrastructure and training ecosystem support.

Heat Pump and HVAC Training Network:[171] The Heat Pump and HVAC Training, Equipment, and Planning Grants are designed to offer direct funding and technical assistance to Massachusetts Community Colleges seeking to establish or upgrade HVAC and heat pump training centers while offering funds for staffing capacity, training seats, and enhanced wrap-around support services. These grants will increase access to modern, relevant training equipment and infrastructure and provide support to community colleges to build and scale career pathways that help Massachusetts residents access and advance in HVAC mechanic and technician occupations. This initiative will support clean energy employers in meeting their workforce needs while providing high-quality training and support opportunities for Massachusetts residents.

Appendix F. Examples of Agencies and Levels of Licensing

Discipline	State Agency / Body	Local Involvement
HVAC/Refrigeration	Division of Occupational Licensure (DOL) / Office of Public Safety and Inspections (OPSI)	Local permitting for plumbing, electrical, HVAC systems.
Electricians	DOL	Local electrical inspector issues permit, inspections.
Hoisting	OPSI	Limited; primarily state-level regulation.
Geothermal Drilling	MassDEP (Well Driller Program + Underground Injection Control (UIC))	Local boards review site plans, setbacks, issue permits.

[170] Massachusetts Clean Energy Center. "Climate-Critical Workforce Training, Equipment & Infrastructure Grants." 2025. https://www.masscec.com/program/climate-critical-workforce-training

[171] Massachusetts Clean Energy Center. "Heat Pump and HVAC Training Network." 2025. https://www.masscec.com/program/heat-pump-and-hvac-training-network

Discipline	State Agency / Body	Local Involvement
Solar Installations	DOL for contractor registration; local building/electrical departments	Permitting, plan approvals per city/town rules.
Mechanics	Varies (Department of Motor Vehicles (DMV), environmental bodies, local)	Local/trade-specific certifications or standards apply.

Appendix G. Examples of Community-Based Workforce Development Programs in Massachusetts

Organization	Program	Location	Focus
Action for Equity & Browning the Green Space	Green Equity Partnership	Boston	Since July 2023, Action for Equity (A4E), a community-based org serving Dorchester and Roxbury, has been training individuals from EJ Neighborhoods in HVAC and heat pump installation, decarbonization auditing, and electrician licensure through the Green Energy Equity Partnership (GEP) program. Through the HVAC and HP training track, A4E has provided training to 42 participants with over 90% completion and placement of graduates into the sector. A4E started as a planning grantee that converted to an Equity Training Implementation award of $1.2 million investment over 3 years.
STEAM the Streets	Offshore Wind Career Module	New Bedford	Offshore wind career exploration program, specifically serving underrepresented youth with pathways to pre-apprenticeship programs, certifications, and educational opportunities.
UMass Amherst	Offshore Wind Career Access Scholarship	Amherst	Scholarship providing full tuition coverage for the Offshore Wind Professional Certificate, prioritizing applicants from diverse backgrounds and residents of Environmental Justice Communities and Gateway Cities.
Browning the Green Space	Multiple	Boston	Workforce development programming for Black, Indigenous and People of Color (BIPOC) students (high school as well as first-generation 2- and 4-year degree candidates), formerly court involved youth, and incumbent workers, as well as business development programming for entrepreneurs of color and women-led startups.
Boston Center for Community Ownership	Powerup! Cooperative Business Incubator	Boston	Technical assistance program supporting women and BIPOC entrepreneurs from disadvantaged communities, starting worker-owned cooperatives in climate-critical construction and energy trades.

Organization	Program	Location	Focus
Bunker Hill Community College	Electric Power Utility Technology Program	Boston/ Chelsea	2-year associates' program in electric utility, with a pathway to careers at Eversource.
Holyoke Community College	Clean Energy & Green Jobs Training	Holyoke	Free weatherization and Intro to Green Construction, Electricity & Clean Energy Systems job training programs.
Asian American Civic Association	Weatherization Technician Training	Boston	Free, 2-week weatherization program & free, 13-week maintenance technician training.
La Colaborativa	Multiple	Chelsea	Multiple, free career exploration and workforce training programs and integrated wraparound services and stipends, supporting both out-of-school BIPOC youth (ages 18-24) and incumbent workers.
Roxbury Community College	Multiple	Boston	Center for Smart Building Technology: Free cutting-edge certification programs and on the job training in energy efficiency technologies, preparing students for careers in high-demand industries. Multiple other free pre-apprenticeship and certification programs with on-the-job training.
Building Pathways	Multiple	Boston	Pre-apprenticeship program, capacity building, outreach efforts with intentional supportive services (e.g. connecting participants to child care) that intentionally seek to recruit and retain underrepresented groups in the building trades (youth, women, and POC).
LISC Massachusetts & Dorchester Bay Economic Development Corporation & Lawrence Community Works	Bridges to Green Jobs Training Program	Boston, Lawrence	Paid 2-week technical and soft skills training program, with financial support/incentives, career coaching, and job placement.
ABCD	Multiple	Boston	Multiple career exploration, career readiness, and vocational training programs for youth/young adults interested in entering the building trades, includes YouthBuild Boston.
Massachusetts YouthBuild Coalition and Training Resources of America, Inc.	YouthBuild Worcester	Worcester, Quincy	Construction skills training program for low-income and out of school youth, with integrated wraparound services.
People Acting In Community Endeavors (PACE)	Multiple	New Bedford	Operate Youth build New Bedford (YBNB) and READi, a soft-skills and field experience career exploration program.

Organization	Program	Location	Focus
Community Teamwork, Inc.	YouthBuild of Greater Lowell	Lowell	YouthBuild program with integrative supportive services
Old Colony YMCA	YouthBuild Brockton & Fall River	Brockton, Fall River	YouthBuild program with integrative supportive services
New North Citizens Council	Multiple	Springfield	YouthBuild program with integrative supportive services
Just A Start	Multiple	Cambridge	YouthBuild construction program + solar training pilot for YouthBuild graduates.
North Shore CDC	YouthBuild North Shore	Salem	YouthBuild program with integrative supportive services.
UMass Boston & National Grid	The National Grid Clean Energy Academy Scholarship	Boston	Financial assistance for students in the clean energy field, with a preference for traditionally underrepresented students.
Northeast Sustainable Energy Association	Multiple	Greenfield	Business development programming for entrepreneurs who have been traditionally underrepresented in architecture, engineering and construction.
Codman Square Neighborhood Development Corporation	Energy Ambassador Program	Boston	Training community ambassadors on topics including energy efficiency upgrades, solar, and advocacy and implementing local weatherization, energy audit, and sustainability initiatives with trainees.
Emerald Cities Collaborative	E Contractor Academy	Springfield	Capacity building program supporting MWBE entrepreneurs pursuing contracts for clean energy projects.
Springfield Technical Community College	Energy Systems Technology, HVAC, and Building Automation	Springfield	Workforce development programs offering degrees, certificates, and licensing depending on the program. Graduates will qualify to test for the oil burner technician license, EPA certification, and fireman's license.
Green Jobs Academy	Home Weatherization and Energy Efficiency	Marlborough	Provides complete career development training and certification courses. Through hands-on instructional learning, GJA provides students with the knowledge and skills necessary to enter and advance in the home weatherization field.
All in Energy	Energy Auditor Training	Greater Lawrence	Provide energy auditor training to call center workers to enable them to attain career advancement. Focused on bilingual individuals.
Brockton High School and Project Green Schools	EV Technician Training	Greater Brockton	Will expand the existing automotive technician training into the Clean Automotive Technology Center of Excellence, which will support training and hands-on equipment essential to developing the next generation of Auto Technicians while creating equitable access to climate-critical internships leading to job placements. Project Green Schools will also renovate a classroom

Organization	Program	Location	Focus
			adjacent to the current automotive shop by installing retractable bay doors, removing non-load bearing walls, and bringing in lifts and other automotive training equipment to create a second large garage to double the shop capacity. The school will bring in additional EV specific equipment, such as EV chargers and tools needed to work safely on EVs.
Black Economic Council of MA (BECMA)	EV Kickstarter and BOSS Services	Statewide with focus in Boston and Pioneer Valley	BECMA provides entrepreneurs and contractors with the back office support, capacity building support and procurement navigation knowledge to enter and grow in the EV charger installation and infrastructure space.
Community Labor United	Providing non-traditional hour child care for Construction and other clean energy workers	Greater Boston	Expanding existing non-traditional hour child care program to include construction workers and other clean energy workers to enable those with child care challenges to successfully attain and retain jobs in the sector.
Energetics and Automotive Career Development Center (ACDC)	Automotive/EV Technician Upskilling	Statewide	Provides upskilling to fossil fuel workers in Massachusetts. Currently employed automotive technicians that work on light, medium, and heavy-duty vehicles in MA receive training in servicing hybrid and electric vehicles and a variety of support services including tools/materials, child care supports, lodging, and retention support services following job placement. Also providing direct training to municipalities to upskill fleet technicians.
Entrepreneurial and Business Collaborative (E&BC)	Consolidated Accelerator Program (CAP) and Comprehensive and Inclusive Support Program (CISP)	Pioneer Valley	Provides both accelerated and long-term business support, capacity growth, and procurement navigation guidance to businesses focused on clean energy opportunities, with a focus on construction and high-performance buildings.
Greater Lawrence Technical School (GLTS) and Centro de Apoyo Familiar	Solar Labor and Building Maintenance Technician training	Lawrence area	Provides training to enter solar photovoltaic careers and building maintenance technician careers. The programs target opportunity youth in the Lawrence area, returning citizens, single parents, and English-isolated individuals residing in environmental justice communities and include other climate-critical occupations such as electrical career pathways to enhance placement opportunities.
Greenfield Community College	Multiple	Pioneer Valley and Western MA	Providing extensive HVAC and heat pump, weatherization, and industrial arts training in Pioneer Valley and Western MA. Greenfield has expanded and updated facilities over several

Organization	Program	Location	Focus
			grants and is now further expanding into the HVAC and Heat Pump Training Network.
Grounded Services and Entrepreneurial and Business Collaborative (E&BC)	Electrician Training and Upskilling	Pioneer Valley and Western MA	Will expand upon existing electrician training by launching the Clean Energy Electrical Training Program with two tracks – one for individuals with prior electrical training who have not completed the 600 classroom hours for licensure and one for licensed journeyperson electricians seeking specialized clean energy skills. The partners will also purchase instructional tools such as AC/DC training systems, motor control panels, solar PV demonstration units, conduit benders, cable pullers, and smart-grid to support the Clean Energy Electrical Training Program. The equipment will enable hands-on, lab-based instruction, enhance field mentorship, and improve participants' job readiness, technical confidence, and certification outcomes.
Homeworks Energy	Multiple	Statewide	Will provide training for new entrant weatherization technicians and upskilling opportunities for weatherization technicians through their new HomeWorks Partner Academy to become HVAC technicians, which expands upon their incumbent worker-focused HomeWorks University. The new training program will focus on heat pump technical training, HVAC servicing, and carpentry while introducing a holistic approach to workforce upskilling and cross training across all areas of home retrofit. This provides individuals with ongoing pathways to advancement, addressing the retention challenges commonly faced in the weatherization sector.
HVAC Pro Blog	HVAC technician upskilling	Statewide	Will expand its incumbent worker upskilling program aimed at fossil fuel workers in the residential HVAC sector across Massachusetts and develop plans to support equity populations through future partnerships. The programming will offer comprehensive technical training to transition to clean heating technologies and is backed by a strong network of industry partners including distributors, manufacturers, and trade organizations.
Massasoit Community College	Multiple	Southcoast (Canton, Brockton)	Massasoit Community College, in collaboration with the Massachusetts Department of Correction (DOC), will expand upon its existing automotive technician training, training near-release incarcerated individuals in Southeastern Massachusetts in Alternative Fuels and

Organization	Program	Location	Focus
			Medium/Heavy Duty Electric Vehicle (EV) Technology. The program will be delivered through a mobile training unit where participants will earn stackable credentials aligned with clean transportation sector needs, and receive supportive services offered in partnership with Greater Brockton MassHire and Massachusetts Probation Services.
MassHire Metro North Workforce Board (MWNB), Somerville High School, Skillseek, and Somerville Center for Adult Learning Experiences (SCALE)	HVAC technician training	Greater Boston (Somerville, etc.)	MWNB will work with established HVAC training programs to establish workforce development pipeline for HVAC-related career pathways for Environmental Justice communities by offering prevocational English and math classes, various training options, and job placement services.
My Brothers Keeper 617	Carpentry training	Greater Boston	Through a combination of classroom instruction, hands-on training, and industry certifications, training participants gain practical experience and expertise in areas such as carpentry and renewable energy systems installation. The program also provides continuous and comprehensive support services, including career counseling and job placement assistance, to ensure participants successfully transition into sustainable employment. By empowering returning citizens and individuals from underserved communities with valuable skills and opportunities, the program seeks to promote economic empowerment, address workforce shortages, and contribute to a more sustainable future.
Spark Charge and Grow2	EV charging technician and related EV occupation training	Greater Boston and Gateway Cities	Will run a workforce development program designed to train and provide credentials to individuals from Environmental Justice communities for careers in fleet electrification, specifically with mobile, off-grid charging. The program will recruit low-income and underrepresented participants from Chelsea, Everett, East Boston, and Dorchester for a hybrid training program that will prepare participants for several occupations including mobile EV charging technician, EV field service support, fleet charging operations associate, and clean energy logistics technician

Organization	Program	Location	Focus
UMass Amherst, Partnership for Worker Education	Pre-apprenticeship in construction and transportation	Western MA	Will expand its Community Works state-registered pre-apprenticeship program supporting workforce training in construction and transportation to include a focus climate-critical occupations in Western Massachusetts, through six additional weeks focused on climate-critical trades.
Upper Cape Cod Technical School	Electrician Training	Cape Cod and Islands, and South Shore	Expands upon prior training programs to provide Electrical Code and Theory Level 1 training with entry to apprenticeship to students from underrepresented populations, including opportunity youth. The 9-month program includes significant supports including provided tools and supplies and wraparound social support services, including career counseling, work-readiness, mentorship, ESOL, and other resources to reduce obstacles to success. UCT recruits students from the South Shore, Cape Cod and the Islands, as well as from the Federally Recognized and State-acknowledged Tribes.
WeReach	Construction Manager training	Statewide	WeReach offers a ten-week construction management training program with a primary focus on increasing the number of individuals of color in leadership positions in the construction industry. The program is tailored to individuals of color within the construction service sector, equipping them with the skills and knowledge needed to become construction managers specializing in clean energy initiatives.

Appendix H. Examples of Registered Apprenticeship Programs in Three Main Energy Infrastructure Occupations

Registered Apprenticeship Program	Occupation	Location	Active Apprentices
BOSTON ELECTRICIANS LOCAL #103	Electrical	Dorchester, MA 02122	1109
PIPEFITTERS LOCAL 537	Pipefitters	Dorchester, MA 02125	314
PIPEFITTERS LOCAL 537	Refrigeration & Air Conditioning	Dorchester, MA 02125	192
Wayne J. Griffin Electric, Inc.	Electrical	Holliston, MA 01746	179
ABC / MAP	Refrigeration & Air Conditioning	Woburn, MA 01801	179
ABC / MAP	Electrical	Woburn, MA 01801	136
ABC / MAP	Pipefitters	Woburn, MA 01801	111
Springfield Area Electricians L.U. 7 JATC	Electrical	Springfield, MA 01103	109

Registered Apprenticeship Program	Occupation	Location	Active Apprentices
Brockton Electricians Local 223	Electrical	Taunton, MA 02780	88
Worcester Electricians J.A.T.P.	Electrical	Worcester, MA 01602	81
Int. Union of Operating Engineers Local 877	Refrigeration & Air Conditioning	Canton, MA 02021	76
ENERGY ELECTRIC CO., INC.	Electrical	Uxbridge, MA 01569	58
SPRINGFIELD PLBRS & PIPEFITTERS L.U. #104 JATC	Pipefitters	Holyoke, MA 01040	50
ELM ELECTRICAL, INC.	Electrical	Westfield, MA 01085	46
WORCESTER PLUMBERS & PIPEFITTERS LOCAL #4	Pipefitters	W. Boylston, MA 01583	37
FLORENCE ELECTRIC, LLC	Electrical	Canton, MA 02021	34
Professional Electrical Contractors of CT, Inc.	Electrical	Canton, MA 02021	34
ENVIRONMENTAL SYSTEMS, INC.	Refrigeration & Air Conditioning	Attleboro, MA 02703	27
Nardone Electric Corp.	Electrical	Woburn, MA 01801	23
M-V ELECTRICAL CONTRACTORS, INC.	Electrical	Acushnet, MA 02743	22
Suburban Electric Contracting, Inc.	Electrical	Stoughton, MA 02072	20
SPRINGFIELD PLBRS & PIPEFITTERS L.U. #104 JATC	Refrigeration & Air Conditioning	Holyoke, MA 01040	20
Commonwealth Electrical Technologies, Inc.	Electrical	Worcester, MA 01607	19
UG2, LLC	Refrigeration & Air Conditioning	Boston, MA 02116	17
LeVANGIE ELECTRIC CO., INC.	Electrical	Hanover, MA 02339	16
D. M. H. ELECTRIC, INC.	Electrical	Sterling, MA 01564	15
Gem Plumbing & Heating Co., LLC	Refrigeration & Air Conditioning	Raynham, MA 02767	15
ENVIRONMENTAL SYSTEMS, INC.	Electrical	Attleboro, MA 02703	14
Mercier Electric Co., Inc.	Electrical	Auburn, MA 01501	14
Harold Brothers Mechanical Contractors, Inc.	Pipefitters	Weymouth, MA 02189	14
HOWSE CORPORATION	Electrical	N. Reading, MA 01864	13
City Facilities Management	Refrigeration & Air Conditioning	Burlington, MA 01803	13
Comalli Group, Inc.	Electrical	Pittsfield, MA 01201	12
MASSHIRE GREATER NEW BEDFORD WIB	Electrical	New Bedford, MA 02740	12
MAK Electric, LLC	Electrical	Dartmouth, MA 02747	10
NAX Electrical Services, LLC	Electrical	New Bedford, MA 02745	10
ENVIRONMENTAL SYSTEMS, INC.	Pipefitters	Attleboro, MA 02703	8

Registered Apprenticeship Program	Occupation	Location	Active Apprentices
SS SERVICE CORP	Refrigeration & Air Conditioning	Raynham, MA 02767	8
EWING ELECTRICAL CO., INC.	Electrical	Deerfield, NH 03037	7
GEORGE T. WILKINSON, INC.	Pipefitters	Rockland, MA 02370	7
C&W Facilities Services, Inc. (NU)	Refrigeration & Air Conditioning	Boston, MA 02110	7
Harold Brothers Mechanical Contractors, Inc.	Refrigeration & Air Conditioning	Weymouth, MA 02189	7
Hub Refrigeration Co., Inc.	Refrigeration & Air Conditioning	Quincy, MA 02169	7
THE DARCY COMPANY	Refrigeration & Air Conditioning	Holyoke, MA 01040	7
Franklin Cummings Tech	Electrical	Boston, MA 02116	6
Helios Energy LLC	Electrical	Bellingham, MA 02019	6
Pereira Electric Corp.	Electrical	Taunton, MA 02780	6
Pioneer Valley Photovoltaics	Electrical	Greenfield, MA 01301	6
Renaud Electric & Communications, Inc.	Electrical	Sutton, MA 01590	6
Adams Plumbing & Heating, Inc.	Pipefitters	Adams, MA 01220	6
E. AMANTI & SONS, INC.	Pipefitters	Salem, MA 01970	6
Int. Union of Operating Engineers Local 877	Pipefitters	Canton, MA 02021	6
MASSACHUSETTS GEN. HOSPITAL	Refrigeration & Air Conditioning	Boston, MA 02114	6
A/Z Corp.	Electrical	Marlboro, MA 01752	5
AMERICAN ELECTRICAL CONSTRUCTION, INC.	Electrical	Carver, MA 02333	5
GABLE ELECTRIC, INC.	Electrical	Pittsfield, MA 01201	5
GOODLESS ELECTRIC CO., INC.	Electrical	Springfield, MA 01090	5
Guardian Energy	Electrical	Marlborough, MA 01752	5
ISLAND LIGHTING & POWER SYSTEMS, INC.	Electrical	Norfolk, MA 02056	5
Jacqueline Electric & Contracting, Inc.	Electrical	S Easton, MA 02375	5
K. Sacco Electric, Inc.	Electrical	Hampden, MA 01036	5
Morse Bros LLC	Electrical	Westminster, MA 01473	5
New England Safety Systems, Inc.	Electrical	Taunton, MA 02780	5
O. H. BURG CORP.	Electrical	Stoughton, MA 02072	5
Ram Electrical Consulting & Contracting Corp.	Electrical	Stoneham, MA 02180	5
Reilly Electrical Contractors, Inc.	Electrical	Easton, MA 02375	5

Registered Apprenticeship Program	Occupation	Location	Active Apprentices
CAPAVI-USA, INC. d/b/a Industrial Piping & Cert	Pipefitters	Woburn, MA 01801	5
Gratta Refrig & AC dba Atlantic Mechanical	Refrigeration & Air Conditioning	Weymouth, MA 02189	5
Joe Warren & Sons, Inc.	Refrigeration & Air Conditioning	Norwood, MA 02062	5
DAVID R. NORTHUP ELECTRICAL CONTR, INC.	Electrical	Agawam, MA 01001	4
G. H. ELECTRICAL SERVICES CO INC.	Electrical	Attleboro, MA 02703	4
LIGHTING RETROFIT SERVICES, INC.	Electrical	Wilmington, MA 01887	4
Raymond D. Melanson Electric & Safety Corp.	Electrical	Swansea, MA 02777	4
Taormina Electrical Inc. dba Roy Spittle Assoc.	Electrical	Gloucester, MA 01930	4
P. H. MECHANICAL CORPORATION	Pipefitters	Canton, MA 02021	4
WJS Mechanical Corp.	Pipefitters	Tewksbury, MA 01876	4
Aalanco Service Corporation	Refrigeration & Air Conditioning	Westborough, MA 01581	4
Control Air Systems, Inc.	Refrigeration & Air Conditioning	Burlington, MA 01803	4
Hanscom Air Force Base AFB Dept. of Defense	Refrigeration & Air Conditioning	Hanscom AFB, MA 01730	4
Lake Industries, Inc.	Refrigeration & Air Conditioning	Stoneham, MA 02180	4
Local 1505, IBEW	Refrigeration & Air Conditioning	Woburn, MA 01801	4
New England Cooling Towers, Inc.	Refrigeration & Air Conditioning	Tyngsboro, MA 01879	4
RENAUD HVAC & CONTROLS, INC	Refrigeration & Air Conditioning	Sutton, MA 01590	4
WORCESTER PLUMBERS & PIPEFITTERS LOCAL #4	Refrigeration & Air Conditioning	W Boylston, MA 01583	4