August 2023

**DEDICATED TO INNOVATION**

# Powering the Future: A Massachusetts Clean Energy Workforce Needs Assessment

MASSACHUSETTS CLEAN ENERGY CENTER

[bw] RESEARCH PARTNERSHIP

# Housekeeping Items

➤ This webinar will be recorded

➤ Recording and PDF of slide deck will be posted to the MA Clean Energy Workforce Needs Assessment website

➤ Type your questions into the Q&A box during the presentation and during the Q&A session

➤ Using Mentimeter to get feedback from participants

# Presenters



**Jennifer Applebaum**
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Vice President and Principal Researcher
BW Research Partnership, Inc.

# Agenda

➤ Overview & Report Highlights

➤ Demand for Clean Energy Workers

➤ Building a More Robust and Diverse Clean Energy Workforce

➤ How to Get the Most out of the Report

➤ Questions

➤ Next Steps

# Mentimeter

**WHAT ARE YOU EXCITED TO LEARN MORE ABOUT DURING THIS WEBINAR?**

**Go to:** **https://www.menti.com/al4z9o7ryjw6**

Report Overview and Highlights

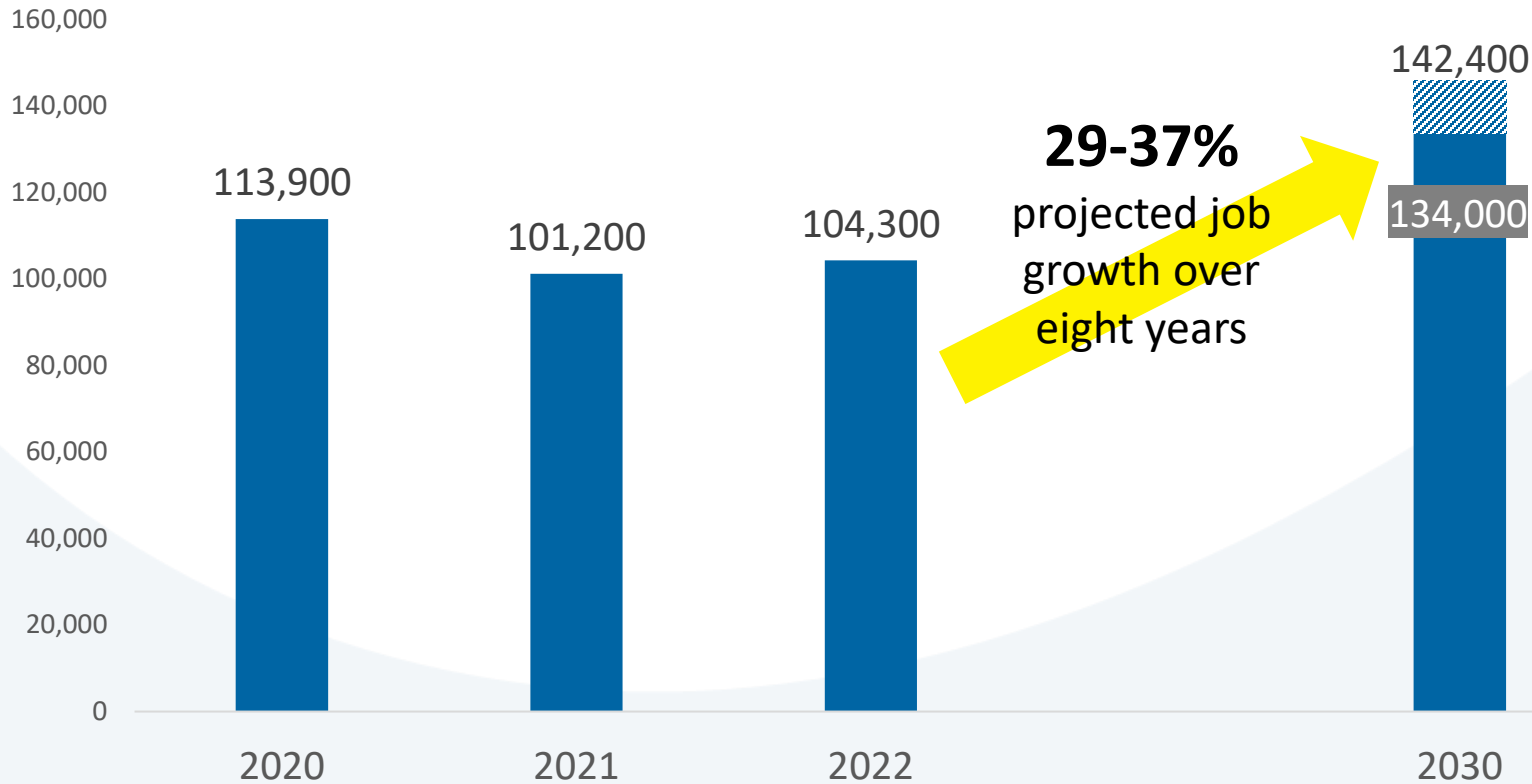# Overview of the Massachusetts Clean Energy Workforce Needs Assessment

➤ Comprehensive analysis of the clean energy workforce needed to meet the state's 2030 climate goals, including recommendations for strategic workforce planning.

➤ Key components include:

  ➤ Forecasting demand and supply of clean energy occupations

  ➤ Identifying current and potential chokepoints in training and workforce development

  ➤ Methods to increase diversity, equity, and inclusion

  ➤ Opportunities to transition fossil fuel workers to clean energy roles

Please Note: The analysis leverages demand projections from the Macroeconomic & Equity Study of the Massachusetts 2050 Decarbonization Roadmap

# Our Clean Energy Workforce Today & Tomorrow

**38,000+ additional clean energy workers** are needed to meet the state's decarbonization goals by 2030



**29-37%** projected job growth over eight years

Chart values:
- 2020: 113,900
- 2021: 101,200
- 2022: 104,300
- 2030: 134,000 (with additional to 142,400)

**88% of clean energy employers already report difficulty finding workers** in this historically-tight labor market (2.6% unemployment; 64.6% Labor force participation rate)

**82% of the jobs created by 2030 will be middle to high-wage jobs** with a median wage of over $36 per hour.

Given the competitive labor market, **a just transition** that provides economic opportunity and advancement to historically marginalized populations is critical to meeting the demand for clean energy workers by 2030.

# Report Highlights

Expanding clean energy career awareness is a crucial first step

Scaling clean energy workforce training capacity will require leveraging existing systems and programs, prioritizing quality and effectiveness, and funding new or enhanced programs

Efforts to expand the clean energy workforce must ensure a just transition

With 65% of clean energy job growth projected across just 20 occupations, certain occupations will require considerable additional support
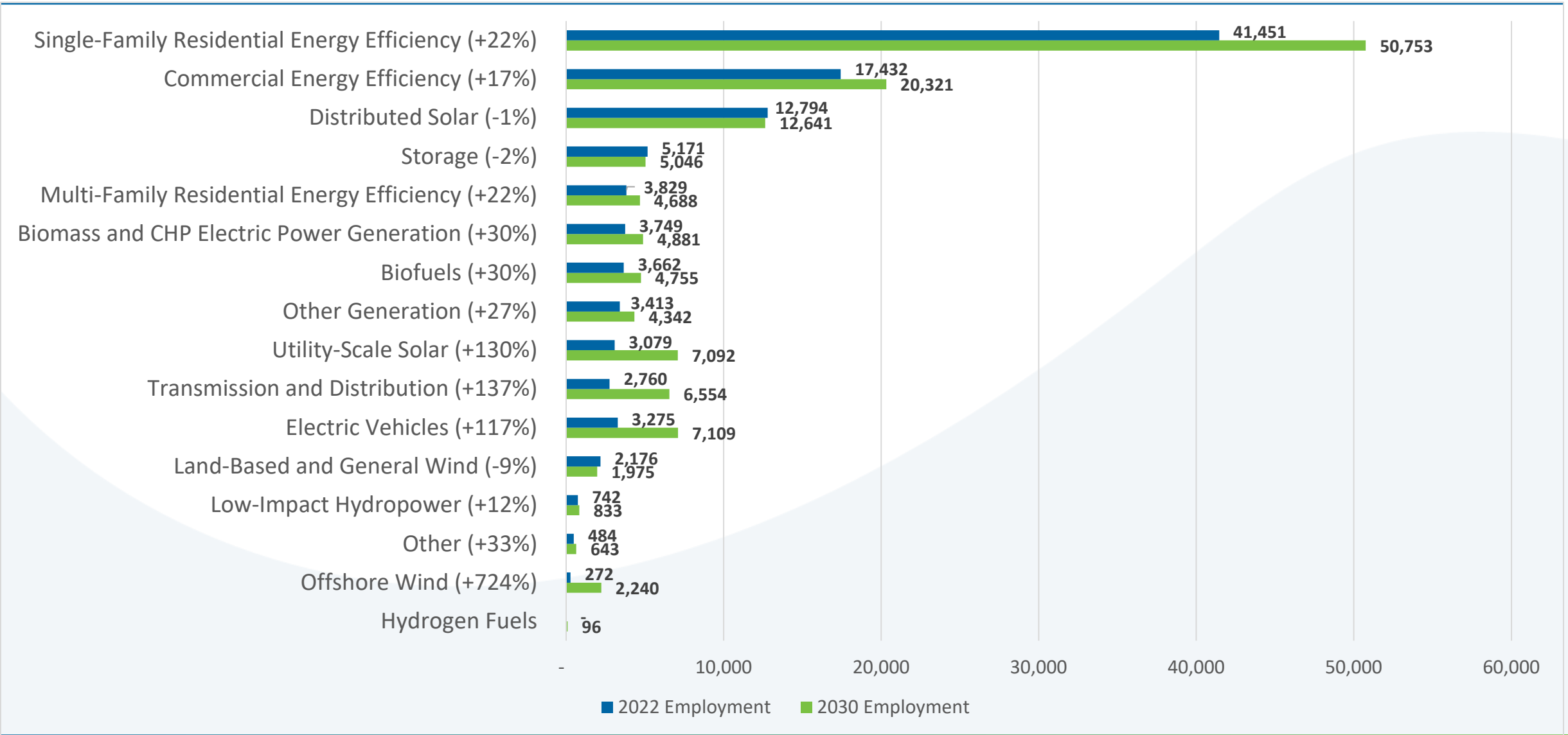
To be effective, workforce development strategies must be tailored to regional considerations

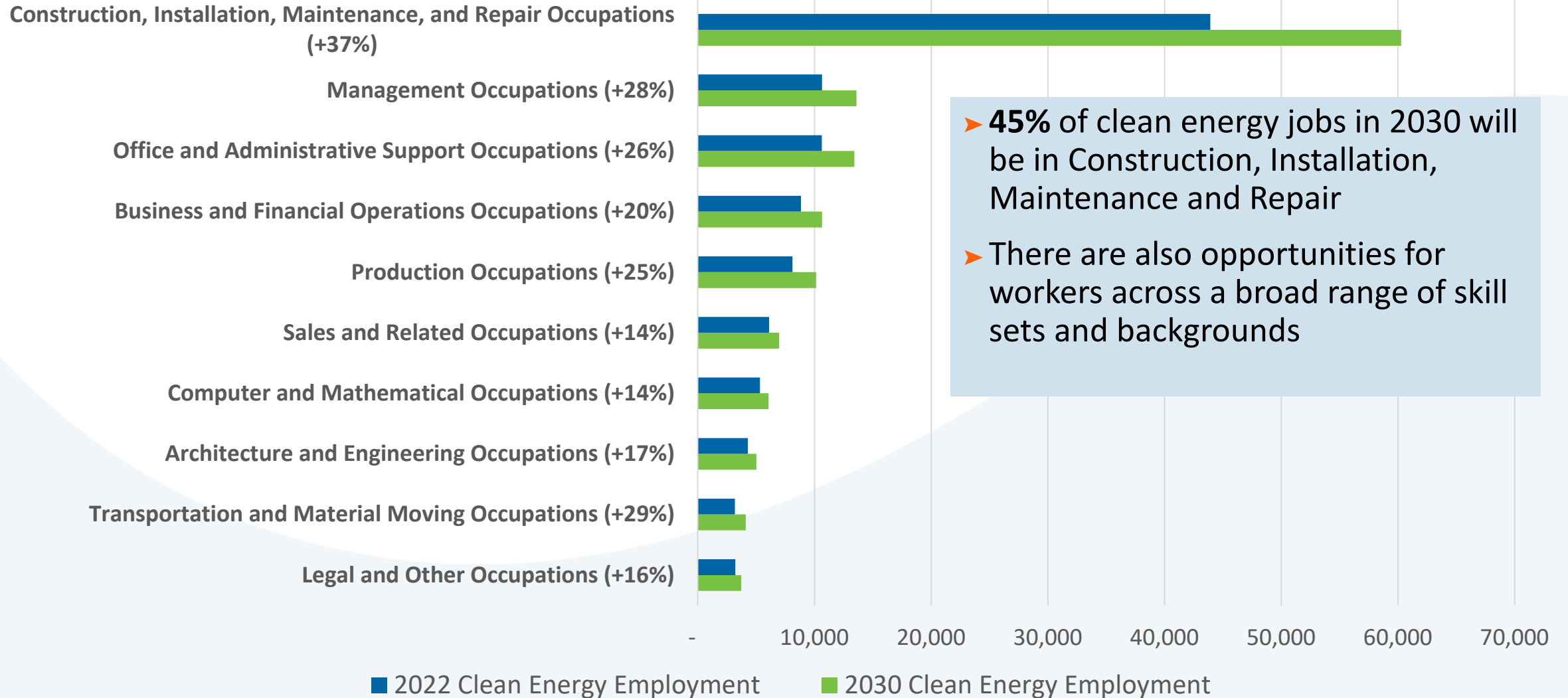While predicted displacement of fossil fuel workers is minimal through 2030, now is the time to act
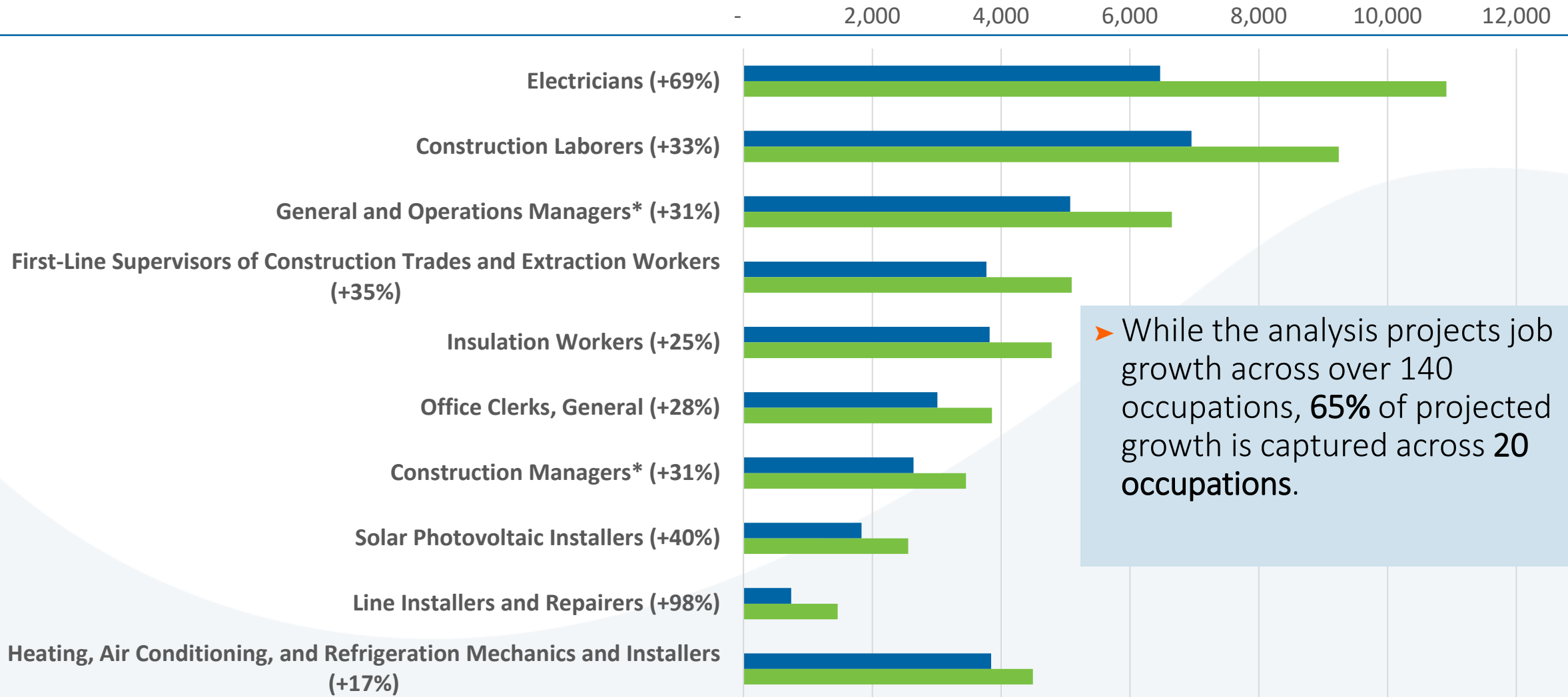
Demand for Clean Energy Workers

# Growth by Clean Energy Sub-Technology



Single-Family Residential Energy Efficiency (+22%): 2022 = 41,451; 2030 = 50,753
Commercial Energy Efficiency (+17%): 2022 = 17,432; 2030 = 20,321
Distributed Solar (-1%): 2022 = 12,794; 2030 = 12,641
Storage (-2%): 2022 = 5,171; 2030 = 5,046
Multi-Family Residential Energy Efficiency (+22%): 2022 = 3,829; 2030 = 4,688
Biomass and CHP Electric Power Generation (+30%): 2022 = 3,749; 2030 = 4,881
Biofuels (+30%): 2022 = 3,662; 2030 = 4,755
Other Generation (+27%): 2022 = 3,413; 2030 = 4,342
Utility-Scale Solar (+130%): 2022 = 3,079; 2030 = 7,092
Transmission and Distribution (+137%): 2022 = 2,760; 2030 = 6,554
Electric Vehicles (+117%): 2022 = 3,275; 2030 = 7,109
Land-Based and General Wind (-9%): 2022 = 2,176; 2030 = 1,975
Low-Impact Hydropower (+12%): 2022 = 742; 2030 = 833
Other (+33%): 2022 = 484; 2030 = 643
Offshore Wind (+724%): 2022 = 272; 2030 = 2,240
Hydrogen Fuels: 96

■ 2022 Employment   ■ 2030 Employment

# Occupational Growth



Construction, Installation, Maintenance, and Repair Occupations (+37%)

Management Occupations (+28%)

Office and Administrative Support Occupations (+26%)

Business and Financial Operations Occupations (+20%)

Production Occupations (+25%)

Sales and Related Occupations (+14%)

Computer and Mathematical Occupations (+14%)

Architecture and Engineering Occupations (+17%)

Transportation and Material Moving Occupations (+29%)

Legal and Other Occupations (+16%)

- **45%** of clean energy jobs in 2030 will be in Construction, Installation, Maintenance and Repair
- There are also opportunities for workers across a broad range of skill sets and backgrounds

■ 2022 Clean Energy Employment    ■ 2030 Clean Energy Employment

# Highest Growth Occupations



Chart showing 2022 and 2030 Clean Energy Employment by occupation:

- Electricians (+69%)
- Construction Laborers (+33%)
- General and Operations Managers* (+31%)
- First-Line Supervisors of Construction Trades and Extraction Workers (+35%)
- Insulation Workers (+25%)
- Office Clerks, General (+28%)
- Construction Managers* (+31%)
- Solar Photovoltaic Installers (+40%)
- Line Installers and Repairers (+98%)
- Heating, Air Conditioning, and Refrigeration Mechanics and Installers (+17%)

Axis values: -, 2,000, 4,000, 6,000, 8,000, 10,000, 12,000

➤ While the analysis projects job growth across over 140 occupations, **65%** of projected growth is captured across **20 occupations**.

*Typically requires a 4-year degree  ■ 2022 Clean Energy Employment  ■ 2030 Clean Energy Employment

# Risk of Workforce Bottlenecks

## Severe

- ➤ Electricians
- ➤ Heating, Ventilation, Air Conditioning and Refrigeration (HVAC-R) Mechanics and Installers

## High

- ➤ Electric Power-Line Installers and Repairers
- ➤ Construction Laborers
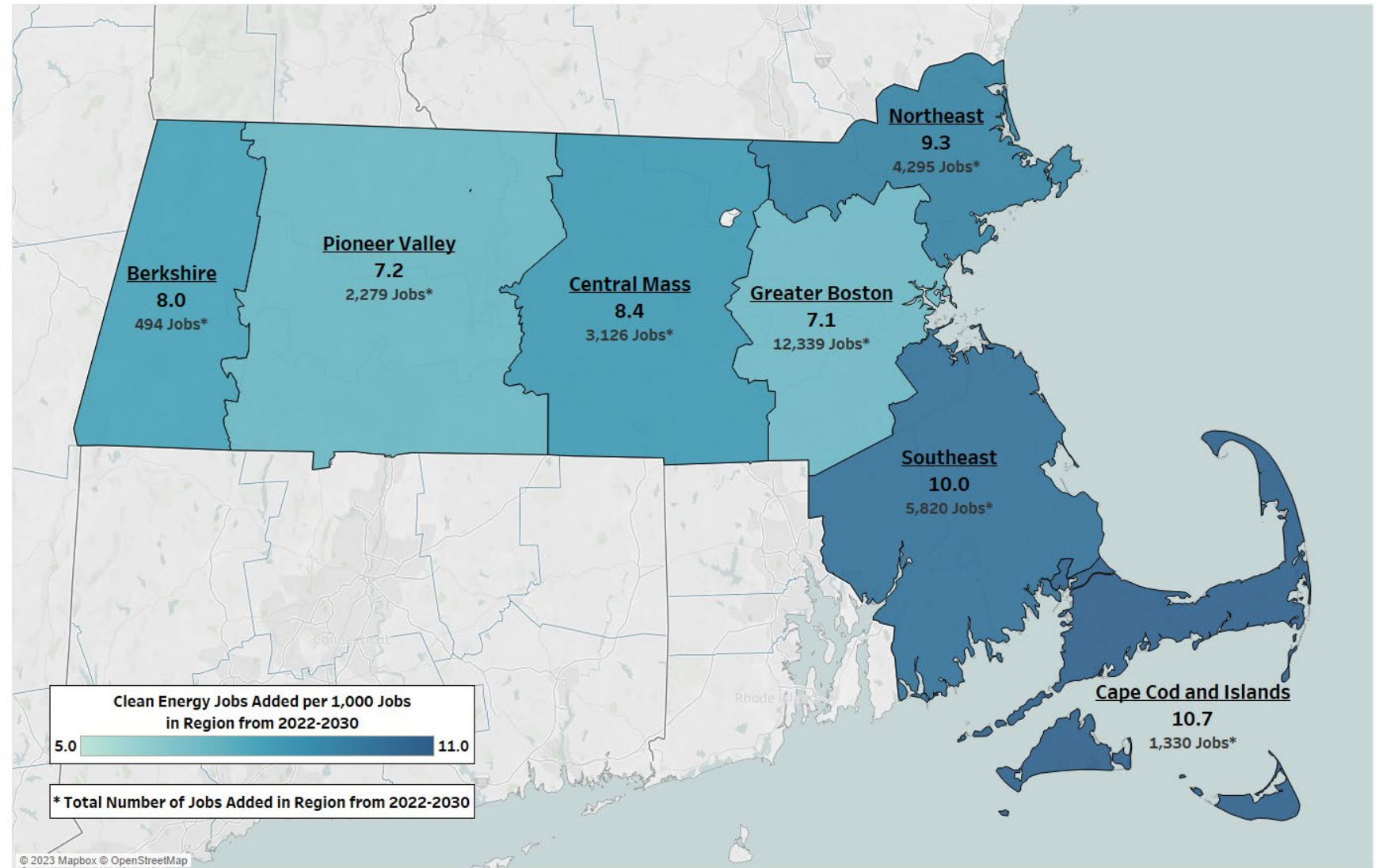- ➤ Construction and Building Inspectors (including Energy Analysts and HERS Raters)

## Moderate

- ➤ Insulation Workers
- ➤ Cost Estimators
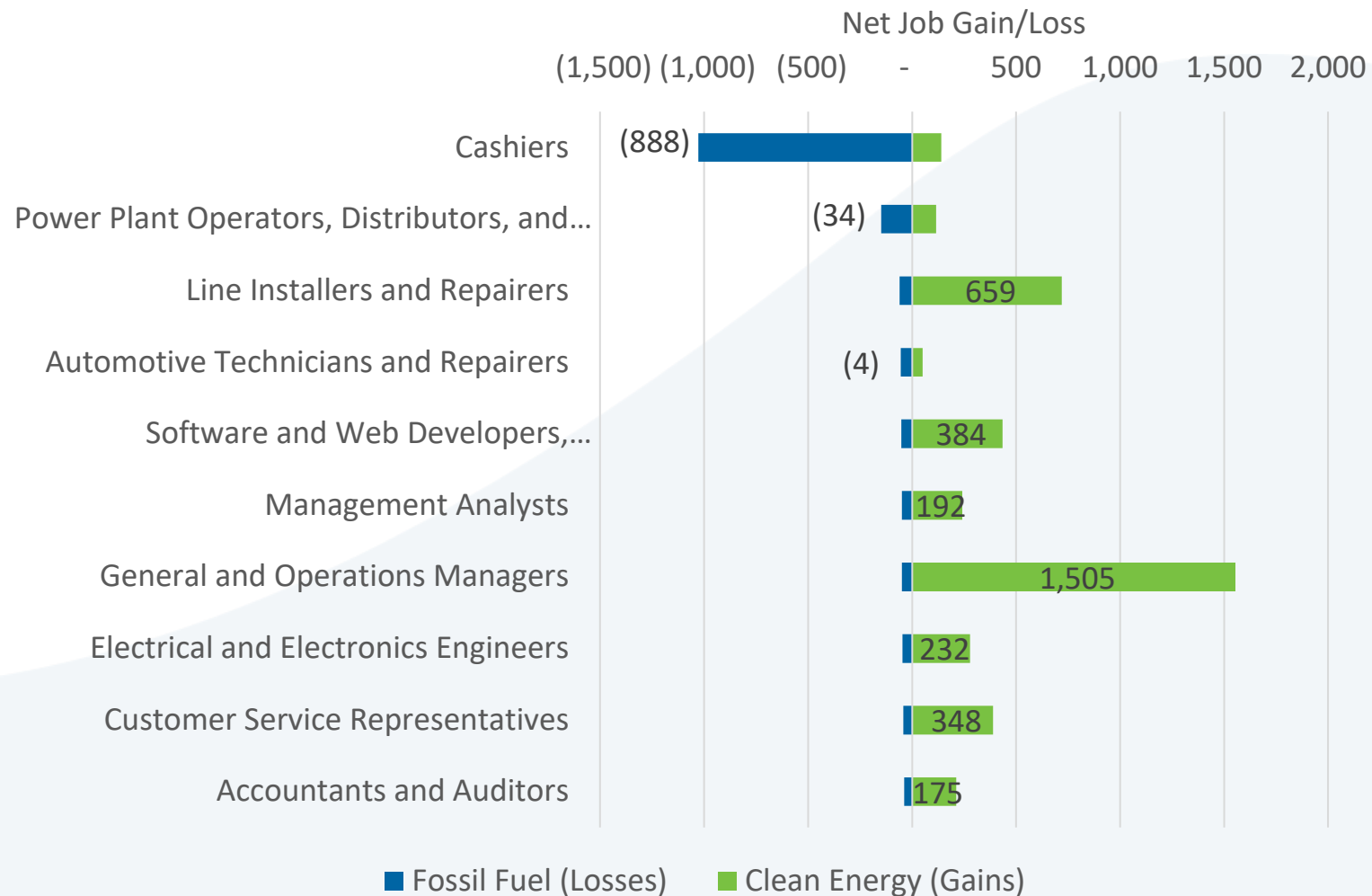- ➤ Pipelayers, Plumbers, Pipefitters and Steamfitters

# Regional Job Growth

- While the Greater Boston area is projected to see the greatest increase in the total number of clean energy jobs by 2030, adding nearly **12,300** jobs, the majority of jobs **(61%)** will be created outside of Highway 128

- **Cape Cod & Islands** and **Southeast Regions** will see the greatest proportional increase in employment



**Northeast**
9.3
4,295 Jobs*

**Pioneer Valley**
7.2
2,279 Jobs*

**Berkshire**
8.0
494 Jobs*

**Central Mass**
8.4
3,126 Jobs*

**Greater Boston**
7.1
12,339 Jobs*

**Southeast**
10.0
5,820 Jobs*

**Cape Cod and Islands**
10.7
1,330 Jobs*

Clean Energy Jobs Added per 1,000 Jobs in Region from 2022-2030
5.0 — 11.0

* Total Number of Jobs Added in Region from 2022-2030

© 2023 Mapbox © OpenStreetMap

# Fossil Fuel Worker Displacement

➤ **2,000** fossil workers are projected to be displaced by 2030 (58,000[2] to 56,000 workers), or around a **3.4%** reduction

➤ Most of the largest-occupation-level declines in fossil fuels are offset by larger gains within clean energy

➤ Most substantial employment losses among fossil fuels are expected after 2030. Some industries, such as natural gas, do not see severe employment losses until much later

➤ This gives policymakers more time to devise thoughtful strategies for just transitions for most fossil fuel workers

Net Job Gain/Loss

(1,500) (1,000) (500)  -  500  1,000  1,500  2,000

| Occupation | Value |
|---|---|
| Cashiers | (888) |
| Power Plant Operators, Distributors, and… | (34) |
| Line Installers and Repairers | 659 |
| Automotive Technicians and Repairers | (4) |
| Software and Web Developers,… | 384 |
| Management Analysts | 192 |
| General and Operations Managers | 1,505 |
| Electrical and Electronics Engineers | 232 |
| Customer Service Representatives | 348 |
| Accountants and Auditors | 175 |

■ Fossil Fuel (Losses)    ■ Clean Energy (Gains)

[2]Roughly 49,000 of the 58,000 fossil fuel jobs in 2022 are associated with motor vehicles

# Building a More Robust and Diverse Clean Energy Workforce

# Training Inventory

## VOCATIONAL AND TECHNICAL HIGH SCHOOLS

➤ First-points of contact with talent

➤ Demand outstrips supply of seats

## POST-SECONDARY INSTITUTIONS

➤ Community colleges offer pathways to many highest-demand clean occupations and are eight of the state's 12 Minority Serving Institutions

➤ Enrollment challenges persist post-pandemic

## UNION TRAINING, APPRENTICESHIP, AND PRE-APPRENTICESHIPS

➤ Program enrollments are much larger than most other institutions

➤ Offer paid training and licensing and often report substantial waitlists



Pie chart legend:
- Vocational Technical High School
- Private Training Company/Technical School
- Community College
- Private College/University
- Union
- Industry Association
- Public College/University
- Pre-Apprenticeship
- State Agency
- Community-Based/Non-Profit Organization

Pie chart values: 198, 82, 59, 15, 14, 11, 9, 8, 7
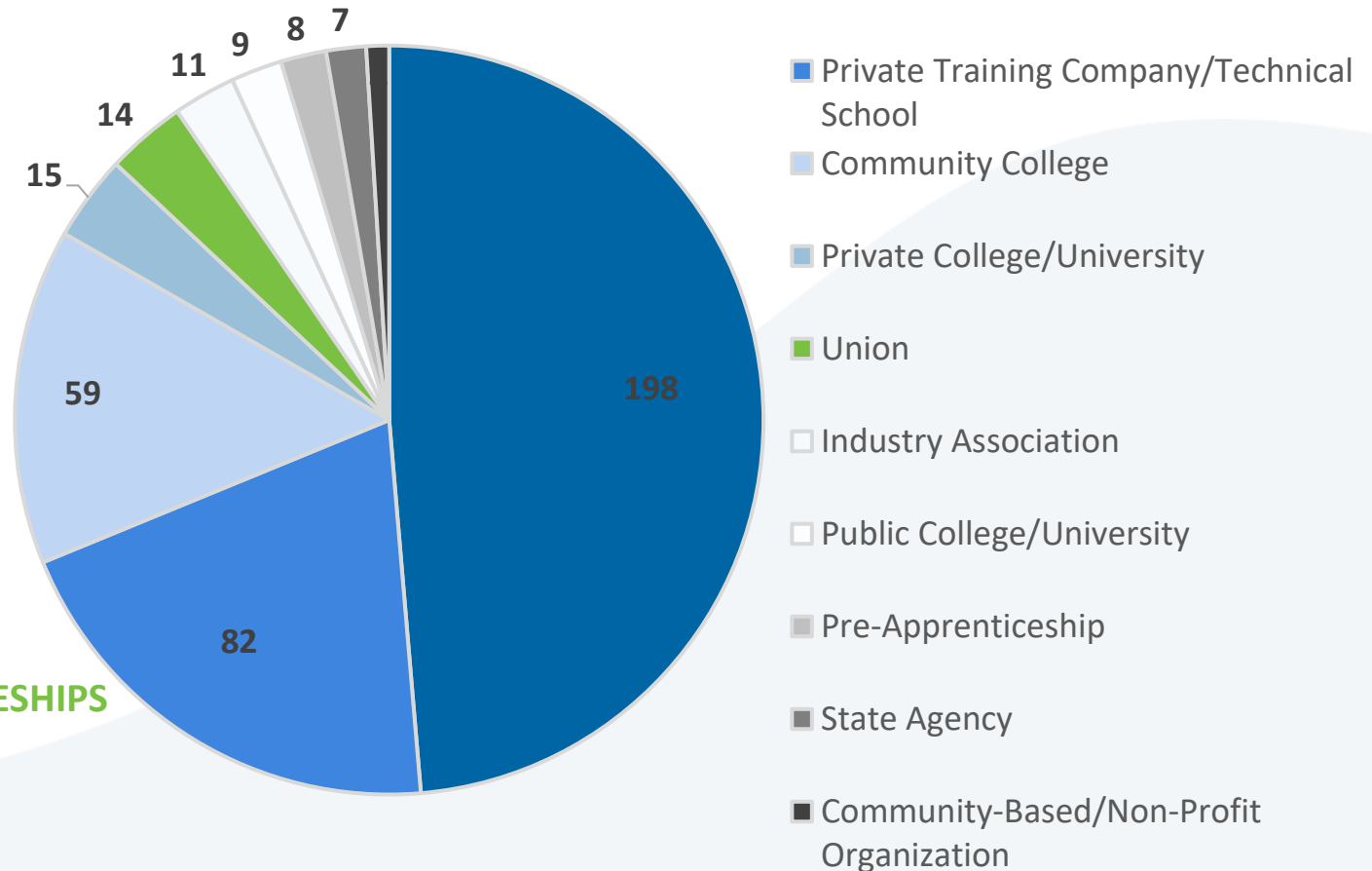
A breakdown of the 406 MA programs that are most relevant to the 32 priority occupations identified in the report

# Supporting Environmental Justice Populations

➤ While some training centers overlap with Environmental Justice populations, training deserts exist

➤ Taking concrete steps to address these training deserts, while increasing support services to mitigate transportation, financial, linguistic, and other accessibility challenges is important
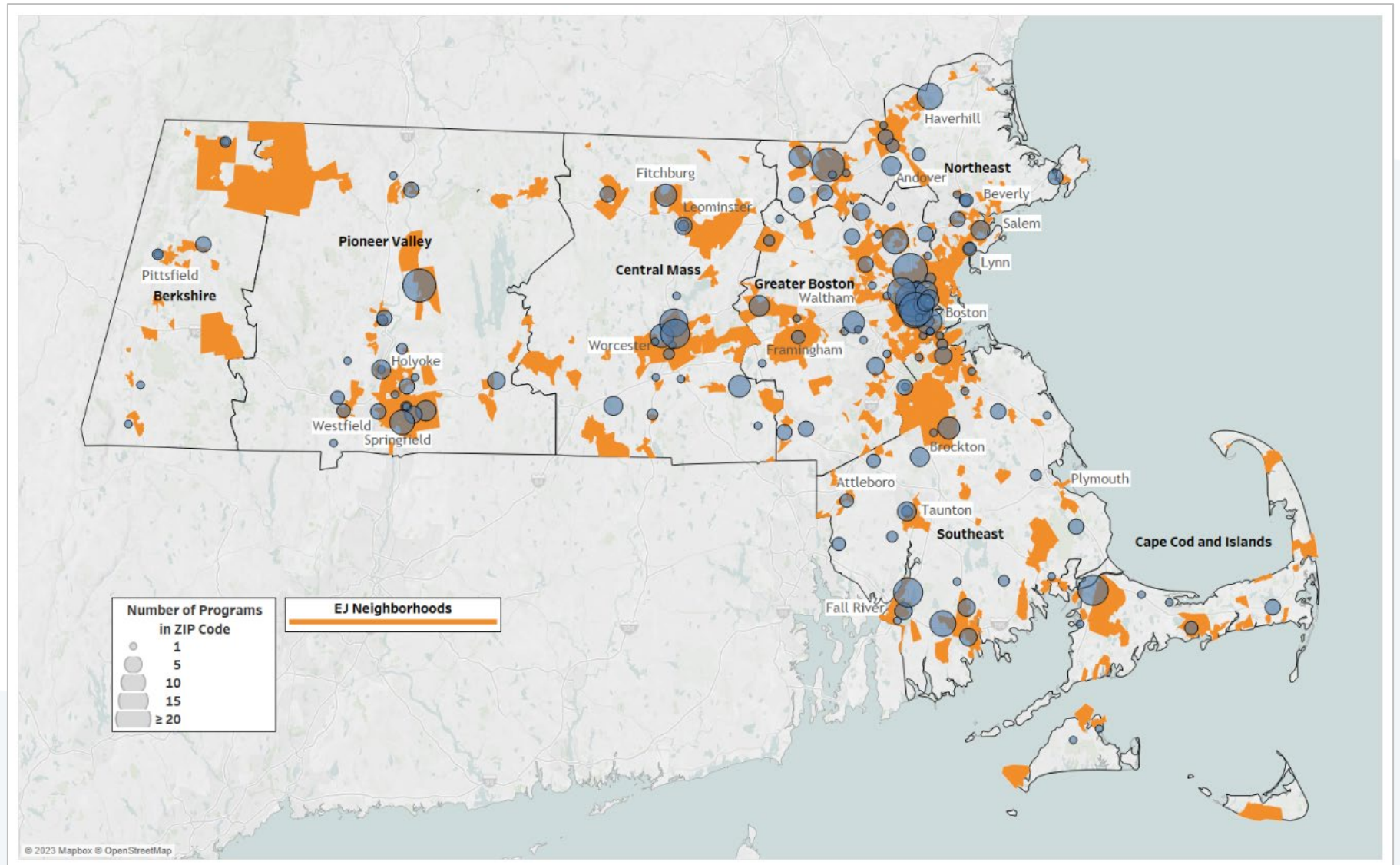
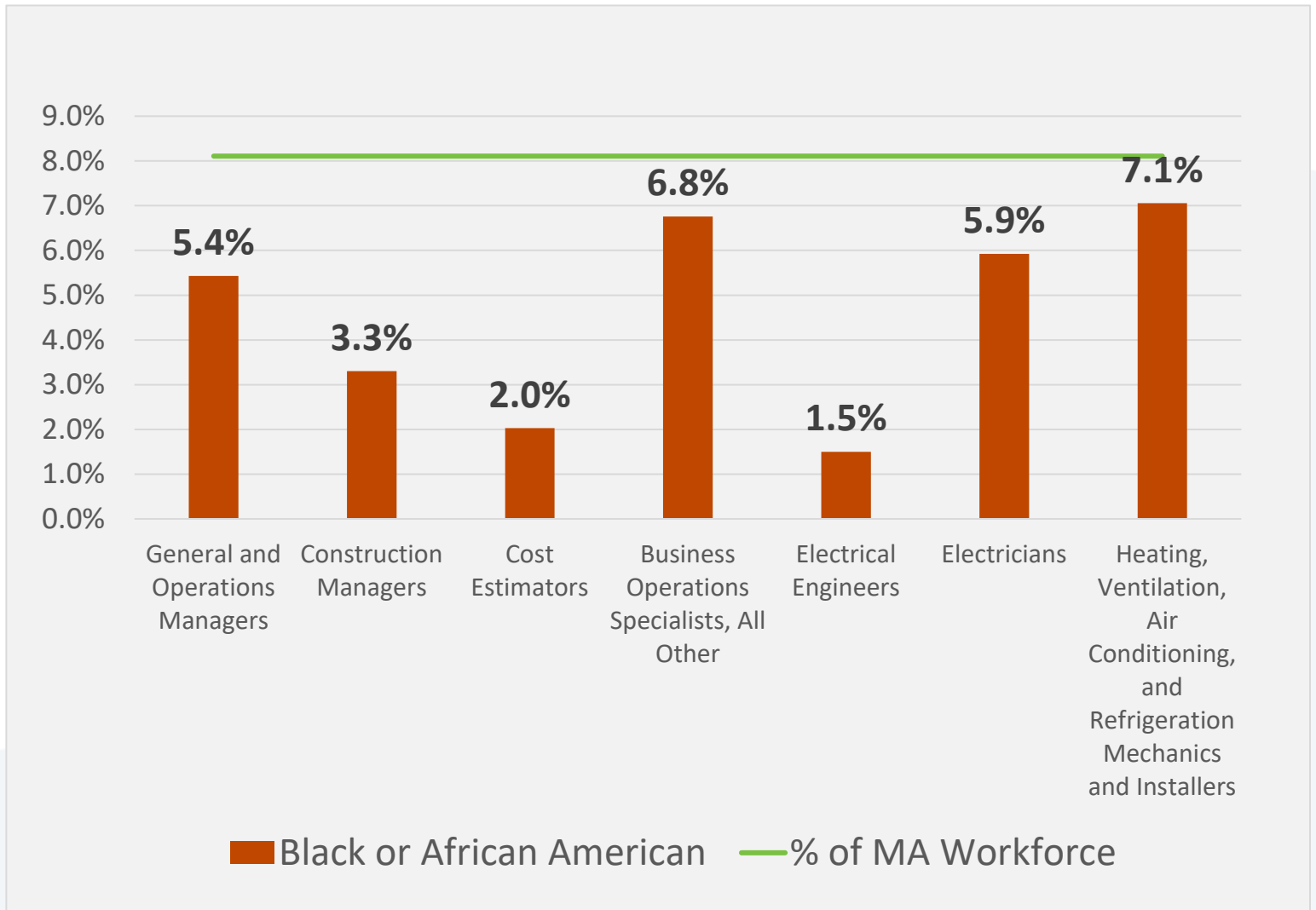# Diversity in the Key Occupations Critical to Clean Energy Women

- Women account for 51% of Massachusetts' overall workforce but represent just 31% of Clean Energy workers.
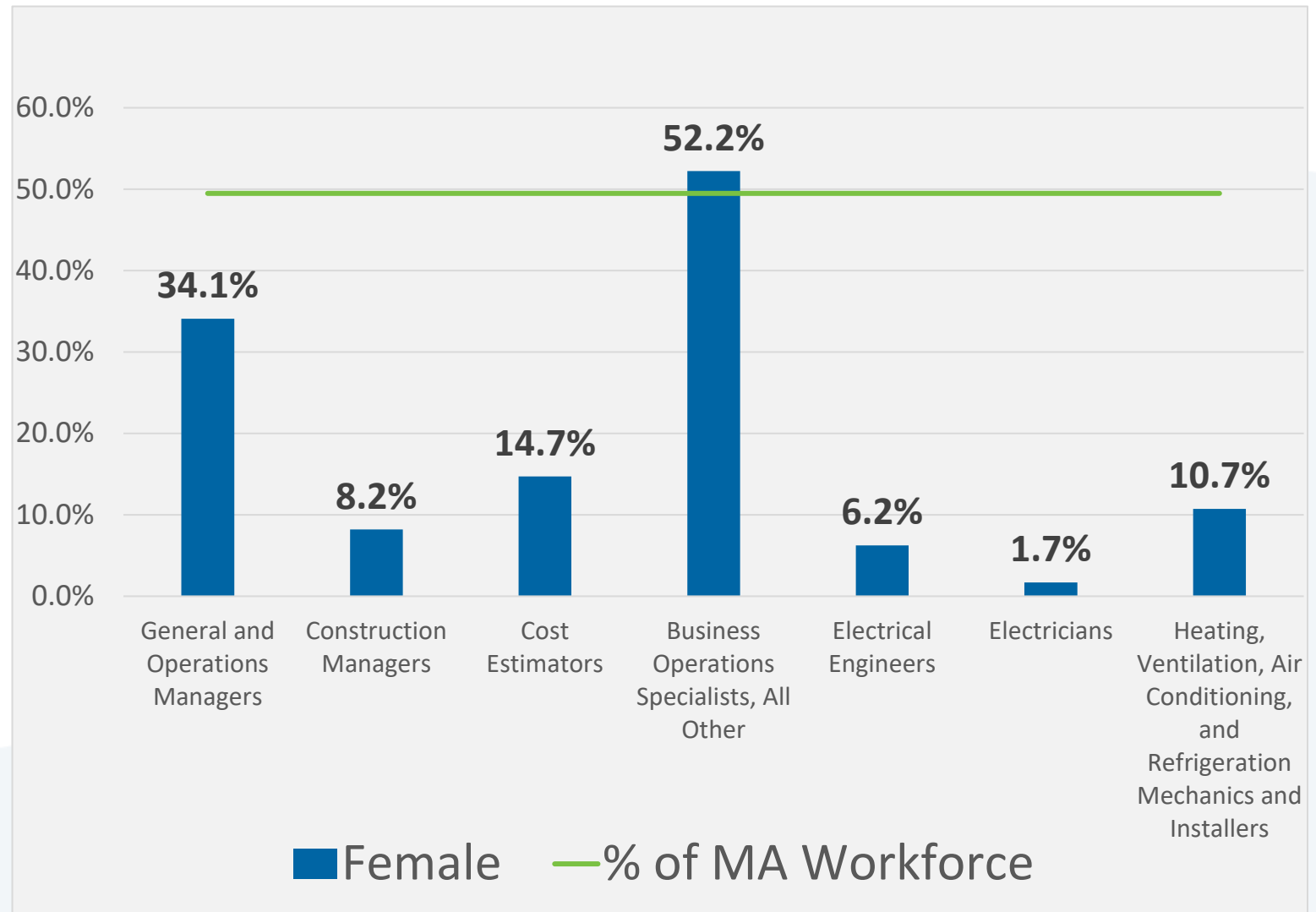
# Diversity in the Key Occupations Critical to Clean Energy
## Black / African American

- One in three current clean energy workers in Massachusetts are people of color. Still, representation in many of the highest-paying positions is not equitable.
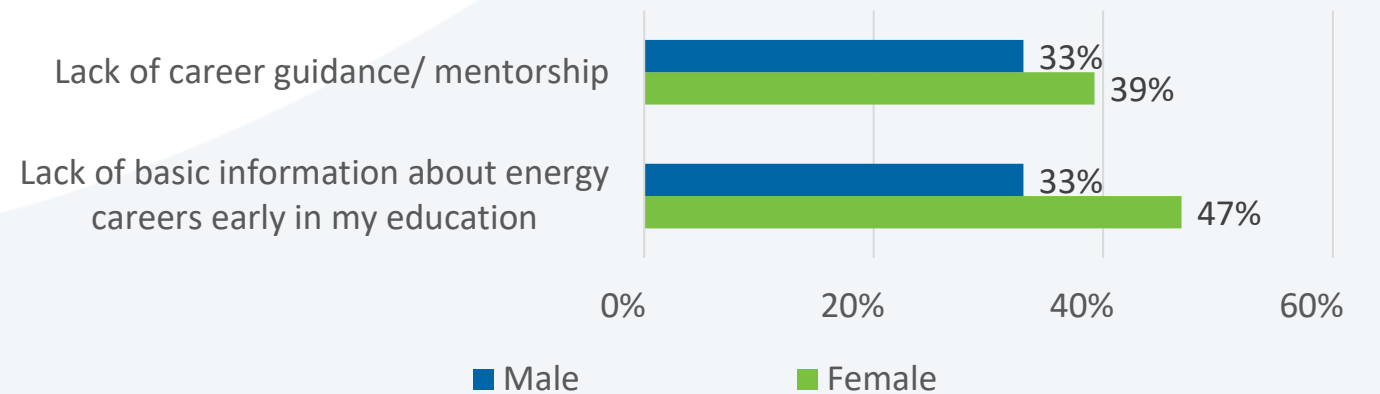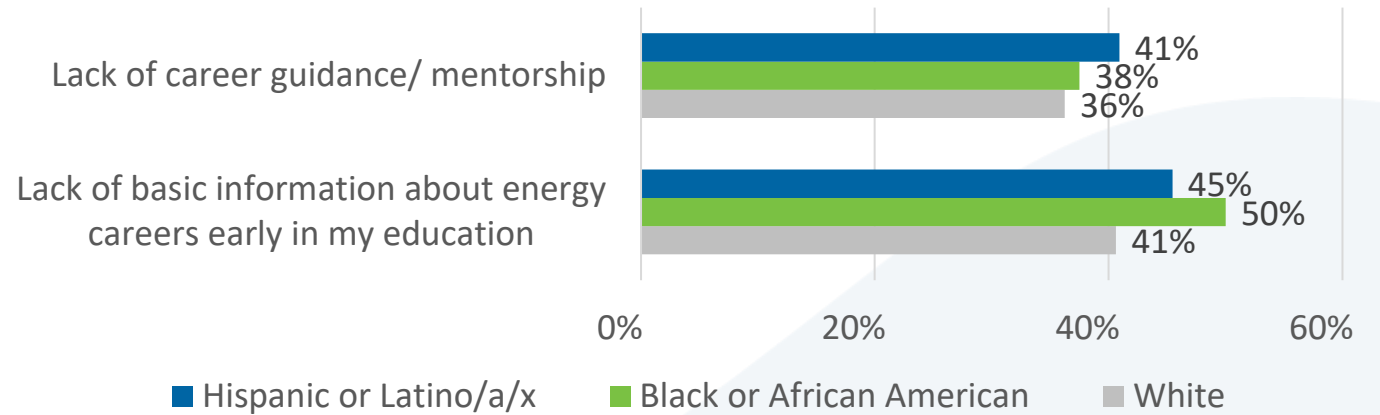


Chart data — Black or African American vs. % of MA Workforce (~8.1%):

| Occupation | Black or African American |
|---|---|
| General and Operations Managers | 5.4% |
| Construction Managers | 3.3% |
| Cost Estimators | 2.0% |
| Business Operations Specialists, All Other | 6.8% |
| Electrical Engineers | 1.5% |
| Electricians | 5.9% |
| Heating, Ventilation, Air Conditioning, and Refrigeration Mechanics and Installers | 7.1% |

■ Black or African American ── % of MA Workforce

# Increasing Diversity, Equity, and Inclusion



Barriers to entry to clean energy careers are more often felt by non-white, as well as female workers

Chart categories (top to bottom):
- Finding training opportunities that are near where I live or am willing to live
- Finding employment opportunities that are near where I live or am willing to live
- Transportation to and from my work or training
- Overcoming prejudice or bias in the workplace
- Cost of required training or education
- Developing resumes and related materials that demonstrate my qualifications
- Communicating effectively with employers and hiring managers

X-axis: 0.0% 10.0% 20.0% 30.0% 40.0% 50.0% 60.0% 70.0% 80.0%

Legend: Hispanic or Latino/a/x | All Other Races | Black or African American | White

# Importance of Awareness of Clean Energy Careers

**LACK OF CLEAN ENERGY CAREER AWARENESS IS A BARRIER TO ENTRY**

➤ Overall, 39% of clean energy workers surveyed cited a lack of career awareness as a barrier to entry into clean energy. 35% cited a lack of career guidance or mentorship.

➤ A higher percentage of non-white and female workers cited awareness and mentorship as barriers to entry



Lack of career guidance/ mentorship — 41% / 38% / 36%

Lack of basic information about energy careers early in my education — 45% / 50% / 41%

0%  20%  40%  60%

■ Hispanic or Latino/a/x   ■ Black or African American   ■ White

Lack of career guidance/ mentorship — 33% / 39%

Lack of basic information about energy careers early in my education — 33% / 47%

0%  20%  40%  60%

■ Male   ■ Female

# The Role of Community-Based Organizations

➤ CBOs often have the strongest relationships with populations that are historically disadvantaged and hardest to reach

➤ Massachusetts has a strong network of CBOs, but few are actively involved in clean energy

➤ CBOs made five requests for assistance in developing and supporting clean energy programming:
  1. Clear, accessible, and customizable information about clean energy careers
  2. Reliable information about the demand for clean energy jobs
  3. Support building relationships with clean energy employers
  4. Robust and reliable funding for comprehensive training programs and support services
  5. An asset-based approach to engaging communities and program participants

➤ MassCEC is well-positioned to assist in meeting many of these requests

# Placing, Retaining, and Advancing Workers

➤ There are serious hiring challenges in clean energy that have gotten worse after the pandemic

  ➤ 88% of employers had "some" or "great" difficulty hiring

➤ Strategies to address hiring and retention challenges include:

  ➤ Support services for new hires to ensure smooth transitions to the world of work

  ➤ Reinforce career advancement opportunities for current clean energy workers

  ➤ Improve quality and accessibility of DEI programming to decrease the biases in the workplace
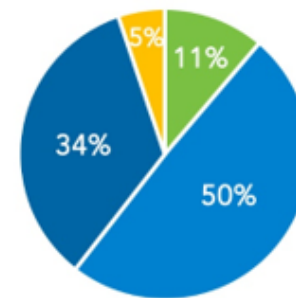
**Hiring Difficulty**

**Hiring Difficulty for Entry- and Mid-Level Positions**

- 5%
- 11%
- 34%
- 50%

- Great Difficulty
- Some Difficulty
- Little to No Difficulty
- Don't Know / Refused

**Sources of Employer Hiring Difficulty**

| 23% | 11% | Enough Applicants but Unwilling to work for the Wages |
| 28% | 11% | Enough Applicants but Do Not Have Certifications/License Needed for Job |
| 37% | 12% | Enough Applicants but Do Not Have Training or Education Needed for Job |
| 37% | 14% | Enough Applicants but Do Not Have Prior Work Experience Needed for Job |
| 30% | 24% | Not Enough Applicants for Open Positions |

- Somewhat Agree
- Strongly Agree
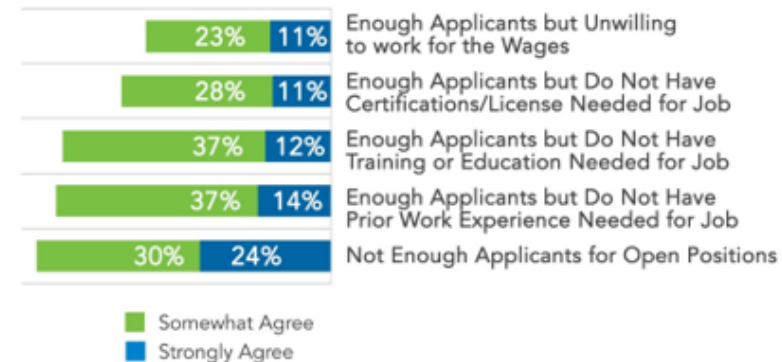
**Most Common Reasons for Employer Hiring Difficulty (Up to Two Selected)**[88]

| 43% | 33% | 33% | 21% | 18% | 9% | 8% | 3% | 3% |
|---|---|---|---|---|---|---|---|---|
| Lack of Experience/ Industry Specific Knowledge | Competition with Other Industries | Small Applicant Pool | Insufficient Non-Technical Skills | High Turnover | Insufficient Educational Attainment | Other | Insufficient Certifications | Don't Know / Refused |
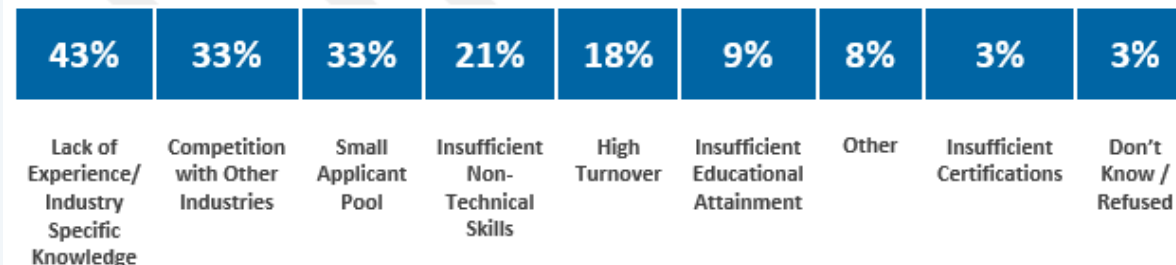
# Best Practices for Clean Energy Workforce Development Programs

PROGRAM DESIGN

OUTREACH & RECRUITMENT

TRAINING & SUPPORT

PLACEMENT & ADVANCEMENT

See **page 54** of the MA Clean Energy Workforce Needs Assessment for full list of best practices

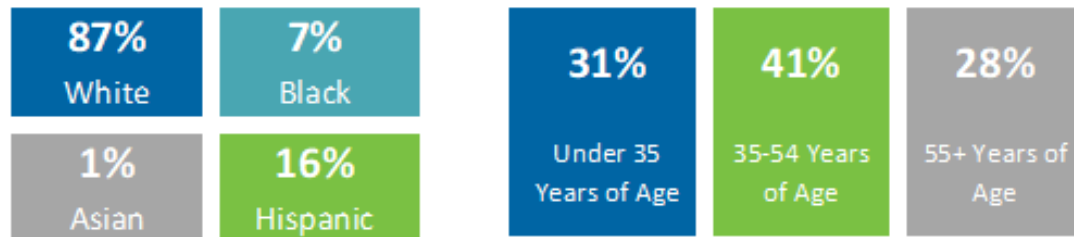# How To Get the Most Out of the Report

# Occupational Gap Analyses

# HVAC-R Mechanics and Installers

| 25th Percentile Wages | Median Wages | 75th Percentile Wages |
|---|---|---|
| $24.80 | $31.26 | $38.44 |

## DEMOGRAPHICS

**89%** Male  **11%** Female

| 87% White | 7% Black |
|---|---|
| 1% Asian | 16% Hispanic |

| 31% Under 35 Years of Age | 41% 35-54 Years of Age | 28% 55+ Years of Age |
|---|---|---|

**87%** Without a Bachelor's Degree

**4 / 5** State Occupation Star Ranking

### JOB OPPORTUNITIES ACROSS CLEAN ENERGY SECTOR

| 0 Alternative Transportation | 506 Energy Efficiency | 145 Renewable Energy |
|---|---|---|

# Supply and Demand of HVAC-R Mechanics and Installers

## Demand

➤ **650 additional full-time clean energy workers needed by 2030**

➤ **27% of current workers are 55 or older and another 41% are 35 or older**

  ➤ There is an impending wave of retirements

## Supply

➤ **67 Training Programs**

  ➤ 28 at Vocational and Technical High Schools

  ➤ 18 Private Training Programs

  ➤ 13 Community College Programs

➤ **Subset of training providers highlighted that some HVAC-R trainings being offered were undersubscribed**



**Chart data (stacked bar):**

| | 2022 | 2030 |
|---|---|---|
| Total | 9,330 | 10,368 |
| Non-Clean Energy Employment | 5,486 | 5,874 |
| Clean Energy Employment | 3,844 | 4,494 |

- 10% Increase in All Jobs
- 7% Increase in Non-CE Jobs
- 15% Increase in CE Jobs

■ Non-Clean Energy Employment    ■ Clean Energy Employment
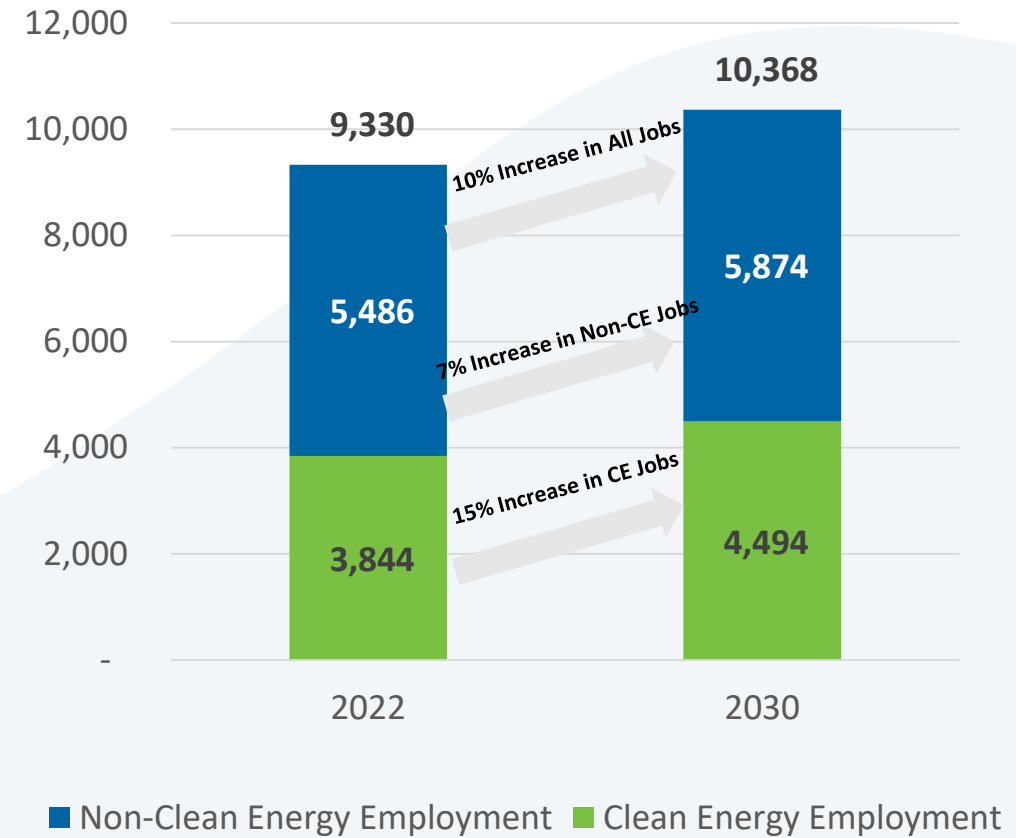
# HVAC-R Mechanics and Installers: Recommended Next Steps

➤ **Increase training capacity at community colleges, industry associations, and private training organizations, as well as supporting awareness campaigns to increase enrollment.**

➤ **Enhance outreach and engagement to increase student enrollment and retention**

  ➤ A subset of training providers also highlighted that some HVAC-R trainings being offered were undersubscribed, and efforts to expand training capacity would need to be paired with supply of prospective workers.

➤ **In the longer run, increasing support for expanded capacity for the 38 vocational and technical school programs can help ensure the next generation of HVAC-R Mechanics and Installers are trained.**

➤ **Develop strategies to support training providers to update curriculum and training labs to incorporate and expand hands-on training for heat pump and other clean heating and cooling technologies.**

➤ **Employers of HVAC-R Mechanics and Installers often noted a preference for North American Technician Excellence (NATE) certifications**

  ➤ Working with vocational and technical schools, community colleges and other training programs to incorporate this curriculum could help future graduates and prospective employers.

➤ **Sponsor informational sessions between contractors and heat pump manufacturers.**

  ➤ These sessions will ensure that HVAC-R Mechanics and Installers, who are often looked to provide recommendations to homeowners, are familiar with the range of products, incentives and projected cost savings of efficient HVAC-R equipment and can relay that information to homeowners. There is additional value in engaging Mass Save as part of these efforts

Regional Analyses

# Regional Analysis Overview

| | 2022 Clean Energy Employment | 2030 Clean Energy Employment | Change in Clean Energy Employment (2022-2030) | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | Percent Growth | Number of Jobs Added | | | | |
| | | | | Energy Efficiency | Renewable Energy | Alternative Transportation | Other | Total |
| **Berkshire** | 1,581 | 2,075 | 31.3% | 312 | 109 | 71 | 3 | 494 |
| **Pioneer Valley** | 6,768 | 9,048 | 33.7% | 1,481 | 497 | 289 | 14 | 2,280 |
| **Central Mass** | 11,083 | 14,210 | 28.2% | 1,810 | 956 | 345 | 16 | 3,127 |
| **Northeast** | 15,036 | 19,332 | 28.6% | 2,499 | 1,254 | 523 | 20 | 4,296 |
| **Greater Boston** | 46,906 | 59,246 | 26.3% | 7,588 | 3,117 | 1,560 | 76 | 12,341 |
| **Southeast** | 18,676 | 24,497 | 31.2% | 3,306 | 1,579 | 911 | 25 | 5,821 |
| **Cape Cod and Islands** | 4,234 | 5,564 | 31.4% | 912 | 271 | 142 | 5 | 1,330 |

# Berkshire Region
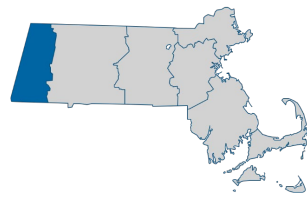
| **1,581** | **2,075** | **494** | **31%** |
|:---:|:---:|:---:|:---:|
| **2022 Clean Energy Jobs in Region** | **2030 Projected Clean Energy Jobs** | **Projected New Jobs Added** | **Percent Growth (2022 – 2030)** |

| Highest-Growth Occupations | 2022 Clean Energy Jobs | Increase in Jobs (2022-2030) |
|---|:---:|:---:|
| Electricians | 119 | 82 |
| *Solar Photovoltaic Installers* | *32* | *13* |
| Construction Laborers | 134 | 44 |
| General and Operations Managers | 77 | 27 |
| First-Line Supervisors of Construction Trades and Extraction Workers | 72 | 25 |
| Insulation Workers | 74 | 19 |

# Berkshire Region Recommendations

➤ **Increase the number of relevant clean energy training opportunities within the region**

   ➤ Additional programs for Electricians and HVAC-R Maintenance and Installation workers are needed.

      ➤ There are currently no HVAC-R-relevant training programs in the region

➤ **Creating new training programs at community colleges and union apprenticeship programs should be explored, particularly in electricity and HVAC-R.**

➤ **Consider expanding vocational and technical high school programs in electricity at Taconic High School and Charles McCann Vocational Technical**

➤ **The Environmental Justice neighborhoods in the northern part of the region near Adams and Savoy are virtually training deserts**

   ➤ These training programs could be developed in tandem with the Pioneer Valley region, which also has a shortage of relevant training programs in nearby Environmental Justice neighborhoods.
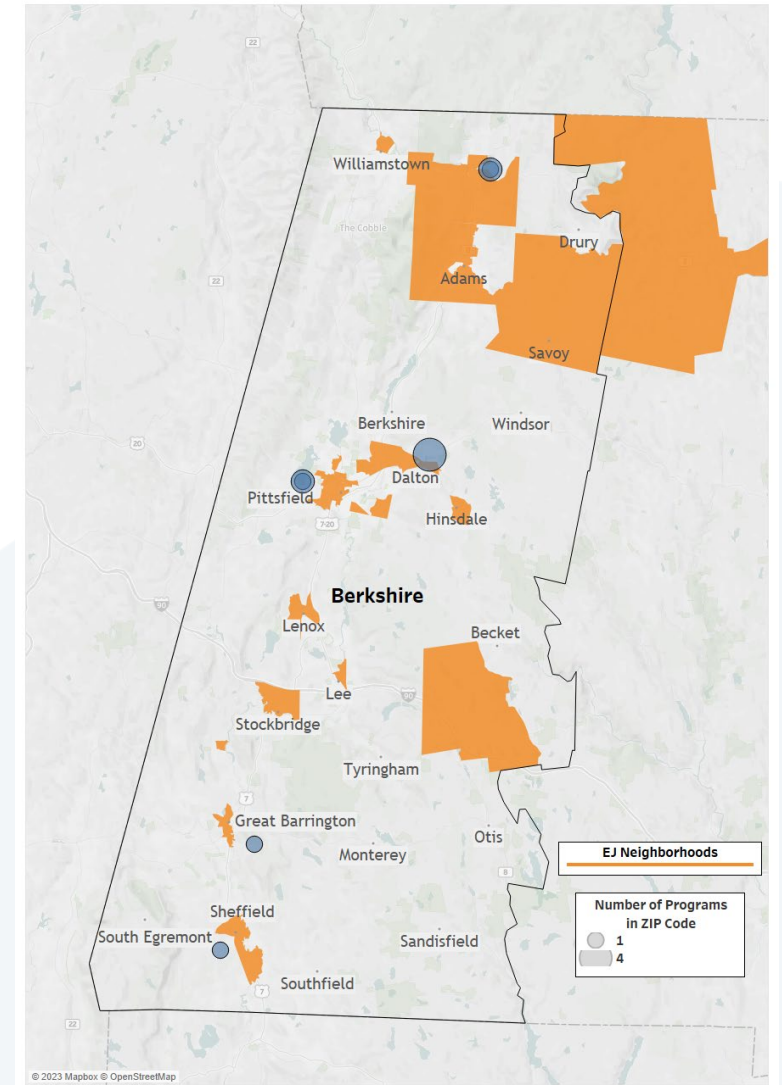
# Access the Data Workbook

➤ A companion Data Workbook is available on the Workforce Needs Assessment webpage **www.masscec.com/resources/massachusetts-clean-energy-workforce-needs-assessment**
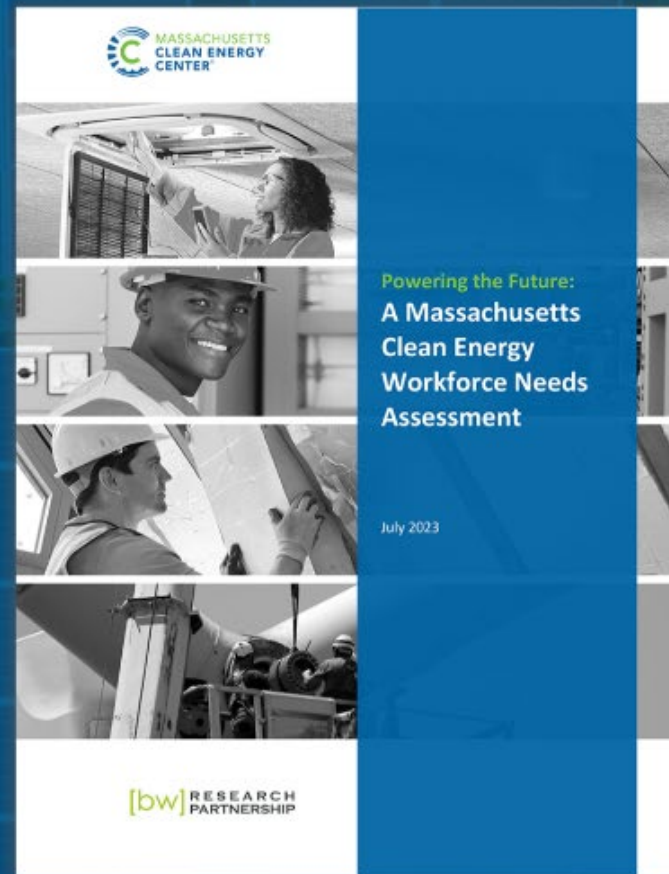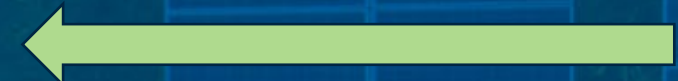
# Additional Detailed Data in Excel Data Workbook

➤ **A Data Workbook with additional detailed data is available through the following link:**

[www.masscec.com/resources/massachusetts-clean-energy-workforce-needs-assessment](www.masscec.com/resources/massachusetts-clean-energy-workforce-needs-assessment)

➤ **The Excel Workbook includes the following data:**
  - ➤ Training Inventory
  - ➤ Certifications for Clean Energy Occupations
  - ➤ Detailed Clean Energy Occupation Estimates
  - ➤ Detailed Fossil Fuel Occupation Estimates
  - ➤ Clean Energy Occupation Demographics
  - ➤ Clean Energy Occupation Career Navigation and Pathways
  - ➤ Clean Energy Jobs by Region
  - ➤ Change in Clean Energy Jobs by Region
  - ➤ Employer Survey Toplines
  - ➤ Current Worker Survey Toplines

# Question and Answer Session

➤ Type your questions into the Q & A Box for the panelists to respond to

➤ If time is a constraint, MassCEC will follow up with any remaining questions after the webinar

# Thank You and Next Steps

➤ Questions about the Massachusetts Clean Energy Workforce Needs Assessment can be sent to Workforce@MassCEC.com

➤ Interested in having MassCEC present to your organization or group?
  ➤ Elizabeth Youngblood, Eyoungblood@MassCEC.com

➤ Sign up for updates on MassCEC workforce news and funding opportunities
  ➤ Go to MassCEC.com/subscribe and select 'Workforce News' and 'Workforce Funding'

August 2023

**DEDICATED TO INNOVATION**

# Powering the Future: A Massachusetts Clean Energy Workforce Needs Assessment

MASSACHUSETTS CLEAN ENERGY CENTER®

# Appendix

# Key Findings and Recommendations

➤ **The Clean Energy industry in Massachusetts will need to grow by a substantial 37% by 2030 to meet the state's decarbonization goals.** The scale of this transformation will reshape a large portion of the state's economy and will boost demand for workers in occupations that are already existing workforce challenges.

➤ **Expanding awareness of clean energy careers is a critical first step to meeting workforce needs.** Increasing awareness of clean energy careers among students and prospective workers, as well as training providers and community-based organizations, is crucial to building a larger and more equitable workforce.

➤ **Scaling training capacity will require leveraging and expanding existing programs, improving quality and efficiency, and funding new and enhanced programs to address gaps and barriers.** Additionally, enhancing the curricula, equipment, support services and employer engagement across all programs are all critical steps in adding capacity to the clean energy workforce development ecosystem.

➤ **A just transition is necessary and will require intentional efforts.** This includes ensuring job quality for workers, providing economic opportunity to job seekers and communities that have historically been marginalized or adversely affected by climate change and pollution, and removing barriers to gainful employment.

# Key Findings and Recommendations Continued

➤ **While job gains will be seen across a broad range of occupations, just 20 occupations account for nearly 2/3 of all jobs created.** Enacting strategies to support workers going into these highest-demand occupations is a top priority.

➤ **At the same time, there will be opportunities for workers of all backgrounds**, including new entrants to the labor market, adult career switchers, and returning workers, among others.

➤ **Workforce development strategies must be tailored to regional needs, challenges and considerations to be effective and best support broader state-level goals.** State-level policies can guide actions, but regions must be able to allocate resources to the specific areas that will best allow their region to address its specific needs.

➤ **Fossil fuel workers are unlikely to experience large-scale displacement leading up to 2030, but now is the time to start planning and transitioning workers.** It is important to bring together stakeholders to support planning efforts to re-skill workers to increase transitions to equivalent opportunities in the clean energy workforce, which will need this steady infusion of talent.

# Overview of Report
# & Methodology

# Quantitative Research

## Training Inventory

➤ Database of nearly 900 training programs around the state was compiled and reviewed by the research team

## Clean Energy Employer Survey (n = 210)

## Current Clean Energy Worker Survey (n = 219)

## Employment Forecasting

➤ High-Level demand projections by sub-sector used from the Macroeconomic Impact and Equity Analysis of the Massachusetts 2050 Decarbonization Roadmap

➤ These employment projections were then applied to staffing patterns developed for each segment of the value chain within a sub-sector, and customized using aggregate responses from current clean energy employers

➤ Economy-wide employment projections are the "Long Term Occupation Projections" from the Massachusetts Department of Unemployment Assistance and the Economic Research Department

# Qualitative Research

## Human-Centered Design Sessions

➤ Employers (four employers)

➤ Organized Labor (six unions)

➤ Training Providers (five training providers)

## Interviews

➤ There was a deliberate effort to get an array of interview participants from different regions of the state representing different areas of expertise

  ➤ 16 Employers

  ➤ 4 Organized Labor Organizations

  ➤ 13 Training Providers

  ➤ 12 Community-Based Organizations

  ➤ 5 State and Administrative Organizations