Learning from the Experts Webinar Series

Workforce Development

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Vice-President
BW Research Partnership

May 25, 2022
Meeting Procedures

Webinar recordings and presentations will be available at:
www.nyserda.ny.gov/osw-webinar-series

Participation for Members of the Public:

> Members of the public will be muted upon entry.

> Questions and comments may be submitted in writing through the Q&A feature at any time during the event.

> If technical problems arise, please contact Sal.Graven@nyserda.ny.gov
Learning from the Experts

This webinar series is hosted by NYSERDA’s offshore wind team and features experts in offshore wind technologies, development practices, and related research.

DISCLAIMER:
The views and opinions expressed in this presentation are those of the presenter and do not represent the views or opinions of NYSERDA or New York State.
Offshore Wind Supply Chain Occupational Gap Analysis

January 2022
Overview

1. Comprehensive database of 117 distinct OSW-related occupations

2. In-depth occupational analysis
   - Supply-demand gap, relative concentration, & geographic distribution


4. Training program overview
## Projected Offshore Wind Employment Growth, 2019-2050 (JTWG Study)

### Low Carbon Fuels

<table>
<thead>
<tr>
<th>Year</th>
<th>Construction</th>
<th>Professional Services</th>
<th>Manufacturing</th>
<th>Other Supply Chain</th>
<th>Induced</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>507</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>5,593</td>
<td>1,388</td>
<td>1,488</td>
<td>1,525</td>
<td>1,082</td>
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<tr>
<td>2030</td>
<td>14,379</td>
<td>3,595</td>
<td>4,975</td>
<td>3,258</td>
<td>2,349</td>
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<tr>
<td>2035</td>
<td>16,559</td>
<td>4,222</td>
<td>5,641</td>
<td>3,765</td>
<td>2,381</td>
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<tr>
<td>2040</td>
<td>18,761</td>
<td>4,856</td>
<td>6,317</td>
<td>4,276</td>
<td>2,349</td>
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<tr>
<td>2045</td>
<td>14,517</td>
<td>3,904</td>
<td>4,435</td>
<td>3,494</td>
<td>2,012</td>
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<tr>
<td>2050</td>
<td>8,340</td>
<td>2,413</td>
<td></td>
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</table>

### Accelerated Transition

<table>
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<tr>
<th>Year</th>
<th>Construction</th>
<th>Professional Services</th>
<th>Manufacturing</th>
<th>Other Supply Chain</th>
<th>Induced</th>
</tr>
</thead>
<tbody>
<tr>
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<td>507</td>
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<td>1,488</td>
<td>1,525</td>
<td>1,082</td>
</tr>
<tr>
<td>2030</td>
<td>14,705</td>
<td>3,675</td>
<td>5,102</td>
<td>3,324</td>
<td>2,424</td>
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<tr>
<td>2035</td>
<td>18,929</td>
<td>4,808</td>
<td>6,547</td>
<td>4,260</td>
<td>2,953</td>
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<tr>
<td>2040</td>
<td>23,840</td>
<td>8,274</td>
<td>8,724</td>
<td>5,320</td>
<td>5,404</td>
</tr>
<tr>
<td>2045</td>
<td>17,261</td>
<td>4,635</td>
<td></td>
<td></td>
<td>2,852</td>
</tr>
<tr>
<td>2050</td>
<td>9,850</td>
<td>2,832</td>
<td></td>
<td></td>
<td>1,321</td>
</tr>
</tbody>
</table>

- Construction
- Professional Services
- Manufacturing
- Other Supply Chain
- Induced
Projected Distribution of OSW Employment by Occupational Group in 2030

- Management/professional: 34.5%
- Installation or repair: 28.8%
- Production/Manufacturing: 19.7%
- Administrative: 10.0%
- Sales: 2.9%
- Other: 4.2%
Relative Concentration of OSW-related Jobs by Project Phase

What is a **Location Quotient**?

> Above average concentration of planning and development and support services

> Below average concentration of manufacturing, construction, and operations
# Geographic Distribution

<table>
<thead>
<tr>
<th>Regional Economic Development Council (REDC)</th>
<th>Total OSW-Related Jobs</th>
<th>% of Total OSW-Related Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>New York City</td>
<td>1,022,184</td>
<td>46.5%</td>
</tr>
<tr>
<td>Long Island</td>
<td>305,689</td>
<td>13.9%</td>
</tr>
<tr>
<td>Mid-Hudson</td>
<td>213,532</td>
<td>9.7%</td>
</tr>
<tr>
<td>Western New York</td>
<td>156,203</td>
<td>7.1%</td>
</tr>
<tr>
<td>Finger Lakes</td>
<td>140,136</td>
<td>6.4%</td>
</tr>
<tr>
<td>Capital Region</td>
<td>131,263</td>
<td>6.0%</td>
</tr>
<tr>
<td>Central New York</td>
<td>87,649</td>
<td>4.0%</td>
</tr>
<tr>
<td>Southern Tier</td>
<td>64,247</td>
<td>2.9%</td>
</tr>
<tr>
<td>Mohawk Valley</td>
<td>43,332</td>
<td>2.0%</td>
</tr>
<tr>
<td>North County</td>
<td>33,047</td>
<td>1.5%</td>
</tr>
</tbody>
</table>
Projected Workforce Gaps

Severity of Estimated Occupation Gap

- **Severe**: Demand exceeds supply and this gap exceeds the size of the existing workforce.
- **Moderate**: Demand exceeds supply but the gap is smaller than the existing workforce.
- **Mild**: Supply exceeds demand.

- Hoist and Winch Operators
- Continuous Mining Machine Operators
- Computer Numerically Controlled Tool Programmers
- Metal Workers and Plastic Workers, All Other
- Metal-Reﬁning Furnace Operators and Tenders
- Engine and Other Machine Assemblers
- Structural Metal Fabricators and Fitters
- Plant and System Operators, All Other
- Wind Turbine Service Technicians
## Top 10 Occupations with Projected Gap

<table>
<thead>
<tr>
<th>SOC Code</th>
<th>Occupation</th>
<th>Total Jobs in NY, 2020 Q4</th>
<th>Location Quotient, 2020 (compared to US)</th>
<th>Estimated Workforce Gap</th>
<th>Typical Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>51-8099</td>
<td>Plant and System Operators, All Other</td>
<td>228</td>
<td>0.26</td>
<td>Severe</td>
<td>Apprenticeship/Postsecondary Training</td>
</tr>
<tr>
<td>53-7041</td>
<td>Hoist and Winch Operators</td>
<td>130</td>
<td>0.49</td>
<td>Severe</td>
<td>Apprenticeship/Postsecondary Training</td>
</tr>
<tr>
<td>47-5041</td>
<td>Continuous Mining Machine Operators</td>
<td>192</td>
<td>0.20</td>
<td>Severe</td>
<td>Post-secondary Training or Associate's</td>
</tr>
<tr>
<td>49-9081</td>
<td>Wind Turbine Service Technicians</td>
<td>182</td>
<td>0.38</td>
<td>Severe</td>
<td>Post-secondary Training or Associate's</td>
</tr>
<tr>
<td>51-4051</td>
<td>Metal-Refining Furnace Operators and Tenders</td>
<td>567</td>
<td>0.64</td>
<td>Moderate</td>
<td>High School Diploma</td>
</tr>
<tr>
<td>51-4199</td>
<td>Metal Workers and Plastic Workers, All Other</td>
<td>338</td>
<td>0.25</td>
<td>Moderate</td>
<td>Apprenticeship/Postsecondary Training</td>
</tr>
<tr>
<td>51-9162</td>
<td>Computer Numerically Controlled Tool Programmers</td>
<td>847</td>
<td>0.55</td>
<td>Moderate</td>
<td>Apprenticeship/Postsecondary Training</td>
</tr>
<tr>
<td>51-2041</td>
<td>Structural Metal Fabricators and Fitters</td>
<td>2,362</td>
<td>0.54</td>
<td>Moderate</td>
<td>Apprenticeship/Postsecondary Training</td>
</tr>
<tr>
<td>51-4193</td>
<td>Plating Machine Setters, Operators, and Tenders, Metal and Plastic</td>
<td>1,076</td>
<td>0.46</td>
<td>Moderate</td>
<td>High School Diploma</td>
</tr>
<tr>
<td>51-2031</td>
<td>Engine and Other Machine Assemblers</td>
<td>1,251</td>
<td>0.50</td>
<td>Moderate</td>
<td>High School Diploma</td>
</tr>
</tbody>
</table>
Typical Educational Attainment

Top 10 occupations with severe to moderate gap require Apprenticeship/Postsecondary or High School Diploma
Training Program Overview

**Wind-specific programs:** High focus on engineering with courses/tracks in wind energy

**General/vocational trades:** 750+ programs to support key trades for OSW projects

**Gap analysis:** Insufficient programs for wind techs and CNC machinists (jobs with severe to moderate gaps)
Wind-Specific Training Programs

Vocational Trade Programs
Carpenters

Typical Entry-Level Education
High school diploma or equivalent

Previous Work Experience
None

Typical On-The-Job Training
Apprenticeship

Common Certifications/ Licensing Requirements
• OSHA 10 Hour (2 days)
• Building Performance Institute (6-40 hours)
• Construction Supervisor (2 months for license; 3 yrs prior experience)

Knowledge
• Wood & substitute materials
• Construction techniques
• Shop mathematics
• Safe working practices

Skills
• Setup & operation of carpentry & wood working tools & equipment

Abilities
• Interpret blueprints & instructions
• Apply standard measurements, specifications, & instructions
• Select appropriate materials

6 in 10 percent receive healthcare benefits
7 in 10 percent receive retirement benefits
Crane & Tower Operators

Typical Entry-Level Education
High school diploma or equivalent

Previous Work Experience
<5 years

Typical On-The-Job Training
Moderate-term on-the-job training

Common Certifications/ Licensing Requirements
- Tower Crane Operator (4-8 weeks)
- Mobile Crane Operator (up to 30 days)
- Service Truck Crane Operator (3 days)
- Overhead Crane Operator (4-8 weeks)
- Massachusetts Hoisting License (6 hours)

Knowledge
- Safety protocols
- Operation of cranes
- Mathematics

Skills
- Operation, design, & use of cranes
- Equipment maintenance
- Troubleshooting & repair

Abilities
- Transport, lift, and move heavy loads using a traveling or stationary case

Healthcare benefits through union membership
Retirement benefits through union membership
Pile Driver Operators

Typical Entry-Level Education
High school diploma or equivalent

Previous Work Experience
None

Typical On-The-Job Training
Moderate-term on-the-job training

Common Certifications/ Licensing Requirements
- Dedicated Pile Driver Operator (<1 day)
- Massachusetts Pile Driver Apprenticeship (7K hours on-the-job training & 640 hours of classroom learning)

Knowledge
- Building & construction materials, methods, & tools
- Use of mechanical tools

Skills
- Operate heavy-duty construction or installation equipment
- Inspecting equipment, structures, or materials

Abilities
- Operate pile drivers & other heavy construction equipment

Healthcare benefits through union membership
Retirement benefits through union membership
Wind Turbine Technicians

Knowledge
• Electrical, mechanical, & hydraulic systems (for land-based and offshore wind)

Skills
• Troubleshoot & test electrical & mechanical equipment & systems

Abilities
• Inspect, diagnose, adjust, repair, & maintain wind turbines

Typical Entry-Level Education
Postsecondary non-degree award (i.e., certificate or license)

Previous Work Experience
None

Typical On-The-Job Training
Long-term on-the-job training (>1 yr)

Common Certifications/Licensing Requirements
• Global Wind Organization (2 days)

9 in 10 percent receive healthcare benefits
8 in 10 percent receive retirement benefits
Electricians

Typical Entry-Level Education
High school diploma or equivalent (incl. proficiency in algebra)
Paid apprenticeship (entry-level wages, full day of work, classes at night)

Previous Work Experience
None

Typical On-The-Job Training
Apprenticeship (4 years; 8,000 hours)

Common Certifications/
Licensing Requirements
• License – Journeyman (1 to 2 months) or Master (150 hours of electrician classroom education, and 1 year as MA journeyman)
• OSHA 10 Hour (2 days)

Knowledge
• Diagnosing typical equipment failures & causes of failures
• Electrical codes
• Math/algebra
• Technical knowledge

Skills
• Installation & repair of electric products
• Preventative maintenance
• Trouble-shooting

Abilities
• Install, operate, maintain, and repair electric apparatus

60% receive healthcare benefits
70% percent receive retirement benefits
Sheet Metal Workers

Typical Entry-Level Education
High school diploma or equivalent (incl. proficiency in algebra & geometry)

Previous Work Experience
Paid internship

Typical On-The-Job Training
Apprenticeship (5 years)

Common Certifications/ Licensing Requirements
• Journeyperson Sheet Metal Worker License (750 hours of classroom sheet metal training)
• Master Sheet Metal Worker License (2000 hours of work as a journeyperson or 40-hour master’s course)

Knowledge
• Hand & power tools equipment & safety procedures
• Welding
• Knowledge of different construction materials
• Mathematics

Skills
• Reading of blueprints
• Lay out, measure, and mark dimensions on materials
• Fasten seams or joints with welds & other materials

Abilities
• Fabricate, assemble, install, and repair sheet metal products & equipment

60% receive healthcare benefits
70% percent receive retirement benefits
Mechanical Engineers

Typical Entry-Level Education

Bachelor’s degree (83%)
Associates degree or some college (12%)

Previous Work Experience

None

Typical On-The-Job Training

None

Common Certifications/ Licensing Requirements

• Engineer-in-Training Certificate (completion of NCEES Fundamentals of Engineering Exam)
• Professional Engineer License (4 years)
• Computer Assisted Design (Less than 1 year)
• Lean Six Sigma Certificate (2 to 7 weeks)

Knowledge

• Mechanical engineering principles & techniques
• Advanced mathematics
• System analysis & design
• Computer aided design software
• Hydraulic & electric systems
• HVAC systems

Skills

• Mechanical, electrical, and plumbing design & systems
• Build, maintain, and assess machinery
• Create blueprints & develop prototypes

Abilities

• Design, develop, operate, & repair of mechanical systems

Similar to other engineering professions
Welders

Typical Entry-Level Education
High school diploma or equivalent (incl. proficiency in algebra & geometry)
Training program (up to six months)

Previous Work Experience
None

Typical On-The-Job Training
Moderate-term on-the-job training

Common Certifications/ Licensing Requirements
- License – Completion of AWE certified welder exam or NYSDOT field welder exam
- AWS Certified Welder – performance-based exam, no prerequisites
- NYSDOT Field Welder Certification - performance based exam, no prerequisites

Knowledge
- Blueprint reading
- Math/algebra
- Fabrication
- Metals & substitute materials

Skills
- Operate various hand tools and welding equipment
- Refurbishing

Abilities
- Fabricate, assemble, install, and repair metal products & equipment

60% receive healthcare benefits
70% percent receive retirement benefits
Preliminary Conclusions

- Sufficient professional services to move laterally and support OSW
- Expand vocational training for construction and manufacturing positions
- Connect to coastal, downstate employers for apprenticeship and OJT programs
Coming Next:

June 22, 1:00 p.m. ET
Stakeholder Engagement & Offshore Wind
Rebecca Karp, Karp Strategies
Andel Koester, Karp Strategies

Visit wind.ny.gov to register

We want your feedback! Send suggestions for future webinar topics to offshorewind@nyserda.ny.gov.