



Leading the Transformation  
to a Clean Energy Economy

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SEIA.ORG

# SEIA Members: Join our Community Groups for Workforce or Apprenticeship Professionals!

Email [workforce@seia.org](mailto:workforce@seia.org) to join!

## SEIA Apprenticeship Task Force

- Identify areas of collaboration around **Registered Apprenticeships**.
- Develop **tools & resources** to assist in **securing tax credits** and centering **quality**, safe apprentice experiences.

## SEIA Workforce Development Committee

- Facilitate sharing about workforce development **tools, resources, strategies, partnerships, & incentives**.
- Build a **brain trust** to support SEIA and its members.

**RE+ 2025**

# Apprenticeship & Workforce Trends & Networking Power Hour

Tues, Sept. 9 | 10:15am-12:15pm



**SEIA** Solar Energy  
Industries  
Association®

**IREC**

For a List of  
Apprenticeship &  
Workforce Related  
Sessions and  
Events at RE+ 25:



<https://events.seia.org/re-plus/workforce>



# **solar and storage workforce in Germany**

Bundesverband Solarwirtschaft e.V.

# Overview of the Dual System

- Combination of on-the-job training at companies with vocational schooling
- Apprentices usually 3–4 days in-company, 1–2 days at school
- Duration: 2–3.5 years, typically ~3 years

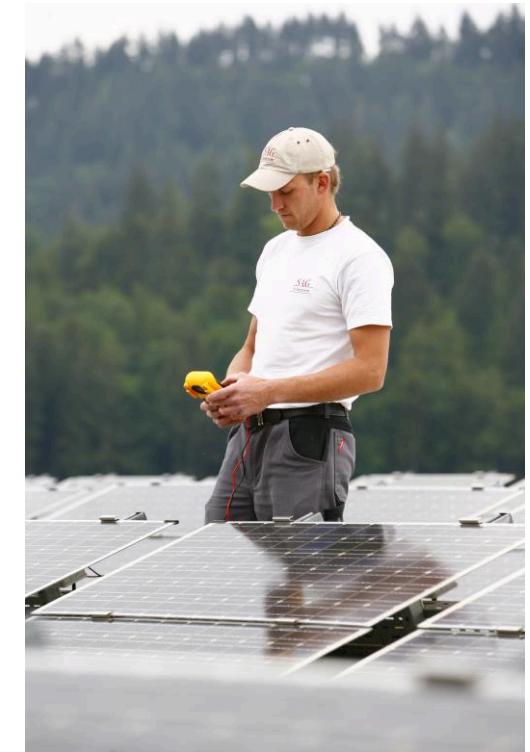
➤ Apprentices earn  
a training wage  
and graduate with a  
recognized qualification



# Participants and Example Trades

- About half of German school-leavers choose vocational training
- 320+ recognized occupations
- Example trades:
  - Electrician (3.5 years, ~15,000 new apprentices annually)
  - Roofer (3 years, ~8,500 apprentices)

Apprentices are typically 16–19 years old  
but can also be adults



## Training Duration and Structure

- Average program: ~3 years
- **70–80% of training time in-company**  
(practical work)
- 20–30% in vocational school (theory and general education)
- Apprentices sign contracts and receive stipends

➤ High practical emphasis ensures job-readiness



## Scale and Key Figures

- ~8,500 vocational schools across Germany
- ~400,000 training companies ( $\approx 20\%$  of all firms)
- ~1.6 million apprentices in training
- Electrical sector: 48,000 businesses, ~46,000 apprentices
- Roofing sector: 15,000 companies, ~8,500 apprentices



# career opportunities in renewable energies

|                     |    |    |    |    |    |    |    |    |    |
|---------------------|---|---|---|--|---|---|---|---|---|
| Sector              | Policy, laws  | Project development   | Project approval  | System design  | Finance   | Manufacturing   | Civil and electrical installation   | Operation and maintenance   | Grid integration  |
| Institution         | Ministries, parliament  | Projects developer, clients   | Public authorities  | Engineering companies  | Finance institutions  | Component producers   | Installation companies + engineers  | Operators, maintenance companies  | Grid operators, regulator   |
| Required personnel  | Lawyers, Policy makers  | Engineer, Economists, Lawyers   | Public servants   | Engineer   | Economists, Lawyers   | Engineers, economists, technicians, workers   | Engineers, technicians, workers   | Engineers, technician, workers  | Engineer, inspector   |
| # of staff required |  |  |  |  |  |  |  |  |  |

Source: Renac Renewables Academy



## Join us on our path!



**Bundesverband Solarwirtschaft e. V. – German Solar Association**  
Phone: +49 30 2977788 0 · Email: [geschaeftsleitung@bsw-solar.de](mailto:geschaeftsleitung@bsw-solar.de)

[bsw.li/4bTjsHf](http://bsw.li/4bTjsHf)



[bsw.li/3QYcpom](http://bsw.li/3QYcpom)



[bsw.li/1JDrtPl](http://bsw.li/1JDrtPl)



[bsw.li/2VsDOS4](http://bsw.li/2VsDOS4)



# Tearing the Paper Ceiling:

The case for skills-first  
talent practices



**Courtney Haynes, Chief Engagement Officer, Opportunity@Work**



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For the skills that you use in your job every day, did you learn them mostly in school OR at work?

# Workers Skilled Through Alternative Routes (STARs)

STARs have developed their skills through “alternative” non-degreed routes such as work experience, military service, educational benefits, training & on-ramps, boot camps, and community college.

## 70+ Million STARs

STARs are located in all regions across the country, including **both** urban and rural areas (71% of rural workers are STARs)

STARs are a large share of many affinity groups: **veterans, returning citizens, Opportunity Youth, returning caregivers, workers vulnerable to automation, etc.** (72% of veterans are STARs)

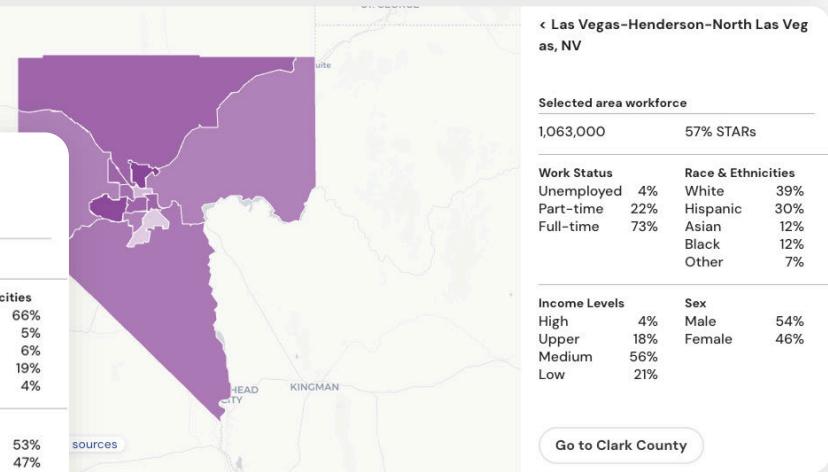
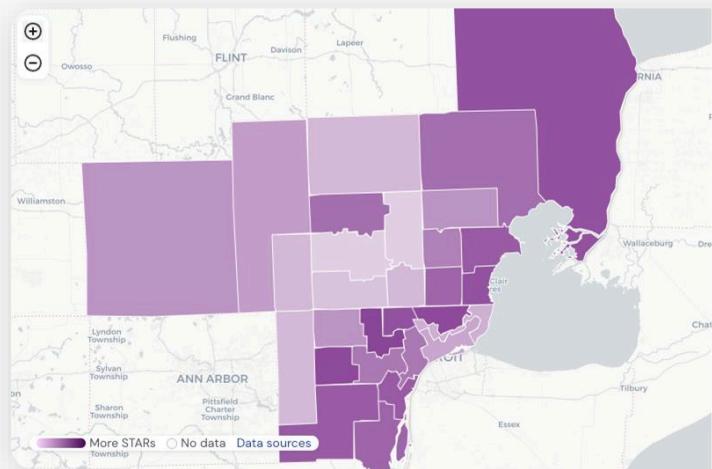
STARs have a similar **gender distribution** as the active population of workers in the U.S.

62% of African American workers, 55% of Hispanic workers, and 49% of Non-Hispanic White workers are STARs

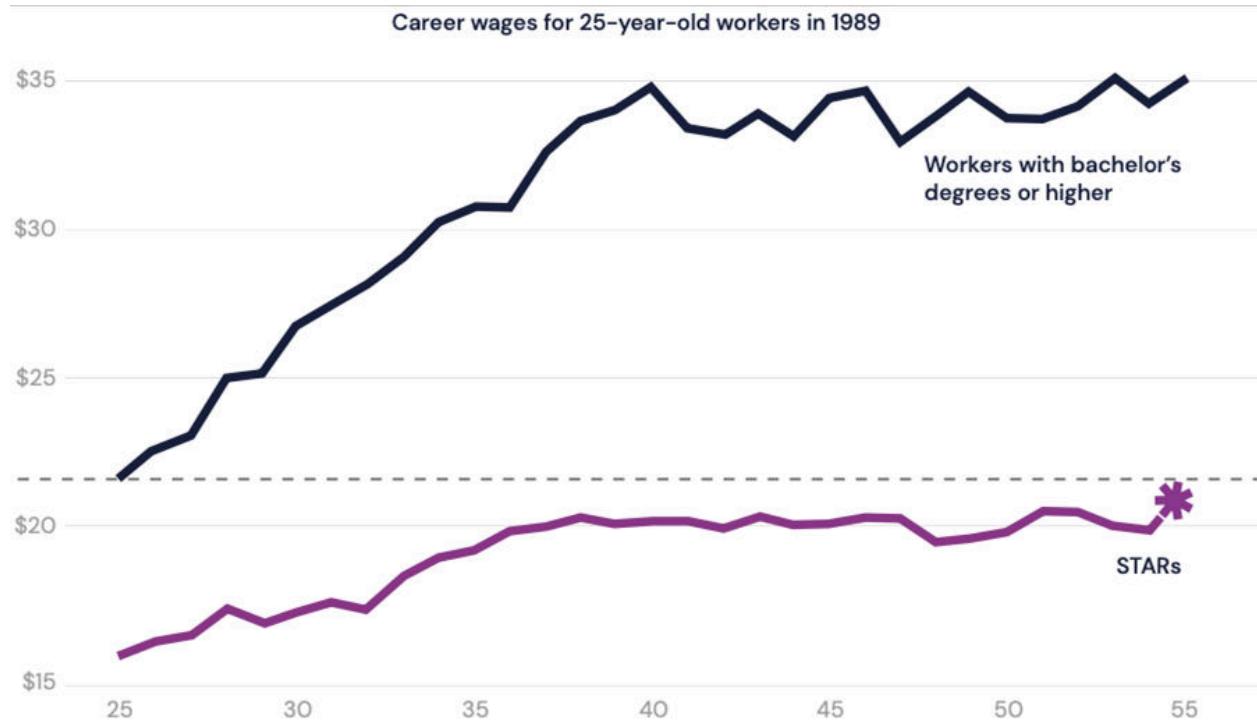


# STARs Are Everywhere – You Just Need to Look for Them in Your Region

[www.starsight.org](http://www.starsight.org)



# STARs wages don't catch up to where workers with BA degrees start their careers for 30 years



Note: Median wages in 2019 dollar for workers 25-29 years old in 1989 for workers with a bachelor's degree or higher versus workers skilled through alternative routes (STARs). Dotted line indicates median hourly wages for workers with a bachelor's degree at age 25 (\$21.59).

Source: Adapted from Blair, Debroy, and Heck (2021, 3). Data are from the 1989–2019 Annual Social and Economic Supplement (ASEC) of the Current Population Survey (CPS) microdata accessed via IPUMS.

# Low Wage ≠ Low Skill

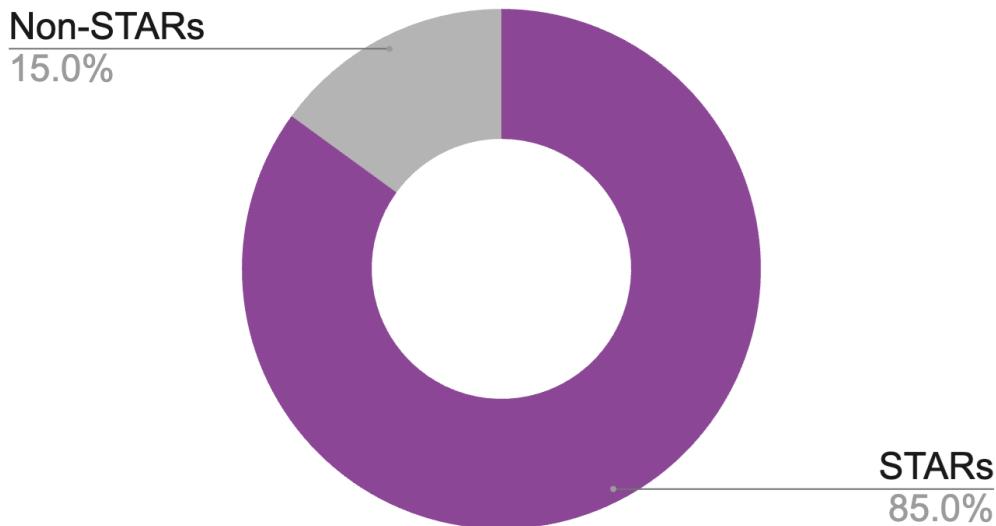


This figure shows the high skills overlap between two sales roles. The first is accessible to STARs, while the second is less so. About 96,000 STARs have made this transition in the five-year period from 2017 to 2021.

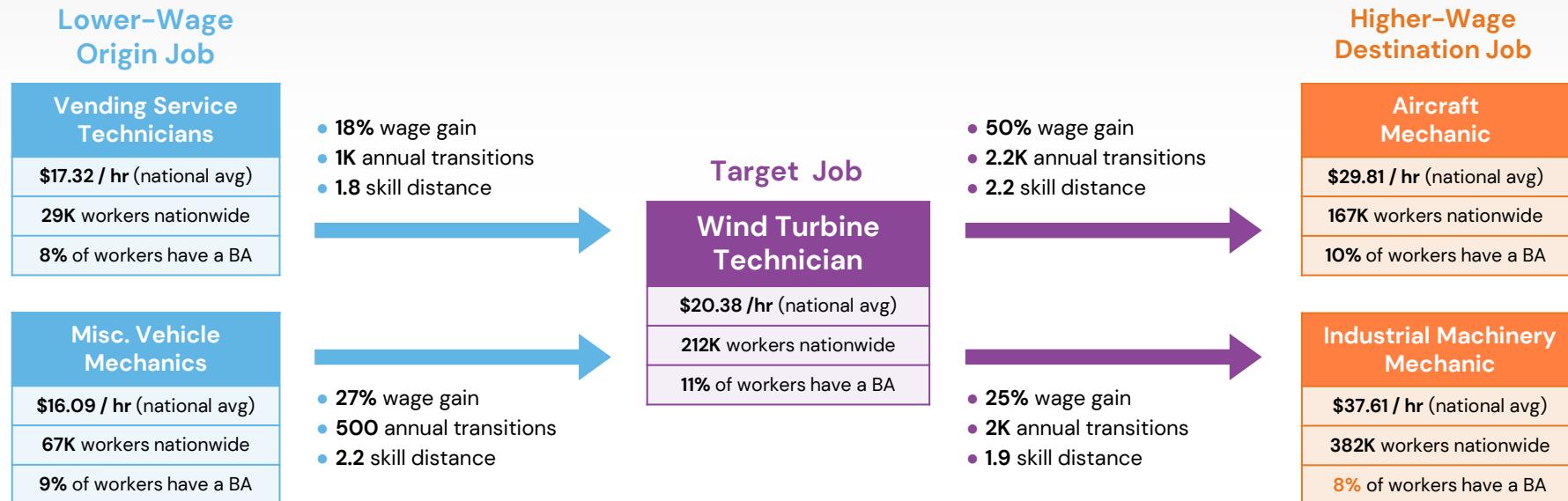
# Established opportunities like Solar Installation are inclusive and are poised for growth

Pathways into middle-wage clean energy installation jobs are already established

- STARs already make up the majority of solar installers (85%), which pays \$37 an hour
- The skills required for those jobs are highly transferable from lower-wage installation/construction roles offering established pipelines for STARs
- In Milwaukee the top sourcing job for solar installers is electrician (218 transitions), followed by Maintenance and Repair (109) and Computer Support Specialists (94)



# Wind Turbine Technicians also provides a proven upward mobility pathway



Promising “proven” pathway for STARs, given significant numbers who have historically traversed this pathway

# Implications for sourcing vary by the strength of the pathway

| Occupation example        | Pathway type                 | Summary  | Targeting implication  |
|---------------------------|------------------------------|--|--|
| Wind Turbine Technician   | Historical STARs pathway     | Rapidly pursue STARs who are in relevant origin jobs relative to a target role   | Target STARs where they live/work with direct marketing to advertise                                     |
| Energy Efficiency Auditor | High potential STARs pathway | Test internal mobility play across technician roles, build partnerships across employers sitting on origin-destination pathway | Target STARs working with largest health providers to drive mobility options internally and externally   |
| Hydrologist               | Less defined STARs Pathway   | Build programs with local talent developers that scale to meet demand for these skills.  | Support Talent Developer expansion to meet needs of these roles<br>Consider work-based learning programs |

# Arresting the downward trajectory of STAR share

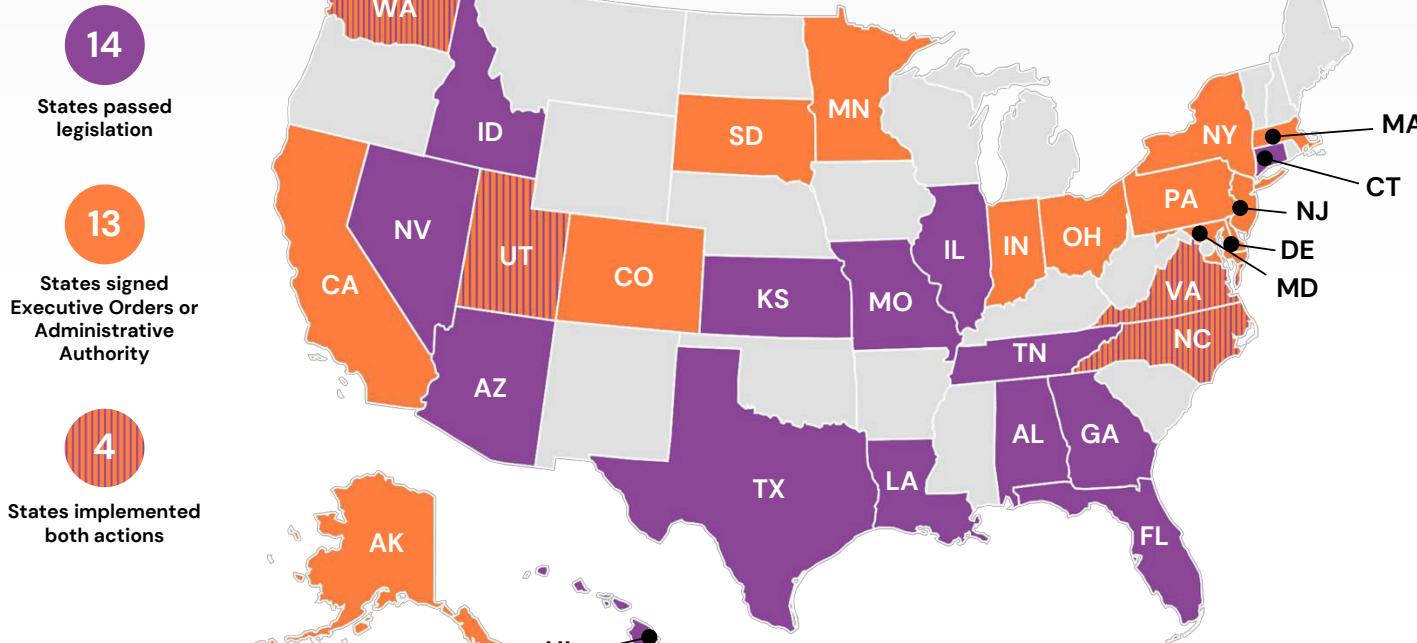


Rapid decline in STAR share of good-paying jobs slows, yielding 783K more STARs in good-paying jobs than projected

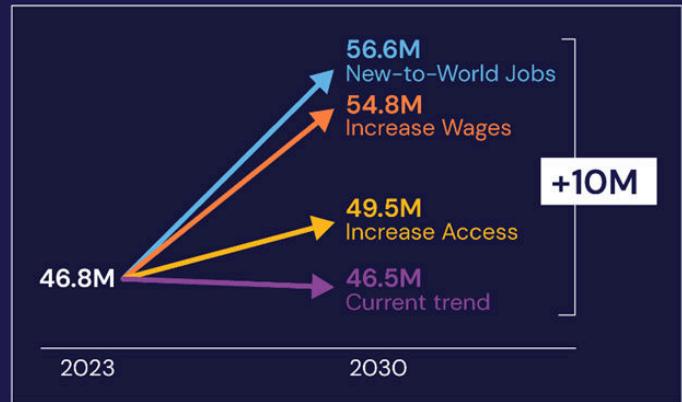


Note: This plot shows the STAR share from 2008 – 2019 in purple, and the projected 2023 STAR share had this trend continued. The actual STAR share from 2019 – 2023 is shown in orange. From 2008 – 2019, 6.3M STARs lost access to good-paying jobs (-0.6% per year). Had this trend continued, 783K more STARs would have been displaced from good-paying jobs. From 2019 – 2023, the decline in STAR share slowed to -0.4% per year. STARs outperformed the historical trend of the prior decade, re-gaining access to good-paying jobs. Source: Opportunity@Work analysis of the 2008 to 2023 1-Year American Community Survey, Integrated Public Use Microdata Series

# 31 States Lead the Way in Removing Degree Requirements, potentially unlocking access to 736,000+ good jobs



# The STAR Mobility Compass Provides a Vision for the Future



Note: This bubble plot shows occupations mapped by their national median hourly wage (y-axis) and the projected share of STARs in 2030 if current trends continue (x-axis). Each bubble represents an occupation, sized by the number of projected workers in 2030. Source: Opportunity@Work analysis of the 2000 Decennial Census Survey and the 2001 to 2023 1-Year American Community Survey, Integrated Public Use Microdata Series, and the Bureau of Labor Statistics Occupational Employment Projections, 2023–33.

# Employers play a critical role in a shifting labor market

Most employers  
are here.



Shift permission  
structures to  
enable company  
focus on the  
STARs talent pool

Create clear  
signals for sources  
of STARs demand and  
supply to find each  
other

Define STARs-  
centric workflows  
that  
support hiring &  
advancement  
of STARs

Align actions &  
incentives  
for STARs hiring &  
advancement  
outcomes throughout  
ecosystem/network

Facilitate  
investment  
throughout the  
talent lifecycle  
(eg, in talent dev.  
vs selection)

**END STATE:**  
STARs hiring &  
advancement  
“business as  
usual” (as is for  
campus hires)

Awareness to Action

Behavior Adapting

Changed Outcomes



Opportunity  
@ Work

TEAR  
THE PAPER  
CEILING

# Thank You

Join the conversation, partner with us  
to find the skilled talent you need!

Courtney Haynes | [courtney@opportunityatwork.org](mailto:courtney@opportunityatwork.org)



# Deep Dive: Best Practices in Workforce Development and Creating a Productive Company Culture

Workforce Development

September 8, 2025



# Hello!



**Dr. Janell Hills-Thomas,**  
Sr. Director of Equitable Workforce  
Strategies, IREC

# Interstate Renewable Energy Council (IREC)



**IREC builds the foundation for rapid adoption  
of clean energy and energy efficiency to  
benefit people, the economy, and our planet.**

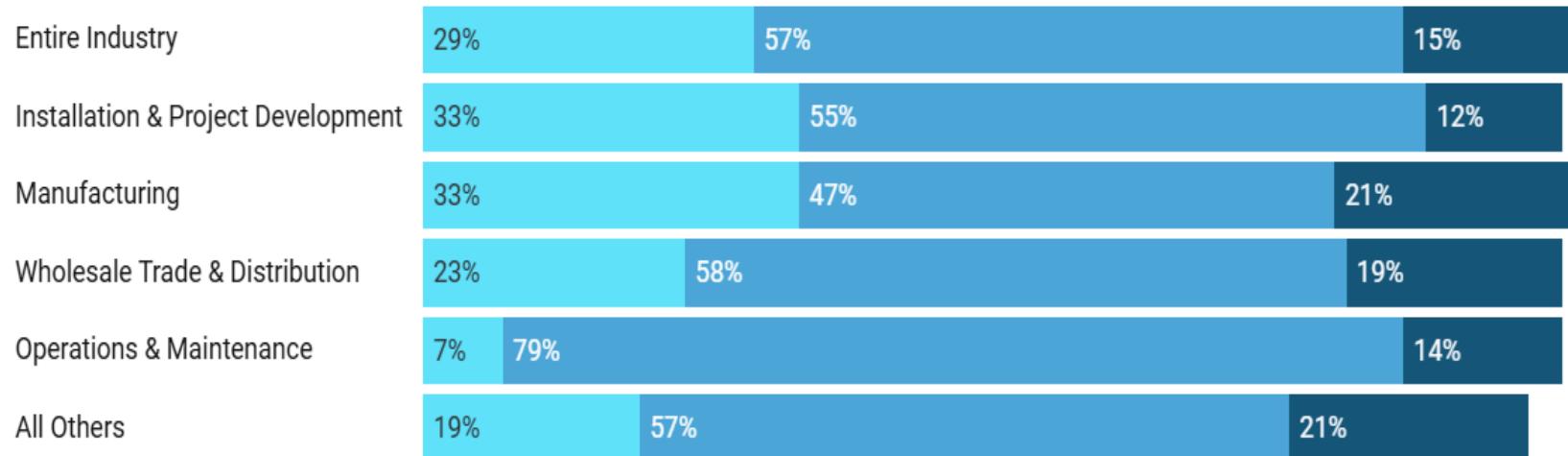
## 2023 Solar Job Census WF Highlights

- 29% of employers across the solar industry reported it was “very difficult” to hire qualified workers.
- 57% said it was somewhat difficult
- 15% found hiring to be not at all difficult
- This is a significant difference from 2022
  - 44% of employers said hiring was very difficult

*What will IREC's 2025 Census Reveal....stay tuned*

# Level of Difficulty Finding Qualified Solar Workers, 2023

Very difficult   Somewhat difficult   Not at all difficult



Source: IREC National Solar Jobs Census 2023 • Created with [Datawrapper](#)

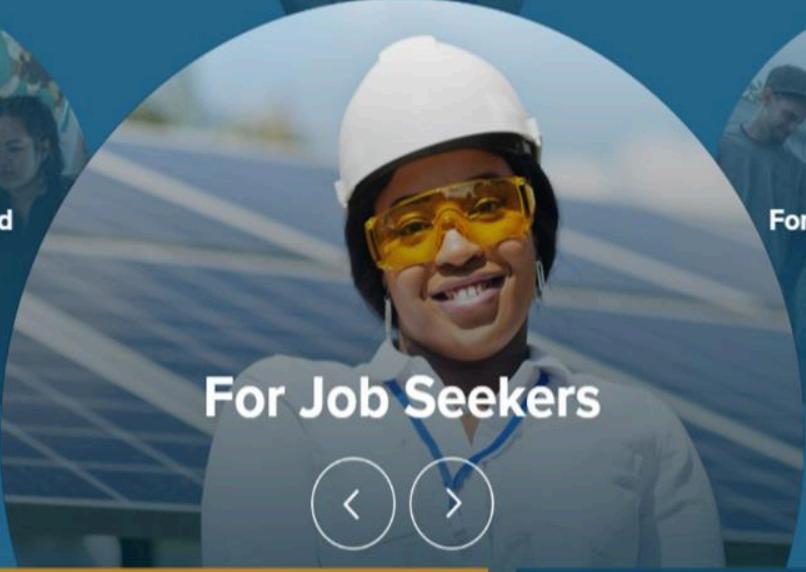
[GreenWorkforceConnect.org](http://GreenWorkforceConnect.org)



# GREEN WORKFORCE CONNECT

Connecting job seekers, employers, training providers, and contractors to support a highly trained and inclusive energy workforce





Explore careers in building performance



Explore careers in solar energy



Learn more about energy careers



Find training and employers in your area



# What are some common solar energy careers?



## Electrician

**\$60,000–\$63,000**

Install, maintain, and repair electrical wiring, equipment, and fixtures for a multitude of electrical technologies. These jobs may include solar, wind, hydropower, geothermal, and battery storage systems.

[Learn more about this role.](#)



## Solar Installer

**\$35,000–\$84,000**

Set up and maintain the equipment and wiring that connect a solar energy system to the electrical grid. Solar installers can work in residential, commercial, and/or utility-scale installations.

[Learn more about this role.](#)



## Advanced Manufacturing Technician

**\$60,000–\$65,000**

Set up, test, and adjust manufacturing machinery and equipment used in solar installation.

[Learn more about this role.](#)

## What types of tasks would I be working on?

The solar and storage industry has a place for everyone—no matter what your skills, interests, and educational background.

Depending on the job, you could be:



Installing solar panels  
on rooftops



Managing large utility-  
scale solar projects



Assembling panels or  
batteries in a factory



Involved in sales and  
marketing



Working as an  
engineer

# Solar Career Maps

There is a career path for you in the solar and storage industry!

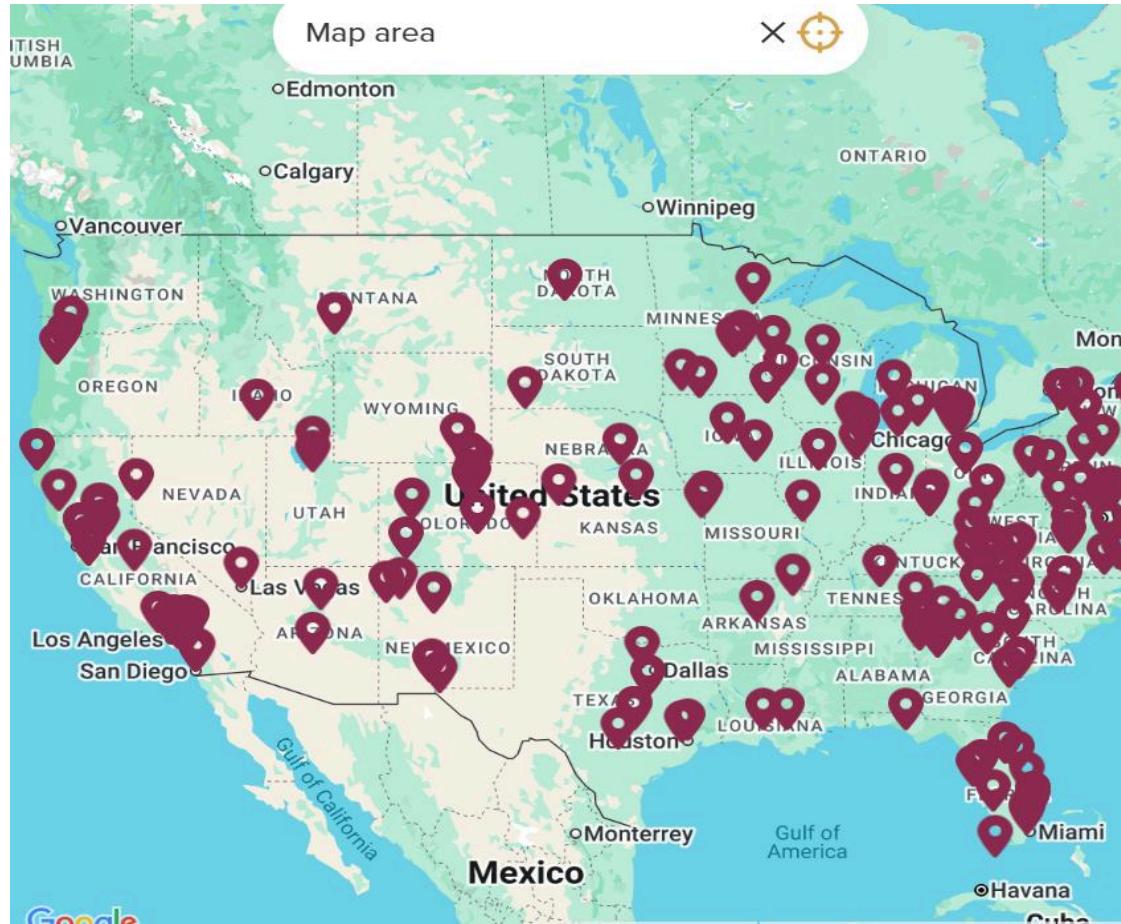
Find more solar energy careers, explore salary ranges, and chart your own path to advancement.

[View the Map](#)



## And...Many Resources

# Over 200 Solar Training Providers!



## Pagan Poggione

*Senior Director, Strategic Workforce Engagement*  
Interstate Renewable Energy Council (IREC)

[paganp@irecusa.org](mailto:paganp@irecusa.org)





## **Strengthening Workforce Pipelines: *Leveraging Tools and Resources***

- Take advantage of vetted, high-quality supports
- A workforce is critical to energy deployment and savings, community resilience, and safe and comfortable housing
- Growing demand and an aging workforce means there is an urgent need for new talent
- People across the country lack exposure to career pathways, training, and employment



## **Strengthening Workforce Pipelines: *Youth Pathways***

- Youth represent a pipeline of untapped talent
- Early exposure increases career awareness and readiness
- Young people bring tech-savviness and new ideas
- Connecting youth to career pathways improves community resilience and economic mobility
- Workforce stability depends on engaging younger generations now



## Strengthening Workforce Pipelines: *Registered Apprenticeships*

- No cost technical assistance
  - Understanding and navigating the RA system
  - Registering or expanding RA programs
  - Identifying partners/training providers
- Outreach and engagement support
  - Strategies to reach underrepresented populations
- Recruitment and connection to candidates (2026)
  - Limited incentive funding available





# **Strengthening Workforce Pipelines: *Business Supports for Contractors***

- 10 Steps to Become a New Home Energy Performance Contractor
- Home Performance Contractor Business Plan: Guidelines and Sample Plan
- Proforma Financial Statement for Home Performance Businesses
- Budget and Chart of Accounts Worksheet for Home Performance Businesses
- Guide to Insurance for Your Energy Company
- Guide to Customer Relationship Management (CRM) Systems for Your Business
- Guide to an Employee Handbook for Your Energy Business
- Example Employee Handbook for Your Energy Business
- Guide to Onboarding Your Home Energy Performance Installers





## Beyond Green Workforce Connect: *More IREC Resources*

- *Exploring Solar Careers* and more at **CleanEnergyTraining.org**
- Additional education at **CleanEnergyClearinghouse.org**
- Interconnection policies and state grades at **FreeingTheGrid.org**
- Energy storage interconnection solutions at  
**EnergyStorageInterconnection.org**
- Local community support at **Energy-Ready.org**
  - SolSmart, Charging Smart, and Distributed Wind Smart



# Thank you!