Evolving Workforce Needs in Clean Energy

School of Labor and Employment Relations
Climate Jobs Institute

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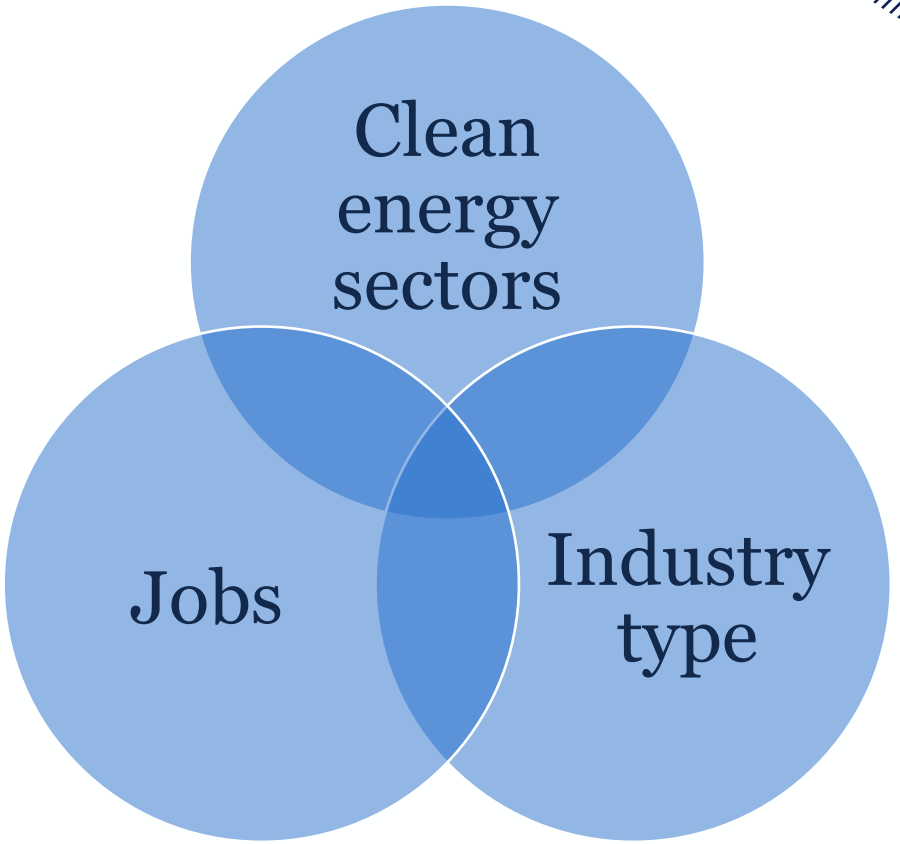
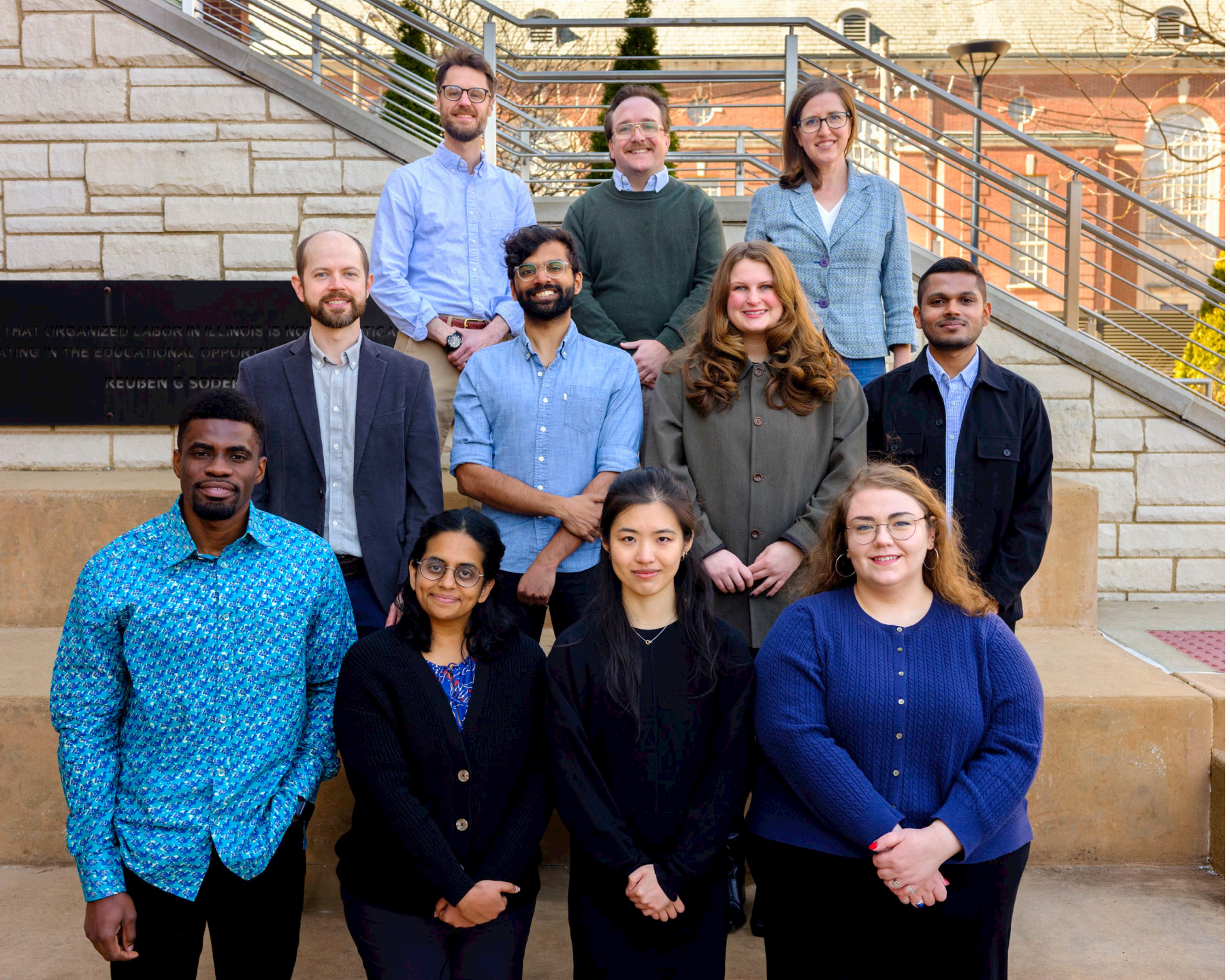
Agenda

1. Who we are + resources
2. Clean Energy Employment Insights: Numbers, growth, policy impacts, training needs
3. Key Takeaways for Workforce Programs





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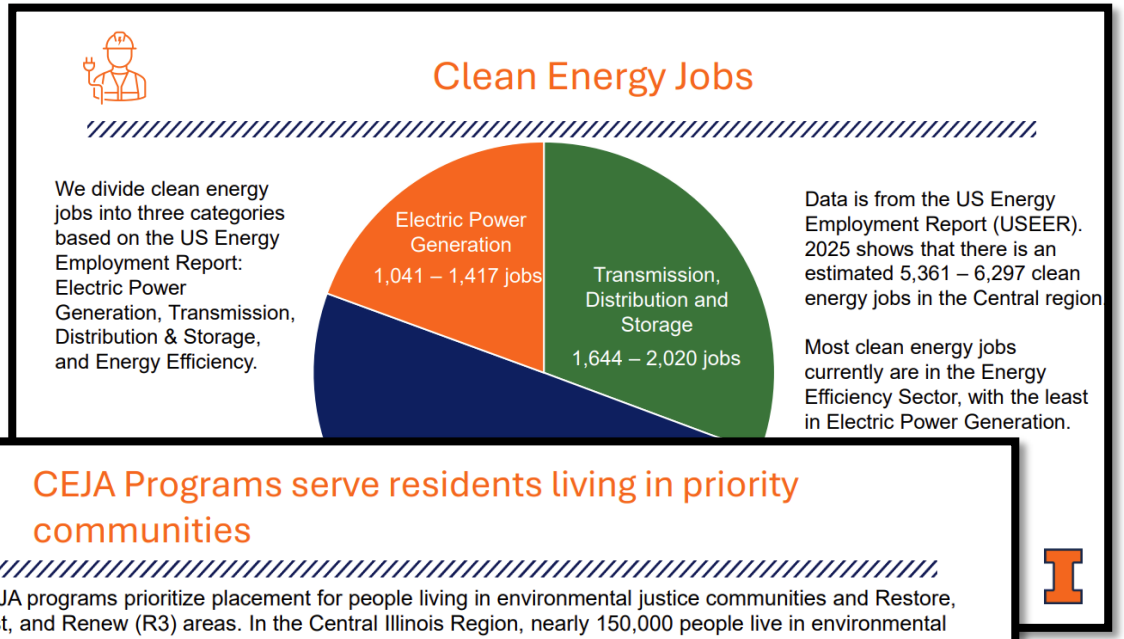
Resources to Support the Clean Energy Workforce: CEJA Mapping Tool

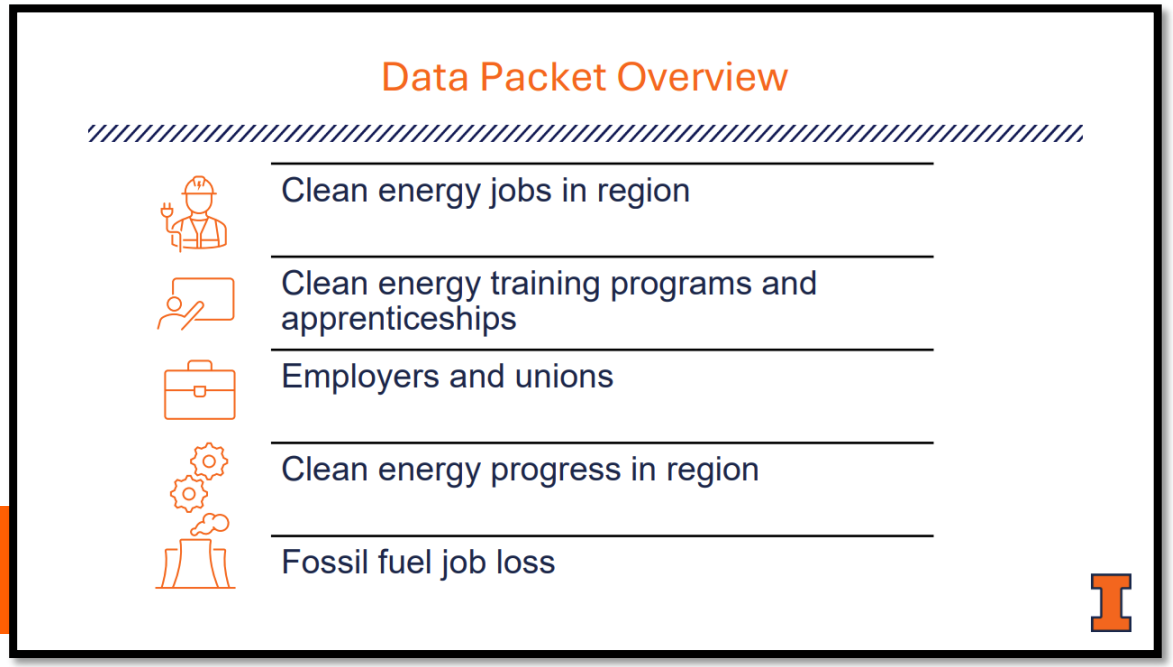
- Used by the CEJA workforce programs, other clean energy stakeholders
- Accessed over 10,000 times

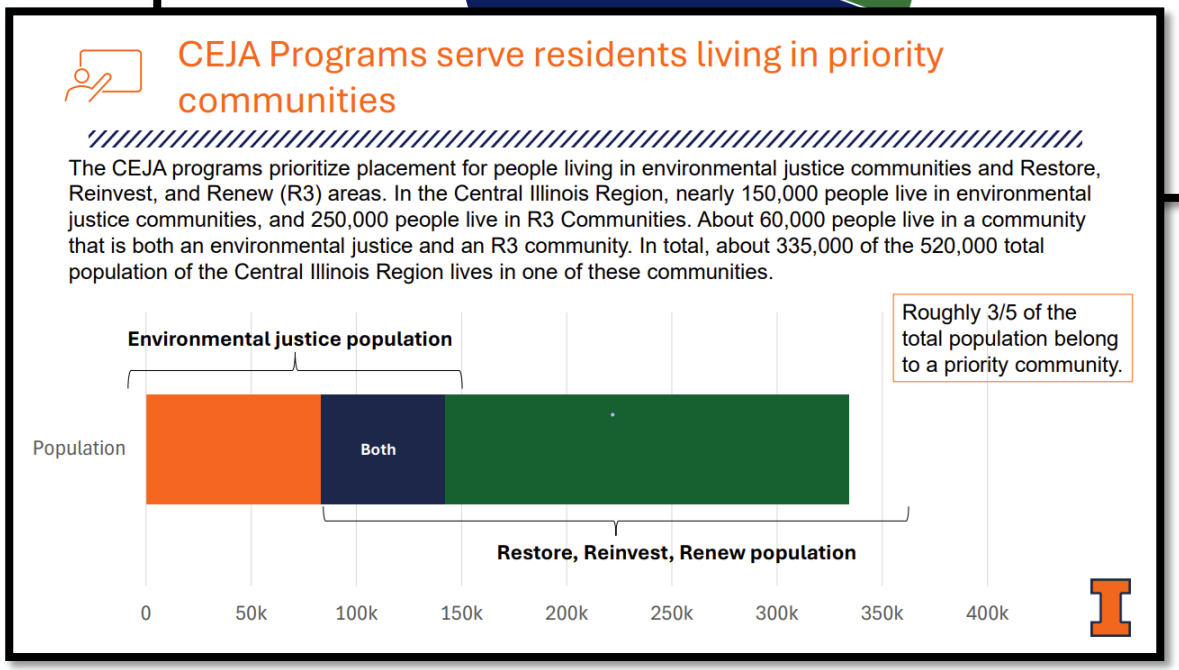
Layers include:
- CEJA workforce & contractor programs
- EJ/R3 communities
- Apprenticeship programs
- Clean energy manufacturers
- Community college programs
- Coal plant and mine closures
- And more

Illinois Clean Energy Jobs Regional Data Packets (Updated February 2026)

- Used by regional planners, workforce organizations, CEJA programs, and more.
- Accessed over 1,000 times







Reports and Policy Briefs

Dec 10

December 10, 2025

Illinois Displaced Energy Worker Dependent Transition Scholarship Program: Status Update and Outreach Toolkit

Nov 17

November 17, 2025

Federal Rollbacks, Local Impacts: Solutions to Support the Illinois Clean Energy Workforce as Federal Tax Credits Expire

Sep 23

September 23, 2025

A Profile of Illinois Building Trades in the Clean Energy Transition

Apr 16

April 16, 2025

Workplace Safety in a Warming World

Coming Soon: Illinois Clean Jobs Inventory

- **How many** clean energy **jobs** are there in Illinois? Which industries, regions, and technologies create the most jobs?
- What are the **recent trends** in clean energy employment? Where is there increased demand or sustained growth?
- **How much** do clean energy jobs **pay**? Which occupations have relatively high or low pay on average or for new hires?
- What **qualifications** do workers need for clean energy jobs? Which occupations have higher or lower barriers to entry?
- How are recent **federal and state policies** impacting the clean energy workforce?

Clean Energy Jobs & Sector Insights

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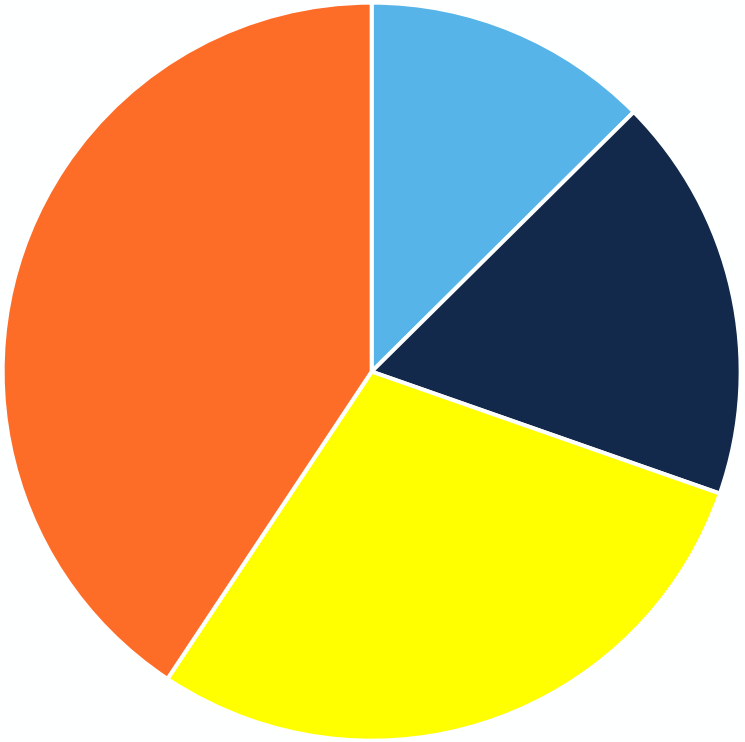
Key Concepts

- **Clean energy jobs**: Employment involved in the generation, transmission, distribution, storage, or manufacturing of equipment or components for energy technologies with low or no greenhouse gas emissions (e.g. renewables, nuclear, energy efficient equipment, heat pumps, EVs)
- **Technology sectors**: classify jobs according to their primary energy function (electric power generation, distribution, efficiency, vehicles) or fuel (fossil fuels, solar, wind, nuclear, hydroelectric, batteries, hydrogen)
- **Industries**: classify jobs according to the employer's primary business (e.g. construction, manufacturing, wholesale trade, utilities)
- **Occupations**: classify jobs according to the worker's trade or duties

The Clean Energy “Garden”

- Hardy **perennials** (energy efficiency, transmission & distribution)
- Fast-growing **annuals** (wind & solar)
- Tender **seedlings** (battery storage, geothermal, hydrogen)

Clean Energy Jobs in Illinois, 2024



Sector	Employment
Energy efficiency	50,886
Transmission, distribution, and storage	36,259
Electric power generation	24,470
Clean vehicles	15,735
TOTAL	127,068

Source: USEER (2025) State Data for Illinois

Energy Efficiency: Hardy Perennials & Promising Seedlings

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Energy Efficiency Employment Breakdown

Technology sector	Employment
High efficiency or renewable HVAC	26,833
Energy Star and efficient lighting	14,895
Advanced building materials	9,158
Traditional heating, ventilation, air conditioning	29,902
Other	9,089
High Efficiency & Advanced Materials Total	50,886
Traditional HVAC & Other	38,991
TOTAL	**89,878**

Source: USEER (2025) State Report for Illinois

Prediction: Energy Efficiency Jobs will Continue to Grow at a Modest Pace

Employment trends

- Steady, modest growth in energy efficiency jobs in past 5 years.

Policy impacts

- Continued state and federal investment in energy efficiency and weatherization programs will ensure modest, steady growth.

Grid impacts

- Electric load growth from data centers, manufacturing is straining the grid. Energy efficiency is the most cost-effective way to reduce load. The more energy you save, the less you have to generate

A Promising Seedling: HVAC Contractors with Heat Pump Expertise

Policy impacts

- New policies in Clean and Reliable Grid Affordability Act and funding from Climate Pollution Reduction Grant will encourage electrification, spur job growth.

Training needs

- Training existing HVAC contractors to install heat pumps a key priority. CEJA and Community College HVAC programs should train to install and maintain heat pumps.

Geothermal: A Promising Seedling

Existing market

- Ground-source heat pumps **small and volatile share** of HVAC market, down 50% from peak in 2010. High upfront costs make geothermal businesses sensitive to subsidies and financing.

Policy impacts

- Federal tax credits, state renewable energy credits, utility rebates, and third-party leasing are creating favorable conditions for geothermal industry growth.

Education needs

- Lack of familiarity with geothermal technology, except in areas where local government or utilities help educate and incentivize customers and contractors.

Geothermal Training Needs

- Shortage of geothermal drillers due to high capital costs, licensing requirements, relatively small share of HVAC market
- Few formal training programs:
  - Operating Engineers Local 150 Apprenticeship & Skill Improvement Program
  - IGSHPA/GAOI certificates, conferences, webinars
  - Enertech (manufacturer) and Connor Co. (distributor) trainings, certificates
- Most training happens on the job
- As sector grows, community colleges and CEJA workforce programs could provide training, e.g. in pipe fusion or ductwork

Electric Power Generation: Annuals Outgrowing Perennials

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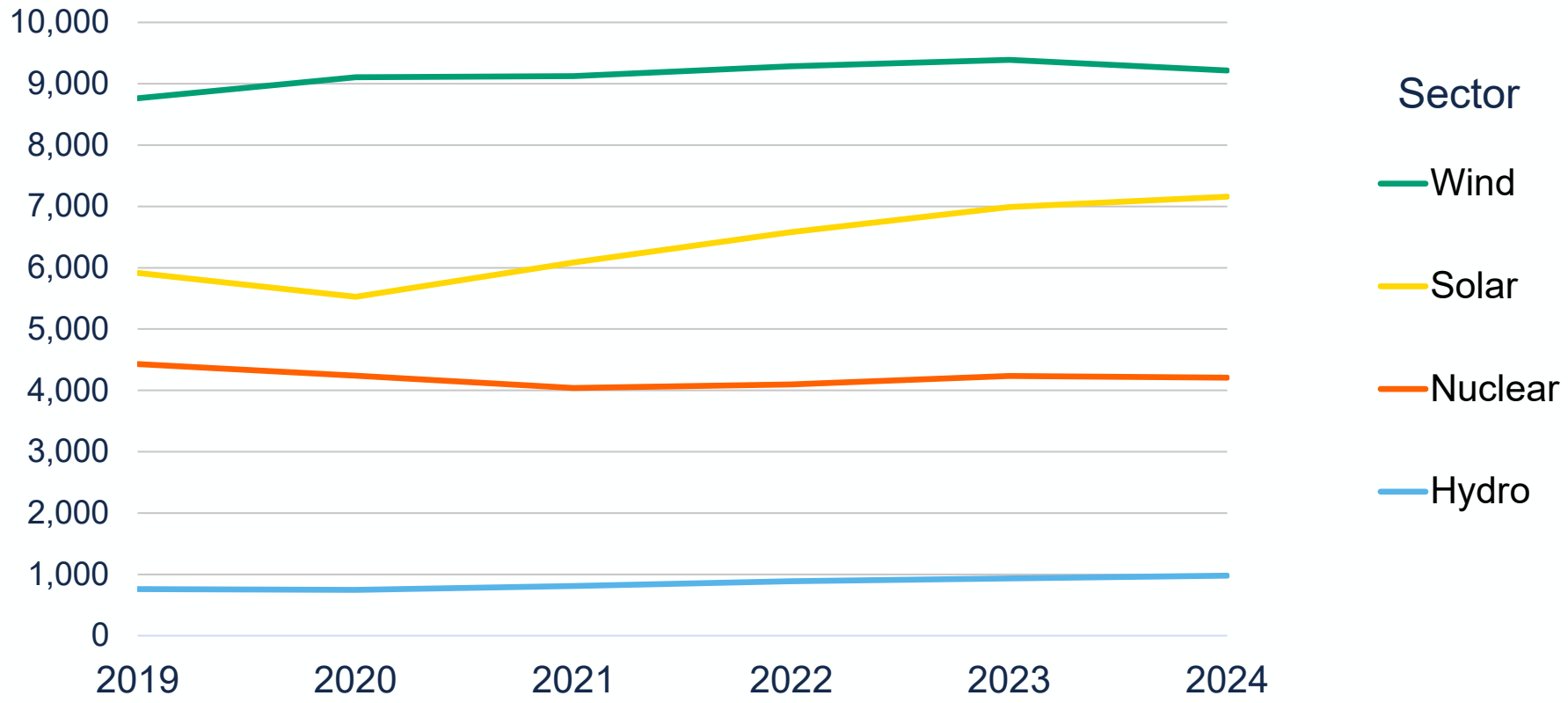
Electric Power Generation Breakdown

Technology sector	Employment
Wind	9,216
Solar	7,158
Nuclear	4,209
Hydroelectric	1,393
Geothermal	282
Combined heat and power, bioenergy	2,212
Clean Energy Generation	24,470
Fossil Fuel & Other Generation	8,595
TOTAL	**33,065**

Source: USEER (2025) State Report for Illinois

Electric Power Generation Employment Trends



Source: USEER State Reports for Illinois

Job Growth in Solar & Wind

Sector	Growth in employment (2019-24)	Growth in job postings (2022-25)
Solar	4%	11%
Wind	1%	-6%

Note: Annualized average growth rates based on USEER and Lightcast.

Garden Pest Alert: Federal Tax Credit Rollbacks Are Slowing Growth

Credits	What they cover	To receive (full) credits…
Clean Electricity Investment Tax Credit (wind and solar)	Up to 30% of cost of solar, wind	Placed in service by Dec. 31, 2027 or **begin construction by July 2026**
Clean Electricity Production Tax Credit (wind and solar)	Tax credits for utility-scale solar and wind	Placed in service by Dec. 31, 2027 or **begin construction by July 2026**
Residential Clean Energy Credits	Up to 30% of cost of solar arrays, battery storage, heat pumps, geothermal, and more	Purchased or placed in service by **Dec. 31, 2025**

Federal Rollbacks, Local Impacts

Solutions to Support the Illinois Clean Energy Workforce as Federal Tax Credits Expire

November 2025

Authors: Linda Larsen, Johnathan Hettinger, Eva Fischer, and Bernard Dzamah-Kumah

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Tax Credit Rollback Impacts

Less Investment, Generation

- Annual Losses of $4.4 billion in GDP in IL in 2030 and 2035 (Energy Innovation)
- 1.3 GW less IL solar capacity in 2035 (Energy Innovation)
- 2.7 GW less IL wind capacity in 2035 (Energy Innovation)

Fewer Jobs

- Illinois could lose 21,000 potential or existing jobs in 2030, 18,000 jobs in 2035 (Energy Innovation)
- Eliminate as many as 52,000 manufacturing and energy jobs (Illinois Environmental Council)
- Small residential solar businesses may be hardest hit in the immediate future.

https://energyinnovation.org/report/updated-economic-impacts-of-u-s-senate-passed-one-big-beautiful-bill-act-energy-provisions/
https://ilenviro.org/trump-big-beautiful-bill-illinois-impacts/

What we're Hearing on the Ground

State incentives are mitigating the negative impact. Many businesses are continuing to hire to take advantage of remaining tax credits. Some businesses are laying people off or implementing hiring freezes.

There's only so many contractors and so much qualified labor, and everybody is under the same timelines.

We're in a hiring freeze because we're not sure what funding will look like… We're being very cautious, very attentive to what's going on.

I'm kind of concerned about my job in this field.

It's going to require a lot of collaboration between contractors as far as pooling resources and perhaps making a group effort to make purchases.

Prediction: Solar Jobs will Continue to Grow at a Modest Pace

Employment trends

- Solar is the fastest growing sector, with steady growth over past 5 years. Growth is flat for wind, hydro, and nuclear jobs.

Policy impacts

- Continued state investment in solar will ensure that solar jobs continue to grow, albeit at a more modest pace due to federal rollbacks.
- State incentives for wind will ensure that jobs remain steady, but they are unlikely to grow much.
- Illinois nuclear moratorium has been lifted, which could lead to more nuclear jobs in the future.

Grid impacts

- Electric load growth from data centers will increase demand for renewable energy development.

Transmission, Distribution, & Storage: Hardy Perennials + Seedlings

Transmission, Distribution, & Storage breakdown

Technology sector	Employment
Traditional transmission and distribution	30,599
Storage	2,789
Smart grid	1,430
Micro grid	713
Other grid modernization	728
Cleaner Transmission, Distribution & Storage	36,259
Pipeline & Other Transmission & Distribution	13,751
TOTAL	**50,010**

Source: USEER (2025) State Report for Illinois

Prediction: Transmission & Distribution Jobs will Grow Modestly; Storage Jobs will Grow Rapidly.

Employment trends

- Transmission and distribution jobs have remained steady over the past 5 years, while storage jobs have grown rapidly.

Policy impacts

- CRGA established battery storage procurement and virtual power plants; expect storage jobs to grow rapidly (though this is a relatively small sector)
- State and federal funding for EV infrastructure continues. Expect EV infrastructure jobs (small sector) to grow modestly.

Grid impacts

- Distributed generation & electric load growth from data centers will require new transmission lines, operations and maintenance, and grid modernization.

Clean Vehicles: Moderately Growing Annuals & Seedlings

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Motor Vehicles Employment Breakdown

Technology sector	Employment
Hybrid electric	7,147
Plug-in electric	3,250
Battery electric	4,525
Hydrogen fuel cell	813
Gasoline, diesel, liquid natural gas	82,233
Other vehicles, commodity flows	9,883
Clean Vehicles	15,735
Internal Combustion & Other Vehicles	92,116
TOTAL	**107,851**

Source: USEER (2025) State Report for Illinois

Prediction: Clean Vehicle Jobs will see Growth, but at a More Modest Rate.

Employment trends

- Illinois clean vehicle jobs grew significantly from 2022-2023, then leveled off in 2024. EV manufacturing job postings peaked in 2023.

Policy impacts

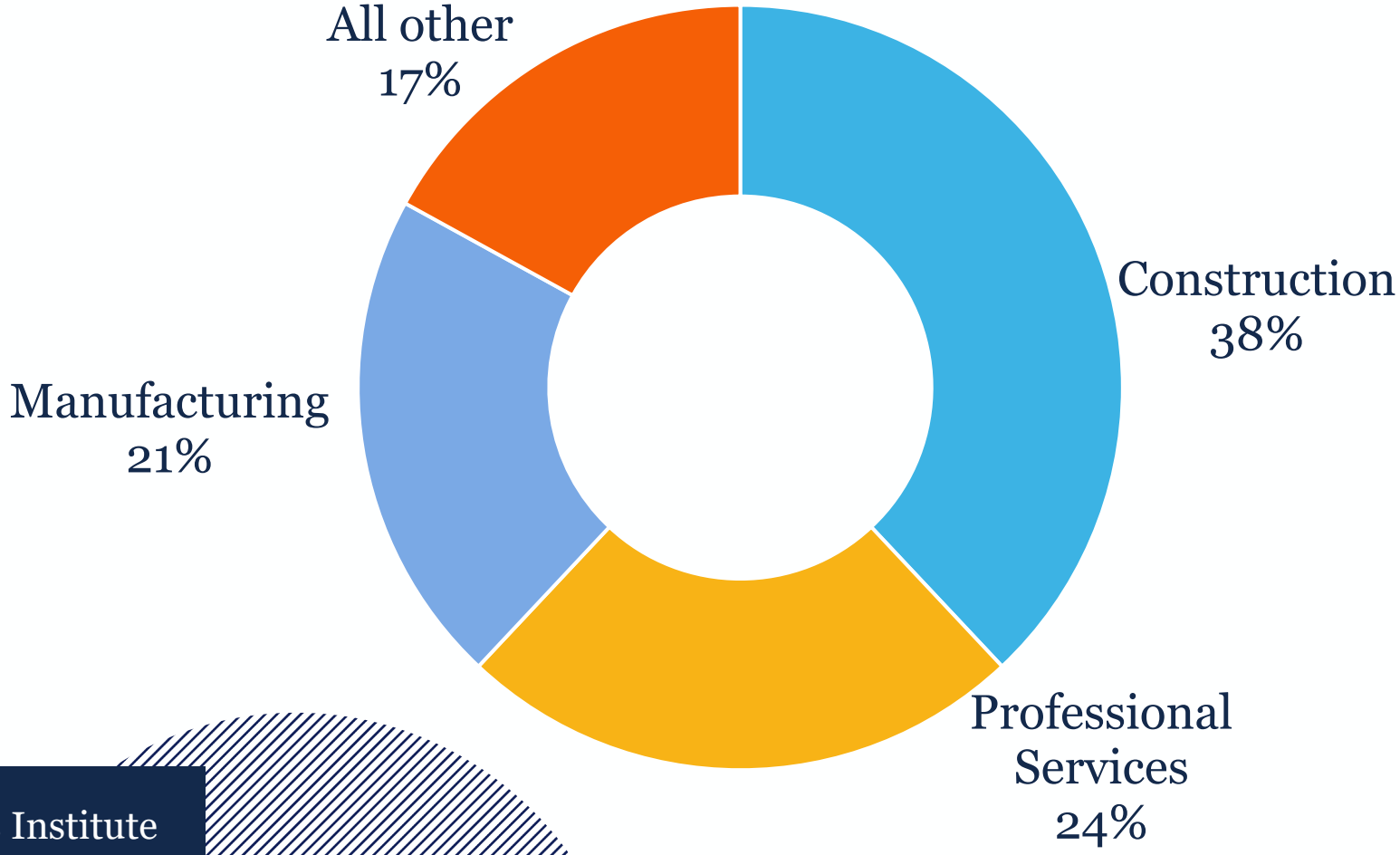
- Federal incentives for electric vehicles have been rolled back but rising gas prices may drive more people to purchase electric or hybrid vehicles.
- State EV and manufacturing (REV) incentives will continue to spur clean energy job growth in Illinois.
- Expect growth in EV and battery manufacturing jobs as manufacturers receiving REV incentives scale up.

Training needs

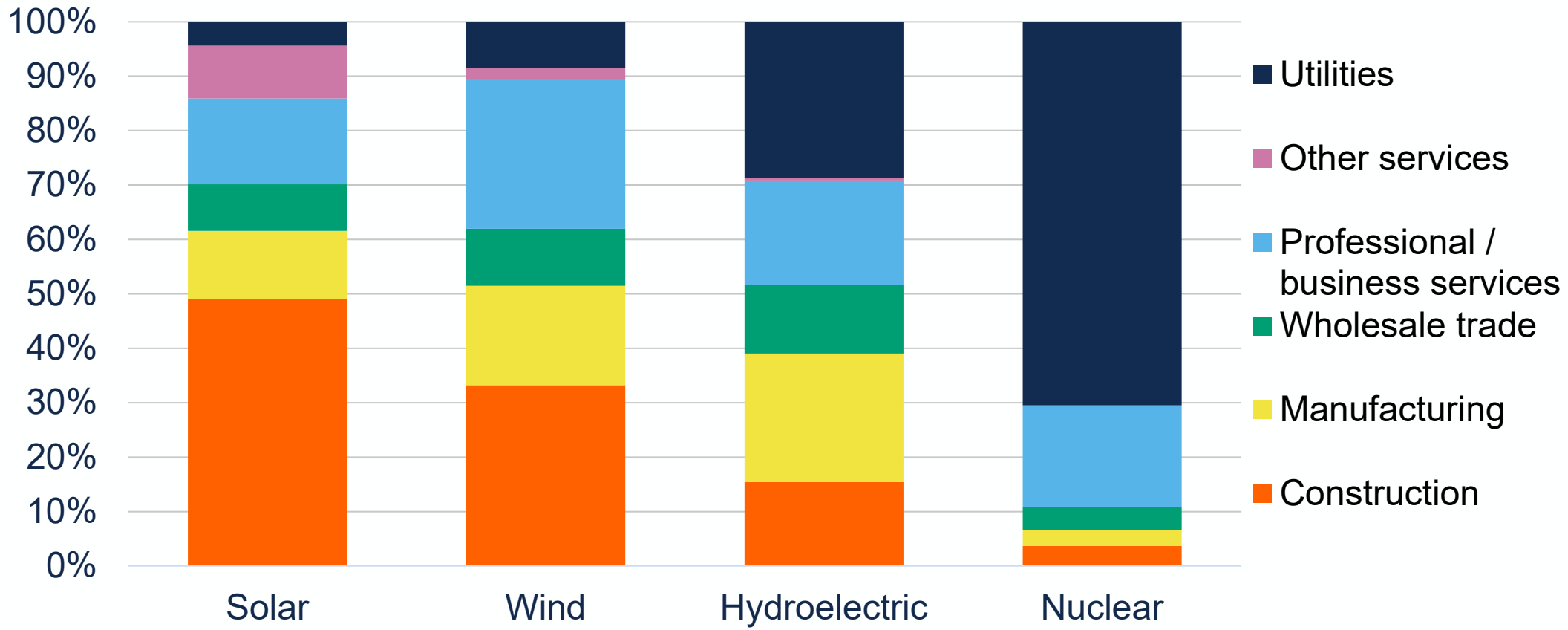
- Existing auto mechanic programs will need to train people to service EVs and hybrid vehicles.
- Workforce programs should build partnerships with manufacturers to identify training and workforce needs.

Industry Insights

In the Clean Energy Garden, Jobs Belong to Different Industries



Industry Breakdown of Electric Generation Jobs (US)



Source: USEER (2025) National Report

Clean Energy Jobs in Construction

- Largest share (38%) of all clean energy jobs
- Some sectors (especially new or emerging sectors) have larger share of construction jobs.
  - 50% of solar and battery storage jobs are in construction.
  - 48% of energy efficiency jobs are in construction or install/maintenance.
- More established sectors typically have fewer construction jobs.
  - Only 3% of nuclear jobs are in construction.
  - Only 21% of transmission and distribution jobs are in construction.
- Construction jobs are typically located where the infrastructure is being built.
  - Renewable energy infrastructure often built in rural areas near existing transmission infrastructure.

Building Trade Unions Play Key Role in Clean Energy Construction & Maintenance

- Supply workers for all kinds of projects across clean energy, fossil fuel, non-energy sectors
- Enhance quality of jobs, provide more stable careers
- Influence energy and labor policies

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Union Labor in Clean Energy

- 30% of Illinois construction workforce is unionized
- Apprenticeships are primary pathway into building trade union
- Some trades more unionized than others

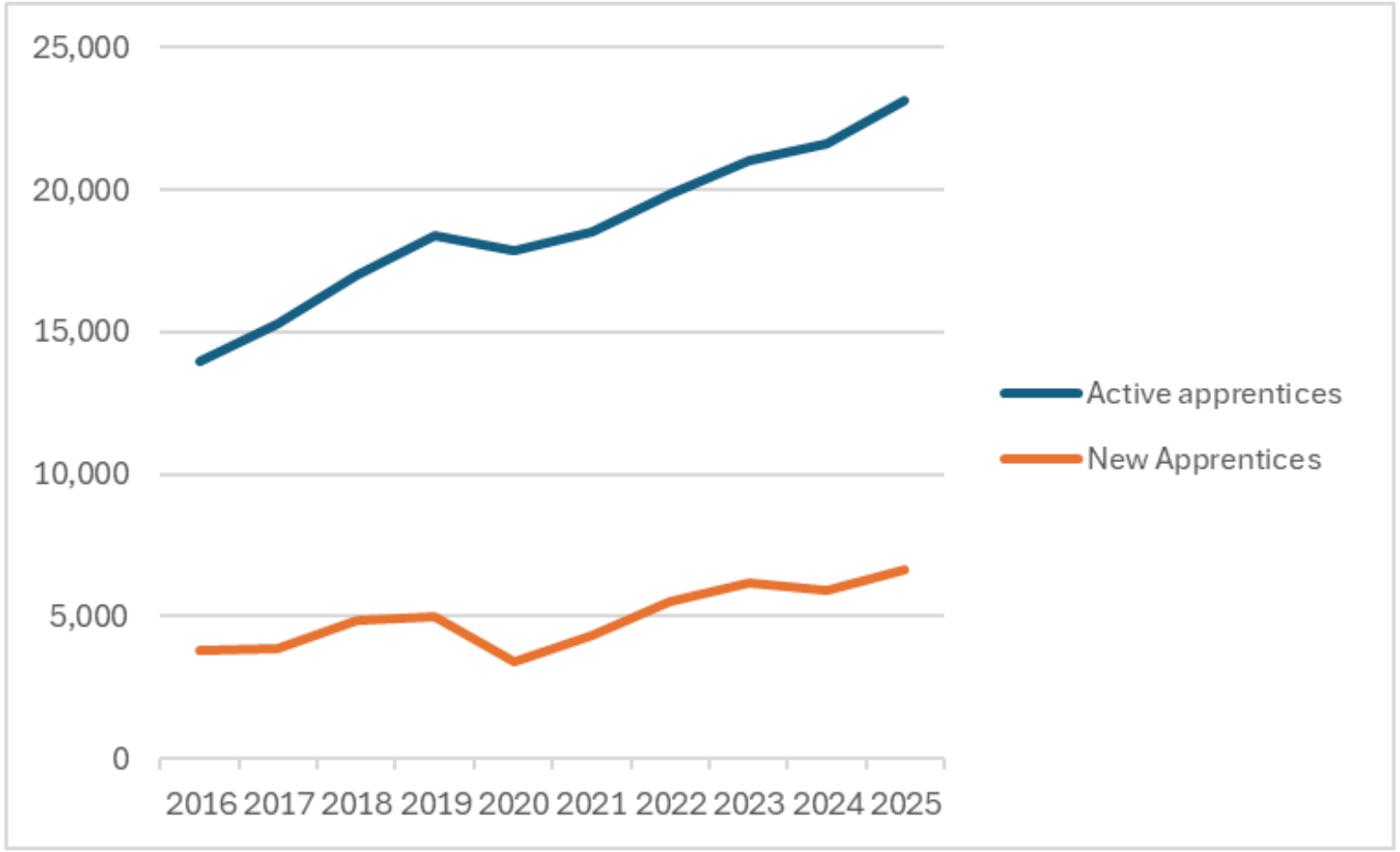
Unionization by occupation, state vs. national (%)

Occupation	Illinois	National
Electric Power Line Installers and Repairers	69	39
Construction Electricians	59	29
Construction Laborers	31	10
Heating, Air Conditioning, Refrigeration Mechanics	28	14

Source: Current Population Survey (2015-2025 average)

Apprenticeships Are Growing Rapidly

- 95% of apprentices are in a union apprenticeship.
- All trades emphasize safety and well-rounded craft training
- Apprenticeship classes increasingly incorporate clean energy topics
- Some trades provide more specialized clean energy training, for example, IBEW solar craft apprenticeship



Source: RAPIDS data for Illinois, 2016-2025

Construction Workforce Recommendations

- Focus on broad construction skills that are relevant across many sectors, project types
  - Some clean energy specific training is helpful, but most is focused on general craft skills
- Prepare people for apprenticeships, which can lead to stable, high-paying careers in the building trades
- Connect to existing employers for on-the-job training

Manufacturing Jobs in Clean Energy

- 21% of Illinois clean energy jobs
- Largest shares of manufacturing jobs:
  - Motor vehicles (40%)
  - Energy efficiency (23%)
- Other sectors have less manufacturing.
  - Solar (12%)
  - Wind (18%)
- Jobs located with factories (see CEJA map and data packets)

Manufacturing Jobs in Clean Energy

See CEJA Map and Regional Data Packets

Clean Energy Manufacturers in Central Illinois

Central Illinois has four businesses that manufacture products used for clean energy or transportation.

Company	City	Sector/Product
Fuyao Glass	Decatur	Solar (glass)
T/CCI Manufacturing, LLC	Decatur	Electric Vehicle (component parts)
Voestalpine	Decatur	Rail (steel track)
Morgan Advanced Materials	Girard	Batteries & Energy Storage (thermal systems)

Sources: SEIA Solar and Energy Storage Map
DCEO REV Grantees
Blue-Green Alliance Rail Data
NREL: Lithium Ion battery supply chain database.

Manufacturing Workforce Recommendations

- Manufacturing job postings peaked in 2023 and have since declined. This may reflect companies that were scaling up during 2023
- Partner with large manufacturers (such as Gotion) in region that are scaling up or receiving Reimagining Electric Vehicles (REV) incentives
  - See CEJA map and data packets
- Partner with colleges receiving REV-up funding for training
- Generally, specialized clean energy training is not required; focus on broad manufacturing training (assembly, machine operation, welding & fabrication)

Occupation Insights

Distinct Opportunities in Varied Occupations

- Many occupations involved in clean energy do not require a college degree
- Non-degree credentials (e.g. occupational license, certification, or apprenticeship) required for some trades and HVAC jobs
- Overlap between skills needed for clean energy and conventional construction, HVAC, and manufacturing jobs
- Tradeoff between job quality and accessibility
  - Higher paid, more stable jobs have more barriers to entry
  - More accessible jobs have lower pay, less stability

Typical Qualifications for Select Occupations

- Construction Electricians
  - Union-affiliated apprenticeship (more selective)
  - Local license
- Construction Laborers
  - On-the-job training or apprenticeship (less selective)
  - No license
- HVAC Mechanics and Installers
  - On-the-job training or vocational school
  - State/federal certifications to work with asbestos and refrigerants

Sources: IDES and Current Population Survey (2015-2025 average)

Wage Range by Occupation, 2024

Occupation	Average hourly wage	25th percentile	Median wage	75th percentile
Electricians	$43.54	$31.55	$47.58	$52.49
Laborers	$33.87	$22.57	$31.70	$47.34
HVAC Mechanics	$34.46	$23.59	$31.49	$40.69
Auto Mechanics	$30.83	$21.67	$29.67	$39.43
Solar PV Installers	$25.12	$18.63	$21.58	$32.53

Source: OEWS Research Estimates by State and Industry

Conclusions

Key Takeaways for Workforce Programs

- What are the best bets for clean energy workforce training? Where is there the most demand/most jobs?
  - Construction jobs, followed by professional services and manufacturing.
    - Consider location!
  - Focus on the perennials: Large sectors with modest growth but lots of jobs:
    - Energy efficiency (50% construction or operations/maintenance)
    - Transmission and distribution
  - Annuals: High growth sectors that are seeing more recent growth
    - Solar
  - Seedings: More sensitive to policy shifts, fewer jobs
    - Battery storage
    - Geothermal
    - Electric vehicles

Key Takeaways for Workforce Programs

- Employer and union partnerships are essential for workforce development in clean energy.
  - This is especially true for jobs in “seedling” and “annual” sectors that are newer or more volatile to policy shifts.

THANK YOU!

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