CONNECTICUT GREEN BANK

Joint Committee of the CT EE Board & CGB Board of Directors

Meeting Date

June 29, 2022

JOINT CGB/EEB COMMITTEE MEMBERS

Brenda Watson
Chair
Executive Director
Operation Fuel
(Green Bank Designee)

Victoria Hackett
Vice Chair
CT Department of Energy and Environmental Protection (DEEP)
(Ex Officio)

John Harrity
Chair
CT Roundtable on Climate and Jobs
(Green Bank Designee)

John Viglione
Office of Consumer Counsel
(EEB Designee)

TBD

AGENDA

Joint Committee of the CT Energy Efficiency Board and the Connecticut Green Bank Board of Directors

Online

June 29, 2022
1:30 pm – 3:00 pm

1. Call to Order
2. Public Comments (5 min)
3. Review and Approval of Minutes for March 23, 2022 (2 min)
4. Energy Jobs Report – Report Out and Next Steps (15 min)
5. Opportunities and Challenges
    a. Shared Clean Energy Facilities – Potential Opportunity for Additional Energy Efficiency (60 min)
6. Update on the 2022 Legislative Session (10 min)
7. C&LM Plan and Green Bank Comprehensive Plan – Reviews and Input (10 min)
    a. FY23 Green Bank Comprehensive Plan
    b. CY23 C&LM Plan
8. Other Business (5 min)
    a. Infrastructure Investment and Jobs Act
    b. Other Business
9. Adjourn

Join the meeting online at https://global.gotomeeting.com/join/851797133

Or dial in using your telephone:
Dial: (669) 224-3412 / Access Code: 851-797-133

RESOLUTIONS

Joint Committee of the CT Energy Efficiency Board and the Connecticut Green Bank Board of Directors

Online

June 29, 2022
1:30 pm – 3:00 pm

1. Call to Order

2. Public Comments (5 min)

3. Review and Approval of Minutes for March 23, 2022 (2 min)

<u>Resolution #1</u>

Motion to approve the meeting minutes of the Joint Committee for March 23, 2022

4. Energy Jobs Report – Report Out and Next Steps

5. Opportunities and Challenges

    a. Shared Clean Energy Facilities – Potential Opportunity for Additional Energy Efficiency (60 min)

6. Update on the 2022 Legislative Session (10 min)

7. C&LM Plan and Green Bank Comprehensive Plan – Reviews and Input (10 min)

    a. FY23 Green Bank Comprehensive Plan
    b. CY23 C&LM Plan

8. Other Business (5 min)

    a. Infrastructure Investment and Jobs Act
    b. Other Business

9. Adjourn

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ANNOUNCEMENTS

- **Mute Microphone** – in order to prevent background noise that disturbs the meeting, if you aren't talking, please mute your microphone or phone.

- **Chat Box** – if you aren't being heard, please use the chat box to raise your hand and ask a question.

- **Recording Meeting** – we continue to record and post the board meetings.

- **State Your Name** – for those talking, please state your name for the record.

Empowering you to make smart energy choices

Joint Committee

Connecticut Energy Efficiency Board and the Connecticut Green Bank Board of Directors

Online
June 29, 2022

Agenda Item #1

Call to Order

Empowering you to make smart energy choices

Agenda Item #2

Public Comments

Empowering you to make smart energy choices

Agenda Item #3

Approval of Meeting Minutes for March 23, 2022

Meeting Minutes

Resolution #1

Motion to approve the meeting minutes of the Joint Committee for March 23, 2022

Empowering you to make smart energy choices

Agenda Item #4

Energy Jobs Report – Report Out and Next Steps

Empowering you to make smart energy choices

Agenda Item #5a

Opportunities and Challenges

Shared Clean Energy Facilities –

Potential Opportunity for Additional EE

Public Policy
Affordable Housing and Vulnerable Communities

- **EE Retrofit Grant Program for Affordable Housing** – PA 21-48 has DEEP establishing a retrofit grant program for upgrades (e.g., energy efficiency, weatherization, solar PV, energy storage, EV charging infrastructure, heat pumps, health & safety) to affordable housing
- **Weatherization** – CGS§16-245m requires that any Conservation and Load Management Plan submitted by Connecticut's electric distribution companies include steps that would be needed to achieve the goal of **weatherizing 80% of Connecticut's residential units by 2030**
- **Energy Affordability** – Governor included within EO3, DEEP and PURA have made energy affordability a priority, and Green Bank established Justice 40 goal (i.e., vulnerable communities)
- **BTM Renewable Energy** – CGS§16-244z establishes tariff rates for BTM renewable energy, including for those residing in affordable multiunit dwellings per Public Act 21-48. Tariff program requires HES-IE, provides \$0.2925/kWh tariff, \$0.0125-\$0.0250/kWh adders for distressed or low-income.
- **Energy Storage Solutions –** overseen by PURA establishes a 580 MW residential and non-residential BTM battery storage incentive program, provide resiliance with a goal of no less than 40% in vulnerable communities

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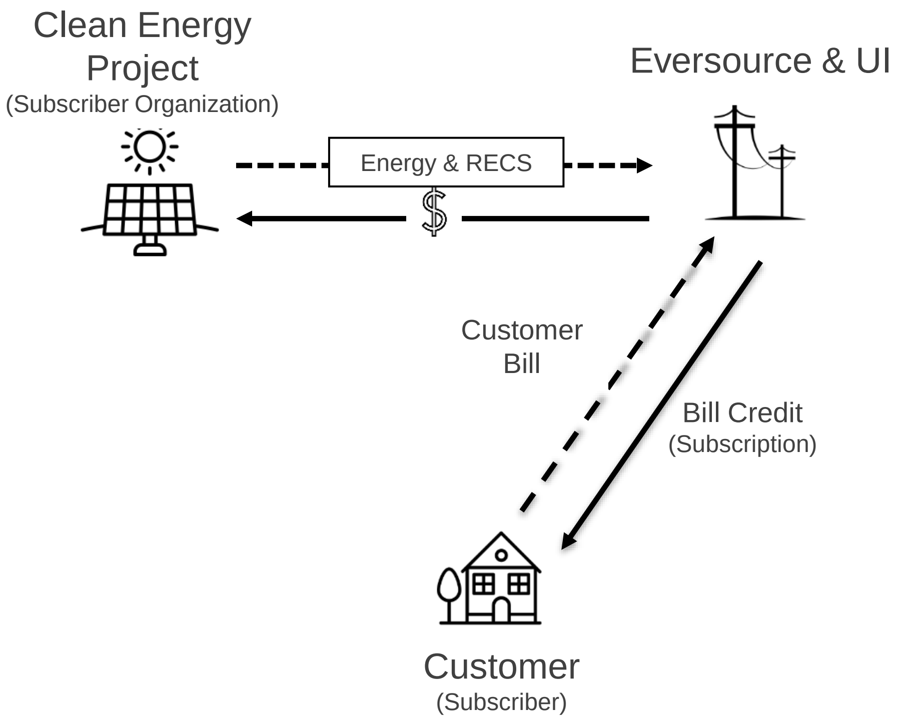
SCEF Program Model

- **SCEF Owner ("Subscriber Organization")**
  - Finance and construct SCEF project
  - Deliver energy and RECs to Utility
  - Receive direct payment for project production
- **Participating Customers ("Subscribers")**
  - Receive clean energy savings as a monthly bill credit, at no cost
- **Utilities**
  - Identify and enroll customers as Subscribers
  - Provide monthly credit to Subscribers
  - Provide quarterly payment to SCEF owner
  - Manage subscriptions to each SCEF



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Customer Benefits of Participation

- Customer will receive a **$0.025 per kWh** credit on their bill
- Each customer will have a unique credit amount based on their average monthly electricity consumption
- **Bill credit will be the same each month**
- Customer could receive bill credit for **up to 20 years**
- **Credit follows customers** if they move within the utility territory
- Credit award **does not require eligibility re-qualification** during life of the program

EXAMPLE SCEF CREDIT CALCULATION	
Average Annual Electricity Usage	9,600kWh
Annual SCEF Benefit	$240
Monthly SCEF Credit	$20

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SCEF Customer Enrollment

- Participation in SCEF program is limited to certain types of customers, primarily:
  - Low-Income Customers
  - Moderate-Income Customers
  - Affordable Housing Landlords, Entities and Facilities
  - Low-Income Service Organizations
  - Small Businesses
- **80% of all SCEF subscriptions are allocated by the utilities using an opt-out process**
  - Utilities pre-identify eligible customers and select them for SCEF subscriptions.
  - Customers are notified they have been selected and can 'opt-out' of Program, otherwise they are automatically enrolled

- **20% of all SCEF subscriptions are available for opt-in customers**
  - Customer submits an application to participate in Program and are notified if they are awarded a selection by their utility company

Customer Eligibility & Subscription Allocation

- SCEF Subscriptions must be allocated in accordance with the following table

	Allocation	Eligible Customer Type
Opt-Out	**20%**	Low-Income customers
Opt-Out	**40%**	Low-Income customers, Moderate-Income customers, Affordable Housing Landlords, Entities and Facilities, and Low-Income Service Organizations
Opt-Out	**20%**	Small Business customers
Opt-In	**20%**	Any of the above + state & municipal, commercial & non-LMI residential incapable of installing solar

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Shared Clean Energy Facilities

Subscriber Savings Value

800 x **$.025** = **$20.00**

kWh Average Electric Consumption per Month

Subscriber Savings per kWh

Average Subscriber Savings Value per Month (i.e., $240 per year at 9,600 kWh of annual consumption)

$240 of annual Subscriber Savings (or Energy Burden reduction) received on average per year or
$4,800 received over a 20-Year Subscription

How can we turn $4,800 over 20 years into more energy burden reduction today?

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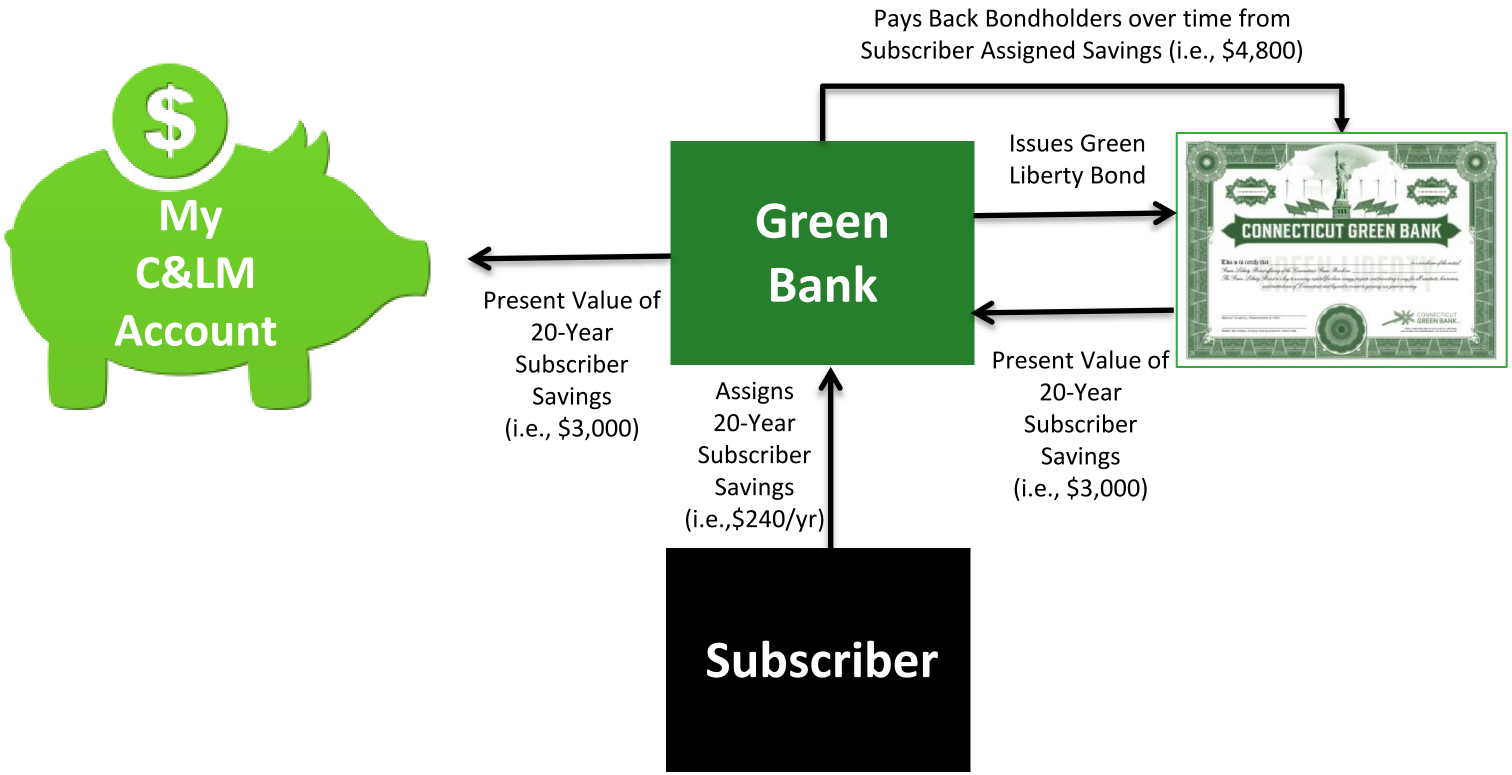
Concept

Raising Capital for Upfront Incentives



Can we deliver greater energy burden reduction than annual Subscriber Savings of $240 from SCEF Subscription?

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REFERENCES

Assumed 5% discount rate on Subscriber Savings over 20 Years

Concept (cont’d)

Use of Upfront Incentives for Weatherization

Weatherization and Thermal Comfort Measures	Installed Cost	Incentives	Installed Costs after Incentives	Estimated Annual Savings
HES-Income Eligible	($1,000)	$1,000	-	$200
Insulation	($2,200)	$2,200	-	$250
Air Source Heat Pump	($10,000)	$3,000	($7,000)	$350
Total	**($13,200)**	**$6,200**	**($7,000)**	**$800**
Subscriber Savings		$3,000	($4,000)	**$380** (net of 0.99% 10Y Heat Loan =$800-$420)

(Data provided by Eversource for Income Eligible Customers 2020)

Through a combination of incentives, including present value of Subscriber Savings, and Heating Loan on-bill financing, LMI households could reduce energy burden more (i.e., beyond annual Subscriber Credits), while being more comfortable in the winter and summer months

REFERENCES

HES-IE saves 12 MMBtu, Insulation saves 13 MMBtu, and an Air Source Heat Pumps saves 7 MMBtu per year – or total of 32 MMBtus saved
HES-IE, insulation, and air source heat pumps have useful lives of 10, 25 and 18 years respectively
Incentives will change for these various programs over time and installed costs vary
Assumed 5% discount rate on Subscriber Savings over 20 Years

Concept (cont'd)
Weatherization Savings > Subscriber Savings

\$800 - \$420 = \$380

\$800	\$420	\$380
Est. Annual Energy Savings from Weatherization and Thermal Comfort Use Case	Debt Service from Heat Loan at a loan of \$4,000 at 0.99% over 10 years	Energy Burden Reduction after Weatherization and Comfort resulting from SCEF

Savings from Weatherization and Electrification (i.e., \$380/year) are greater than Subscriber Savings (i.e., \$240/year) or \$140 in additional savings to participating LMI households

(↑ Investment = ↑ Jobs + ↑ Tax Revenues + ↓ Energy Burden + ↓ GHG Emissions)

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Green Bank Concept
Questions for Consideration

1. What do you think of the concept (i.e., achieve more public policy)?
2. Would Subscribers have a choice in terms of (1) participation, and (2) use of Subscriber Savings for investment (e.g., arrearage, weatherization)?
3. Is there a different role for the EDCs where they could more efficiently direct SCEF proceeds to benefit the subscriber (e.g., direct Subscriber Savings to C&LM)?
4. Are there other ways to think about this value that can provide more benefits to Subscribers (e.g., direct Subscriber Savings directly to Heat Loan)?
5. If this concept is supported and successful, will more demand for energy efficiency programs cause issues with the C&LM budget?

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Agenda Item #6

Update on the 2022 Legislative Session

2022 Legislative Session

- **PA 22-6 C-PACE**
  - Enables climate resilience and EV charger projects
- **PA 22-14 Clean Energy Tariffs**
  - Doubles NRES and SCEF program caps, larger project sizes
- **PA 22-5 Zero-Carbon Electric Sector by 2040**
- **SA 22-8 Hydrogen Task Force**
  - Connecticut Green Bank (Chair)
- **PA 22-55 EDC Storage and Reliability**
  - Grid-side storage pilots, 3 per EDC
- **PA 22-25 Connecticut Clean Air Act**
  - Established MHDV electrification targets (including ESBs), longer contracting for ESBs, RGGI over-average to ESBs in EJ communities, additional CHEAPR (bikes, scooters), adopts CA standards…

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Empowering you to make smart energy choices

Agenda Item #7a

Plan Coordination

Connecticut Green Bank

Comprehensive Plan – Green Bonds US

Connecticut Green Bank
FY 2023 Targets – Incentive Programs

Segment	Program		Targets		
			Number of Projects	Total Capital Deployed	Capacity Installed/ Nameplate Capacity
Incentive Programs	ESS (C&I)	*C&I Storage Incentives Total*	0	0	0
	ESS (Residential)	Total Battery Storage	500	$20,000,000	7.6
	Smart-E	Total Smart-E	960	$14,994,623	0.2
	Incentive Programs Total		1,460	$34,994,623	7.8

In FY 2023, the Connecticut Green Bank will support **$34.9 MM in investment** through Incentive Programs for **1,460 projects** that deploy **7.8 MW of clean energy,** annually avoiding **6,554 TCO_2,** and create **181 direct, indirect, and induced job years**

Connecticut Green Bank
FY 2023 Targets – Financing Programs

Segment	Product	Channel	Targets		
			Number of Projects	Total Capital Deployed	Capacity Installed
Financing Programs	CPACE	Total CPACE	23	$31,000,000	0.0
	PPA/RoofLeases	Total PPA	19	$13,710,000	7.6
	SBEA		839	$18,600,000	
	Multi-Family Pre-Dev		0	$0	0.0
	Multi-Family Term	Total Multi-Family Term	6	$1,380,000	0.6
	Multi-Family Health and Safety Total		1	$892,500	
	Transportation	Total Transportation	0	0	0
	Strategic Investments	Total Strategic Investments	0	$0	0.0
	Financing Programs Total		882	$ 64,202,500	7.6

In FY 2023, the Connecticut Green Bank will support **$64.2 MM in investment** through Financing Programs for **882 projects** that deploy **7.6 MW of clean energy,** annually avoiding **48,073 TCO_2,** and will create **566.4 direct, indirect, and induced job years.**

Connecticut Green Bank
FY 2023 Targets – Investments

Program Type - CGB portfolio loan (Asset) advances											
Program Name	Description		Interest Rate	Term in Years	Q1	Q2	Q3	Q4	FY23 Total	FY22 Budget	FY22 YTD Actuals
Multifamily Programs	C4C Lime facility draws		4.0%	15	$ -	$ 100,000	$ -	$ 100,000	$ 200,000	$ 200,000	$ 200,000
Multifamily Programs	PPA Multifamily		4.25%	20	345,000	345,000	345,000	345,000	1,380,000	270,000	-
			Total MultiFamily Program Loans:		***$ 345,000***	***$ 445,000***	***$ 345,000***	***$ 445,000***	***$ 1,580,000***	***$ 470,000***	***$ 200,000***
LMI Programs	Posigen - Junior facility		7.5%	6	$ 525,000	$ 525,000	$ 525,000	$ 525,000	$ 2,100,000	$ -	$ 6,999,432
LMI Programs	Posigen - Working Capital ($2m)		2.0%	10	650,000	450,000	450,000	450,000	2,000,000	-	
LMI Programs	Posigen - Term Loan ($6m)		4.0%	10	-	-	250,000	250,000	500,000	-	
			Total Resi 1-4 Program Loans:		***$ 1,175,000***	***$ 975,000***	***$ 1,225,000***	***$ 1,225,000***	***$ 4,600,000***	***$ -***	***$ 6,999,432***
CPACE	CGB Portfolio	Current/Future Pipeline	5.60%	17.5	$ 1,500,000	$ 1,500,000	$ 2,000,000	$ 2,000,000	$ 7,000,000	$ 5,000,000	$ 3,128,622
Solar PPA Development	PPA State		3.0%	20	2,082,500	2,082,500	2,082,500	2,082,500	8,330,000	9,000,000	1,573,954
Solar PPA Development	PPA Municipality		3.75%	20	-	-	-	-	-	2,347,200	741,496
Solar PPA Development	Commercial Projects		3.75%	20	-	-	-	-	-	-	96,621
Solar PPA Development	PPA Developers		4.50%	20	325,000	325,000	325,000	325,000	1,300,000	1,257,000	659,295
Solar PPA Development	PPA Debt to 3rd parties		4.50%	15	675,000	675,000	675,000	675,000	2,700,000	4,100,000	1,794,111
SBEA	Regular Loan Purchases		3.50%	4	930,000	930,000	930,000	930,000	3,720,000	1,447,000	819,022
			Total CI&I Program Loans:		***$ 5,512,500***	***$ 5,512,500***	***$ 6,012,500***	***$ 6,012,500***	***$ 23,050,000***	***$ 23,151,200***	***$ 8,813,121***
CE Finance Prg	PPA Sub Debt into IPC Fund	Debt financing	5.5%	15	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CE Finance Prg	Strategic Investments	FuelCell Groton	8.0%	10	3,200,000	-	-	-	3,200,000	3,200,000	-
Hydro Projects	Strategic Investments	Canton Hydro	5.0%	10	-	-	-	-	-	-	615,330
CE Finance Prg	Strategic Investments	Unspecified	4.0%	10	-	-	2,500,000	2,500,000	5,000,000	5,000,000	5,000,000
			Total CE Finance Program Loans:		***$ 3,200,000***	***$ -***	***$ 2,500,000***	***$ 2,500,000***	***$ 8,200,000***	***$ 8,200,000***	***$ 5,615,330***
			Total of all Program Loans:		***$ 10,232,500***	***$ 6,932,500***	***$ 10,082,500***	***$ 10,182,500***	***$ 37,430,000***	***$ 31,821,200***	***$ 21,627,883***

Using CEF and RGGI Proceeds, along with cash on hand, we will **invest $37.4 MM** that will deliver **$12.9 MM in interest income over time** or a **weighted average return of 4.42% over 8 years** thereby exceeding our portfolio **target of 4% interest over an average 10-year term**

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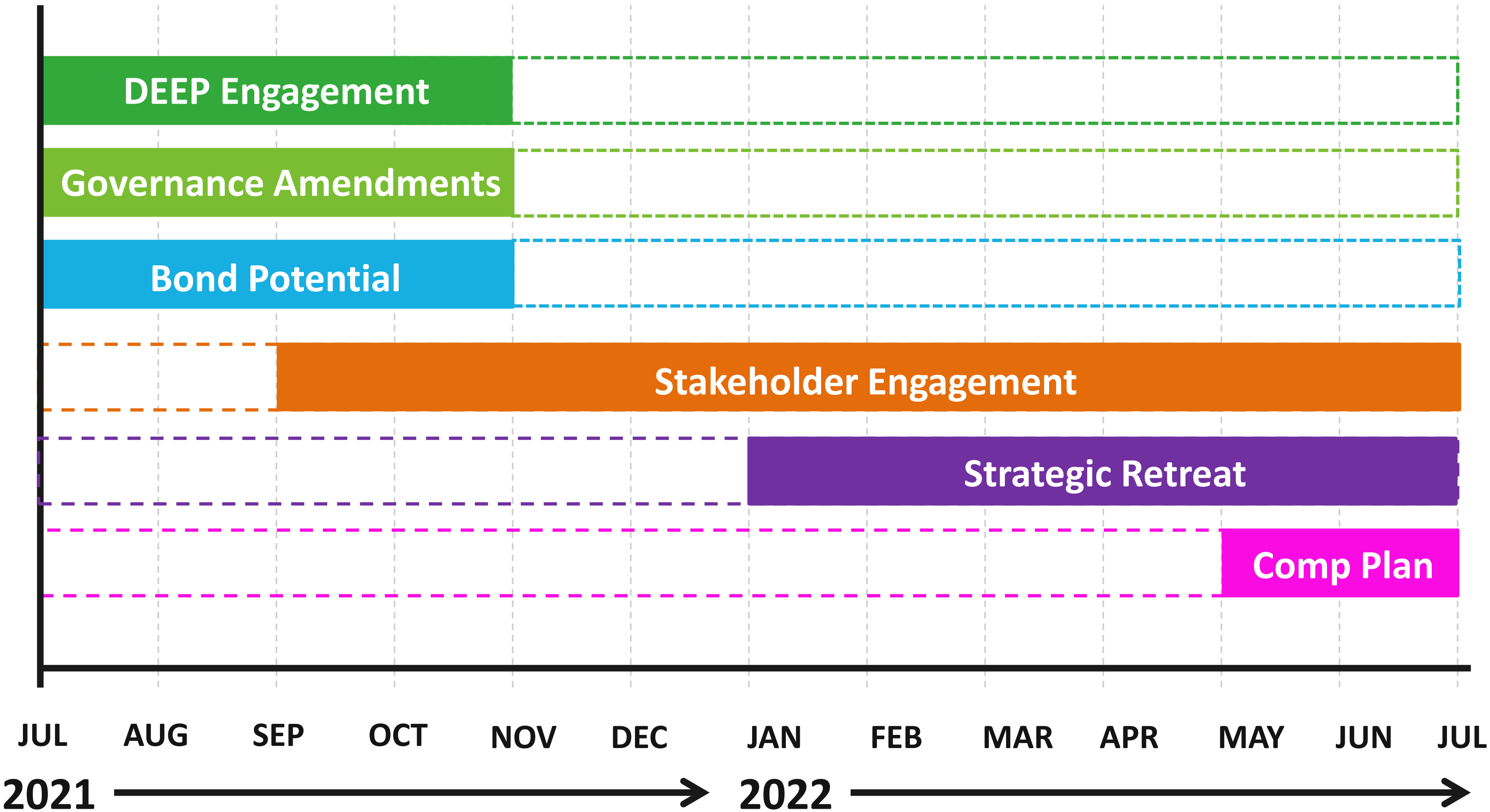
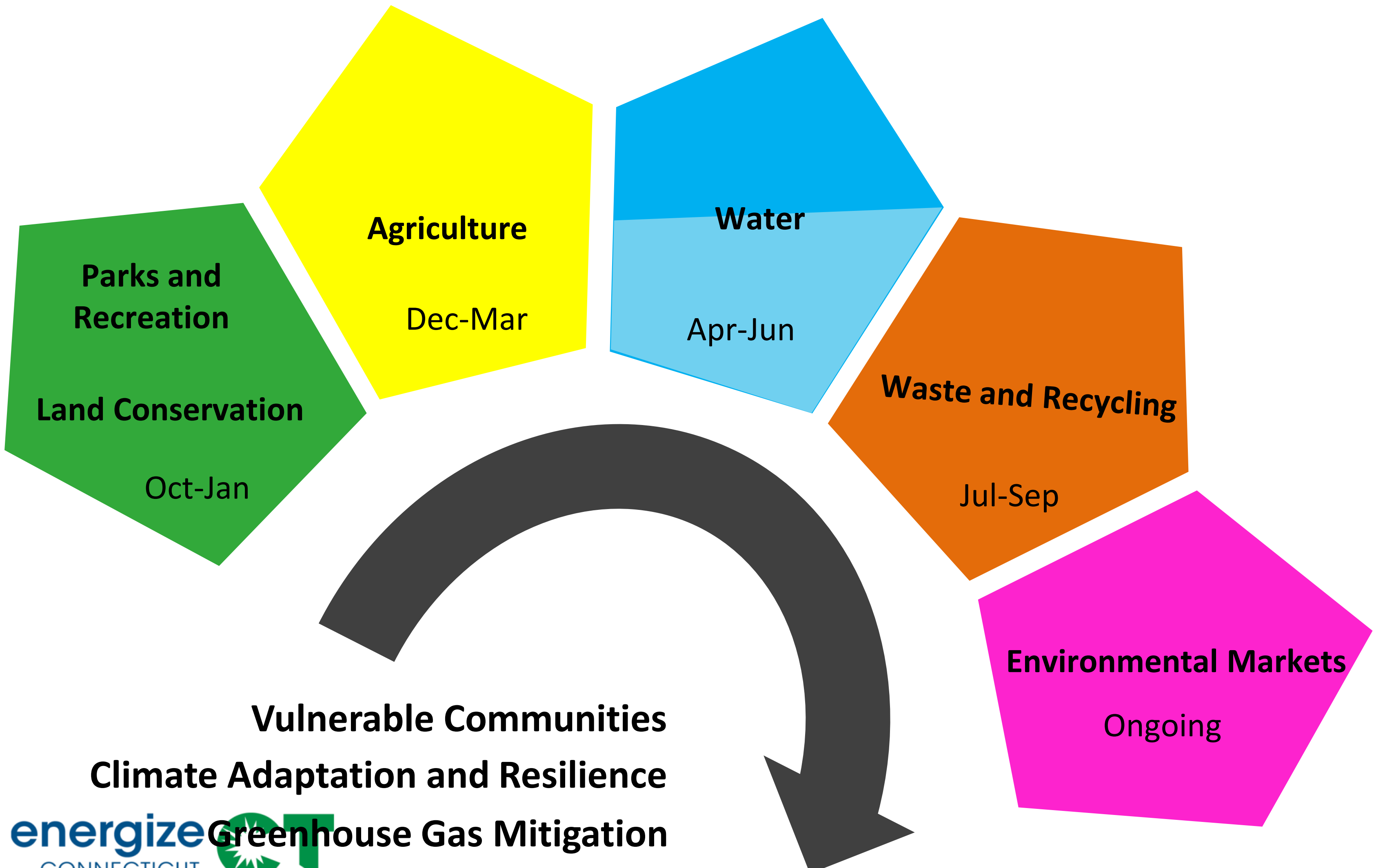
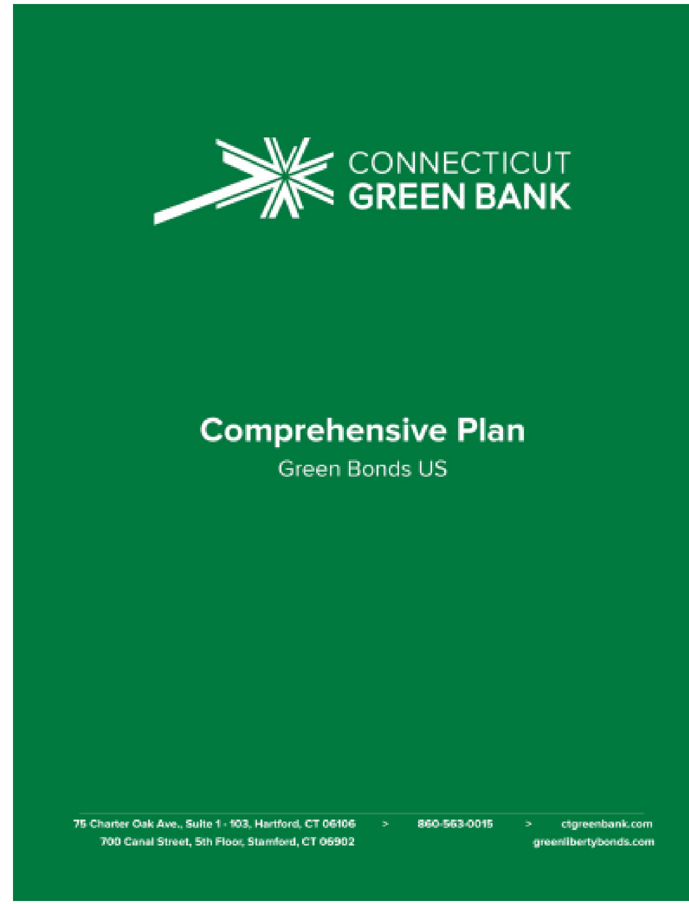
Environmental Infrastructure Process Timeline



Connecticut Green Bank
Environmental Infrastructure Process



Connecticut Green Bank Comprehensive Plan 2020



…a planet protected by
the love of humanity

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REFERENCES

Vision Statement inspired by the Innovations in American Government Awards at the Ash Center of Harvard University's Kennedy School of Government, Maya Angelou's "On the Pulse of Morning," the powerful words of Mary Evelyn Tucker on "inclusive capitalism," and Mother Jennifer of the Daughters of Mary of the Immaculate Conception

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Agenda Item #7b

Plan Coordination

Conservation and Load Management Plan

Energy Efficiency Board Updates

- One vacancy available on the Board
  - Residential representative
- Two new member onboarding sessions have been conducted
  - Two remaining – C&I on July 18th at 2 pm and Residential on July 29th at 1 pm
- Board's Diversity Equity and Inclusion (DEI) Consultant started in June

2022-2024 Plan Priorities

- Energy Affordability
  - Reducing the energy burden on customers and promoting economic development through lower energy bills, enhanced energy security, and increased reliability
- Decarbonization
  - Supporting high efficiency, low-carbon technologies to reduce greenhouse gas emissions from the building sector to meet legislative/regulatory emission and climate change goals
- Equity
  - Equitable distribution of benefits of energy efficiency and active demand response programs across state, communities, market segments, and customer types

2022-2024 C&LM Plan Review & Approval

- DEEP issued Final Determination on June 1
  - 25 conditions provided
  - Did not provide finalized versions of the weatherization definition or new cost-effectiveness test provisions
- Companies are working to incorporate the Conditions of Approval
  - Discussed at the Board and/or Committee levels

2023 C&LM Plan Update to the 2022-2024 C&LM Plan

- Alignment with Final DEEP Decision re: 2022-2024 Plan and Conditional Items
- Residential Portfolio
- Commercial & Industrial Portfolio
- Education, Workforce & Community Outreach Portfolio
- Active Demand Response Programs
- 2023, 2024, and 2025 Budgets / Savings Tables
- Screening Models
- Evaluation Efforts
- 2023 Program Savings Document (PSD) Manual

2023 C&LM Plan Update to the 2022-2024 C&LM Plan

June

- Develop timeline
- Develop Plan Update text outline, draft budget tables and 2023 PSD
- June 8 EEB meeting
- Jun 30: Deadline for evaluation inclusion in 2023 PSD

July

- Develop initial draft of Plan Update text, budget tables and 2023 PSD
- Jul. 12 EEB meeting
- First EEB/DEEP Public Input Session

August

- Develop second draft of Plan Update text, budget/savings tables and 2023 PSD
- Aug. 5: distribute draft documents to EEB
- Aug. 10 EEB Meeting

September

- Develop third draft of Plan Update text, budget/savings tables and 2023 PSD
- Sep.14 EEB Mtg
- Sep.14: EEB votes on budget and savings tables
- Second EEB/DEEP Public Input Session

October / November

- Oct.12 EEB Meeting
- Oct.12: EEB votes on Plan Update text and 2023 PSD
- Prep documents for filing once approved
- Nov.1: File 2023 Plan Update and 2023 PSD

Areas for C&LM Plan and CT Green Bank Coordination

Per Phase 1 Equity in Energy Efficiency (E3) Proceeding Goal 7:

- *Action 7.1: Work with the CT Green Bank to explore improved financing options for Home Energy Solutions (HES) and HES-Income Eligible customers to access interest-free financing for health and safety barrier mitigation.*

- Continuing to integrate storage and renewables into current program offers
  - Combine with new construction all-electric offers
  - Paring of HPs with PV (and storage?)
- Joint evaluation of financing activities?

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Agenda Item #8
Other Business

Other Business
Issues of Interest

- **Financing Programs** – updates from the front-lines lines for the staff of the Green Bank and EDCs

- **Infrastructure Investments and Jobs Act** – areas of formula and/or competitive grant focus for DEEP, Green Bank, and EDCs

Smart-E Loan
Summer Special Offer

- Launching July 1, 2022
- **Rate**:
  - 2.99%
  - 1.99% for borrowers at/below 100% SMI
- **Term**: 5, 7, 10 years
- **Eligible Measures**:
  - Heat pumps + HES
    - Air source heat pumps
    - Ductless + ducted mini splits
    - Ground source heat pumps
    - Heat pump water heaters
  - Battery storage (up to $25,000)
  - EV charging equipment
- Other measures can be financed at a blended rate

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Communities LEAP
Bridgeport "Phoenix Rising"

Energize Connecticut

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Agenda Item #9

Adjourn

Draft MINUTES

Joint Committee of the CT Energy Efficiency Board and the Connecticut Green Bank Board of Directors

Wednesday, March 23, 2022
1:30 - 3:30 p.m.

Due to COVID-19, all participants joined via the conference call.

In Attendance

Voting Members: Victoria Hackett (DEEP), John Harrity, Lonnie Reed, Claire Sickinger, Brenda Watson

Non-Voting Members: Stephen Bruno, Bryan Garcia, Bert Hunter

Members Absent: John Viglione, Donna Wells

Others: Ron Araujo, Giulia Bambara, Joe Buonannata from IPC, Sergio Carrillo, Hammad Chaudry, Kate Donatelli, Mackey Dykes, Richard Faesy, Brian Farnen, Philip Jordan and Sarah Lehmann from BW Research, Shubhada Kambli, George Lawrence, Peter Ludwig, Cheryl Lumpkin, Matt Macunas, Ashley Marshall, Glenn Reed, Ariel Schneider, Stacy Sherwood, Rudy Sturk, Kenya Van Eyken

Unnamed Callers: None

1. Call to Order

    Brenda Watson called the meeting to order at 1:33 pm.

2. Public Comments

    No public comments.

3. Review and approval of Meeting Minutes from the December 15, 2021 meeting.

Resolution #1

Motion to approve the meeting minutes for December 15, 2021.

Upon a motion made by Victoria Hackett and seconded by Brenda Watson, the Joint Committee voted to approve Resolution 1. None opposed or abstained. Motion approved unanimously.

4. Clean Energy Jobs Report 2021 – Additional Opportunities for Consideration

- Bryan Garcia noted that the second Clean Energy Industry Report was completed recently and then introduced Philip Jordan and Sarah Lehmann from BW Research.
- Glenn Reed summarized the additional opportunities for consideration that the Clean Energy Industry Report touched on, which includes HVAC contracting, multi-family support, electrification of heat pumps, health and safety remediation, new construction and renovation contractors, and other workforce development and equity efforts. Stephen Bruno agreed with the update.
- Philip Jordan gave an overview to the supplemental research performed by BW Research including technology sector deep dives, economic impact models, various mappings, stakeholder engagement, workforce pathways, and priority populations. He gave more context as to the data examined for each topic.
    - Brenda Watson asked about the breakdown for the number of people of color who are workers compared to people of color in management positions. Philip Jordan responded that the survey parameters unfortunately doesn't lend itself well to that breakdown because it is developed by the federal government which has very limited definitions around race and ethnicity. However, even though the employer survey does break down the different groups of employees better, it doesn't have the intersectionality needed to give that detailed of breakdown. Philip Jordan did explain that the priority population research does include an employee portion and potential employee portion however, which those surveys allow for some intersectionality as well as examining other important statistics.
    - Lonnie Reed asked about the mobile units that were developed to bring training into targeted communities, and if information about that has been examined and has been compared to other states. Philip Jordan responded in other states, most of the clean energy economy is found in the energy efficiency of buildings, and that the most growth is found efficiency and electrification of buildings. However, the biggest barrier to entry is transportation and a driver's license. So, though the training is effective, the other barriers limit their ability to pursue jobs. His suggestion was to look at whether those programs are effective and then examine if there are any other barriers which need to be addressed.
    - Victoria Hackett commented that the Utilities are developing Workforce Planning programs and wanted to make sure that any work is done in coordination with them if possible. As well, she noted Executive Order 21-3 for the creation of a Clean Economy Council, which some of the proposals of this research may be examined by that Council and may be helpful to incorporate with them once formed. She also noted that there is overlap of the different programs and wanted to make sure that potential overlap is considered when programs are being developed.
    - Bryan Garcia, Victoria Hackett, and Brenda Watson discussed the ways that the CT Green Bank and Joint Committee can work with Clean Economy Council and Office of Workforce Strategy.

5. Plan Coordination
    a. Input to FY 2023 Connecticut Green Bank Comprehensive Plan (Revisions)

- Bryan Garcia summarized the Green Bank's status for the Comprehensive Plan, which is currently in transition, though some goals have been met, and noted the changes to the Green Bank Board of Directors. Bert Hunter summarized the new Green Liberty Notes program for small denomination and short-term investments, and reviewed the debut offering and its success.

- Bryan Garcia gave an update to the Environmental Infrastructure process timeline, which is progressing well with stakeholder engagement, and a strategic retreat is planned for the near future.

   b. Input to 2022-2024 Conservation and Load Management Plan

- Glenn Reed gave an update to the status of the Energy Efficiency Board, which has had several changes. He continued to summarize the C&LM Plan priorities and progress. He reviewed the Plan highlights and noted it is still in review by DEEP. As for the review and approval process, the next steps include DEEP drafts and distribution of the Tentative Determination and Conditions of Approval, public comments on the Tentative Determination, and then DEEP will issue the Final Determination. He reviewed the updates for the next few months for the C&LM Plan.
- Glenn Reed reviewed the highlights of the 2022 – 2024 C&LM Plan, its savings and benefits, and its areas of coordination with the Green Bank.

   c. Comprehensive Energy Strategy

- Victoria Hackett summarized the updates to the Comprehensive Energy Strategy, which includes an update to the Scope based on recent public comments. She also summarized an update to the upcoming Technical Meeting and Request for Written Comment for Hydrogen opportunities.

Brenda Watson noted that she had to leave the meeting at 3:00 pm.

6. Plans for the 2022 Legislative Session

- Matt Macunas gave a brief update to the recent Legislative Session items. Victoria Hackett evaluated further on a few points as well.

7. Other Business
   a. Brief Update: C&I – Government

- Sergio Carrillo gave an update to the Energy Storage Solutions program, which has an unprecedented and unexpected interest, pushing it to the 3-year target in just 60 days. The Green Bank has been collaborating with the EDCs and progress is going well.

   b. Brief Update: C&I – Small and Medium/Large Business

- Mackey Dykes noted that for the SBEA and BEA programs, the Green Bank continues to focus on its partnership with Eversource, including a nearly finalized 3-year extension. For the SBEA program specifically, the terms may be extended, and loans increased. For Medium and Large Businesses, the program is being expanded to match the benefits of the SBEA program.

   c. Brief Update: Residential – Single Family and Multi-Family

- Sergio Carrillo summarized the collaboration effort progress for the HES, HES-IE for RRES, and ESS incentive programs which launched January 1, 2022. Joe Buonannata from IPC summarized the Smart-E Loan program for heat pumps for the last 2 years. Bryan Garcia noted that the remaining ARRA SEP funds, the Special Offer through the Smart-E program will go to that. Otherwise, the Smart-E loan support of renewable heating and cooling may have to look to the Infrastructure Investment and Jobs Act.

- Mackey Dykes summarized the Residential Multi-family efforts, which continues to coordinate around the existing projects, particularly solar in the Multi-family and Affordable Multi-family sectors.

8. Adjourn

Upon a motion made by Victoria Hackett and seconded by Lonnie Reed, the Joint Committee Meeting adjourned at 3:05 pm.

Respectfully submitted,

____
Brenda Watson, Chairperson

June 2022

UNITED STATES ENERGY & EMPLOYMENT REPORT 2022

U.S. DEPARTMENT OF ENERGY

ENERGY.GOV/USEER

DEPARTMENT OF ENERGY
Secretary Jennifer M. Granholm

DEPARTMENT OF ENERGY OFFICE OF POLICY
OFFICE OF ENERGY JOBS

Preparation and Authorship

This report was prepared by the U.S Department of Energy's (DOE) Office of Policy, Office of Energy Jobs.

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Table of Contents

Executive Summary

In 2021, U.S. energy sector jobs grew 4.0% over 2020, outpacing overall U.S. employment, which climbed 2.8% in the same time period. The energy sector added more than 300,000 jobs, increasing from 7.5 million total energy jobs in 2020 to more than 7.8 million in 2021.

Energy sector jobs, for the purposes of this report, include all the professional, construction, utility, operations, and production occupations associated with energy infrastructure, production, and use, including the manufacturing of motor vehicles.

Prior to the COVID-19 pandemic, the energy sector was one of the nation's fastest-growing job markets. From 2015 to 2019, the annual growth rate for energy employment in the United States was 3%—double the 1.5% job growth in the U.S. economy.

In 2020, the energy sector was deeply impacted by the COVID-19 pandemic and subsequent economic fallout. The energy sector lost nearly 840,000 jobs, contracting at a faster rate than jobs economy-wide. Last year's United States Energy and Employment Report (USEER) showed that, by the end of 2020, the energy sector was beginning to rebound, adding back 560,000 jobs.

While the energy sector as a whole has not recovered all of the jobs lost in 2020, nearly all technologies added energy jobs in 2021. Employment in transmission, distribution, and storage; energy efficiency; and motor vehicles increased across all technologies. However, energy jobs in the fuels category declined in 2021.

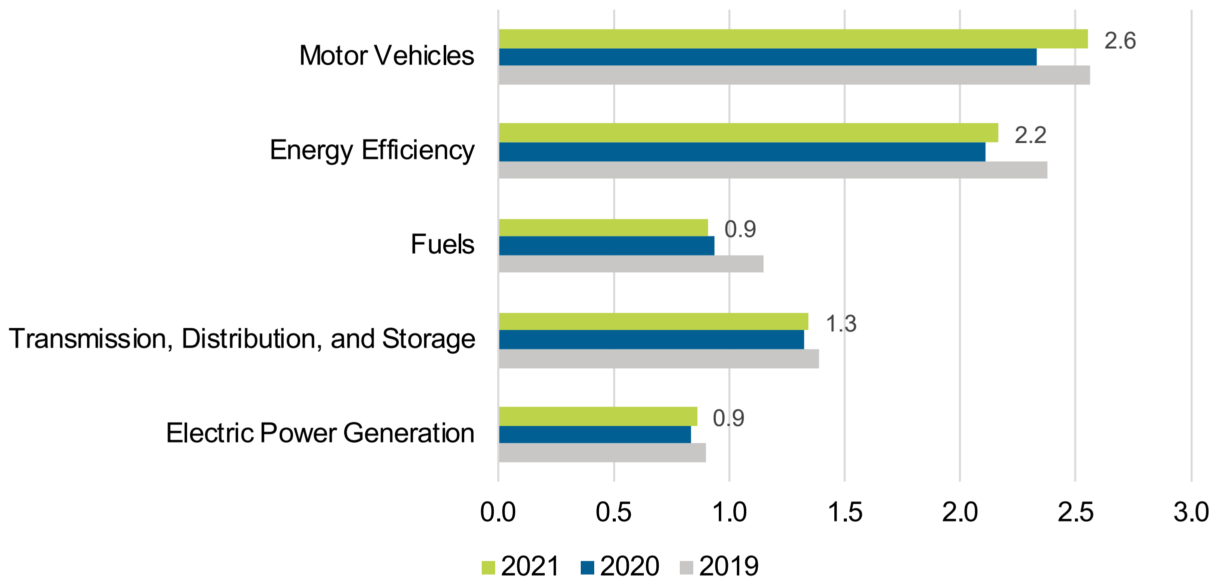
Jobs in Net-Zero Aligned Areas

The United States has a goal to reach net-zero greenhouse gas emissions by 2050. Net-zero emissions refers to achieving an overall balance between greenhouse gas emissions produced and greenhouse gas emissions prevented or taken out of the atmosphere.

Jobs in net-zero emissions-aligned areas are defined as jobs related to: renewable energy; grid technologies and storage; traditional transmission and distribution; nuclear energy; a subset of energy efficiency; biofuels; and plug-in hybrid, fully electric, and hydrogen fuel cell vehicles and components.

In 2021, there were 3,086,467 jobs in net-zero emissions-aligned areas. These jobs made up 41% of total energy jobs in 2021.

Figure 1. Energy Employment by Technology, 2019–2021 (Millions)



Motor Vehicles

Motor vehicles and component parts is the largest energy technology group, employing just under 2.6 million workers in 2021. The motor vehicles group added 144,300 jobs in 2021, increasing by 11.9%. Motor vehicle component parts companies added 79,100 jobs, increasing by 7.9%. Jobs in carbon-reducing motor vehicles and component parts technologies grew a collective 25%, led by 23,577 new jobs in hybrid electric vehicles (19.7% growth) and 21,961 jobs in electric vehicles (26.2% growth). In fact, jobs in electric vehicles, plug-in hybrid vehicles, and hybrid vehicles were among the only subcategories of any type of energy jobs that rose in numbers from 2019 to 2021 and that did not decrease from 2019 to 2020.

Energy Efficiency

In 2021, the energy efficiency technology group added 57,741 jobs and saw positive job growth in all efficiency technologies, especially in traditional heating, ventilation, and air conditioning (HVAC), which added 17,740 jobs and grew by 3.3%. The energy efficiency group was hit especially hard by the COVID-19 pandemic in 2020, resulting in across-the-board declines, amounting to a total loss of 271,719 jobs. Despite modest gains in 2021, energy efficiency grew more slowly than the energy sector as a whole (2.7% vs 4.0%) and did not make up job losses in 2020. However, job gains in energy efficiency still outpaced job growth in U.S. employment overall, and the sector remains one of the largest energy technology groups with over 2.1 million workers.

Fuels

In 2021, the fuels technology group declined by 29,271 jobs (-3.1%). Fossil fuel jobs accounted for most of the fuel jobs lost. Petroleum—both onshore and offshore—led losses, shedding 31,593 jobs (-6.4%). Coal fuel jobs declined by the greatest percentage, losing 7,125 jobs and decreasing by 11.8%. Fuel extraction jobs overall decreased by 12%. Biofuels, including renewable diesel fuels, biodiesel fuels, and waste fuels, grew by 6.7%, adding 1,180 jobs.

Transmission, Distribution and Storage

All transmission, distribution, and storage (TDS) technologies experienced employment growth in 2021 with an increase of 21,460 jobs. Smart grids outpaced virtually all other technologies in the TDS technology group in growth rate, increasing 4.9%. Traditional transmission and distribution added the most jobs (13,088) and grew 1.4%. Batteries, for both grid storage and electric vehicles, added 2,949 jobs (4.4%).

Electric Power Generation

Electric power generation jobs grew 2.9%, adding 24,006 jobs in 2021, slightly faster than U.S. jobs overall. In total, there were an estimated 857,579 electric power generation jobs in the United States in 2021.

The two largest employers in renewable energy technologies, solar and wind, both increased in 2021. Solar had the largest gains, both in terms of new jobs (17,212) and percent growth (5.4%). In 2020, the solar industry lost 28,718 jobs. Wind energy jobs, including land-based and offshore wind, sustained modest growth in terms of new jobs (3,347) and percent growth (2.9%), continuing a trend of steady growth over the last few years.

Other renewable energy technologies for electric power generation also experienced job growth in 2021, including hydropower, which added 1,383 jobs (2.2% growth); bioenergy, which added 349 jobs (2.9% growth); and geothermal, which added 220 jobs (2.8% growth).

Nuclear energy within electric power generation lost 2,440 jobs in 2021, decreasing 4.2% from 2020. In contrast, nuclear fuel jobs added 413 jobs and grew by 4.7%.

Fossil energy for electric power generation jobs either declined or grew at a slower pace than renewable energy jobs. Coal power generation jobs decreased by 572 from 2020 to 2021, down 0.8%, while the natural gas and petroleum grew at slower rates (1.6% and 0.5%, respectively) than overall U.S. employment (2.8%).

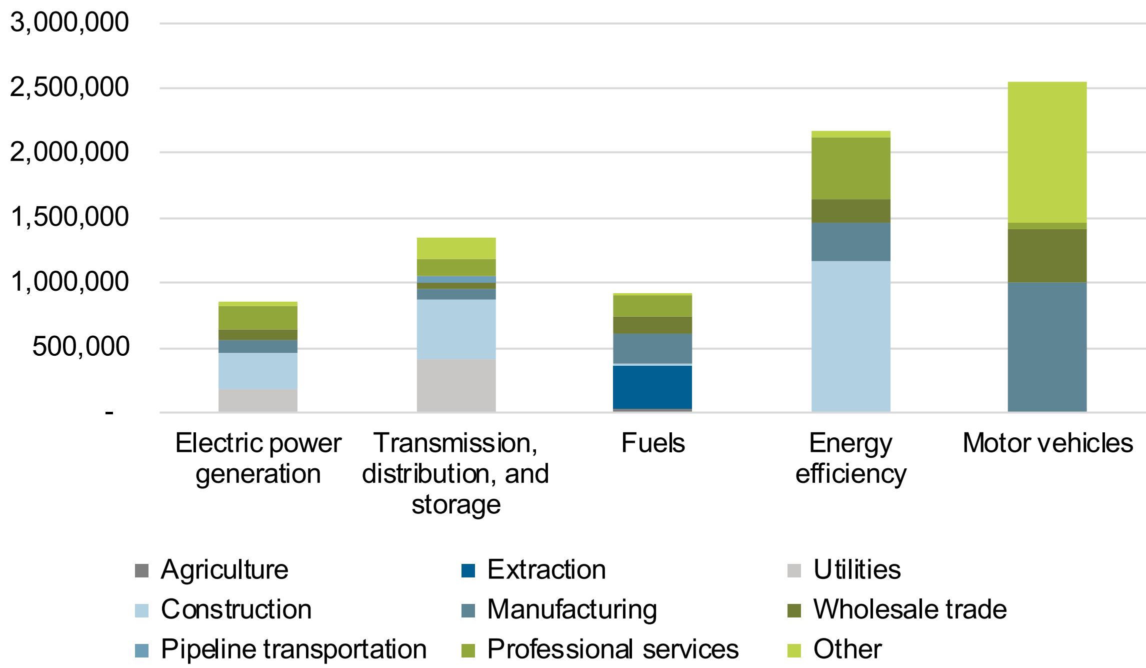
The Infrastructure Investment and Jobs Act

In November 2021, the Infrastructure Investment and Jobs Act (the Bipartisan Infrastructure Law) was signed into law. The infrastructure law allocates more than $62 billion for the DOE to revitalize domestic supply chains and strengthen America's manufacturing leadership; expand access to energy efficiency and clean energy for families, communities, and businesses; deliver reliable, clean, and affordable power to more Americans; and build the technologies of tomorrow through clean energy demonstrations. Because the 2022 USEER only includes data from 2021, the impacts of the Infrastructure Investment and Jobs Act are not reflected in this year's report.

Industry and Occupational Data

- Fuels is the only technology category that contracted in 2021, shedding 29,270 jobs, driven by companies' reductions in extraction jobs.
- Manufacturing and "other services"[1] jobs showed the biggest increases, with motor vehicles contributing the most new jobs in both industries.

Figure 2. Energy Employment by Technology Category and Industry



Supporting Energy Workers

In 2021, renewable energy jobs grew while fossil energy jobs decreased. These data highlight the need to catalyze economic revitalization and diversification, encourage the growth of the economy characterized by secure and good-paying jobs, and support energy workers and communities across the country as we make the transition to economy-wide net-zero emissions by 2050.

The White House Interagency Working Group on Coal and Power Plant Communities and Economic Revitalization is of the main locus of action the federal government is currently taking to support coal, oil and gas, and power plant communities and workers.

[1] "Other services" is classified under the North American Industry Classification System (NAICS) code 81. It is defined as containing industry activity not defined elsewhere within the NAICS classification system with the exception of public administration.

Table 1. Change in Energy Jobs by Industry, 2020–2021

	Electric Power Generation	Transmission, Distribution, and Storage	Fuels	Energy Efficiency	Motor Vehicles	Industry Total
Agriculture	0	0	831	0	0	831
Extraction	0	0	-46,007	0	0	-46,007
Utilities	-446	-768	0	0	0	-1,214
Construction	11,333	17,612	773	25,131	0	54,849
Manufacturing	1,058	1,495	1,246	5,878	109,870	119,547
Wholesale trade	3,277	1,686	5,582	7,774	26,296	44,615
Pipeline transportation[2]	0	-4,671	0	0	0	-4,671
Professional services	7,465	7,094	8,215	17,686	-3,129	37,331
Other	1,319	-988	90	1,272	118,074	119,767
Technology Total	24,006	21,460	-29,270	57,741	251,111	

2021 Demographic Information and Diversity

- The energy workforce is 74% male, making it less gender diverse than the U.S. workforce average, which is 53% male. Women make up 25% of the energy workforce, much less than the U.S. average, which is 47%.[3]
- There is a higher percentage of non-White workers in energy, 26% compared to 22% of the entire U.S. workforce. However, the energy workforce has a lower-than-average percentage of Black and Latino workers. There are no technologies where Black workers are represented proportionally to their overall representation in the U.S. workforce.
- Workers of two or more races are more represented in nearly every energy technology, composing 8% of the energy workforce, compared to 2% across all U.S. industries. Economy-wide research, however, shows that respondents may answer inconsistently to questions about two or more races.
- The percentage of Asian workers in energy is the same as the national workforce average.
- The energy workforce is younger than average. Only 17% of the energy workforce is older than 55, which is lower than the national employment average of 24%.

2 This does not include pipeline construction. Pipeline construction falls under the NAICS 23712 code, which is construction.
3 Percentages do not sum to 100% due to rounding.

Table 2. United States Energy Workforce Demographics and Characteristics

	Number of Workers	Energy Average	National Workforce Averages
Male	5,634,389	74%	53%
Female	1,915,191	25%	47%
Gender non-binary	22,723	0%	insufficient data[4]
Hispanic or Latino	1,307,137	17%	18%
Not Hispanic or Latino	6,265,167	83%	82%
American Indian or Alaska Native	125,591	2%	1%
Asian	503,710	7%	7%
Black or African American, not Indigenous	608,433	8%	12%
Black Indigenous	54,869	1%	insufficient data[5]
Native Hawaiian or other Pacific Islander	72,736	1%	<1%
White	5,596,223	74%	78%
Two or more races	610,743	8%	2%
Veterans	651,801	9%	6%
55 and over	1,273,900	17%	24%
Disability	162,570	2%	4%
Formerly Incarcerated	80,857	1%	2%
Represented by a Union or Project Labor Agreement	777,028	10%	6%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

[4] While the USEER asks male, female, and nonbinary, no data from the Bureau of Labor Statistics or Census exists for the number of nonbinary workers within the national workforce.

[5] Data not available from the Census.

Union Membership

- The proportion of union workers or those covered under a project labor agreement in the energy workforce is higher than the private sector, with 10% of workers represented by a union or covered by project labor agreement, compared to 6% within the private sector nationally.
- The transmission, distribution, and storage technology group had the highest unionization rate at 18%; nuclear was the highest technology with 20%.

Executive Actions on Worker Empowerment

During 2021, President Biden issued several Executive Orders related to energy jobs:

- **Executive Order 14008: Tackling the Climate Crisis at Home and Abroad: Calls for an all-of-government approach to "create well-paying union jobs to build a modern and sustainable infrastructure, deliver an equitable, clean energy future, and put the United States on a path to achieve net-zero emissions, economy-wide, by no later than 2050."**
- **Executive Order 14005: Ensuring the Future Is Made in All of America: Increases domestic content requirements on federal procurement.**
- **Executive Order 14063: Use of Project Labor Agreements for Federal Construction Projects: Requires project labor agreements (PLAs) on large federally contracted construction projects.**
- **Executive Order 14025: Worker Organizing and Empowerment: Established the *Task Force on Worker Organizing and Empowerment* to identify ways the federal government could fully utilize its authority to encourage worker organizing and collective bargaining. On Feb. 7, 2022, the task force released its report, detailing nearly 70 recommendations for revising labor laws and regulations.**
- **Executive Order 14052: Implementation of the Infrastructure Investment and Jobs Act: Emphasizes the importance of high labor standards, including prevailing wages and the free and fair chance to join a union in the implementation of the Infrastructure Investment and Jobs Act.**

Key State Takeaways

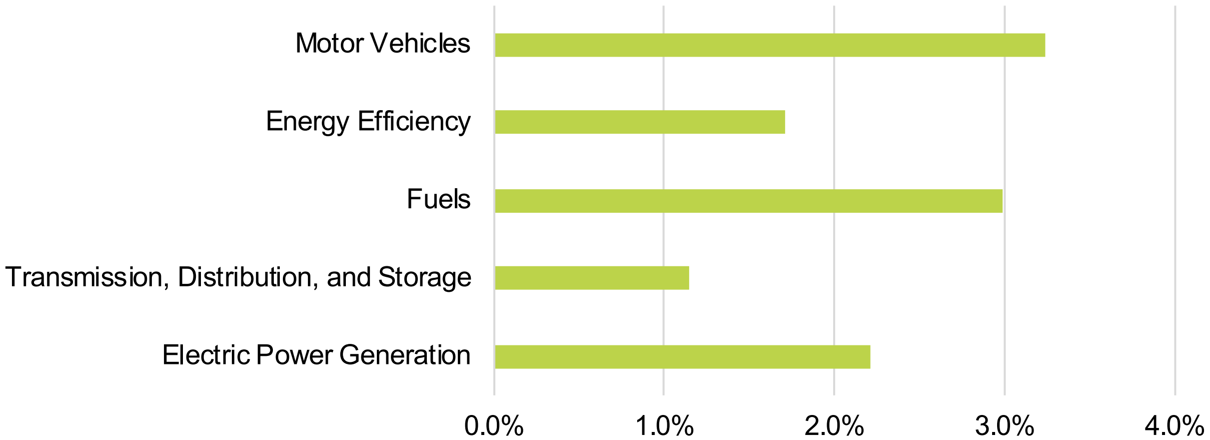
In addition to this national report, USEER data are collected at the state level in a companion report, which includes a brief energy and employment profile for each state and the District of Columbia. The state report includes a high-level snapshot of the electric power generation; transmission, distribution, and storage; fuels; energy efficiency; and the motor vehicle industry, as well as a breakdown by technology application and workforce characteristics. Highlights are provided below. For more information, view the state-level report at energy.gov/useer.

- Michigan added most new energy jobs (35,500) in 2021, followed by Texas (30,900) and California (29,400).
- West Virginia and Pennsylvania fared best nationally for percent growth in transmission, distribution, and storage, with the fastest growth occurring in West Virginia (29%) and Pennsylvania (14%).
- Electric power generation technologies grew fastest in the Midwest, with the highest percent growth in Nebraska (32%), Minnesota (18%), and Iowa (16%).
- The top two states with the highest percent growth in fuels jobs were North Dakota (21%) and Montana (8%).
- Percent growth in motor vehicles jobs was spread across many states, led by Texas (20%), Tennessee (19%), and Indiana (18%).
- Oklahoma and New Mexico were among the top states for percentage growth among all five energy categories. Oklahoma had the third highest per capita growth nationally for transmission, distribution, and storage (11%) as well as energy efficiency (5.3%). New Mexico was first for energy efficiency (7.0%) and third for fuels (5.4%).

Survey of Future Trends

- Companies in all energy technology groups reported in surveys that they expect job growth from 2021 to 2022 (Figure 3).
- This is led by motor vehicles (3.2% growth expected by employers), followed by fuels (3.0%), electric power generation (2.2%), energy efficiency (1.7%), and transmission, distribution, and storage (1.1%).

Figure 3. Anticipated Change in Employment by Technology Group, 2021–2022



About the 2022 United States Energy and Employment Report

The United States Energy and Employment Report (USEER) captures employment, workforce, industry, occupation, unionization, demographic, and hiring information by energy industry technology groups. These groups represent the fields of electric power generation; transmission, distribution, and storage; fuels; energy efficiency; and motor vehicles and component parts.

In addition to this national report, a companion report, available at energy.gov/useer, provides state-level snapshots that are useful for understanding and comparison.

The data in these reports are based on a combination of data from the Bureau of Labor Statistics (BLS), U.S. Census Bureau, and surveys completed by about 33,000 employers in the energy technology group. A job is counted when a company reports that an individual spends any of their time in the technology group.

The BLS employment data used in these reports considers anyone who is employed each month as a job regardless of whether they are part-time or full-time. Thus, someone working 20 hours per week for a year would be considered one job, but someone working full-time for six months would be considered half of a job.

Each technology contains subtechnologies that fit within the technology group. For example, solar electric power generation and wind power generation fit within the electric power generation group. Some technologies fit within multiple groups—for example, natural gas is both a fuel and an electric power generation technology.

The USEER includes employment information by industry within each technology. These industries are organized according to North American Industry Classification System (NAICS) codes.[6] NAICS codes are a standard way of organizing industrial activity in the United States, Mexico, and Canada. Each technology fits within multiple NAICS codes—portions of industry activity within most technology groups are considered “energy” while other portions are not.[7] This split is determined by a survey of businesses, which can be found in Appendix A. There are exceptions: all employment in some NAICS industries such as coal extraction is considered energy and is included in the USEER.

Appendix B contains definitions of each technology. Detailed explanation of how union jobs were estimated is in Appendix C.

The USEER was published in 2016, 2017, and 2021 by DOE upon recommendation of the first 2015 installment of the Quadrennial Energy Review (QER), “to reform existing data collection systems to provide consistent and complete definitions and quantification of energy jobs across all sectors of the economy.” The 2016, 2017, and 2021 reports can all be found at energy.gov/useer.

The 2022 USEER was prepared by the Department of Energy, which contracted with BW Research Partnership (BWR) on survey collection and data processing. In recent years, the 2018 USEER, 2019 USEER, and 2020 USEER were prepared under a Memorandum of Understanding between the Energy Futures Initiative (EFI) and the National Association of State Energy Officials (NASEO) and a contract between EFI and BWR.

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[6] More information about NAICS codes can be found at https://www.census.gov/naics/.

[7] Employment within each industry prior to being split by energy and non-energy activity comes from the Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW). More information about the QCEW can be found at https://www.bls.gov/cew/.

Electric Power Generation

Electric Power Generation

Employment in Electric Power Generation consists of jobs across all electric generating technologies. This covers both utility and non-utility generation. This technology group also includes employment in any firms engaged in the manufacture, operation, and/or maintenance of turbines and other generating equipment, as well as those engaged in the construction and installation of electricity generation plants or other sources of electricity (e.g., solar panels), capital investments, and wholesale parts distribution for all electric generation technologies.

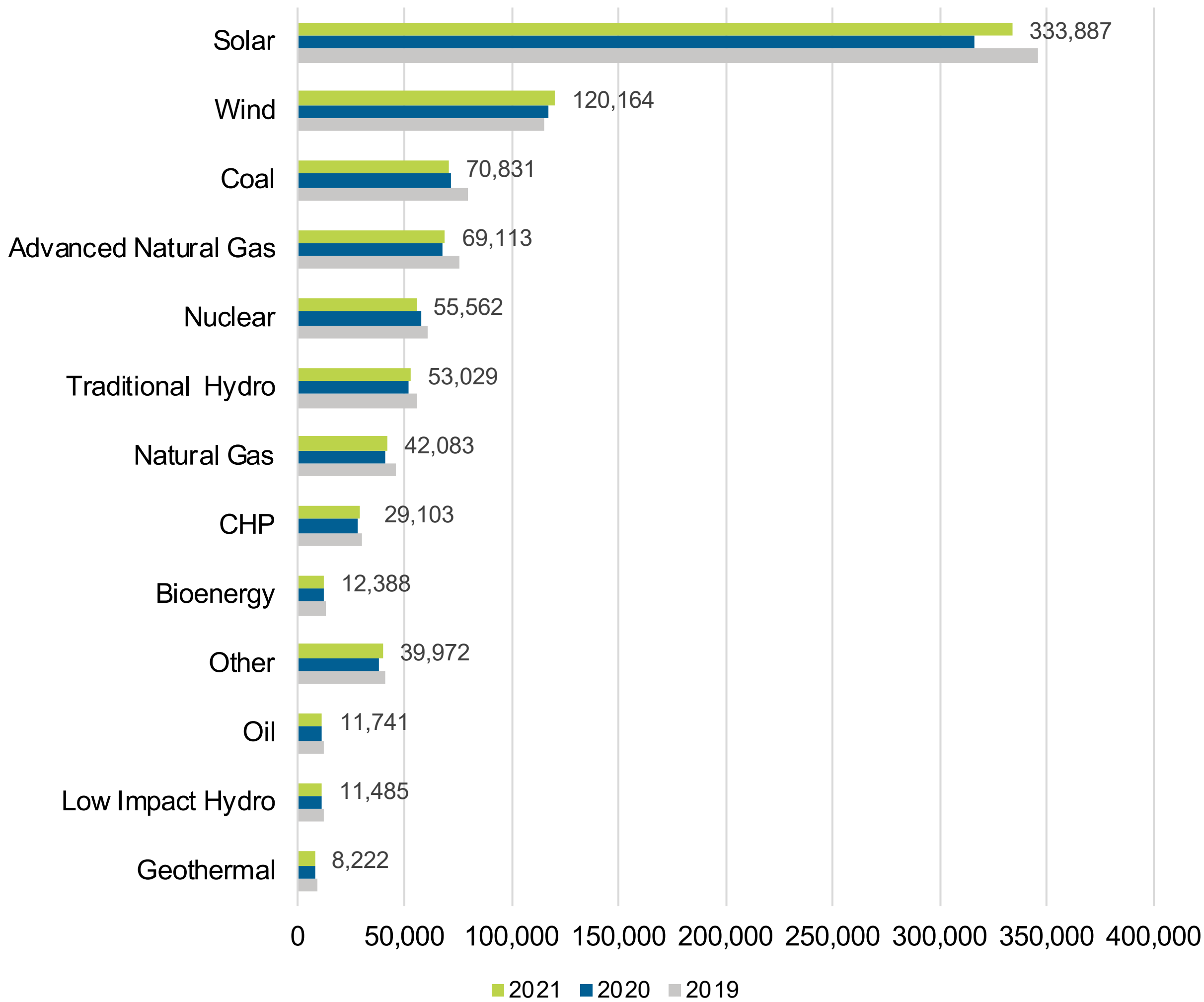
Trends and Key Takeaways

- Electric power generation jobs grew by 24,006 jobs or 2.9%—faster than the economy as a whole, but not enough to make up for the 63,257 jobs lost in 2020.
- In 2021, solar had the largest gains, both in terms of new jobs (17,212) and percent growth (5.4%).
- Nuclear electric power generation is the only technology in which employment declined, shedding 2,440 jobs or -4.2%.
- Renewable technologies in electricity added 22,511 jobs, growing 4.4%.
- The largest gains were in the construction industry, with 11,333 new jobs.
- Utilities was the only industry to lose jobs, decreasing by 446 positions or -0.3%.
- Construction had the highest percentage of companies relating hiring difficulty, with 92% of respondents indicating it was "very difficult" or "somewhat difficult" to find employees.
- Utilities reported the lowest hiring difficulty with 76% of firms indicating at least some difficulty.
- Electricity's workforce tends to be disproportionately male, with 69% male workers compared to 53% within the national workforce.
- The percentage of non-White workers is higher than the national average (30% compared to 22% overall). This is attributable to Asian workers (10% compared to 7% nationally), those of two or more races (9% compared to 2% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally) being more concentrated in electricity. Veterans are more represented in electricity at 8%, compared to 6% nationally.
- The percentage of workers represented by a union or project labor agreement in electricity (12%) is also higher than the national average (6%).
- Those with disabilities are less represented in electricity at 2% compared to 4% nationally.
- The percentage of previously incarcerated workers is the same as the national workforce (2%).

Employment by Technology and Industry

In 2021, there were 857,579 workers employed in electricity, representing a change of 2.9% from 2020 (Figure 4). Solar primarily drove these changes, increasing by 24,006 workers, which was also the largest percent change (5.4%). Nuclear was the only technology to lose jobs, decreasing by 2,400 workers or -4.2%.

Figure 4. Electric Power Generation Employment by Technology



The largest number of electricity employees are in the construction industry, with 285,866 workers (Figure 5, Table 3). Construction also showed both the largest number of new jobs—11,333—and the third greatest percentage rate of growth at 4.1%. Wholesale trade grew the by the greatest percentage at 4.6%, adding 3,277 jobs. Only professional services exceeded its 2019 level of employment, however. This stood at 183,429 in 2021 compared to 182,688 in 2019. While it did contract in 2020, it added 7,465 new jobs in 2021 (4.2% growth). Manufacturing in electricity added 1,058 jobs.

Figure 5. Electric Power Generation Employment by Industry

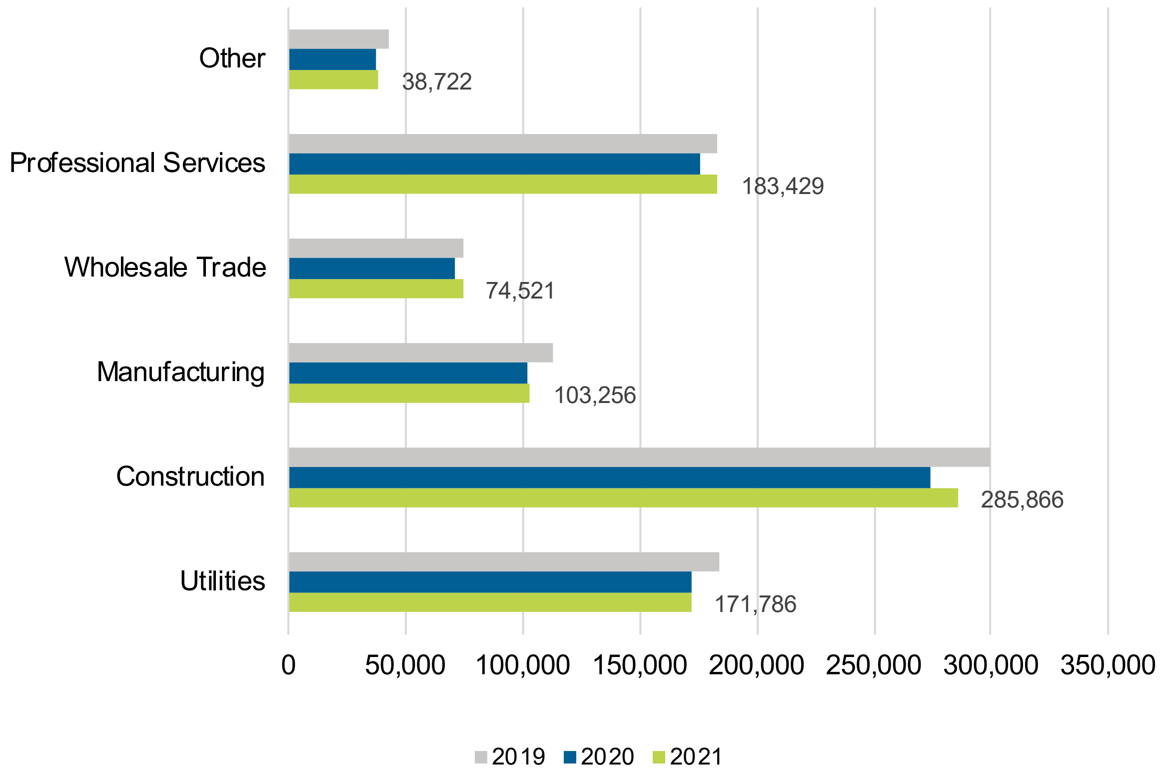


Table 3. Electric Power Generation Employment by Industry

Industry	2019	2020	2021
Other	43,134	37,403	38,722
Wholesale Trade	74,906	71,244	74,521
Manufacturing	113,146	102,198	103,256
Professional and Business	182,688	175,964	183,429
Utilities	183,565	172,232	171,786
Construction	299,391	274,533	285,866
Total	896,830	833,573	857,579

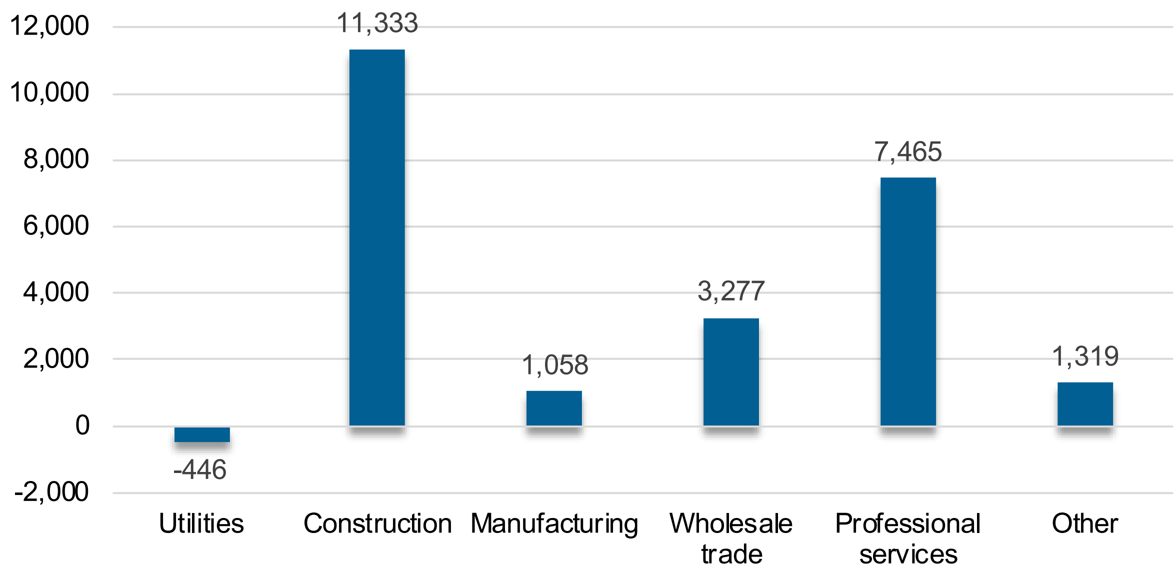
Of all technologies, geothermal has the highest concentration of workers in construction with 57% of all workers, followed by solar with 52% (Table 4), where the physical installation of solar arrays is considered construction activity. Nuclear electricity and advanced natural gas have the highest concentration of workers in utilities with 61% for each.

Table 4. Concentration of Electric Power Generation Employment by Technology and Industry

	Utilities	Construction	Manufacturing	Wholesale Trade	Professional Services	"Other Services"
Solar	2%	**52%**	13%	8%	16%	10%
Land-based Wind	6%	**36%**	20%	10%	25%	2%
Offshore Wind	0%	24%	19%	1%	**53%**	3%
Geothermal	14%	**57%**	3%	4%	22%	0%
Bioenergy	16%	**42%**	9%	5%	25%	3%
Low impact hydro	0%	15%	26%	22%	**36%**	1%
Traditional hydro	**33%**	15%	25%	11%	15%	0%
Adv Nat Gas	**61%**	13%	4%	7%	14%	1%
Nuclear	**72%**	4%	3%	5%	17%	0%
Coal	**48%**	10%	1%	8%	32%	1%
Oil	3%	0%	**44%**	17%	35%	1%
Natural Gas	**40%**	23%	8%	8%	19%	2%
CHP	6%	14%	7%	13%	**60%**	1%

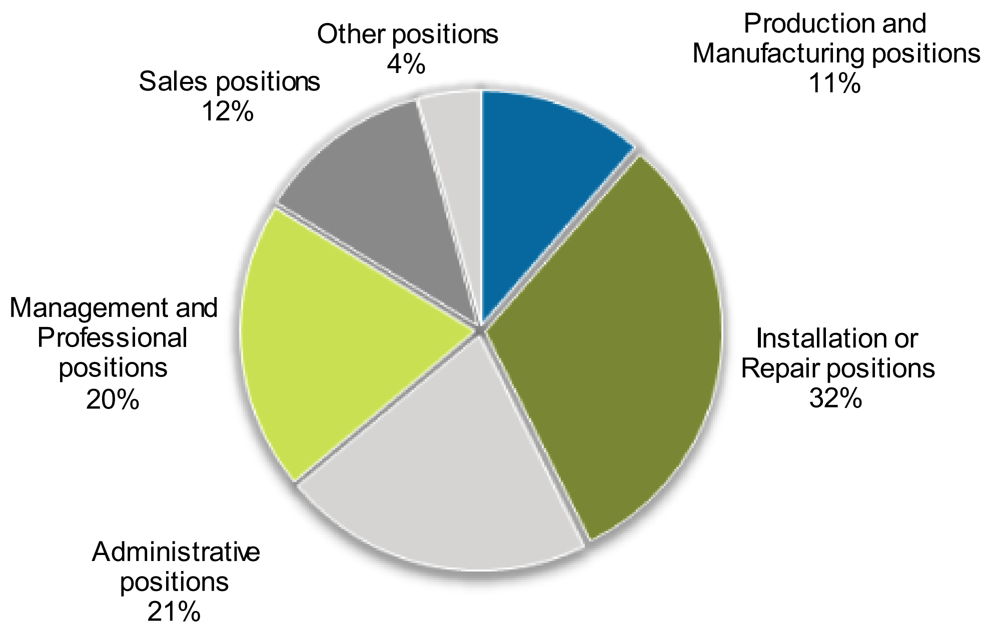
Construction also drove the largest number of new jobs in electricity in 2021, creating 11,333 positions (Figure 6). This was followed by professional services, which added 7,465. Only utilities decreased, losing 446 positions.

Figure 6. Electric Power Generation Employment Changes by Industry, 2020–2021



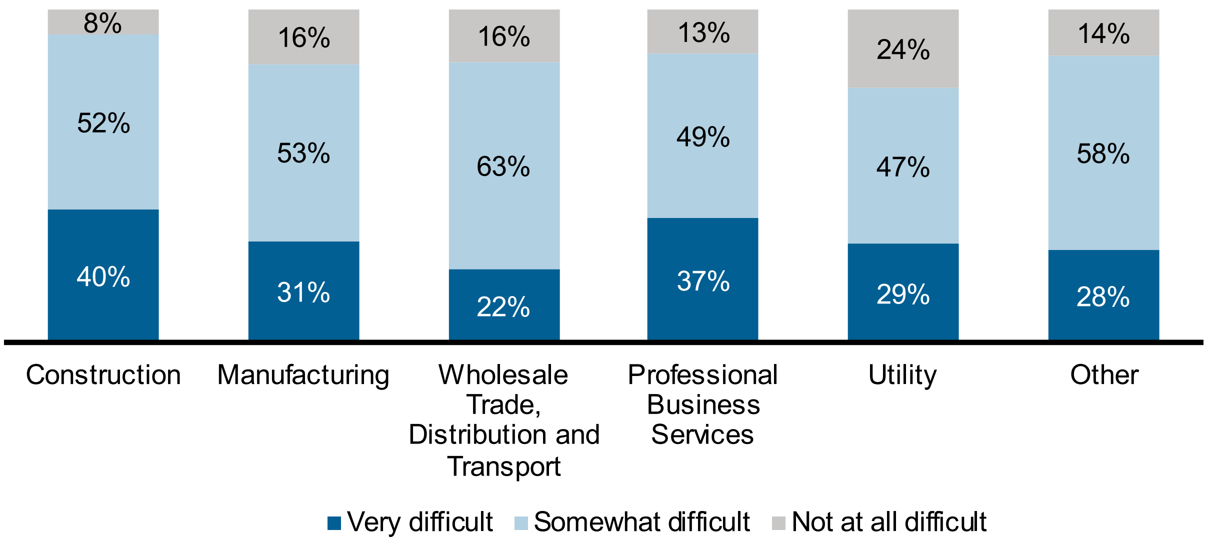
The largest occupational category of workers within electricity was installation or repair positions (construction), with 32% (Figure 7). This is followed by administrative positions (21%) and management and professional positions (20%).

Figure 7. Worker Occupations in Electric Power Generation



Within electricity industries, construction had the greatest difficulty hiring workers (Figure 8). Over 92% of employers reported finding qualified workers as “very difficult” or “somewhat difficult” with 40% claiming it is very difficult. Electric utilities reported the least difficulty hiring, with 24% stating that it is “not at all difficult.” Still, more than three of every four respondents from this industry reported hiring difficulty.

Figure 8. Electric Power Generation Hiring Difficulty by Industry



As shown in Table 5, utilities and manufacturing both showed insufficient qualifications (certifications or education) among applicants as a reason for hiring difficulty, while construction and “other industries” cited a lack of experience, training, or technical skills. Employers for both professional and business services and wholesale trade, distribution, and transport, however, cited an inability to provide competitive wages.

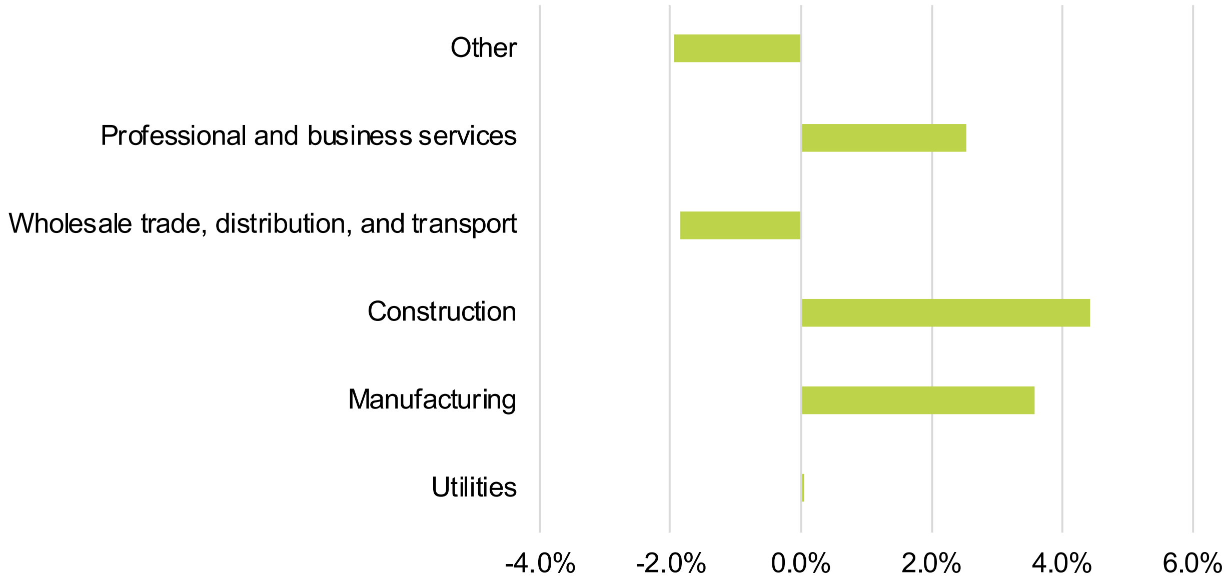
Table 5. Electric Power Generation Employer Reasons for Hiring Difficulty

Industry	Most Common Reason	Second Most Common Reason	Third Most Common Reason
Utilities	Competition / small applicant pool (38%)	Insufficient qualifications (certifications or education) (31%)	Lack of experience, training, or technical skills (31%)
Construction	Competition/ small applicant pool (47%)	Lack of experience, training, or technical skills (36%)	Insufficient non-technical skills (work ethic, dependability, critical thinking) (22%)

Manufacturing	Competition/ small applicant pool (31%)	Insufficient qualifications (certifications or education) (31%)	Difficulty finding industry-specific knowledge, skills, and interest (23%)
Wholesale Trade, Distribution, and Transport	Competition/ small applicant pool (52%)	Cannot provide competitive wages (28%)	Difficulty finding industry-specific knowledge, skills, and interest (24%)
Professional and Business Services	Competition/ small applicant pool (52%)	Cannot provide competitive wages (28%)	Difficulty finding industry-specific knowledge, skills, and interest (28%)
Other	Competition/ small applicant pool (46%)	Lack of experience, training, or technical skills (32%)	Insufficient qualifications (certifications or education) (24%)

Four out of the six industries in electricity expect growth in 2022: Professional business services, construction, manufacturing, and utilities (Figure 9). While the utilities industry does anticipate growth, at 0.1%, it is nearly zero. Wholesale trade, distribution, and transport, as well as "other services" anticipate declines.

Figure 9. Electric Power Generation Anticipated Change in Employment, 2021–2022



Electricity is less diverse than the rest of the economy in terms of gender; males make up 69% of the workforce, more than the 53% U.S. average.

Table 6. Electric Power Generation Demographics and Characteristics

	Number of Workers	Electricity Average	National Workforce Averages	Energy Workforce Average
Male	588,144	69%	53%	74%
Female	267,820	31%	47%	25%
Gender non-binary	1,615	<1%	insufficient data[8]	0%
Hispanic or Latino	155,051	18%	18%	17%
Not Hispanic or Latino	702,528	82%	82%	83%
American Indian or Alaska Native	11,195	1%	1%	2%
Asian	82,787	10%	7%	7%
Black or African American, not Indigenous	71,526	8%	12%	8%
Black Indigenous	5,889	1%	insufficient data[9]	1%
Native Hawaiian or other Pacific Islander	9,185	1%	<1%	1%
White	600,040	70%	78%	74%
Two or more races	76,958	9%	2%	8%
Veterans	68,991	8%	6%	9%
55 and over	119,462	14%	24%	17%
Disability	16,758	2%	4%	2%

[8] While the USEER asks male, female, and nonbinary no data from the Bureau of Labor Statistics or Census exists for the number of nonbinary workers within the national workforce.

[9] Data not available from the Census.

Formerly Incarcerated	14,261	2%	2%	1%
Represented by a Union or Project Labor Agreement	106,974	12%	6%	10%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of non-White workers in electricity is 30%, higher than the national workforce average of 22%. This is due to higher-than-average portions of workers of two or more races (9% in electricity compared to 2% nationally), Asian workers (10% in electricity compared to 7% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally). The concentrations of other races are lower than national averages.

The portion of formerly incarcerated workers is the same as the national average (2%), while those with disabilities disclosed to employers (2% compared to 4% nationally) and workers over the age of 55 (14% compared to 24% nationally) are lower than average. The concentration of veterans is higher than the national average (8% compared to 6% nationally).

Those represented by a union or a project labor agreement (12%) is double the national average.

Solar Energy

Solar energy companies, which include photovoltaics and concentrating solar power, employed 333,887 workers in 2021, up 17,212 from the 316,675 employed in 2020 (5.4%).[10] Solar employed 345,393 workers in 2019, however, indicating the technology has yet to fully recover from losses in 2020.

Trends and Key Takeaways

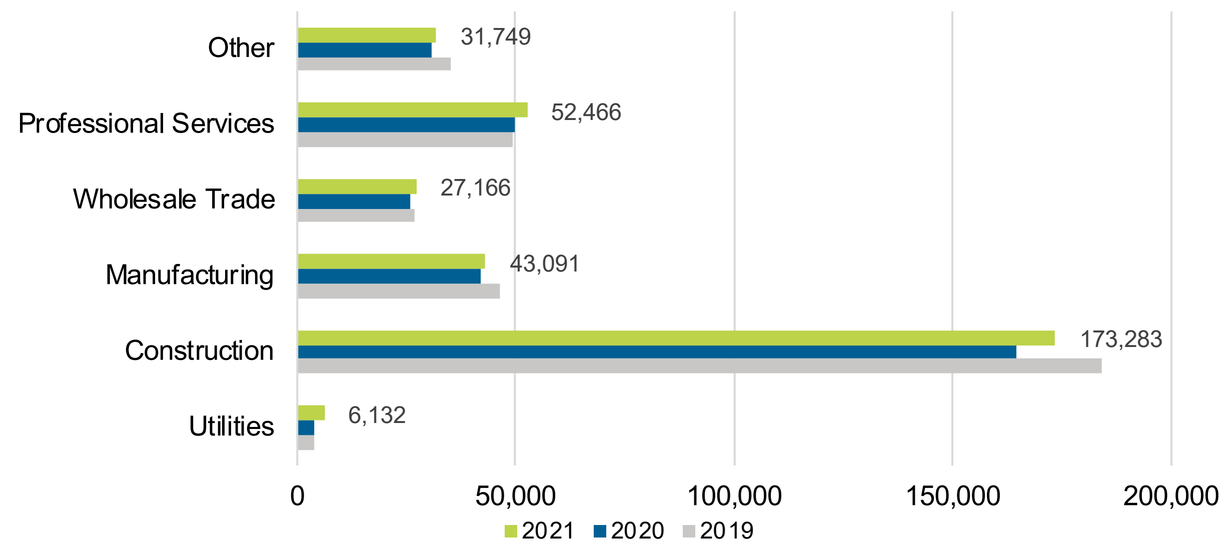
- The largest job gains were in the construction industry, with 8,539 new jobs (5.2%). On a percentage basis, utilities increased the most, expanding 50% from 4,077 to 6,132 jobs.
- Construction had the highest percentage of companies reporting hiring difficulty, with 93% of respondents indicating it was “very difficult” or “somewhat difficult” to find employees.
- Solar energy employers in four out of six industries anticipate growth in 2022, with these expectations ranging from 2.0% to 6.9%. The other two industries anticipate declines ranging from -1.3% to -2.7%.
- The percentage of union workers and those covered by project labor agreements in solar energy jobs (10%) is also higher than the national private sector average (6%). This is skewed to regions with high union participation in utility-scale solar development. For example, according to the methods used, 47% of all unionized solar workers are in the State of California.
- Solar’s workforce is disproportionately male, with 70% compared to 53% nationally.
- Hispanic workers are more concentrated in solar than the workforce average (20% compared to 18%).
- The solar industry is more racially diverse than national averages. The percentage of non-White workers is higher than the national average (28% compared to 22%). This is attributable to Asian workers (9% compared to 7% nationally), those of two or more races (8% compared to 2% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally) being more concentrated in solar.
- Black or African American workers are less represented in than the rest of the workforce (8% compared to 12% overall).
- Veterans are more represented in solar energy jobs at 8% compared to 6% nationally.
- Those with disabilities are less represented in solar energy jobs (2% compared to 4% nationally). The percentage of previously incarcerated workers is lower than the national workforce (1% compared to 2%).

[10] There were 253,052 solar workers who spent 50% or more of their time on solar. This contrasts with 333,887 workers who spent any of their time on solar.

Employment by Industry

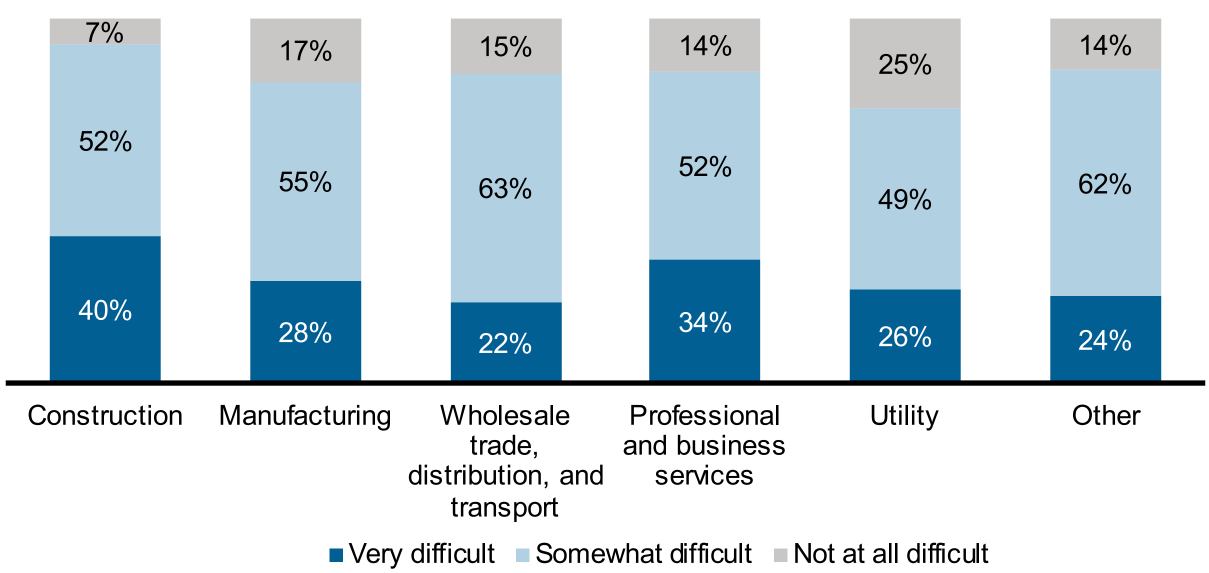
The largest number of solar energy employees are in the construction industry, with 173,283 workers (Figure 10). Construction also reported both the largest number of new jobs, 8,539 or 5.2%. While total solar jobs in 2021 did not exceed its 2019 level, half of the industries within the technology did. Utilities, wholesale trade, and professional and business services all had more jobs in 2021 than 2019.

Figure 10. Solar Electric Power Generation Employment by Industry, 2019–2021



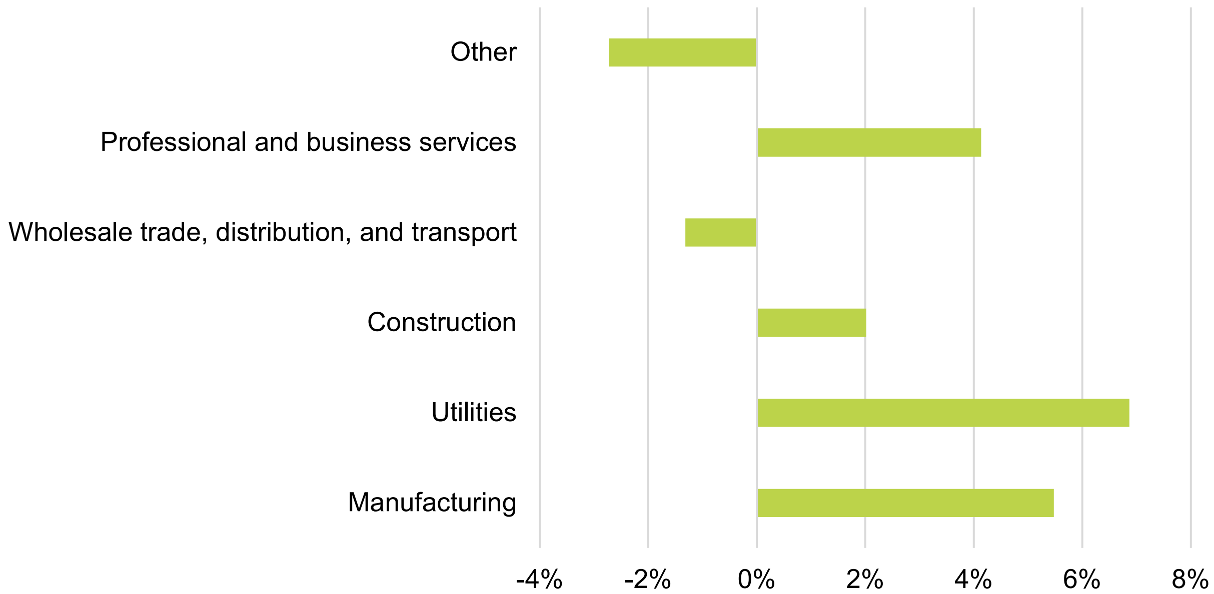
Within solar sub-industries, construction had the greatest difficulty hiring workers (Figure 11). Over 93% of employers reported some difficulty finding qualified workers with 40% claiming it is "very difficult." That is the highest for "very difficult" among the industries as well. Utilities in the solar energy workforce reported the least difficulty hiring, with 25% stating that it is "not at all difficult."

Figure 11. Solar Electric Power Generation Hiring Difficulty by Industry



As shown in Figure 12, four out of the six industries in solar expect growth in 2022: Utilities (6.9%), manufacturing (5.5%), professional and business services (4.1%), and construction (2.0%). "Other industries" (-2.7%) and wholesale trade, distribution, and transport (-1.3%) anticipate job declines.

Figure 12. Anticipated 2022 Changes in Solar Electric Power Generation Employment



Solar is less diverse than the rest of the economy in terms of gender; males make up 70% of the workforce, more than the 53% U.S. average. (Table 7).

Table 7. Solar Electric Power Generation Workforce Demographics and Characteristics

	Number of Workers	Solar Electricity Average	National Workforce Averages	Energy Workforce Averages
Male	234,431	70%	53%	74%
Female	99,021	30%	47%	25%
Gender non-binary	435	0%	Unknown	0%
Hispanic or Latino	66,893	20%	18%	17%
Not Hispanic or Latino	266,994	80%	82%	83%
American Indian or Alaska Native	4,004	1%	1%	2%
Asian	30,505	9%	7%	7%

Black or African American, not Indigenous	26,826	8%	12%
Black Indigenous	735	0%	insufficient data
Native Hawaiian or other Pacific Islander	4,247	1%	<1%
White	239,672	72%	78%
Two or more races	27,897	8%	2%
Veterans	27,117	8%	6%
55 and over	36,817	11%	24%
Disability	5,256	2%	4%
Formerly incarcerated	4,857	1%	2%
Represented by a Union or Project Labor Agreement	34,898	10%	6%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of non-White workers in solar energy jobs is 28%, higher than the national average. This is attributable to higher-than-average portions of workers of two or more races (8% compared to 2% nationally), Asians (9% compared to 7% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally). American Indian or Alaska Natives are the same as the national average (1%). At 8%, the concentration of Black or African Americans is lower than the 12% national average.

The proportion of Hispanic or Latino workers in the solar industry is higher than workforce average (20% compared to 18% nationally).

The concentration of veterans (8% compared to 6% nationally) is higher than the national average. The portion of formerly incarcerated workers is lower than the national average (1% compared to 2%), which is also the case for those with disabilities disclosed to employers (2% compared to 4% nationally). The percentage of workers over the age of 55 (11% compared to 24% nationally) is also lower than the national average.

The concentration of workers represented by a union or a project labor agreement is higher than the overall workforce average (10% compared to 6%).

Wind

Wind energy companies employed 120,164 workers in 2021, up 2.9% or 3,347 from 116,817 in 2020. Unlike most energy technologies, wind energy jobs grew from 2019 to 2020. So, despite growth that is slower than the 4.0% for all energy jobs, the 2021 levels are above its 2019 levels. This increase from 2019 to 2021 is unusual for both the energy industry and the economy overall.

The majority of wind workers in the United States—119,287—are in land-based wind, while the remaining 877 are in the offshore wind sector. Previous U.S. Energy and Employment Reports have not differentiated between land-based and offshore wind, so growth numbers for these technologies individually are not available.

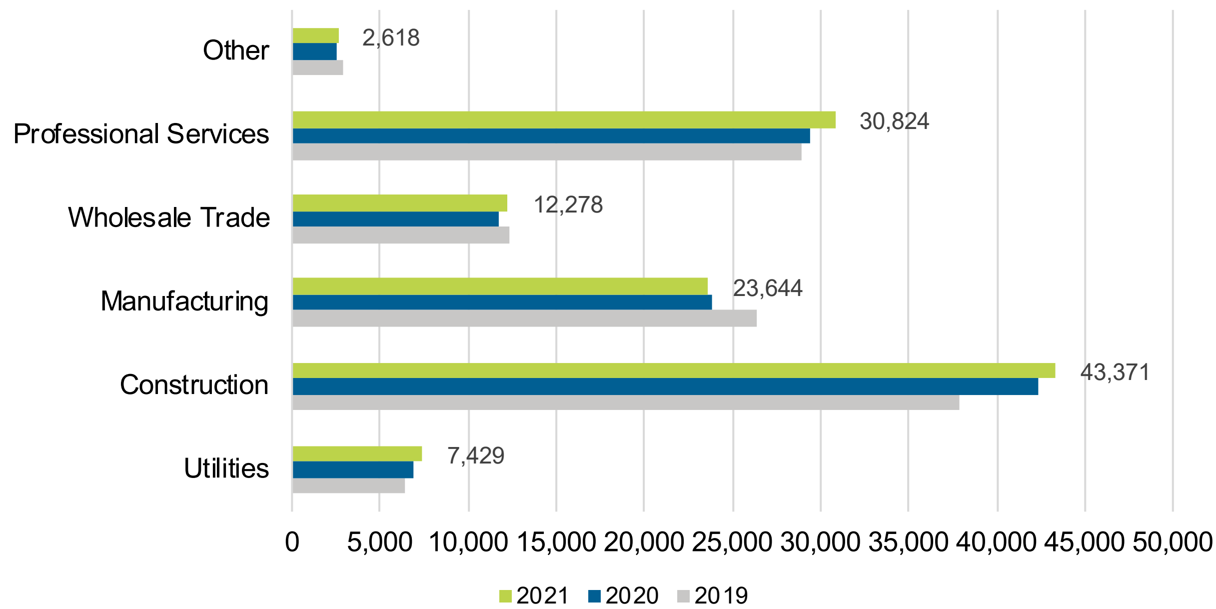
Trends and Key Takeaways

- Wind energy employment stood at 114,774 in 2019 and is one of the few energy technologies to post positive job growth over the subsequent two years: 5,390 positions or 4.7% from 2019 to 2021.
- The largest job gains from 2020 to 2021 were in the professional services industry, with 1,374 new jobs (4.7%). On a percentage basis, utilities increased the most, expanding 8.0% from 6,882 to 7,429 jobs.
- Wind jobs decreased by 234 in manufacturing, a decline of 1.0%.
- Construction had the highest percentage of companies reporting hiring difficulty, with 98% of respondents indicating that it was "very difficult" or "somewhat difficult" to find employees.
- Wind employers in five out of six industries anticipate positive growth in 2022, with these expectations ranging from 0.2% to 8.7%. Wholesale trade, distribution, and transport was the only industry to anticipate negative growth (-1.7%).
- Wind's workforce tends to be disproportionately male, with 70% compared to 53% nationally.
- The wind sector is more non-White than the workforce average (30% compared to 22%). This is attributable to Asian workers (10% compared to 7% nationally), those of two or more races (9% compared to 2% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally) being more concentrated in wind.
- The percent of American Indians is the same as the national average (1%).
- The portion of Black or African Americans in wind is lower than the national average.
- Veterans are more represented in wind at 9% compared to 6% nationally.
- The percentage of union workers in wind (11%) is also higher than the national average (6%).
- Those with disabilities are less represented in wind at 2% compared to 4% nationally. The percentage of previously incarcerated workers is the same as the national workforce (2%).

Employment by Industry

The largest number of wind energy employees are in the construction industry, with 43,371 workers—up 1,029 from 2020 (Figure 13). Professional services reported the largest number of new jobs, 1,374, translating to 4.7% growth. This is the second greatest percentage rate of growth for an energy industry, trailing only utilities (8.0%) and tying with wholesale trade.

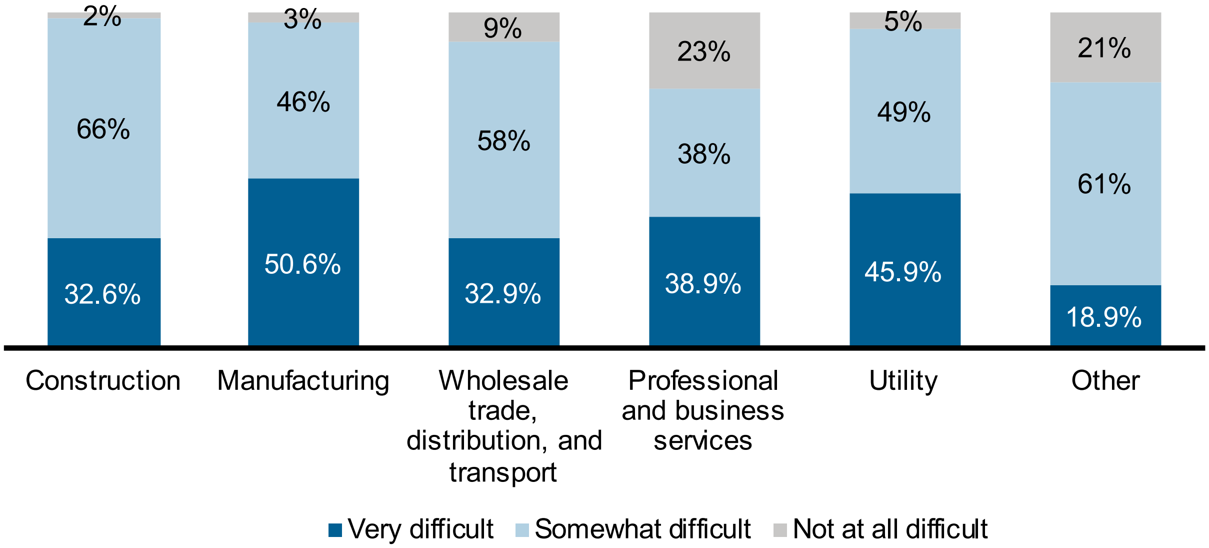
Figure 13. Wind Electric Power Generation Employment



Wind energy employment stood at 114,774 in 2019 and is one of the few energy technologies to post positive job growth over the subsequent two years: 5,390 positions or 4.7% from 2019 to 2021.

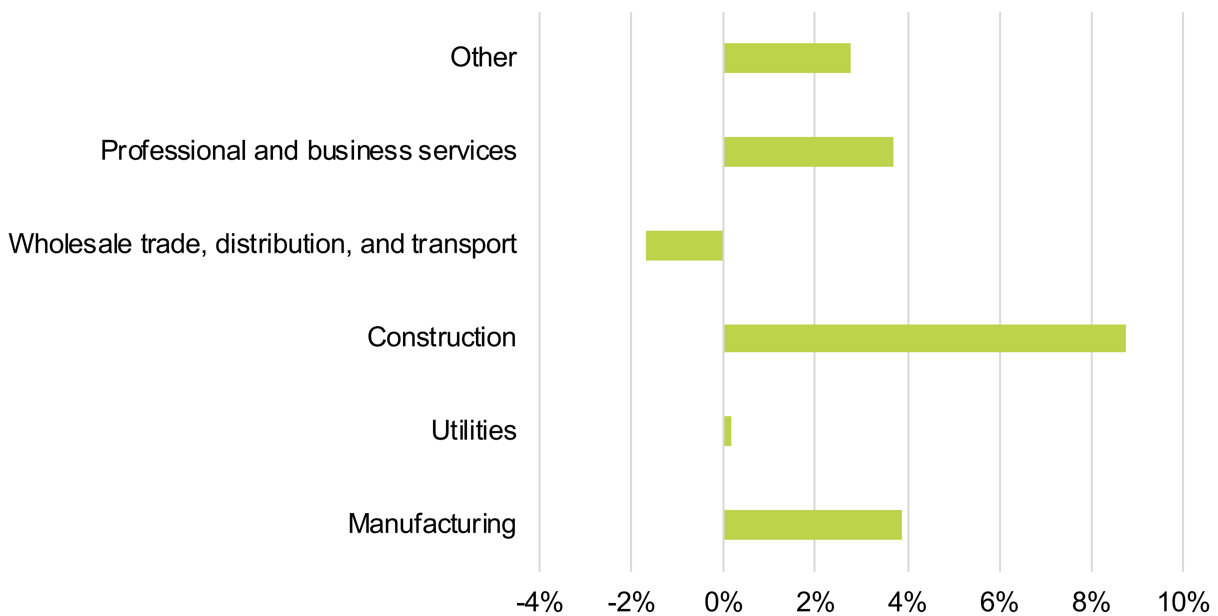
Within wind industries, construction employers reported showed the greatest difficulty hiring workers (Figure 14). Over 98% of employers reported at least some difficulty finding qualified workers, with 33% claiming it is “very difficult.” That is the not highest for “very difficult” among industries, however. Nearly 51% of manufacturers indicated that it is very difficult to find workers, followed by 46% of utilities. Professional services had the lowest difficulty with 77% of companies reporting hiring to be somewhat or very difficult.

Figure 14. Wind Electric Power Generation Hiring Difficulty by Industry



As shown in Figure 15, five out of the six industries in wind expect growth in 2022: Construction (8.7%), manufacturing (3.9%), professional and business services (3.7%), other (2.8%), and utilities (0.2%). Wholesale trade, distribution, and transport anticipated declines of 1.7%.

Figure 15. Wind Electric Power Generation Anticipated 2022 Changes in Employment



Wind is less diverse than the rest of the economy in terms of gender; males make up 70% of the workforce, more than the 53% U.S. average (Table 8).

Table 8. Wind Electric Power Generation Workforce Demographics and Characteristics

	Number of Workers	Wind Electricity Average	National Workforce Averages	Energy Workforce Averages
Male	83,564	70%	53%	74%
Female	36,444	30%	47%	25%
Gender non-binary	156	<1%	Unknown	0%
Hispanic or Latino	22,264	19%	18%	17%
Not Hispanic or Latino	97,900	81%	82%	83%
American Indian or Alaska Native	1,336	1%	1%	2%
Asian	11,878	10%	7%	7%
Black or African American, not Indigenous	8,724	7%	12%	8%
Black Indigenous	1,061	1%	insufficient data	1%
Native Hawaiian or other Pacific Islander	1,370	1%	<1%	1%
White	84,431	70%	78%	74%
Two or more races	11,365	9%	2%	8%
Veterans	10,330	9%	6%	9%
55 and over	17,773	15%	24%	17%
Disability	2,982	2%	4%	2%
Formerly Incarcerated	2,225	2%	2%	1%
Represented by a Union or Project Labor Agreement	13,743	11%	6%	10%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers is slightly higher than as the national average, 19% compared to 18%.

The portion of White workers in wind energy jobs is 70%, lower than the national average of 78%. This is attributable to higher-than-average portions of workers of two or more races (9% compared to 2% nationally), Asians (10% compared to 7% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally). American Indian or Alaska Natives are the same as the national average (1%) while the concentrations of other races are lower than national averages.

The proportion of veterans (9% compared to 6% nationally) is higher than the national average. The concentration of formerly incarcerated workers is the same as the national average (2%). Those with disabilities are less represented in the wind workforce than they are across all industries (2% compared with 4%), as are workers over the age of 55 (15% compared to 24%).

The proportion of workers represented by a union or project labor agreement is higher than the national average (11% compared to 6%).

Coal

Coal electricity[11] employed 70,831 workers in 2021, down 572 from the 71,403 employed in 2020 (-0.8%). This is 8,880 fewer workers than were employed in 2019.

Trends and Key Takeaways

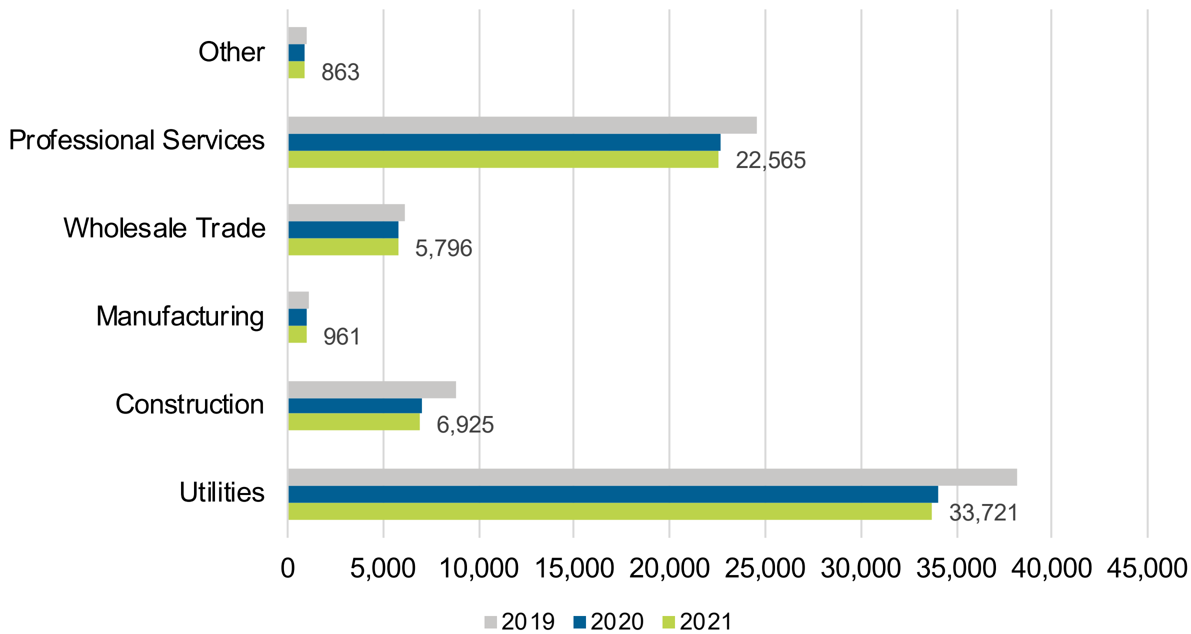
- The largest job losses were in the utility industry, with 354 fewer jobs than in 2020 (-1.0%). On a percentage basis, construction decreased the most, contracting 1.8% from 7,052 to 6,925 jobs.
- Jobs did not increase in any coal industry.
- Manufacturing and wholesale trade, distribution, and transport reported the most hiring difficulties with 97% of respondents indicating some difficulty.
- Despite the trend of employment losses over the past three years, some coal employers expect gains in 2022, especially in construction (+9.1%). Only the utilities industry expects losses (-1.0%).
- Coal electricity's workforce tends to be disproportionately male, with 68% compared to 53% nationally. Hispanic workers are less concentrated than the national average (13% compared to 18% overall).
- Racially, the coal industry is more non-White than national averages (29% non-White compared to 22%). This is attributable to Asian workers (10% compared to 7% nationally), those of two or more races (6% compared to 2% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally) being more concentrated in coal electricity. The percent of American Indians is the same as the national average (1%).
- Hispanic workers are less concentrated than the workforce average (13% compared to 18% overall).
- Black or African American workers are underrepresented, making up 10% of the coal electricity workforce compared to 12% of the overall U.S. workforce.
- The percentage of union workers in coal electricity (17%) is also higher than the national average (6%)
- Those with disabilities are less represented in coal electricity at 2% compared to 4% nationally. The percentage of previously incarcerated workers is the same as the national workforce (2%).

Employment by Industry

The largest number of coal electricity employees are in the utilities industry, with 33,721 workers (Figure 16). Utilities also reported the largest decrease in jobs, -354, although, being the largest industry, its 1.0% decline was the third largest behind construction (-1.8%) and manufacturing (-1.2%). All industries in coal electricity had employment levels lower than 2019.

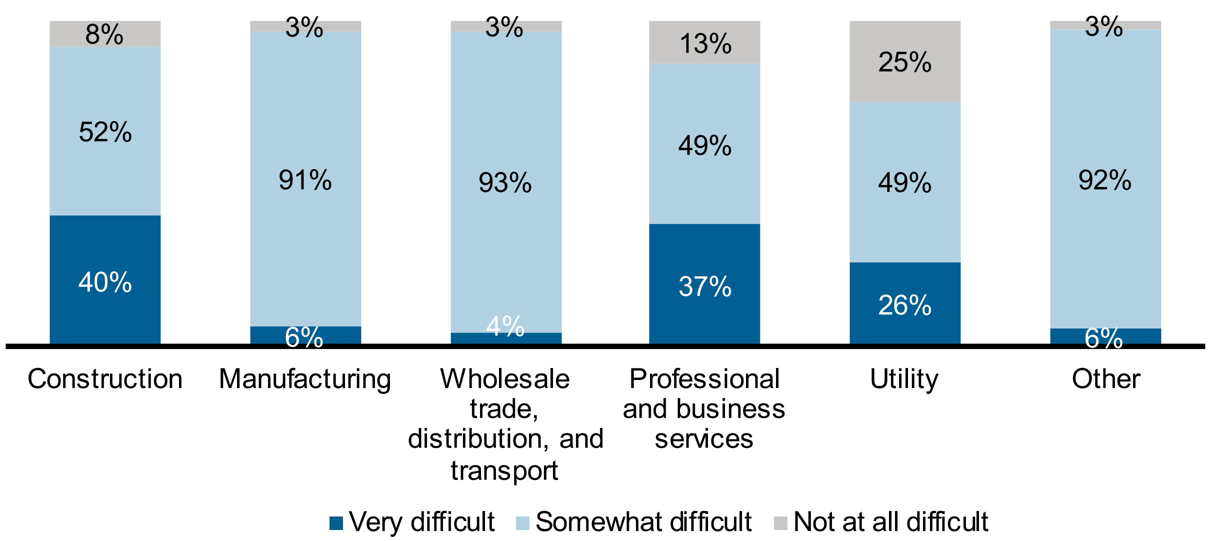
[11] This is solely coal electricity generation. Coal extraction is included in the "Fuels" and "Multi-Sectors" sections of this report.

Figure 16. Coal Electric Power Generation Employment by Industry



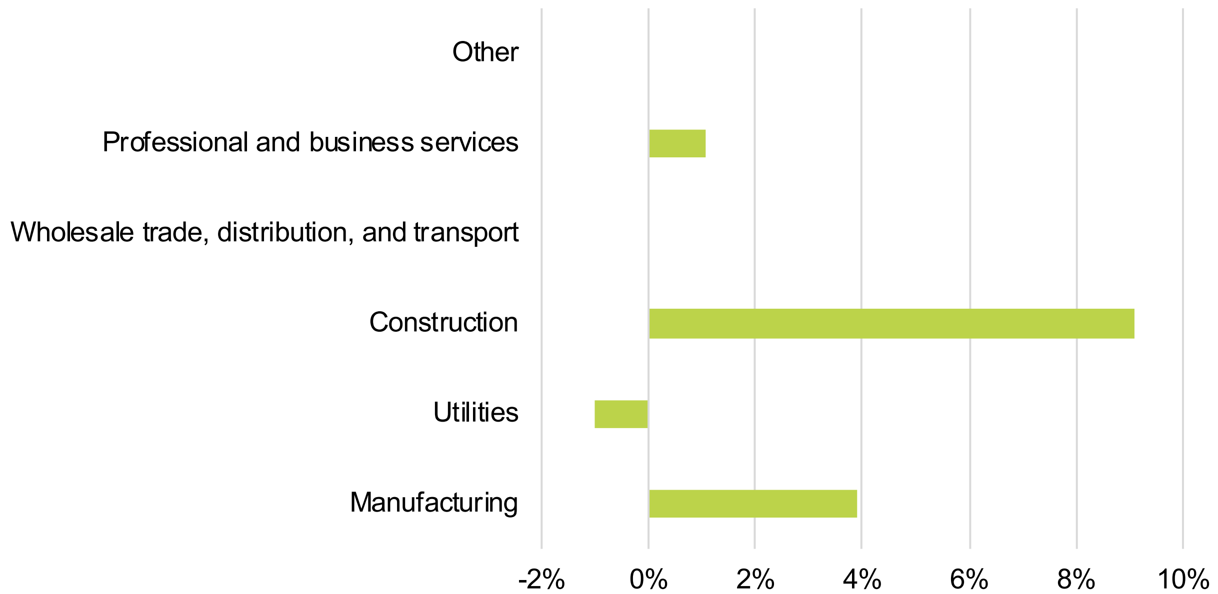
Within coal electricity industries, manufacturing and wholesale trade, distribution, and transport reported showed greatest difficulty hiring workers (Figure 17). Over 97% of these employers reported finding qualified workers as "very difficult" or "somewhat difficult." These results were driven by "somewhat difficult" responses; both were in the bottom three industries reporting "very difficult." Construction (40%) and professional and business services (37%) had the highest percentage of businesses reporting it to be "very difficult" to hire qualified workers.

Figure 17. Coal Electric Power Generation Hiring Difficulty by Industry



As shown in Figure 18, three out of the six industries in coal expect growth in 2022: Construction (9.1%), manufacturing (3.9%), and professional and business services (1.1%). Utilities anticipate a 1.0% decline in coal electricity jobs while "other services" and wholesale trade, distribution, and transport do not expect changes.

Figure 18. Coal Electric Power Generation Anticipated Change in Employment



Coal electricity is less diverse than the rest of the economy in terms of gender; males make up 68% of the workforce, more than the 53% U.S. average (Table 9).

Table 9. Coal Electric Power Generation Workforce Demographics and Characteristics

	Number of Workers	Coal Electricity Average	National Workforce Averages	Energy Workforce Averages
Male	48,021	68%	53%	74%
Female	22,799	32%	47%	25%
Gender non-binary	11	<1%	Unknown	0%
Hispanic or Latino	9,446	13%	18%	17%
Not Hispanic or Latino	61,385	87%	82%	83%
American Indian or Alaska Native	712	1%	1%	2%
Asian	7,088	10%	7%	7%

Black or African American, not Indigenous	6,784	10%	12%	8%
Black Indigenous	810	1%	insufficient data	1%
Native Hawaiian or other Pacific Islander	518	1%	<1%	1%
White	50,637	71%	78%	74%
Two or more races	4,283	6%	2%	8%
Veterans	4,802	7%	6%	9%
55 and over	12,789	18%	24%	17%
Disability	1,164	2%	4%	2%
Formerly Incarcerated	1,233	2%	2%	1%
Represented by a Union or Project Labor Agreement	12,021	17%	6%	10%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers is lower than the national average, 13% compared to 18%.

The portion of non-White workers in coal electricity is 29%, higher than the national average off 22%. This is attributable to higher-than-average portions of workers of two or more races (6% compared to 2% nationally), Asian workers (10% compared to 7% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally). American Indian or Alaska Natives are the same as the national average (1%) while the concentrations of other races are lower than national averages. The concentration of Black or African American workers is lower than the national average (10% compared to 12%).

The concentration of veterans (7% compared to 6% nationally) is higher than the national average. The portion of formerly incarcerated workers is the same as the national average (2%). The portion of the coal electricity workforce with disabilities that are known by employers, 2%, is lower than the 4% national average. The percentage of workers over the age of 55 (18% compared to 24% nationally) is also lower than the national average.

The concentration of workers represented by a union or project labor agreement is higher than the national average (17% compared to 6%).

Natural Gas

Natural gas electricity,[12] which includes conventional as well as advanced natural gas, employed 111,196 workers in 2021, up 1,715 from the 109,481 employed in 2020 (1.6%). Of these, 69,113 were in advanced natural gas with the remaining 42,083 in conventional natural gas. It employed 121,812 workers in 2019, indicating the technology has yet to fully recover from losses in 2020.

Trends and Key Takeaways

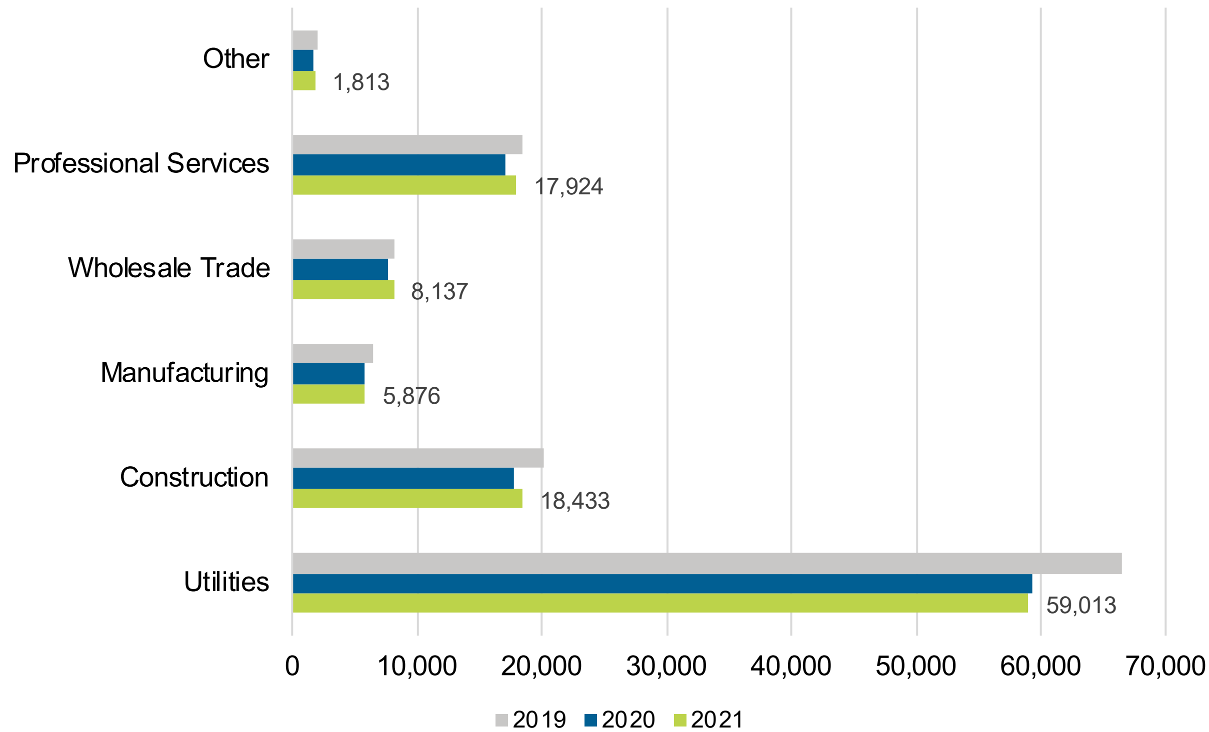
- The largest job gains were in the professional and business services industry, with 815 new jobs (4.8%). On a percentage basis, this ties with wholesale trade as the fastest growing sectors.
- Jobs only declined in utilities, which shrank by 370 positions or -0.6%.
- Manufacturing, professional and business services, and “other services” had the highest difficulty finding workers with 97% of respondents reporting difficulty. Professional and business services had the highest percentage of employers reporting hiring to be “very difficult” (53%).
- Natural gas electricity employers in five out of six industries anticipate growth in 2022, with these expectations ranging from 0.1% to 8.9%. Wholesale trade, distribution, and transport anticipated a 2.6% decline.
- Natural gas electricity’s workforce is disproportionately male, with 64% compared to 53% nationally.
- The percent of non-White workers is higher than the national average (36% compared to 22%). This is attributable to Asian workers (10% compared to 7% nationally), those of two or more races (14% compared to 2% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally) being more concentrated in natural gas electricity.
- Black or African American workers are underrepresented, making up 9% of the workforce compared to 12% of the overall U.S. workforce.
- Veterans are more represented in natural gas electricity at 8% compared to 6% nationally.
- The percentage of union workers in natural gas electricity (17%) is also higher than the national average (6%)
- Those with disabilities are less represented in natural gas electricity at 2% compared to 4% nationally. The percentage of previously incarcerated workers is lower than the national workforce (1% compared to 2%).

[12] The employment numbers in this chapter do not include extraction. These are in the Fuels and Multi-Sector chapters of this report.

Employment by Industry

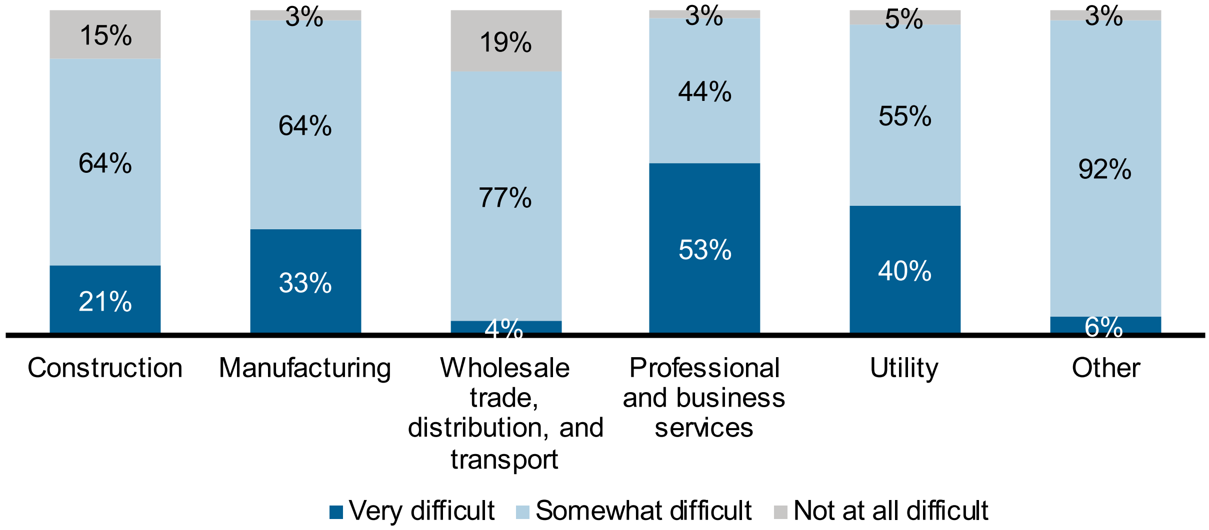
The largest number of natural gas electricity employees are in the utilities industry, with 59,013 workers (Figure 19). Construction employers reported the largest number of new jobs (746) translating to 4.2% growth. Construction experienced the second greatest percentage growth in jobs behind wholesale trade and professional and "other services," each of which expanded 4.8%. Wholesale trade, and professional and business services all had more jobs in 2021 than 2019.

Figure 19. Natural Gas Electric Power Generation Employment by Industry



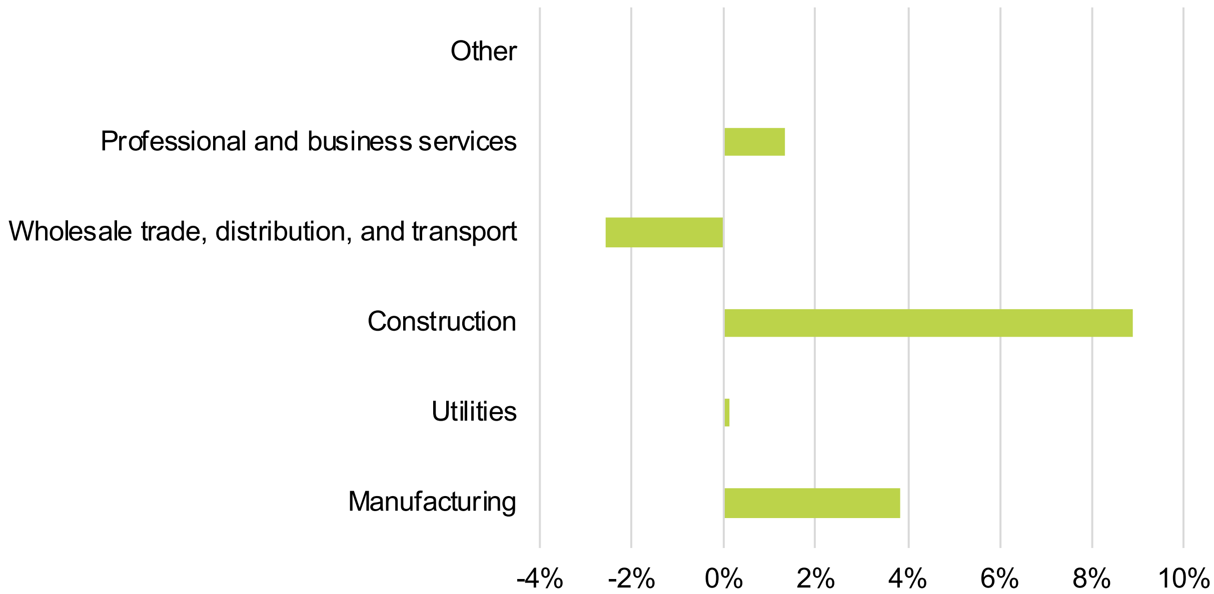
Within natural gas electricity industries, manufacturing, professional and business services, and employers from "other services" reported the greatest difficulty hiring, with 97% indicating at least some difficulty (Figure 20). Professional and business services had the highest percentage of businesses reporting that it is "very difficult" to hire at 53%.

Figure 20. Natural Gas Electric Power Generation Hiring Difficulty by Industry



As shown in Figure 21, only wholesale trade, distribution, and transport expected declines (-2.6%). Expected growth of 8.9% in construction was the highest number and, while not negative, "other services" anticipated no growth.

Figure 21. Natural Gas Electric Power Generation Hiring Difficulty



Natural gas electricity is less diverse than the rest of the economy in terms of gender; males make up 64% of the workforce (Table 10).

Table 10. Natural Gas Electric Power Generation Workforce Demographics and Characteristics

	Number of Workers	Natural Gas Electricity Averages	National Workforce Averages	Energy Workforce Averages
Male	71,645	64%	53%	74%
Female	39,385	35%	47%	25%
Gender non-binary	165	<1%	Unknown	0%
Hispanic or Latino	19,904	18%	18%	17%
Not Hispanic or Latino	91,292	82%	82%	83%
American Indian or Alaska Native	1,305	1%	1%	2%
Asian	11,068	10%	7%	7%
Black or African American, not Indigenous	10,011	9%	12%	8%
Black Indigenous	854	1%	insufficient data	1%
Native Hawaiian or other Pacific Islander	950	1%	<1%	1%
White	70,951	64%	78%	74%
Two or more races	16,057	14%	2%	8%
Veterans	8,882	8%	6%	9%
55 and over	16,545	15%	24%	17%
Disability	2,559	2%	4%	2%

Formerly Incarcerated	1,248	1%	2%	1%
Represented by a Union or Project Labor Agreement	18,564	17%	6%	10%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers is the same as the national average, 18%.

The portion of non-White workers in natural gas electric power generation is 36%, higher than the 22% national average. This is attributable to higher-than-average portions of workers of two or more races (14% compared to 2% nationally), Asian workers (10% compared to 7% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally). The portion of the workforce made up American Indian or Alaska Natives is the same as national averages (1%), while the concentrations of other races are lower than national averages.

The concentration of veterans (8% compared to 6% nationally) is higher than the national average. The portion of formerly incarcerated workers is lower than the national average (1% compared to 2%), which is also the case for those with disabilities disclosed to employers (2% compared to 4% nationally). The percentage of workers over the age of 55 (15% compared to 24% nationally) is also lower than the national average.

The concentration of workers represented by a union or project labor agreement is higher than the national average (17% compared to 6%).

Nuclear

Nuclear electricity companies,[13] employed 55,562 workers in 2021, down 2,440 from the 58002 employed in 2020 (-4.2%). This continued a trend of declines. Employment stood at 60,916 in 2019—a 5,354 job difference.

Trends and Key Takeaways

- The largest job losses were in utilities (-2,966 or -6.9%), which is also the largest industry in nuclear (39,815).
- Jobs increased in four industries, but these gains were small: the largest was 392 new jobs in Professional and business services
- Construction companies reported the highest percentage of companies with hiring difficulty, with 94% of respondents indicating that it was “very difficult” or “somewhat difficult” to find employees.
- Nuclear electricity employers in three out of six industries anticipate growth in 2022, with these expectations ranging from 1.3% to 8.9%. Two industries anticipate declines ranging from -2.7% to -7.0%. Utilities did not expect any changes in 2022.
- Nuclear electricity’s workforce is disproportionately male, with 65% compared to 53% nationally.
- Racially, the nuclear electricity industry is more non-White than national averages. The percent of non-White workers is 34% compared to 22%. This is attributable to Asian workers (10% compared to 7% nationally), those of two or more races (8% compared to 2% nationally), American Indian or other Alaska Native (3% compared to 1%), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally) being more concentrated in nuclear electricity.
- Hispanic workers are less concentrated than the workforce average (14% compared to 18%).
- Black or African American workers are underrepresented, making up 11% of the workforce compared to 12% of the overall U.S. workforce.
- Veterans are similarly represented in nuclear electricity as they are in the national workforce (6%).
- At 20%, nuclear electricity is the most unionized energy technology and higher than the national private sector average of 6%.
- Those with disabilities are less represented in nuclear at 1% compared to 4% nationally. The percentage of previously incarcerated workers is the same as the national workforce (2%).

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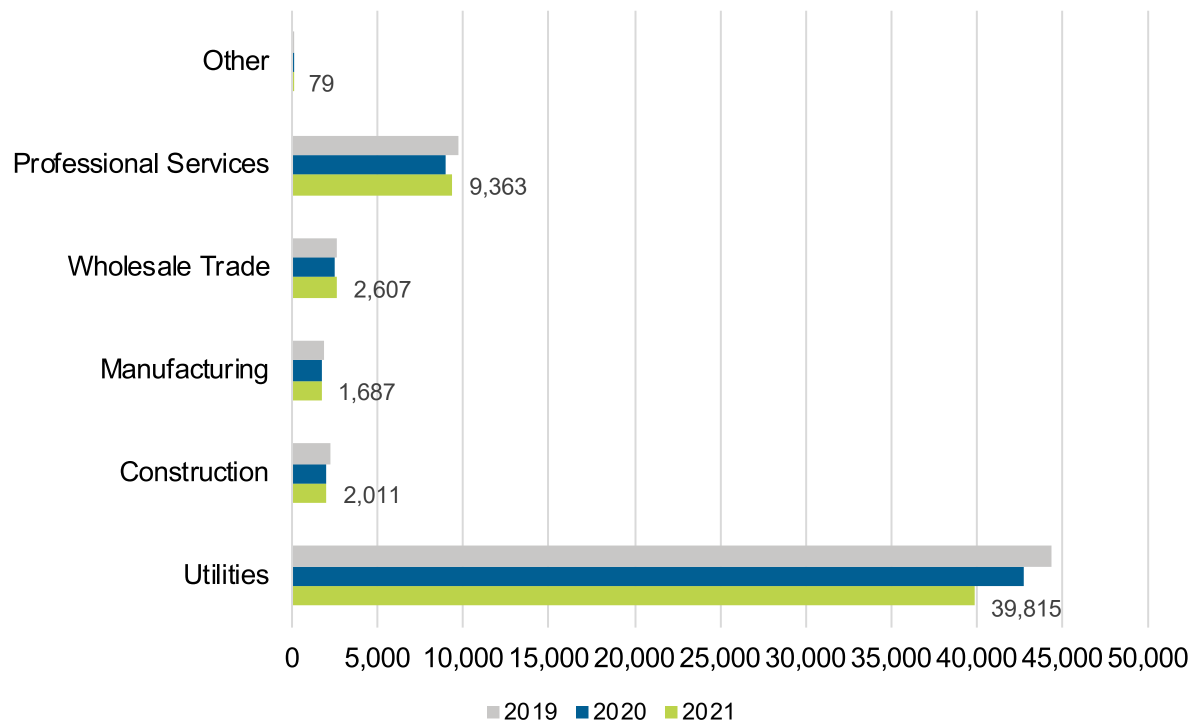
[13] These job numbers do not include extraction activity. This is covered in the Fuels and Multi-Sector chapters of this report.

Employment by Industry

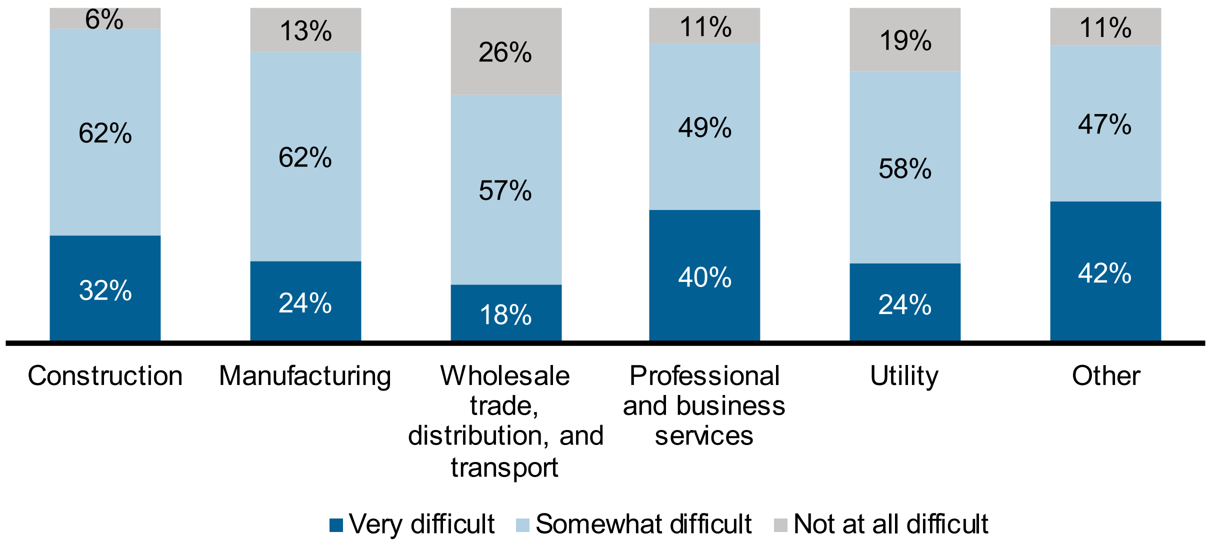
The largest number of nuclear electricity employees are in utilities, with 39,815 workers (Figure 22). Utilities also drove job losses, decreasing by 2,966 (-6.9%). Nuclear utilities employed 44,366 workers in 2019 for a two-year decrease of 4,551. The only other sector to decline was manufacturing, which decreased by 35 jobs (-2.0%). Professional and business services led job growth with 392 new positions (4.4%) followed by wholesale trade with 98 new jobs (3.9%).

Figure 22. Nuclear Electric Power Generation Employment by Industry



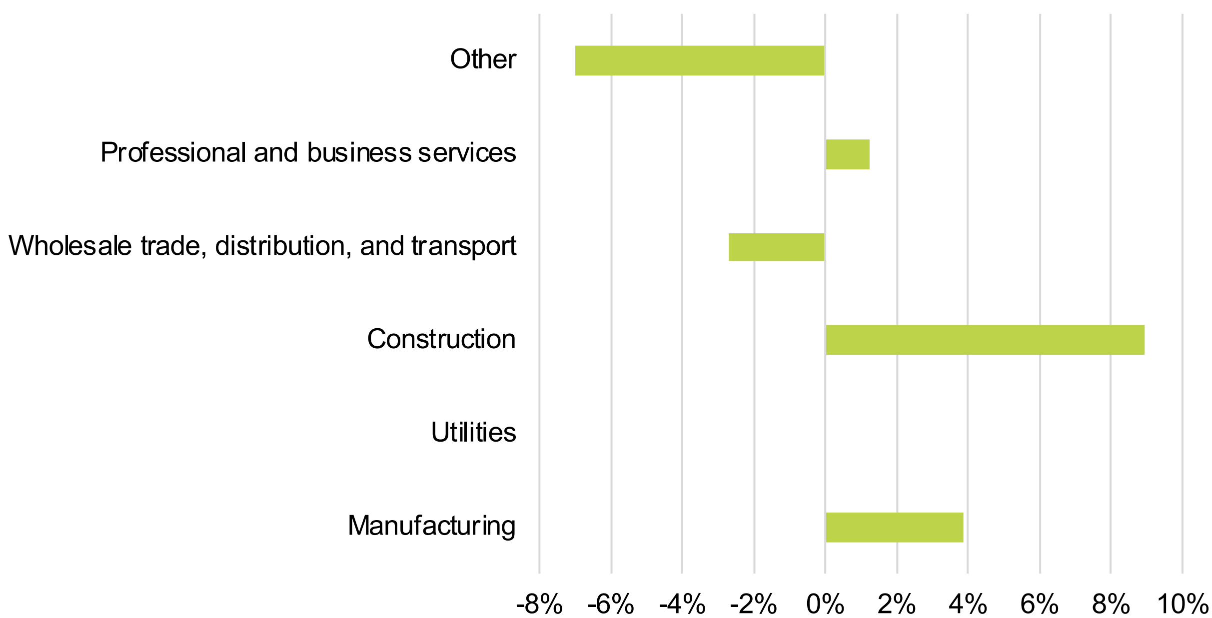
Within nuclear electricity industries, construction employers reported the greatest difficulty hiring workers (Figure 23). Nearly 94% of employers reported some difficulty finding qualified workers, with 32% claiming it is “very difficult,” the highest for “very difficult” among industries. Wholesale trade, distribution, and transport reported the least difficulty hiring, with 26% stating that it is “not at all difficult.” Nearly 74% of this industry still reported hiring difficulty.

Figure 23. Nuclear Electric Power Generation Hiring Difficulty by Industry



As shown in Figure 24, half out of the six industries in nuclear electricity expect growth in 2022: Construction (8.9%), manufacturing (3.9%), and professional and business services (1.3%). Utilities do not expect any change in employment while "other services" (-7.0%) and wholesale trade, distribution, and transport (-2.7%) expect declines.

Figure 24. Nuclear Electric Power Generation Anticipated Change in Employment by Industry



Nuclear electricity is less diverse than the rest of the economy in terms of gender; males make up 65% of the workforce, more than the 53% U.S. average (Table 11).

Table 11. Nuclear Electric Power Generation Workforce Demographics and Characteristics

	Number of Workers	Nuclear Electricity Averages	National Workforce Averages	Energy Workforce Averages
Male	36,372	65%	53%	74%
Female	18,832	34%	47%	25%
Gender non-binary	358	1%	insufficient data	0%
Hispanic or Latino	7,594	14%	18%	17%
Not Hispanic or Latino	47,969	86%	82%	83%
American Indian or Alaska Native	1,887	3%	1%	2%
Asian	5,522	10%	7%	7%
Black or African American, not Indigenous	6,255	11%	12%	8%
Black Indigenous	335	1%	insufficient data	1%
Native Hawaiian or other Pacific Islander	392	1%	<1%	1%
White	36,562	66%	78%	74%
Two or more races	4,610	8%	2%	8%
Veterans	3,104	6%	6%	9%
55 and over	8,197	15%	24%	17%
Disability	797	1%	4%	2%

Formerly Incarcerated	1,146	2%	2%	1%
Represented by a Union or Project Labor Agreement	11,218	20%	6%	10%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The concentration of Hispanic or Latino workers is 14%, compared to the workforce average of 18%.

The portion of non-White workers in nuclear electricity is 34%, higher than the national average of 22%. This is attributable to higher-than-average portions of workers of two or more races (8% compared to 2% nationally), Asian workers (10% compared to 7% nationally), Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally), and American Indian or Alaska Natives (3% compared to 1% nationally). The proportion of other races is lower than national averages as well.

The concentration of veterans (8% compared to 6% nationally) is higher than the national average. The portion of formerly incarcerated workers is the same as the national average (2%), while those with disabilities (1% compared to 4% nationally) and workers 55 and over (15% compared to 24% nationally) are less represented in nuclear electricity than the entire national workforce.

The concentration of workers represented by a union or project labor agreement is higher than the national average, as is the portion of those represented by a union (20% compared to 6%).

Hydropower

Hydropower includes traditional facilities, such as dams, as well as smaller, lower impact hydropower facilities, and can include marine and hydrokinetic power. In 2021 hydropower companies employed 64,514 workers, up 1,383 (2.2%) from 2020, yet down 3,258 jobs from the 67,772 employed in 2019.

Most hydropower employment, 53,029 jobs, was in traditional hydropower. The remaining 11,485 were in low-impact hydropower.

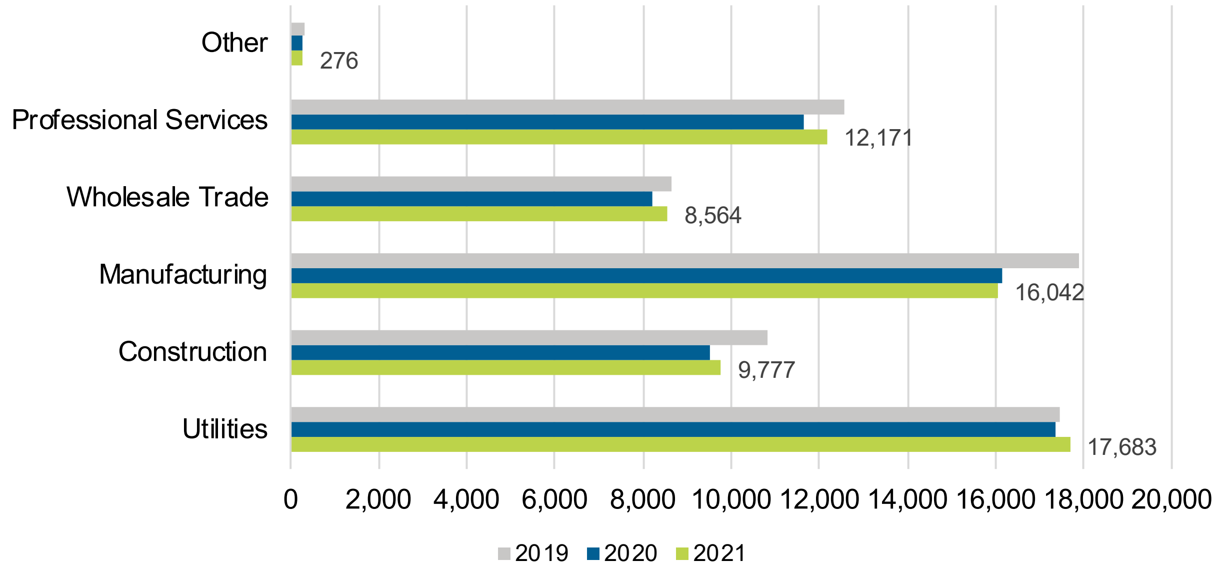
Trends and Key Takeaways

- The largest job gains were in the professional and business services industry, with 510 new jobs (4.4%). On a percentage basis, wholesale trade had slightly higher gains with 4.5% growth (368 jobs).
- Jobs decreased in manufacturing by 98, or -0.6%
- Construction had the highest percentage of companies reporting hiring difficulty, with 98% of respondents indicating it was "very difficult" or "somewhat difficult" to find employees.
- Hydropower electricity employers in three out of six industries anticipate growth in 2022, with these expectations ranging from 0.3% to 8.9%. Wholesale trade, distribution, and transport anticipated a 2.6% decline while both manufacturing and utilities did not expect gains or losses.
- The percentage of workers covered by a union or project labor agreement in hydropower electricity (12%) is also higher than the national average (6%).
- Hydropower electricity's workforce is disproportionately male, with 69% compared to 53% nationally.
- Racially, the hydropower electricity industry is more non-White than national averages. The percent of non-White workers is higher than the national average (30% compared to 22%). This is attributable to Asian workers (10% compared to 7% nationally), those of two or more races (7% compared to 2% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally) being more concentrated in hydropower electricity.
- Hispanic workers are less concentrated than the workforce average (16% compared to 18%).
- Black or African American workers are underrepresented, making up 10% of the workforce compared to 12% of the overall U.S. workforce.
- Veterans are more represented in hydropower electricity at 9% compared to 6% nationally.
- Those with disabilities are less represented in hydropower electricity at 2% compared to 4% nationally. The percentage of previously incarcerated workers is higher than the national workforce (3% compared to 2%).

Employment by Industry

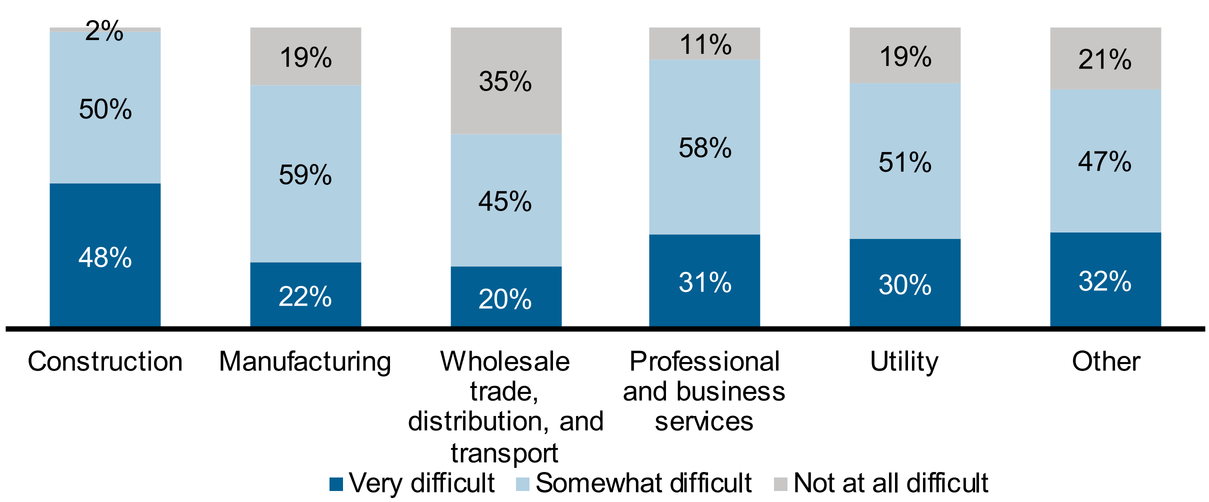
The largest number of hydropower employees are in the utilities industry, with 17,683 workers (Figure 25). Professional and business services, however, showed both the largest number of new jobs—510 (4.4% growth)—although the greatest industry growth by percentage was in wholesale trade with a 4.5% change (368 jobs). Manufacturing was the only sector to experience a decline, falling 98 jobs (-0.6%). Only utilities had more jobs in 2021 than it did in 2019.

Figure 25. Hydropower Electric Power Generation Employment by Industry



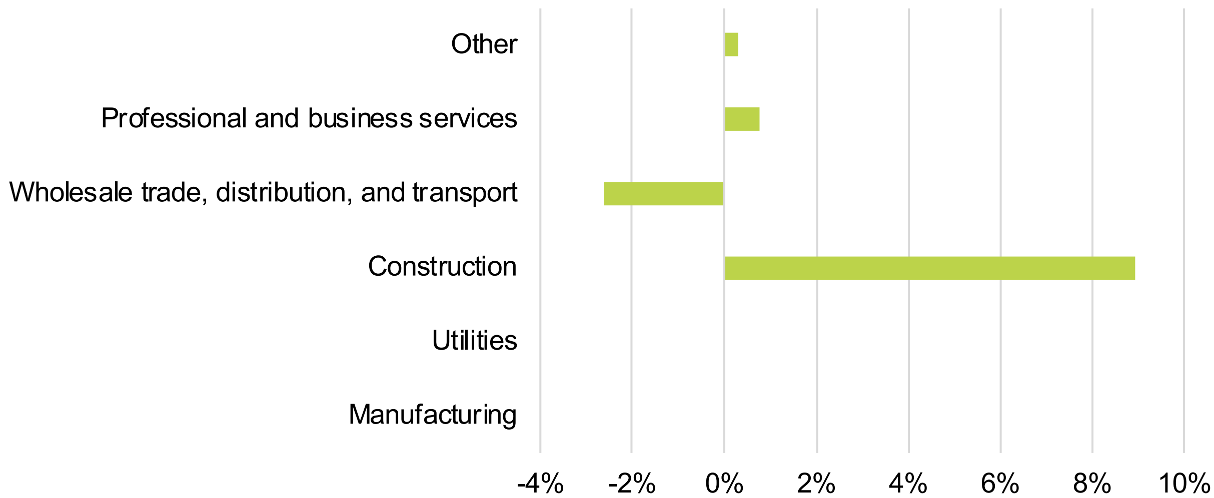
Within hydropower sub-industries, construction employers reported the greatest difficulty hiring workers (Figure 26). Over 98% of employers reported some difficulty finding qualified workers, with 48% claiming it is "very difficult." That is the highest for "very difficult" among industries as well. Utilities in hydropower reported the least difficulty hiring, with 19% stating that it is "not at all difficult." Nearly 81% of this industry still reported hiring difficulty.

Figure 26. Hydropower Electric Power Generation Hiring Difficulty by Industry



As shown in Figure 27, only one hydropower industry anticipates a decline in employment: wholesale trade, distribution, and transport (-2.6%). Manufacturing and utilities do not expect changes in jobs from 2020 to 2021 while “other services” (0.3%), professional and business services (0.8%), and construction (8.9%) do anticipate growth.

Figure 27. Hydropower Electric Power Generation Anticipated Employment Changes



Hydropower is less diverse than the rest of the economy in terms of gender; males make up 69% of the workforce, more than the 53% U.S. average (Table 12).

Table 12. Hydropower Electric Power Generation Workforce Demographics and Characteristics

	Number of Workers	Hydropower Electricity Averages	National Workforce Averages	Energy Workforce Averages
Male	44,487	69%	53%	74%
Female	19,877	31%	47%	25%
Gender non-binary	151	0%	insufficient data	0%
Hispanic or Latino	10,272	16%	18%	17%
Not Hispanic or Latino	54,242	84%	82%	83%
American Indian or Alaska Native	794	1%	1%	2%
Asian	6,699	10%	7%	7%

Black or African American, not Indigenous	5,862	9%	12%	8%
Black Indigenous	983	2%	insufficient data	1%
Native Hawaiian or other Pacific Islander	648	1%	<1%	1%
White	44,990	70%	78%	74%
Two or more races	4,539	7%	2%	8%
Veterans	5,543	9%	6%	9%
55 and over	11,238	17%	24%	17%
Disability	1,418	2%	4%	2%
Formerly Incarcerated	1,891	3%	2%	1%
Represented by a Union or Project Labor Agreement	7,671	12%	6%	10%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of non-White workers in hydropower is 30%, higher than the national average of 22%. This is attributable to higher-than-average portions of workers of two or more races (8% compared to 2% nationally), Asian workers (10% compared to 7% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally). American Indian or Alaska Natives are the same as the national average (1%).

The portion of the workforce made up of Hispanic or Latino workers is lower than the national average, 15% compared to 18%.

The concentration of veterans (% compared to 6% nationally) is higher than the national average. The portion of formerly incarcerated workers is higher than the national average (3% compared to 2%). Workers with disabilities (2% compared to 4% nationally) and those over the age of 55 (17% compared to 24% nationally) are also lower than the national average.

The concentration of workers represented by a union or project labor agreement is higher than the national average (12% compared to 6%).

Combined Heat and Power

Combined heat and power (CHP) electricity employed 29,103 workers in 2021, up 996 from the 28,107 employed in 2020 (3.5%). It employed 30,342 workers in 2019, indicating the technology has yet to fully recover from losses in 2020.

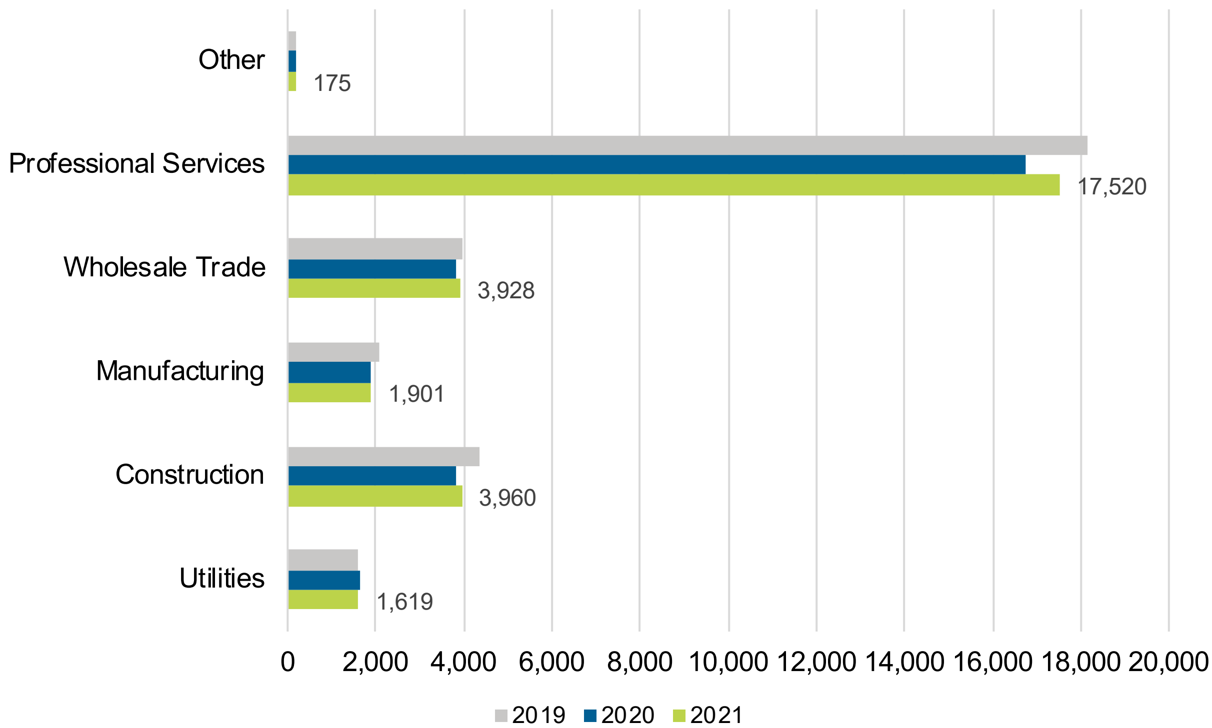
Trends and Key Takeaways

- The largest job gains were in the professional and business services industry, with 759 new jobs. This industry also expanded by the greatest percentage, increasing 4.5%.
- Jobs only decreased in utilities, dropping 2.7% (45 employees).
- Manufacturing had the highest percentage of companies reporting hiring difficulty, with 97% of respondents indicating that it was “very difficult” or “somewhat difficult” to find employees.
- CHP electricity employers in four out of six industries anticipate growth in 2022, with these expectations ranging from 0.6% to 9.0%. Wholesale trade, distribution, and transport anticipates a -6.4% change and “other services” expect neither growth nor declines.
- The percentage of workers covered by a union or project labor agreement in CHP electricity (11%) is also higher than the national average (6%).
- CHP electricity’s workforce is disproportionately male, with 68% compared to 53% nationally.
- Racially, CHP electricity is more non-White than national averages. The percent of non-White workers is higher than the national average (27% compared to 22%). This is attributable to Asian workers (9% compared to 7% nationally), those of two or more races (9% compared to 2% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally) being more concentrated in CHP electricity.
- Black or African American workers are underrepresented, making up 6% of the workforce compared to 12% of the overall U.S. workforce.
- Hispanic workers are more concentrated than the workforce average (20% compared to 18%).
- Veterans are more represented in CHP electricity at 8% compared to 6% nationally.
- Those with disabilities are less represented in CHP electricity at 2% compared to 4% nationally.
- The percentage of previously incarcerated workers is the same as the national workforce (2%).

Employment by Industry

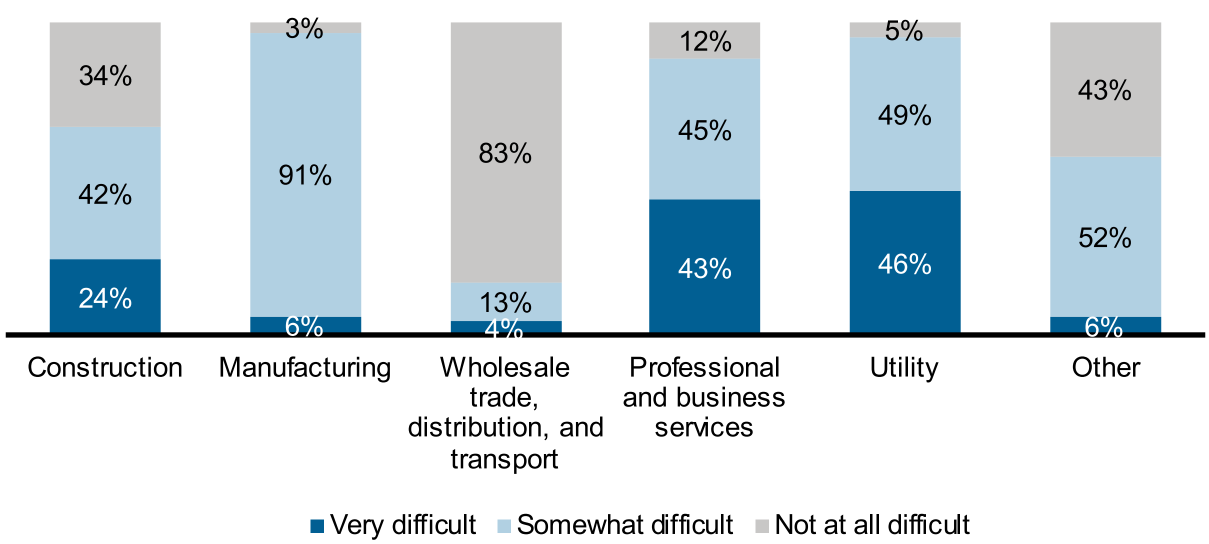
The largest number of CHP electricity employees was in the professional services industry, with 17,520 workers (Figure 28). This industry also showed the largest number of new jobs in 2021 (759) and greatest percentage growth rate (4.5%). Only jobs in utilities exceeded 2019 levels in 2021: 1,619 compared to 1,608.

Figure 28. Combined Heat and Power Electric Power Generation Employment by Industry



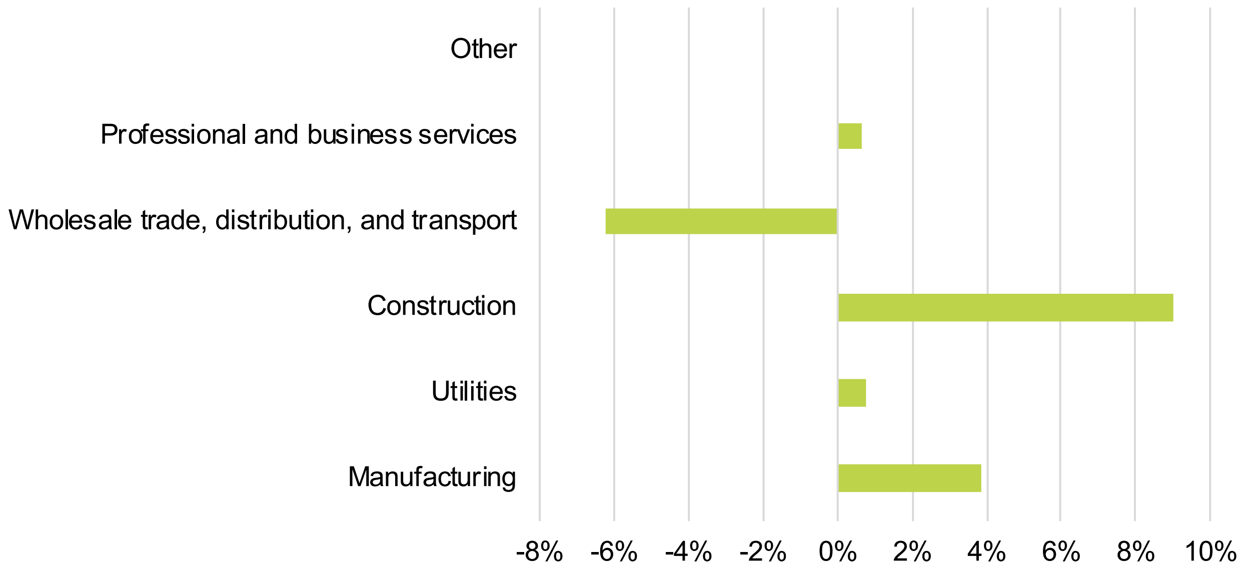
Within CHP electricity sub-industries, manufacturing had the greatest difficulty hiring workers (Figure 29). Nearly 97% of employers reported finding qualified workers as "very difficult" or "somewhat difficult." Utilities reported the highest percentage for it being "very difficult" to find workers (46%). Only 17% of employers in wholesale trade, distribution, and transport indicated hiring difficulty.

Figure 29. Combined Heat and Power Electric Power Generation Hiring Difficulty



As shown in Figure 30, only one industry within electricity expects a decline in 2022: wholesale trade, distribution, and transport (6.3%). Construction expects the greatest percentage rate of growth at 9.0%, while “other services” do not expect growth or job losses.

Figure 30. Combined Heat and Power Electric Power Generation Anticipated Changes in Employment



CHP electricity is less diverse than the rest of the economy in terms of gender; males make up 68% of the workforce, more than the 53% U.S. average (Table 13).

Table 13. Combined Heat and Power Electric Power Generation Workforce Demographics and Characteristics

	Number of Workers	CHP Electricity Average	National Workforce Averages	Energy Workforce Averages
Male	19,825	68%	53%	74%
Female	9,235	32%	47%	25%
Gender non-binary	43	<1%	insufficient data	0%
Hispanic or Latino	5,688	20%	18%	17%
Not Hispanic or Latino	23,415	80%	82%	83%
American Indian or Alaska Native	262	1%	1%	2%

Asian	2,668	9%	7%	7%
Black or African American, not Indigenous	1,835	6%	12%	8%
Black Indigenous	419	1%	insufficient data	1%
Native Hawaiian or other Pacific Islander	228	1%	<1%	1%
White	21,173	73%	78%	74%
Two or more races	2,518	9%	2%	8%
Veterans	3,096	11%	6%	9%
55 and over	6,025	21%	24%	17%
Disability	535	2%	4%	2%
Formerly Incarcerated	509	2%	2%	1%
Represented by a Union or Project Labor Agreement	3,582	12%	6%	10%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers is higher than the national average (20% compared to 18%).

The portion of non-White workers in CHP is 27%, higher than the national average of 22%. This is attributable to higher-than-average portions of workers of two or more races (9% compared to 2% nationally), Asian workers (9% compared to 7% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally). American Indian or Alaska Natives are the same as the national average (1%) while the concentrations of other races are lower than national averages.

The concentration of veterans (11% compared to 6% nationally) is higher than the national average. The portion of formerly incarcerated workers is the same as the national average (2%). The percentage of workers over the age of 55 (11% compared to 24% nationally) is lower than the national average, as are those with disabilities (2% compared to 4%).

The concentration of workers represented by a union or a project labor agreement is higher than the national average (12% compared to 6%).

Oil Electric Power Generation

Oil electricity,[14] primarily peaking plants, employed 11,741 workers in 2021, up 56 from the 11,685 employed in 2020 (0.5%), representing virtually no growth. It employed 12,722 workers in 2019, indicating the technology has yet to recover from losses in 2020.

Trends and Key Takeaways

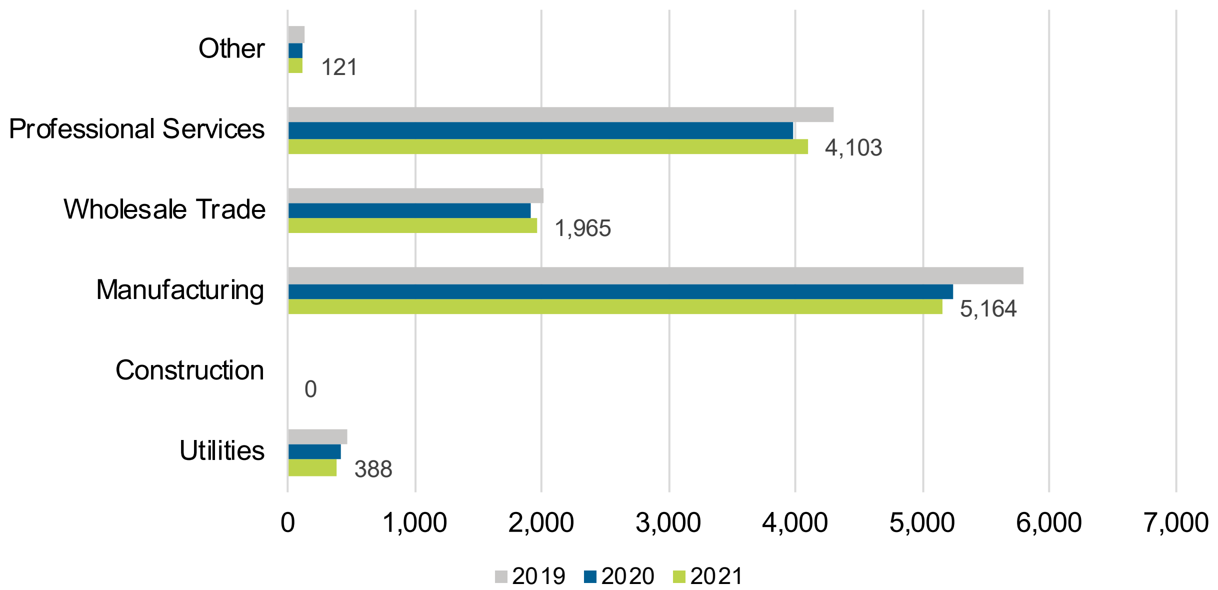
- The largest job gains were in the professional and business services industry, with 116 new jobs. This is also the highest percentage change, 2.9%.
- Utilities jobs declined by 35, or -8.3%.
- Professional and business services had the highest percentage of companies reporting hiring difficulty, with 89% of respondents indicating it was "very difficult" or "somewhat difficult" to find employees.
- Oil employers in all industries except for professional and business services expect growth in 2022, ranging from 0.1% (manufacturing) to 8.9% (wholesale trade, distribution, and transport). Professional and business services employers reported an anticipated 5.6% decline.
- The percentage of workers covered by a union or project labor agreement in oil electricity (16%) is also higher than the national average (6%).
- Oil jobs are disproportionately male, with 72% of workers being male compared to 53% nationally.
- Racially, the oil electricity technology is more diverse than national averages. The percent of White or Caucasian workers is lower than the national average (71% compared to 78%). This is attributable to Asian workers (10% compared to 7% nationally), those of those of two or more races (8% compared to 2% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally) being more concentrated in oil electricity.
- The percent of American Indians is the same as the national average (1%).
- Black or African American workers are underrepresented, making up 7% of the workforce compared to 12% of the overall U.S. workforce.
- Veterans are more represented in oil electricity at 8% compared to 6% nationally.
- Those with disabilities are less represented in oil electricity at 3% compared to 4% nationally.
- The percentage of previously incarcerated workers is lower than the national workforce (1% compared to 2%).

[14] These job numbers do not include extraction, which is in the Fuels and Multi-Sector sections of this report.

Employment by Industry

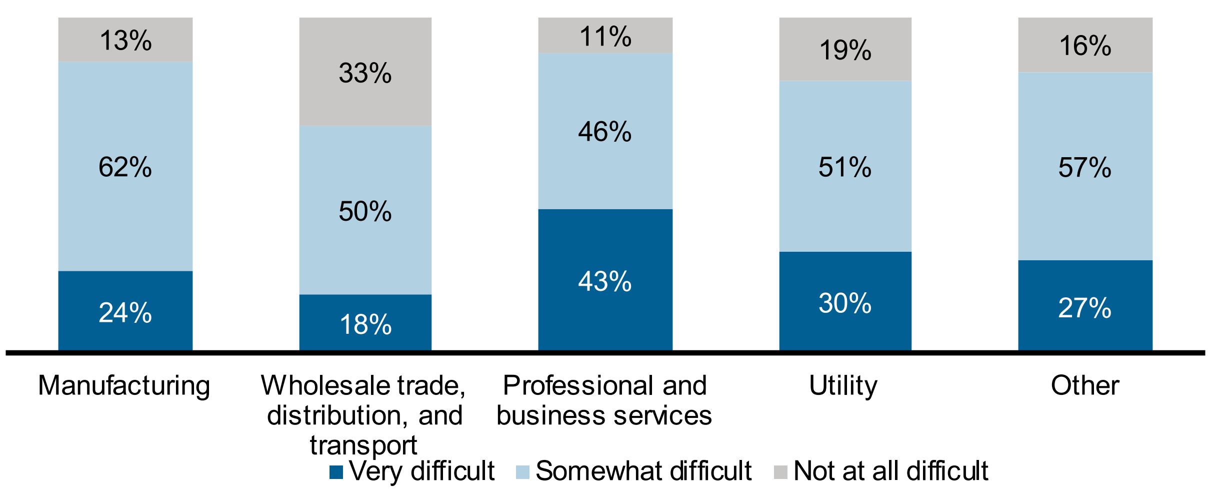
The largest number of oil electricity employees are in the manufacturing industry, with 5,164 workers (Figure 31). Manufacturing declined by 70 workers from 2020 to 2021 (-1.3%) while professional and business services added enough jobs to offset these losses (116 or 2.9% growth). No industry in oil electricity had more jobs in 2021 that it did in 2019.

Figure 31. Oil Electric Power Generation Employment by Industry



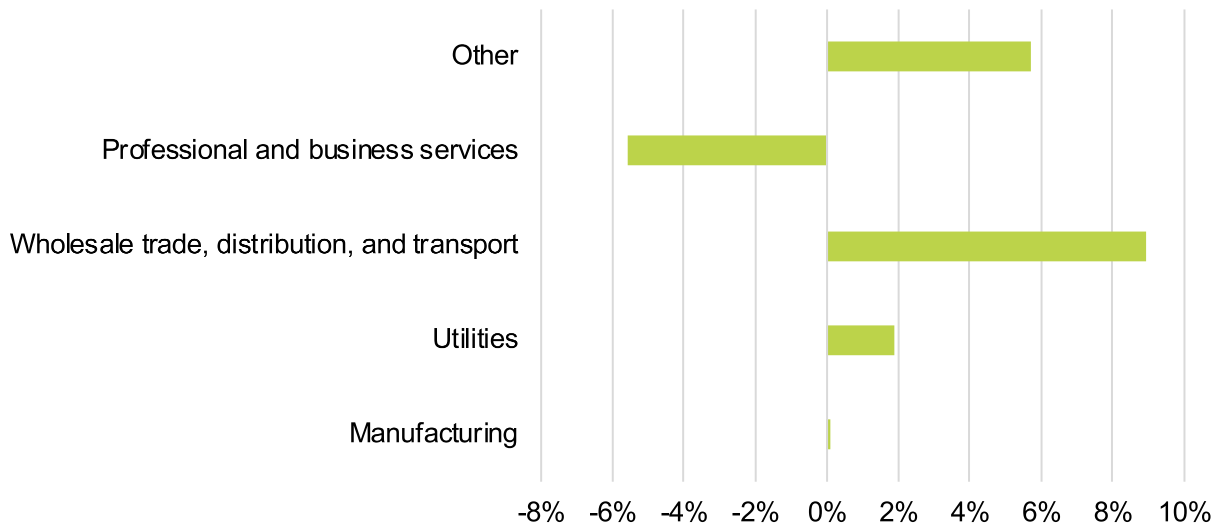
Within oil electricity industries, manufacturing had the greatest difficulty hiring workers (Figure 32). Nearly 87% of employers reported some difficulty finding qualified workers, with 24% claiming it is "very difficult." Professional and business services employers reported the highest instances of "very difficult" among industries as well: 43%.

Figure 32. Oil Electric Power Generation Hiring Difficulty by Industry



As shown in Figure 33, only professional and business services employers expect job declines from 2021 to 2022 (-5.6%). All other industries expect growth, ranging from 0.1% in manufacturing to 8.9% in wholesale trade, distribution, and transport.

Figure 33. Oil Electric Power Generation Anticipated Employment Changes



Oil electricity is less diverse than the rest of the economy in terms of gender; males make up 72% of the workforce, more than the 53% U.S. average (Table 14).

Table 14. Oil Electric Power Generation Workforce Demographics and Characteristics

	Number of Workers	Oil Electricity Averages	National Workforce Averages	Energy Workforce Averages
Male	8,418	72%	53%	74%
Female	3,318	28%	47%	25%
Gender non-binary	5	<1%	insufficient data	0%
Hispanic or Latino	2,014	17%	18%	17%
Not Hispanic or Latino	9,727	83%	82%	83%
American Indian or Alaska Native	133	1%	1%	2%
Asian	1,197	10%	7%	7%

Black or African American, not Indigenous	868	7%	12%	8%
Black Indigenous	109	1%	insufficient data	1%
Native Hawaiian or other Pacific Islander	115	1%	<1%	1%
White	8,389	71%	78%	74%
Two or more races	932	8%	2%	8%
Veterans	953	8%	6%	9%
55 and over	1,871	16%	24%	17%
Disability	326	3%	4%	2%
Formerly Incarcerated	147	1%	2%	1%
Represented by a Union or Project Labor Agreement	1,057	9%	6%	10%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of non-White workers in oil electricity is 29%, higher than the national average of 22%. This is attributable to higher-than-average portions of workers of two or more races (8% compared to 2% nationally), Asian workers (10% compared to 7% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally). American Indian or Alaska Natives are the same as the national average (1%) while the concentrations of other races are lower than national averages.

The portion of the workforce made up of Hispanic or Latino workers is lower than the national average, 17% compared to 18%.

The concentration of veterans (8% compared to 6% nationally) is higher than the national average. The portion of formerly incarcerated workers is lower than the national average (1% compared to 2%), which is also the case for those with disabilities disclosed to employers (3% compared to 4% nationally). The percentage of workers over the age of 55 (16% compared to 24% nationally) is also lower than the national average.

The concentration of workers represented by a union or project labor agreement is higher than the national average (9% compared to 6%).

Bioenergy

Bioenergy for power generation employed 12,388 workers in 2021, up 349 from the 12,039 employed in 2020 (2.9%). It did, however, employ 13,178 workers in 2019, indicating the technology has yet to fully recover from losses in 2020.

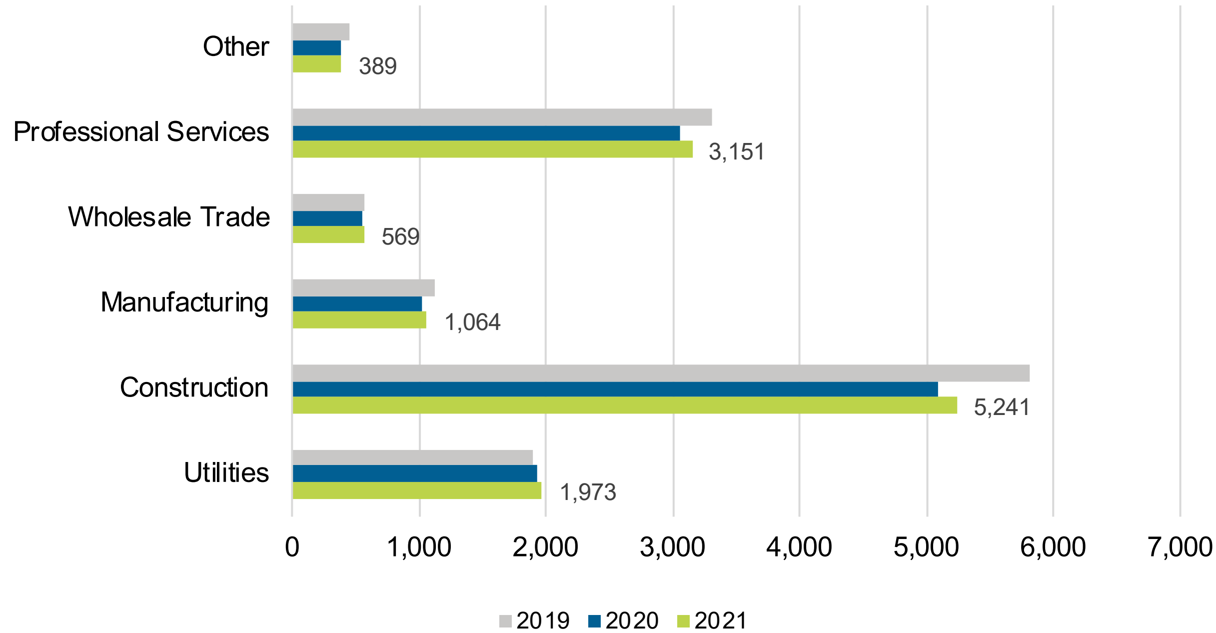
Trends and Key Takeaways

- The largest job gains were in the construction industry, with 155 new jobs (3.0%). On a percentage basis, manufacturing increased the most, expanding 3.9% from 1,024 to 1,064 jobs.
- Jobs did not decrease in any bioenergy industry.
- Construction employers had the highest percentage of companies reporting hiring difficulty, with 94% of respondents indicating that it was “very difficult” or “somewhat difficult” to find employees.
- No bioenergy employers expect job declines from 2021 to 2022, although both manufacturing and wholesale trade, distribution, and transport do not expect any changes.
- The percentage of workers covered by a union or project labor agreement in bioenergy (11%) is also higher than the national average (6%).
- The bioenergy workforce tends to be disproportionately male, with 69% of workers being male compared to 53% nationally.
- Racially, it is more non-White than national averages. The percent of non-White workers is higher than the national average (29% compared to 22%). This is attributable to Asian workers (9% compared to 7% nationally), those of two or more races (6% compared to 2% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally) being more concentrated in bioenergy.
- The percent of American Indians is the same as the national average (1%).
- Black or African American workers are underrepresented, making up 10% of the workforce compared to 12% of the overall U.S. workforce.
- Hispanic workers are less concentrated than the workforce average (15% compared to 18%).
- Veterans are more represented in bioenergy at 11% compared to 6% nationally.
- Those with disabilities are less represented in bioenergy at 3% compared to 4% nationally.
- The percentage of previously incarcerated workers is lower than the national workforce (1% compared to 2%).

Employment by Industry

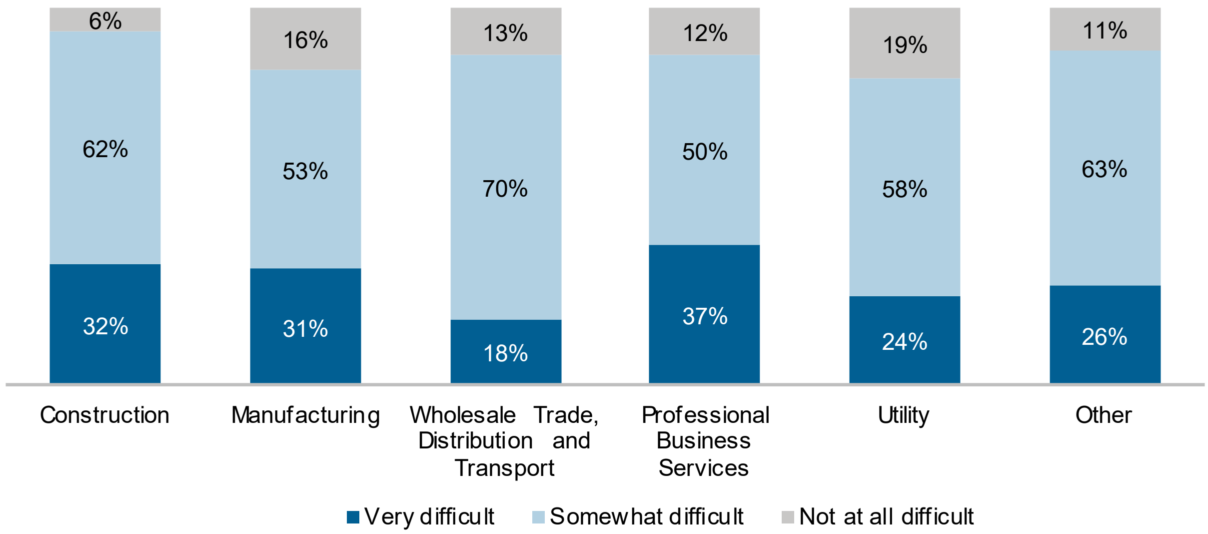
The largest number of bioenergy employees are in the construction industry, with 5,241 workers (Figure 34). Construction also showed the largest number of new jobs—155—although, being the largest industry, its 3.0% growth rate was the third largest behind manufacturing (3.9%) and wholesale trade (3.3%). Professional and business services grew at the same rate as construction. Total bioenergy jobs in 2021 did not exceed its 2019 level (13,178). No industry except for utilities reached its 2019 level; utilities was 76 jobs higher.

Figure 34. Bioenergy Employment by Industry, 2019–2021



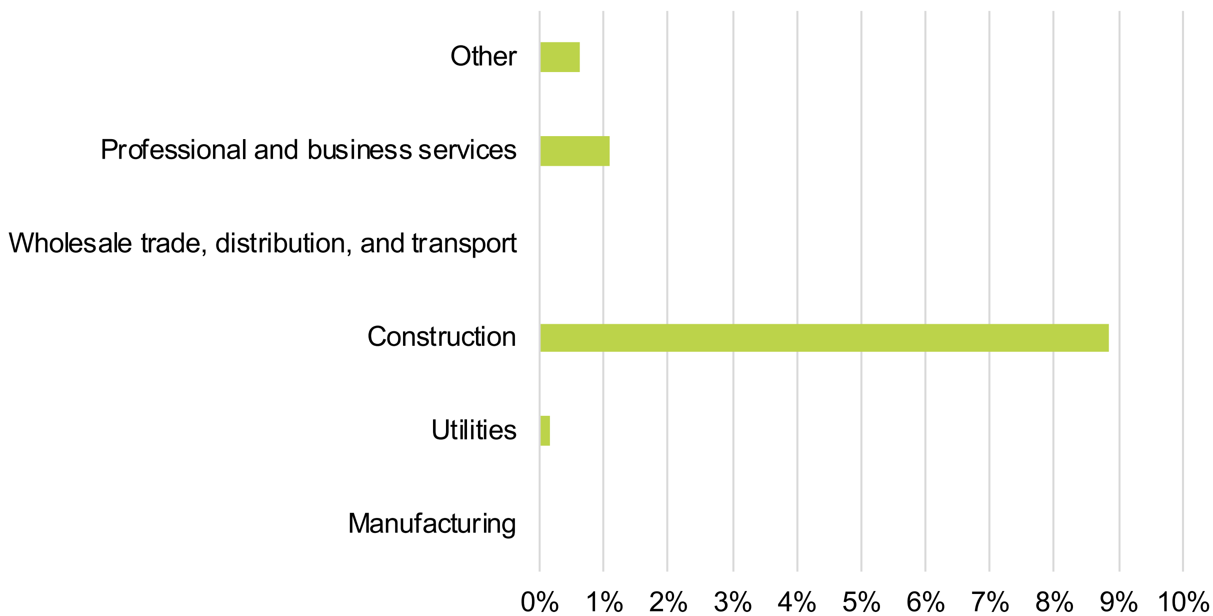
Within bioenergy industries, construction employers reported the greatest difficulty hiring workers (Figure 35). Nearly 94% of employers reported some difficulty finding qualified workers, with 32% claiming it is "very difficult." At 37%, professional and business services reported the greatest instances of "very difficult." Utilities in bioenergy reported the least difficulty in hiring, with 19% stating that it is "not at all difficult."

Figure 35. Bioenergy Hiring Difficulty



As shown in Figure 36, four out of the six industries in bioenergy expect growth in 2022: Construction (8.8%), professional and business services (1.1%), "other services" (0.6%), and utilities (0.2%). Manufacturing and wholesale trade, distribution, and transport anticipate no changes.

Figure 36. Bioenergy Anticipated Changes in Employment, 2021–2022



Bioenergy is less diverse than the rest of the economy in terms of gender; males make up 69% of the workforce, more than the 53% U.S. average (Table 15).

Table 15. Bioenergy Workforce Demographics and Characteristics

	Number of Workers	Bioenergy Electricity Averages	National Workforce Averages	Energy Workforce Averages
Male	8,508	69%	53%	74%
Female	3,835	31%	47%	25%
Gender non-binary	45	<1%	insufficient data	0%
Hispanic or Latino	1,873	15%	18%	17%
Not Hispanic or Latino	10,515	85%	82%	83%
American Indian or Alaska Native	143	1%	1%	2%
Asian	1,161	9%	7%	7%
Black or African American, not Indigenous	1,269	10%	12%	8%
Black Indigenous	84	1%	insufficient data	1%
Native Hawaiian or other Pacific Islander	128	1%	<1%	1%
White	8,832	71%	78%	74%
Two or more races	770	6%	2%	8%
Veterans	1,376	11%	6%	9%
55 and over	2,585	21%	24%	17%
Disability	357	3%	4%	2%
Formerly Incarcerated	157	1%	2%	1%
Represented by a Union or Project Labor Agreement	1,409	11%	6%	10%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers is lower than as the national average, 15% compared to 18%.

Racially, the portion of non-White workers in bioenergy, 29%, is higher than the national average of 22%. This is attributable to higher-than-average portions of workers of two or more races (6% compared to 2% nationally), Asian workers (9% compared to 7% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally). American Indian or Alaska Natives are the same as the national average (1%) while the concentrations of other races are lower than national averages.

The concentration of veterans (11% compared to 6% nationally) is higher than the national average, as is the portion of those represented by a union (11% compared to 6%). The portion of formerly incarcerated workers is lower than the national average (1% compared to 2%), which is also the case for those with disabilities disclosed to employers (3% compared to 4% nationally). The percentage of workers over the age of 55 (21% compared to 24% nationally) is also lower than the national average.

The concentration of workers represented by a union or project labor agreement veterans is higher than the national average (11% compared to 6%).

Other Electric Power Generation

"Other electricity" technologies[15] employed 48,194 workers in 2021, up 1,960 from the 46,234 employed in 2020 (4.2%). They did, however, employ 50,211 workers in 2019, indicating the these technologies have yet to fully recover from losses in 2020.

Trends and Key Takeaways

- The largest job gains were in the professional and business services industry, with 714 new jobs (5.7%). On a percentage basis, utilities increased the most, expanding 9.7% from 3,658 to 4,013 jobs.
- Jobs did not decrease in any "other electricity" industry.
- Construction employers had the highest percentage of companies reporting hiring difficulty, with 94% of respondents indicating it was "very difficult" or "somewhat difficult" to find employees.
- No "other electricity" employers expected negative growth from 2021 to 2022. Among industries anticipating growth, estimates range from 2.2% to 7.6%.
- The percentage of workers covered by a union or project labor agreement in "other electricity" is the same as the national average (6%).
- The workforce in "other electricity" tends to be disproportionately male, with 68% compared to 53% nationally.
- Hispanic workers are slightly more concentrated than the workforce average (19% compared to 18%).
- Racially, this mix of technologies is more diverse than national averages. The percent of non-White workers is higher than the national average (29% compared to 22%). This is attributable to Asian workers (10% compared to 7% nationally), those of two or more races (8% compared to 2% nationally), Hispanic and Latino workers (19% compared to 18%), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally) being more concentrated in "other electricity."
- The percent of American Indians is the same as the national average (1%).
- Veterans are more represented in "other electricity" at 8% compared to 6% nationally.
- Those with disabilities are less represented in ""other electricity"" at 3% compared to 4% nationally.
- The percentage of previously incarcerated workers is the same as the national workforce.

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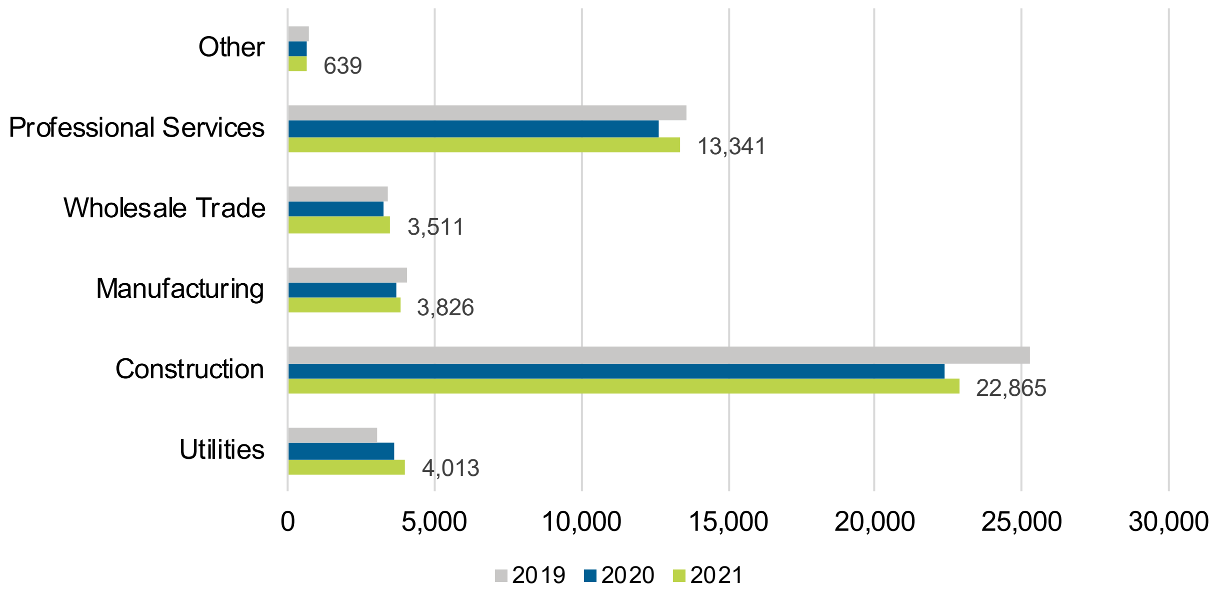
[15] Includes generation from incineration of "other fuels" (waste, etc.), and employment that cannot be classified into a single category. This includes geothermal.

Employment by Industry

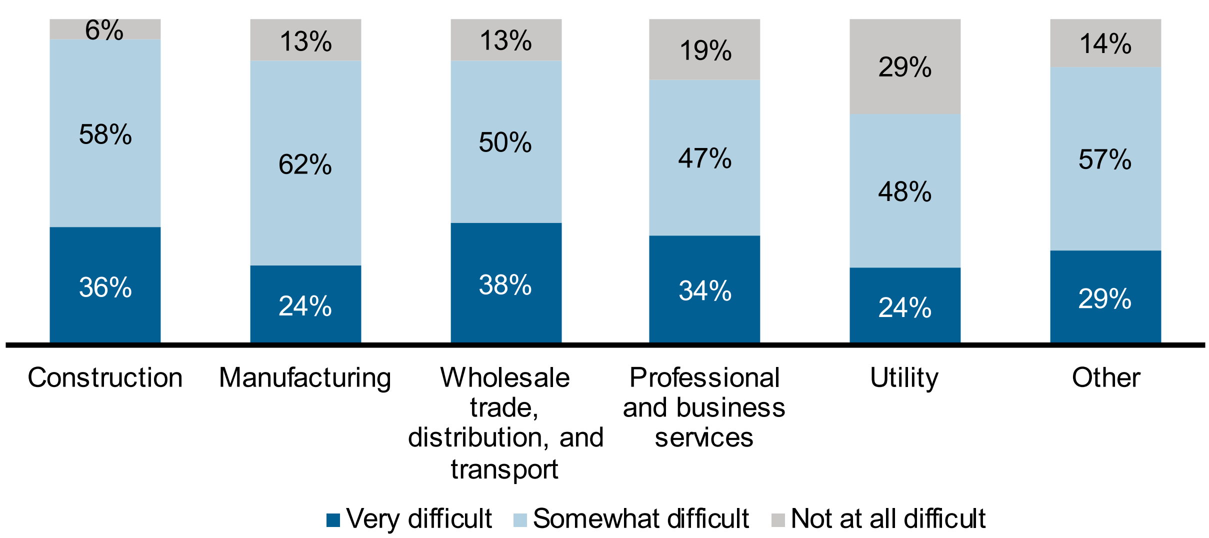
The largest number of "other electricity" employees are in the construction industry, with 22,865 workers (Figure 37). Professional and business services showed the largest number of new jobs at 714 (5.7%), while utilities grew by the greatest percentage, expanding 9.7% (355 jobs). Only utilities and wholesale trade exceeded their 2019 pre-COVID levels.

Figure 37. "Other Electric Power Generation" Employment by Industry



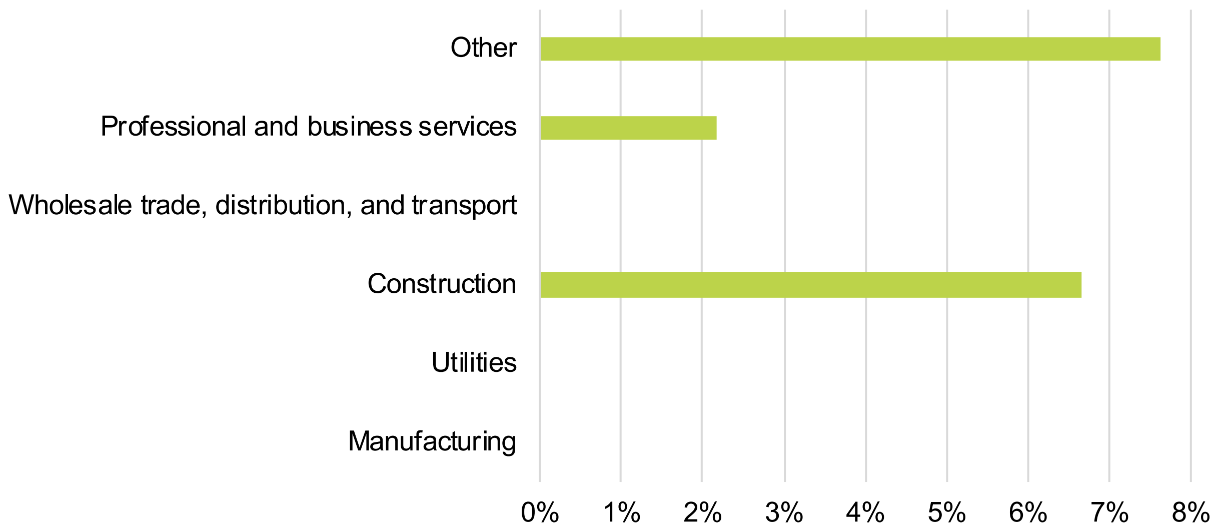
Within "other electricity" industries, construction employers reported the greatest difficulty hiring workers (Figure 38). Nearly 94% of employers reported some difficulty finding qualified workers, with 36% claiming it is "very difficult." That is the second highest occurrence of "very difficult" among industries, exceeded only by wholesale trade.

Figure 38. "Other Electric Power Generation" Hiring Difficulty



As shown in Figure 39, three out of the six industries in “other electricity” expect growth in 2022: “Other services” (7.6%), construction (6.7%), and professional and business services (2.2%). All other industries do not anticipate changes.

Figure 39. “Other Electric Power Generation” Anticipated Employment Changes, 2021–2022



“Other electricity” is less diverse than the rest of the economy in terms of gender; males make up 68% of the workforce, more than the 53% U.S. average (Table 16).

Table 16. “Other Electric Power Generation” Workforce Demographics and Characteristics

	Number of Workers	“Other Electricity” Averages	National Workforce Averages	Energy Workforce Averages
Male	32,873	68%	53%	74%
Female	15,075	31%	47%	25%
Gender non-binary	246	1%	insufficient data	0%
Hispanic or Latino	9,104	19%	18%	17%
Not Hispanic or Latino	39,090	81%	82%	83%
American Indian or Alaska Native	619	1%	1%	2%
Asian	5,001	10%	7%	7%

Black or African American, not Indigenous	3,091	6%	12%	8%
Black Indigenous	500	1%	insufficient data	1%
Native Hawaiian or other Pacific Islander	591	1%	<1%	1%
White	34,403	71%	78%	74%
Two or more races	3,989	8%	2%	8%
Veterans	3,789	8%	6%	9%
55 and over	5,623	12%	24%	17%
Disability	1,363	3%	4%	2%
Formerly Incarcerated	848	2%	2%	1%
Represented by a Union or Project Labor Agreement	2,811	6%	6%	10%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers is slightly higher than as the national average, 19% compared to 18%.

The portion of non-White workers in “other electricity” is 29%, higher than the national average of 22%. This is attributable to higher-than-average portions of workers of two or more races (8% compared to 2% nationally), and Asian workers (10% compared to 7% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally). American Indian or Alaska Natives are the same as the national average (1%) while the concentrations of other races are lower than national averages.

The concentration of veterans (8% compared to 6% nationally) is higher than the national average. Union representation is the same as the national average (6%), as is the portion of the workforce that is formerly incarcerated (2%). The portion of the workforce over the age of 55 is lower than the national average (12% compared to 24%), as is the portion of the workforce with a disability (3% compared to 4%).

Transmission, Distribution, and Storage

Transmission, Distribution, and Storage

The Transmission, Distribution, and Storage (TDS) sector includes employment associated with constructing, operating, and maintaining energy infrastructure. This includes employment associated with electric transmission lines, pipeline construction, fuel distribution and transport, and the manufacture of equipment used for electrical transmission. Also included in this sector is employment related to storage technologies such as batteries, pumped storage, compressed air, and other utility-level storage methods. The TDS sector includes both legacy power lines and newer technologies such as microgrids and smart grids.

Utility transmission employment is actively tracked by multiple North American Industry Classification System (NAICS) codes. This broad category includes natural gas distribution, electrical transmission line construction, and pipeline transportation for fossil fuels. Traditional transmission and distribution technologies are split between electricity and fuels. Employment pertaining to storage of fuels is also included. TDS sector employment also encompasses jobs in energy-related sub-sectors in construction, manufacturing, wholesale trade, professional and business services, and “other services.”

Trends and Key Takeaways

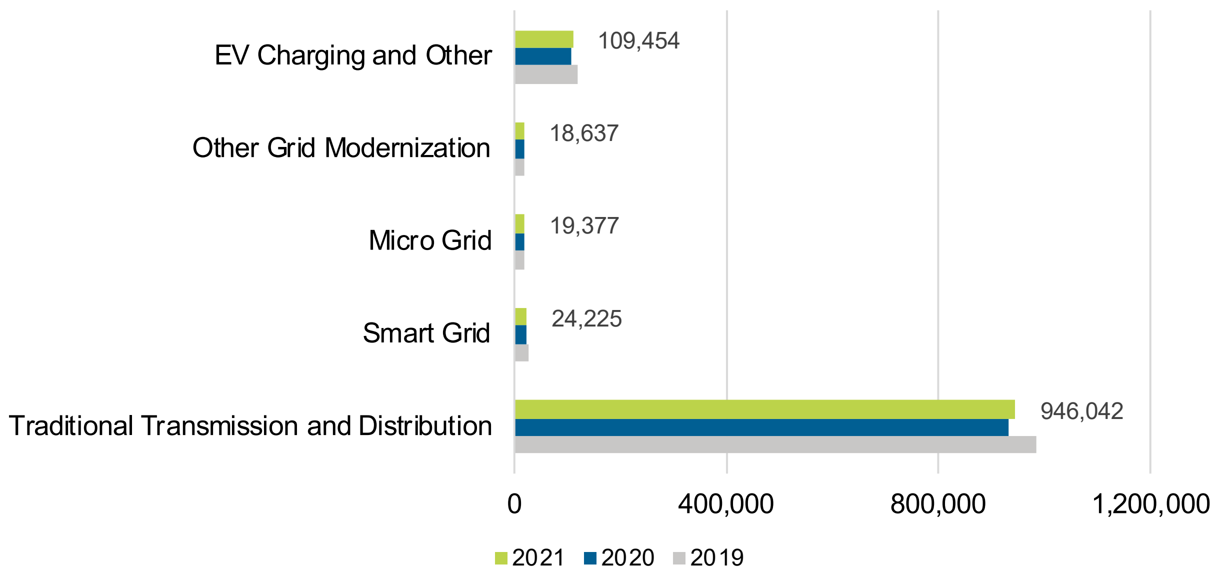
- TDS grew by 21,460 jobs, or 1.6%, and is one of two USEER categories that does not contain a technology that lost jobs in 2021.
- Traditional transmission, the largest TDS technology, added the most jobs of any category, 13,088 (1.4%), although smart grid grew by the greatest percentage, increasing 4.9% (1,136 new jobs).
- Battery jobs make up 80% of all storage technology jobs.
- The largest gains were in the construction industry, with 17,612 new jobs.
- Wholesale trade and distribution, as well as utilities, lost jobs, with the former declining 4,304 (-1.8%) and the latter decreasing 768 (-0.2%).
- Renewable energy and efficiency enabling TDS jobs increased by 5,093, or 4.2%—faster than TDS as a whole.
- “Other services” had the highest percentage of companies reporting hiring difficulty, with 100% of respondents indicating it was “very difficult” or “somewhat difficult” to find employees.
- The percentage of workers covered by a union or project labor agreement in TDS (18%) is triple the national average (6%).
- Employers in all TDS industries anticipate growth in 2022, although the degree of anticipated growth varies by technology.
- TDS’s workforce is disproportionately male, with 75% of workers being male compared to 53% nationally.

- Racially, TDS is more non-White than national averages. The percent of non-White workers is higher than the national average (32% compared to 22%). This is attributable to Asian workers (9% compared to 7% nationally), those of two or more races (8% compared to 2% nationally), Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally), and American Indians or Alaska Natives (3% compared to 1% nationally) being more concentrated in TDS.
- Black or African American workers are underrepresented, making up 9% of the workforce compared to 12% of the overall U.S. workforce.
- Hispanic workers are less concentrated than the workforce average (16% compared to 18%).
- Veterans are more represented in TDS at 7% compared to 6% nationally.
- Those with disabilities are less represented in TDS at 2% compared to 4% nationally.
- The percentage of previously incarcerated workers (1%) is lower than the national workforce (2%).

Employment by Technology and Industry

In 2021, there were 1.3 million workers employed in TDS, representing a change of 1.9% from 2020. As shown in Figure 40 and Figure 41, traditional transmission and distribution, the largest sector, primarily drove this change, increasing from 932,954 to 946,042 (1.4%).[16][17]

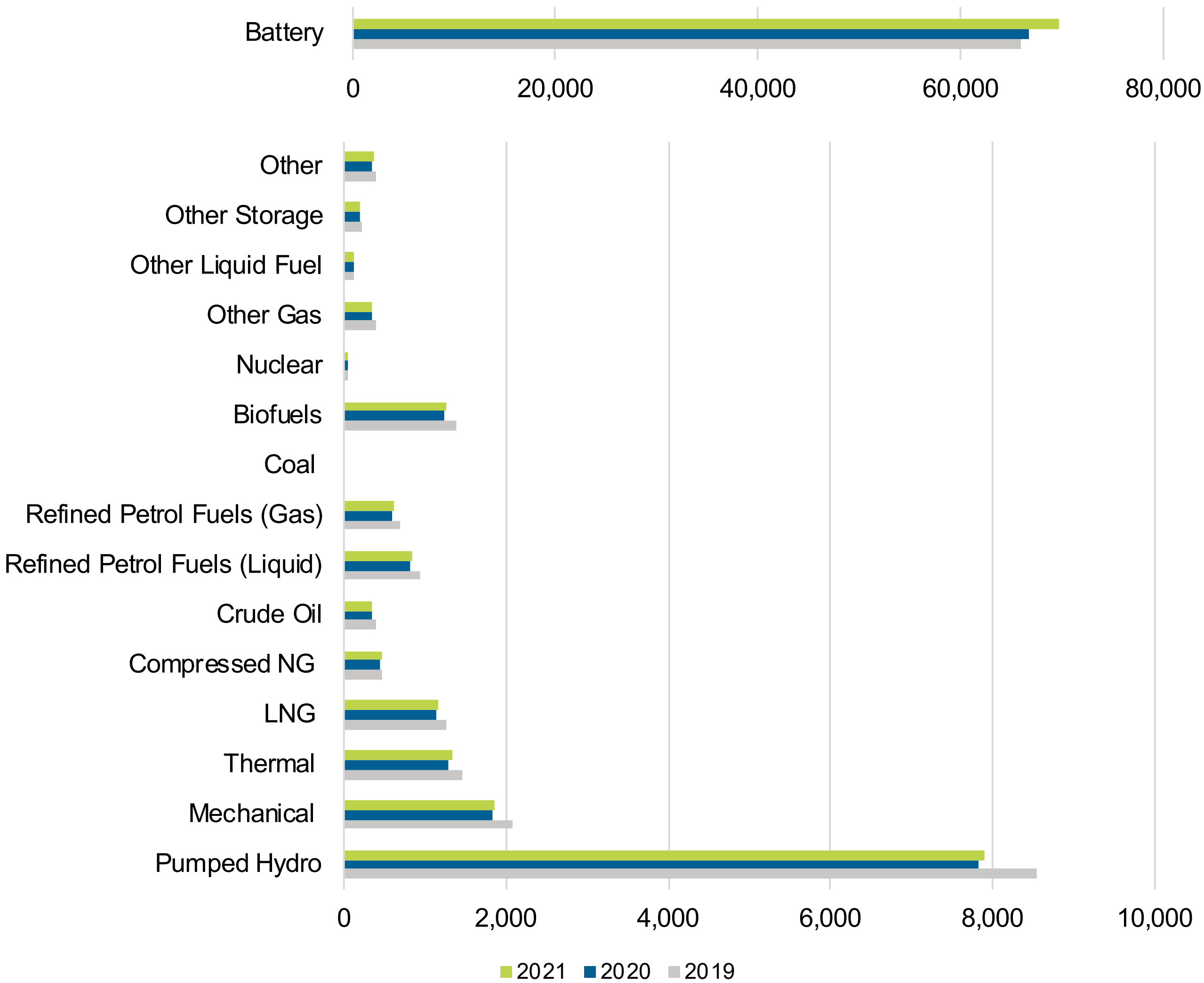
Figure 40. Transmission and Distribution Employment by Technology



[16] Figure 40 does not include commodity flows, which are associated with transmission and distribution yet not assignable to any one specific technology. This accounted for 139,329 jobs in 2021.
[17] Appendix B contains definitions of each technology.

Battery storage had the most jobs within storage, employing 69,698 workers (Figure 41). This is nearly nine times the 7,901 employed in pumped storage hydropower, the next storage sector in terms of jobs. Employment in "other" technologies, excluding coal which did not employ anyone, ranged from 42 in nuclear storage to 1,867 in mechanical storage.

Figure 41. Storage Employment by Technology



The largest number of TDS employees were in the construction industry, with 456,213 workers (Figure 42, Table 17). Construction also showed both the largest number of new jobs—17,612—and the second greatest percentage rate of growth at 3.9%. Professional and business services grew by the greatest percentage at 5.7%, adding 7,094 jobs. Only wholesale trade and distribution exceeded its 2019 level of employment, however. This stood at 240,250 in 2021 compared to 231,188 in 2019. It did decline 1.8% from 2020 to 2021, but this decrease was not enough to offset gains made in 2020.

Figure 42. Transmission, Distribution, and Storage Employment by Industry

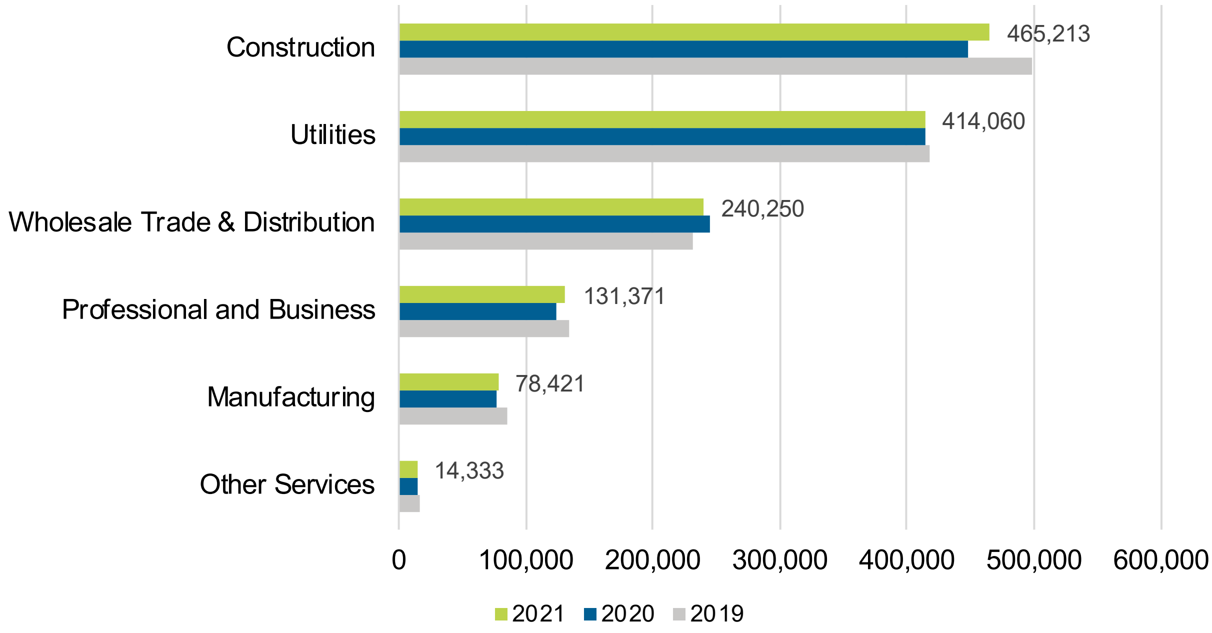


Table 17. Transmission, Distribution, and Storage Employment by Industry

Industry	2019	2020	2021
"Other Services"	16,183	14,002	14,333
Manufacturing	85,469	76,926	78,421
Professional and Business	134,304	124,277	131,371
Wholesale Trade & Distribution	231,188	244,554	240,250
Utilities	417,660	414,828	414,060
Construction	498,842	447,601	465,213
Total	1,383,646	1,322,188	1,343,648

Of all technologies, “other grid modernization” has the highest concentration of workers in construction—the largest industry—with 74% of all workers, followed by “other fuels” storage with 65% (Table 18). Only traditional transmission and distribution technologies had employment in utilities.

Table 18. Concentration of Transmission, Distribution, and Storage Employment by Technology and Industry

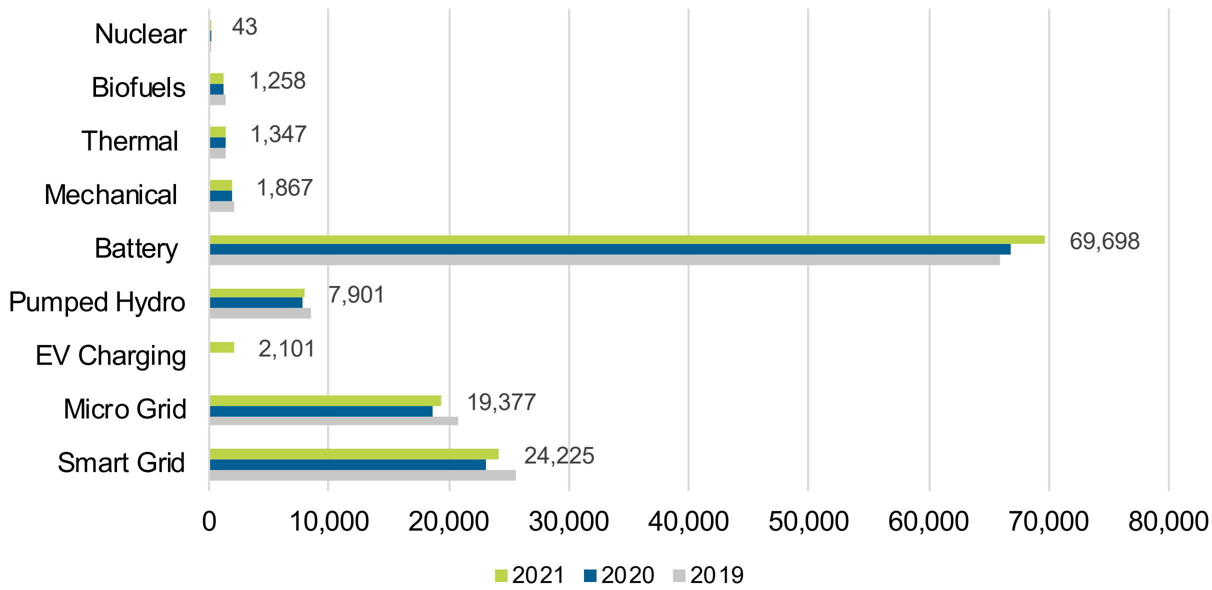
	Utilities	Construction	Manufacturing	Wholesale Trade, Distribution, + Transport	Professional Services	Pipeline	“Other Services”
Traditional Transmission + Distribution Electricity	**46%**	28%	6%	6%	12%	0%	2%
Traditional Transmission + Distribution Petroleum	0%	40%	0%	**50%**	0%	10%	0%
Traditional Transmission + Distribution Natural Gas	**56%**	29%	0%	0%	0%	15%	0%
Traditional Transmission + Distribution Coal	0%	0%	0%	**100%**	0%	0%	0%
Traditional Transmission + Distribution “other fuels”	0%	0%	0%	**100%**	0%	0%	0%
Pumped Hydro	0%	**38%**	30%	3%	17%	10%	1%
Battery Storage	0%	**53%**	18%	11%	17%	0%	2%

"Other Storage"	0%	35%	**41%**	1%	20%	0%	2%
Petroleum Storage	0%	**61%**	14%	2%	0%	0%	23%
Natural Gas Storage	0%	31%	16%	13%	**39%**	0%	1%
"Other Fuels" Storage	0%	**65%**	0%	0%	32%	0%	3%
Smart Grid	0%	**45%**	7%	6%	41%	0%	1%
Micro Grid	0%	**57%**	17%	8%	15%	0%	2%
"Other Grid Modernization"	0%	**74%**	10%	1%	13%	0%	1%
EV Charging	0%	**33%**	8%	25%	26%	0%	7%
Other	0%	**63%**	13%	1%	23%	0%	0%

TDS technologies that enable renewables and increase efficiency grew from 120,623 in 2020 to 127,817 in 2021.[18] This is still down from the 125,790 jobs in 2019 (Figure 43).

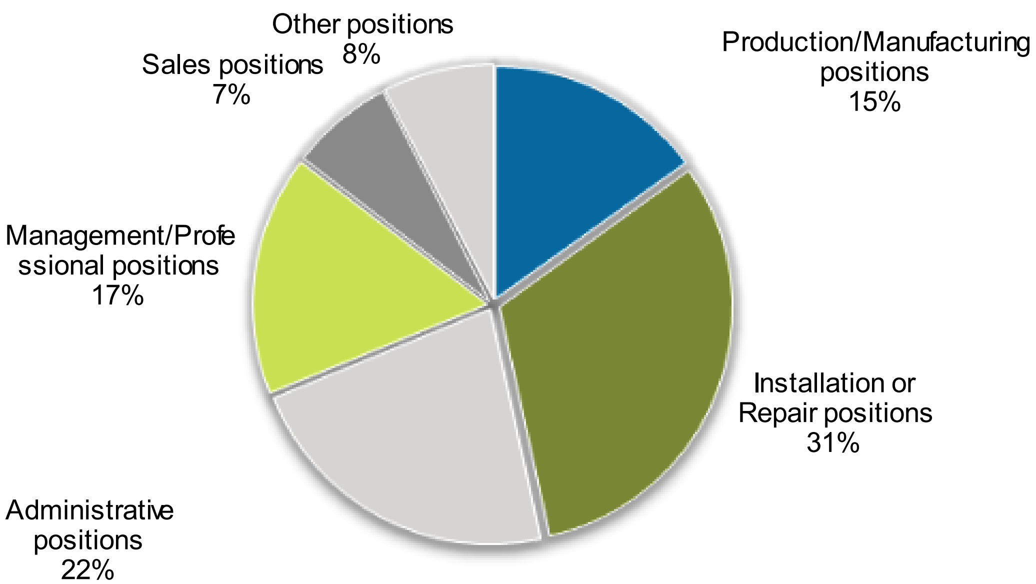
[18] Previous USEERs included the construction and maintenance of EV charging infrastructure in "other transmission and distribution." The 2022 report splits this apart, so the 7,194 increase in clean energy jobs is not indicative of the growth of the sector since this is due to detail in the USEER. When excluded, clean energy TDS jobs grew by 5,093 or 4.2%.

Figure 43. Renewable Energy and Efficiency Enabling Transmission, Distribution, and Storage Jobs



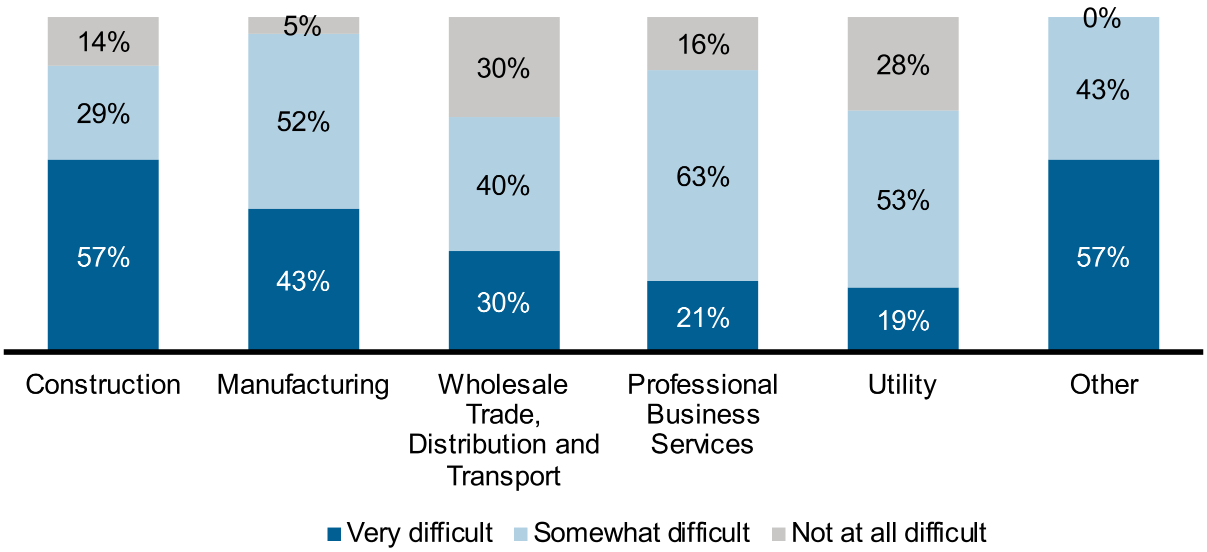
The largest occupational category of workers within TDS was installation or repair positions, with 32% (). This is followed by administrative positions (22%) and management and professional positions (17%).

Figure 44. Worker Occupations in Transmission, Distribution, and Storage



Within TDS industries, "other services" had the greatest difficulty hiring workers (Figure 45). One hundred percent of these employers reported some difficulty finding qualified workers with 57% claiming it is very difficult. Both 57% of construction and "other services" reported this level of difficulty, the highest among all industries. TDS wholesale trade, distribution, and transport reported the least difficulty hiring, with 30% stating that it is "not at all difficult." Nearly 70% of respondents in this industry still reported hiring difficulty.

Figure 45. Electric Power Generation Hiring Difficulty by Industry



As shown in Table 19, competition and/or a small applicant pool is the most cited reason by employers in all industries for hiring difficulty. This reaches 65% for manufacturing. Insufficient knowledge, experience, and skills is also cited in the top three reasons by employers in all industries.

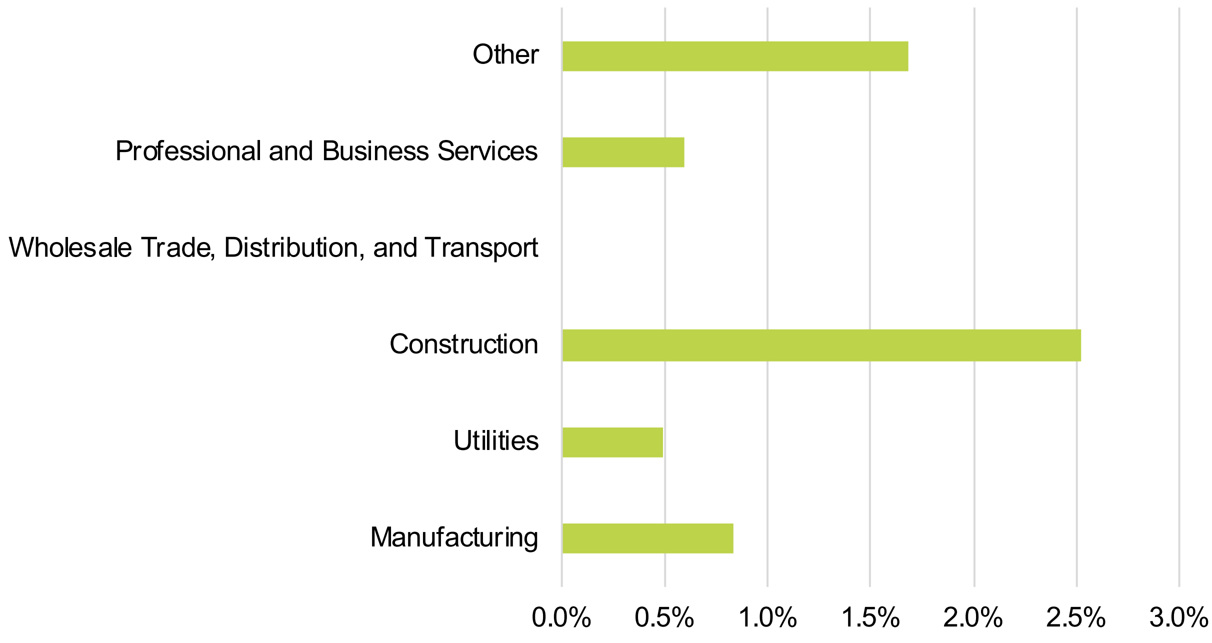
Table 19. Transmission, Distribution, and Storage Employer Reasons for Hiring Difficulty

Industry	Most Common Reason	Second Most Common Reason	Third Most Common Reason
Utilities	Competition/ small applicant pool (51%)	Cannot provide competitive wages (32%)	Insufficient qualifications (certifications or education) (20%)
Construction	Competition/ small applicant pool (50%)	Insufficient non-technical skills (work ethic, dependability, critical thinking) (33%)	Lack of experience, training, or technical skills (33%)
Manufacturing	Competition/ small applicant pool (65%)	Location (25%)	Difficulty finding industry-specific knowledge, skills, and interest (25%)

Wholesale Trade, Distribution, and Transport	Competition/ small applicant pool (50%)	Insufficient qualifications (certifications or education) (36%)	Insufficient non-technical skills (work ethic, dependability, critical thinking) (36%)
Professional and Business Services	Competition/ small applicant pool (56%)	Insufficient qualifications (certifications or education) (31%)	Difficulty finding industry-specific knowledge, skills, and interest (25%)
Other	Competition/ small applicant pool (43%)	Cannot provide competitive wages (43%)	Insufficient qualifications (certifications or education) (21%)

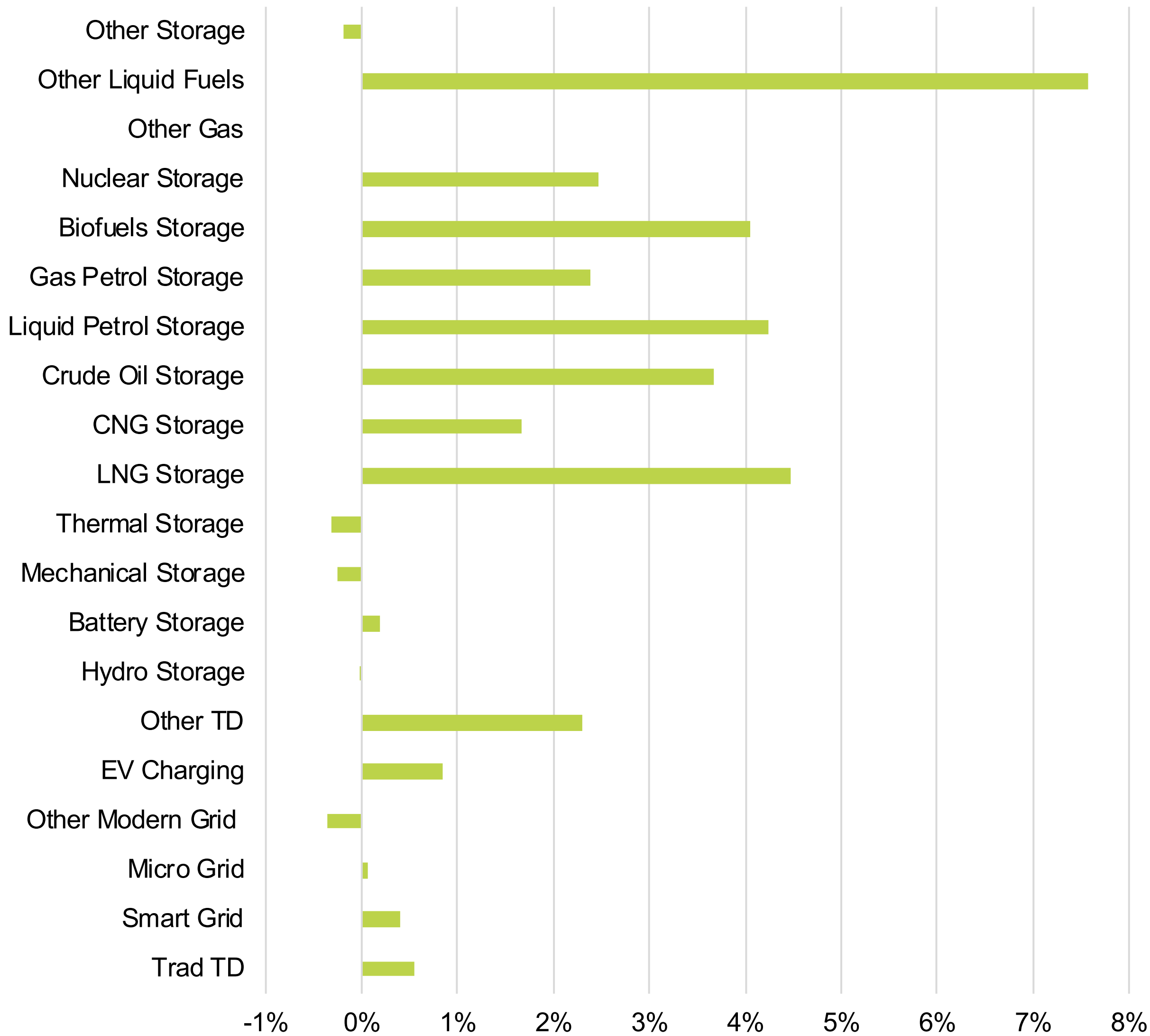
No industries in TDS expect a decline in employment in 2022, although the wholesale trade, distribution, and transport industry does not anticipate growth either (Figure 46). Where growth is greater than zero ranges from 0.5% in utilities to 2.5% in construction.

Figure 46. Transmission, Distribution, and Storage Anticipated Change in Employment by Industry, 2021–2022



By technology area, "other liquid fuels"[19] anticipates the highest rate of growth, 7.6% (Figure 47). Several technology areas anticipate declines, ranging from -0.4% for other modern grids to -0.2% for "other storage".

Figure 47. Transmission, Distribution, and Storage Anticipated Changes in Employment by Technology, 2021–2022



[19] Other liquid fuels consists of employers that identify as being classified within the fuels technology category but do not fit into any of the subtechnology categories.

TDS is less diverse than the rest of the economy in terms of gender; males make up 75% of the workforce, more than the 53% U.S. average (Table 20).

Table 20. Transmission, Distribution, and Storage Workforce Demographics and Characteristics

	Number of Workers	Transmission, Distribution, and Storage Averages	National Workforce Averages	Energy Workforce Averages
Male	904,941	75%	53%	74%
Female	285,001	24%	47%	25%
Gender non-binary	14,377	1%	insufficient data	0%
Hispanic or Latino	187,119	16%	18%	17%
Not Hispanic or Latino	1,017,200	84%	82%	83%
American Indian or Alaska Native	32,526	3%	1%	2%
Asian	112,069	9%	7%	7%
Black or African American, not Indigenous	113,585	9%	12%	8%
Black Indigenous	13,472	1%	insufficient data	1%
Native Hawaiian or other Pacific Islander	10,169	1%	0%	1%
White	824,470	68%	78%	74%
Two or more races	98,029	8%	2%	8%
Veterans	80,746	7%	6%	9%
55 and over	199,411	17%	24%	17%
Disability	29,627	2%	4%	2%

Formerly Incarcerated	12,892	1%	2%	1%
Represented by a Union or Project Labor Agreement	218,233	18%	6%	10%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers (16%) is lower than the national average, 18%.

The portion of non-White workers in TDS is 32%, higher than the national average of 22%. This is attributable to higher-than-average portions of workers of two or more races (8% in TDS compared to 2% nationally), Asian workers (9% in TDS compared to 7% nationally), American Indian and Alaska Natives (3% compared to 1% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally). The concentrations of other races are lower than national averages.

The concentration of veterans (7% compared to 6% nationally) is higher than the national average. The portion of formerly incarcerated workers is lower than the national average (1%), as are those with disabilities disclosed to employers (2% compared to 4% nationally) and workers over the age of 55 (17% compared to 24% nationally).

The concentration of workers represented by a union or project labor agreement is triple the rate of the national average (18% compared to 6%).

Fuels

Fuels

Fuels are combusted or otherwise spent in the generation of electricity or heat. Employment in fuels includes any work related to fuel extraction, mining, and processing. This includes firms that manufacture machinery that supports oil and gas extraction, as well as coal mining. Agriculture and forestry workers who support fuel production with biodiesels, corn ethanol, and fuel wood are also included in the employment data for fuels. This category also includes the production of nuclear fuels for power plants. Jobs in electricity fuel to power vehicles and buildings are reflected in the Electric Power Generation section.[20]

In 2021, fuels employed a total of 908,422 workers, down 29,270 from its 2020 level of 937,693 (-3.1%) and 240,471 from its 2019 level of 1,148,893.

Trends and Key Takeaways

- In 2021, “other fuels,” which are not classified in other USEER categories, had the largest gains, increasing by 1,985 jobs (4.3%). Natural gas followed with 1,803 jobs (0.9%).
- Petroleum and coal were the only two technologies to decline, but the 31,953 job decrease in petroleum (-6.4%) and 7,125 decrease in coal (-12%) were too large for gains in other sectors to counter.
- Zero-emissions and lower carbon technologies in fuels added 5,016 jobs, growing 4.5%.
- The largest gains were in the professional and business services industry, with 8,215 new jobs.
- All job loss occurred in extraction, which decreased 46,007 (-12%). Petroleum led these losses in job levels, decreasing 31,593 (-6.4%) while coal had the most significant percentage decrease (-12% or -7,125 jobs).
- Despite losses, all extraction employers reported hiring difficulty. All construction employers also reported difficulty hiring.
- Professional and business services had the lowest hiring difficulty with 41% of firms reporting hiring to be “not at all difficult.”
- The percentage of workers covered by a union or project labor agreement in fuels (7%) is slightly higher than the national average (6%).
- The fuels workforce is disproportionately male, with 74% male workers compared to 53% nationally.
- The percent of White or Caucasian workers is lower than the national average (77% compared to 78%). This is attributable to workers of two or more races (7% compared to 2% nationally), American Indians and Alaska Natives (2% compared to 1% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally) being more concentrated in fuels.

[20] Appendix B contains definitions of each technology.

- Black or African American workers are underrepresented, making up 7% of the workforce compared to 12% of the overall U.S. workforce.
- Hispanic workers are less concentrated than the workforce average (13% compared to 18%).
- Veterans are more represented in fuels at 9% compared to 6% nationally.
- Those with disabilities are less represented in fuels at 2% compared to 4% nationally.
- The percentage of previously incarcerated workers is also lower than the national workforce (1% compared to 2%).

Employment by Technology and Industry

In 2021, there were 908,422 workers employed in fuels, representing a change of -3.1% from 2020. (Figure 48, Table **21**). Petroleum primarily drove these changes, decreasing by 31,593 workers (-6.4%). Coal also shed 7,125 jobs (-12%).

Figure 48. Fuels Employment by Technology, 2019–2022

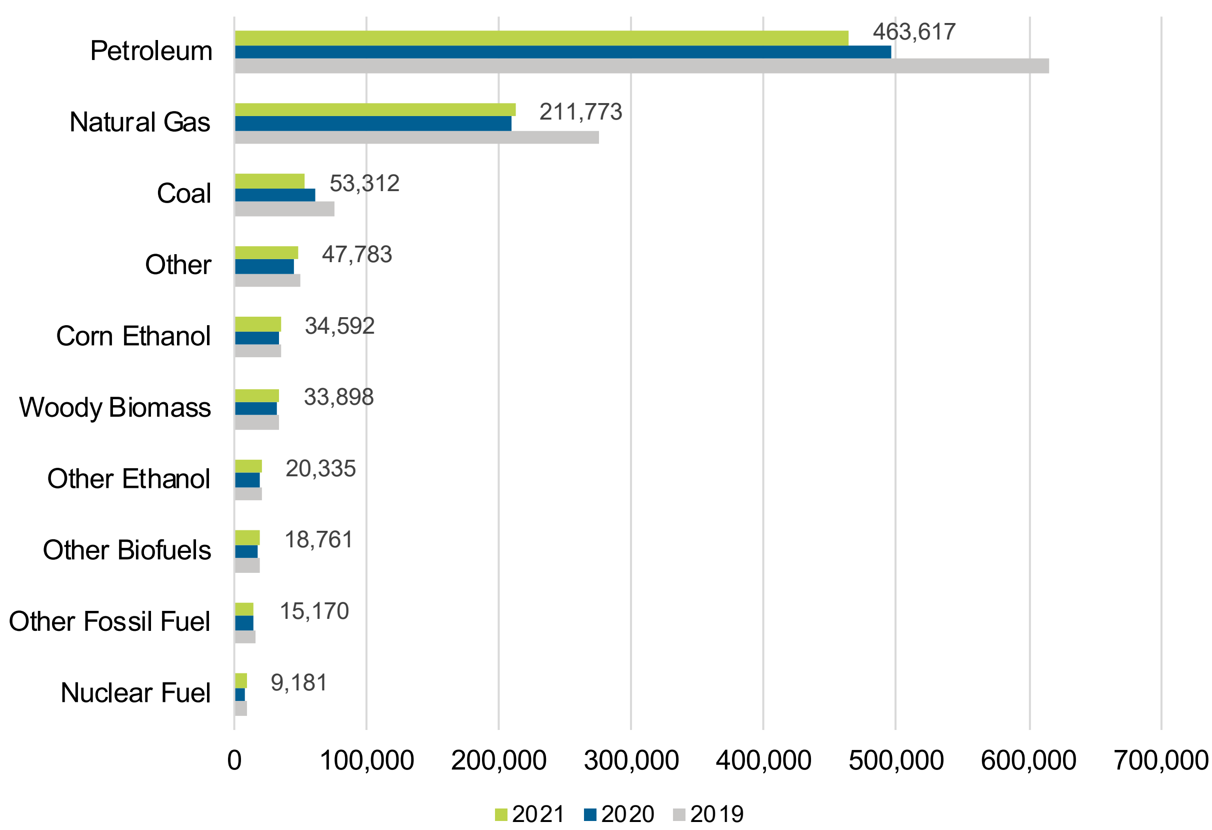


Table 21. Fuels Employment by Technology, 2019–2022

	2019	2020	2021	2020–2021	2020–2021
Nuclear Fuel	9,406	8,768	9,181	413	4.7%
“Other Fossil Fuel”	15,546	14,526	15,170	644	4.4%
“Other Biofuels”	18,928	17,581	18,761	1,180	6.7%
“Other Ethanol”	20,694	19,455	20,335	880	4.5%
Woody Biomass	33,426	32,442	33,898	1,457	4.5%
Corn Ethanol	34,866	33,506	34,592	1,086	3.2%
Other	49,131	45,798	47,783	1,985	4.3%
Coal	75,443	60,438	53,312	-7,125	-12%
Natural Gas	275,924	209,970	211,773	1,803	0.9%
Petroleum	615,528	495,210	463,617	(31,593)	-6.4%

The largest number of fuels employees were in the extraction industry, with 322,887 workers (Figure 49, Table 22). Extraction also showed the only decrease in jobs, 46,007 (12%). Wholesale trade grew by the greatest percentage at 4.6%, adding 3,277 jobs. Professional and business services led increases, adding 8,215 jobs (5.2%). Only agriculture, with 831 workers, exceeded its 2019 employment level in 2021.

Figure 49. Fuels Employment by Industry, 2019–2021

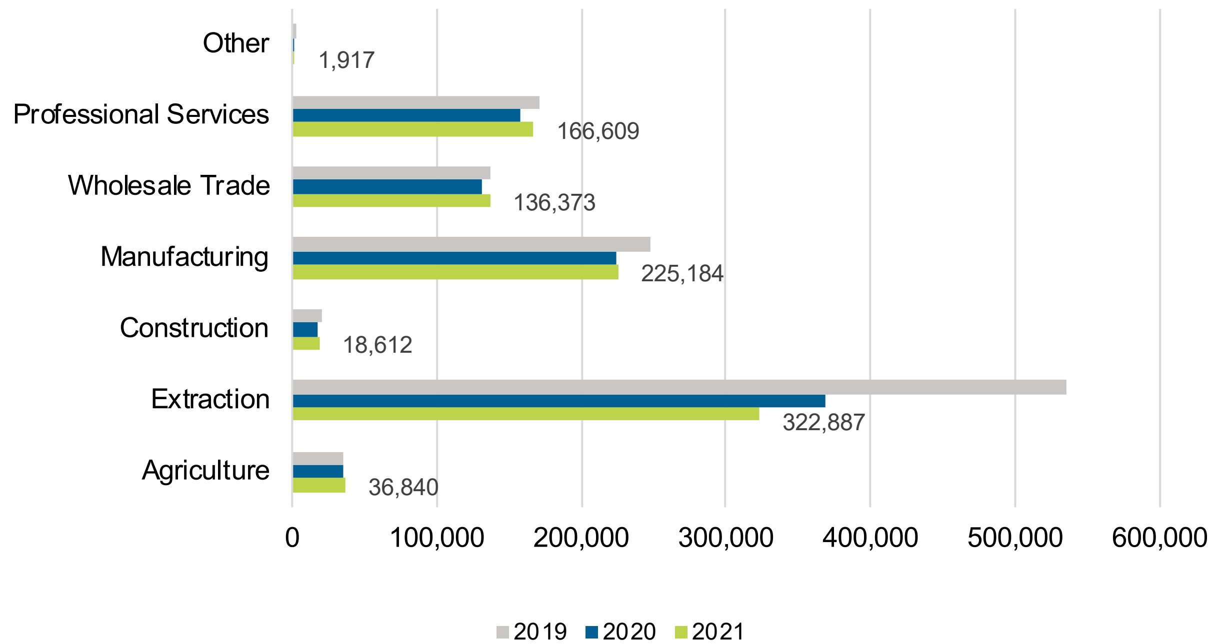


Table 22. Fuels Employment by Industry, 2019–2021

	2019	2020	2021
Agriculture	35,616	36,009	36,840
Extraction	535,210	368,894	322,887
Construction	20,409	17,839	18,612
Manufacturing	247,336	223,938	225,184
Wholesale Trade	137,677	130,791	136,373
Professional Services	170,514	158,394	166,609
Other	2,131	1,827	1,917
Total	1,148,893	937,693	908,422

Fuels technologies are spread across a number of industries with concentrations of workers in different areas. The most common industries were professional and business services, where seven out of the 15 fuels technologies have the highest concentration of workers, and mining and extraction where three technologies have the highest concentration (Table 23).

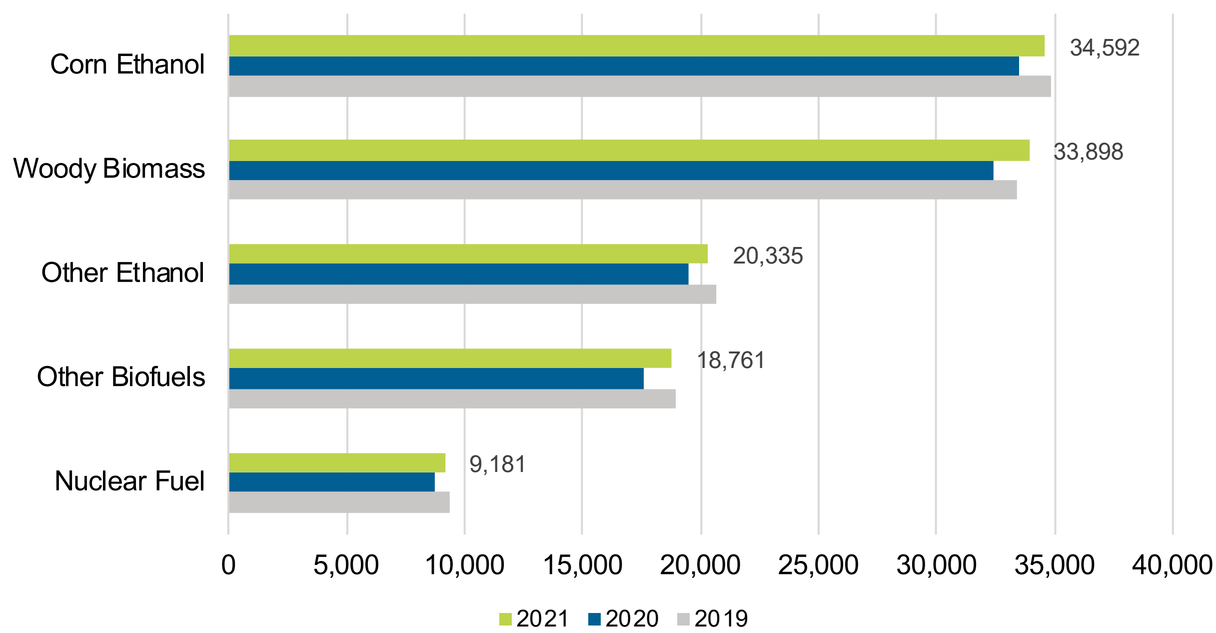
Table 23. Concentration of Fuels Employment by Technology and Industry

	Agriculture	Mining and Extraction	Construction	Manufac- turing	Wholesale Trade	Professional Services	"Other Services"
Coal	0%	**66%**	0%	18%	2%	15%	0%
Onshore Petroleum	0%	**39%**	5%	26%	15%	15%	0%
Offshore Petroleum	0%	35%	0%	**50%**	2%	12%	1%
Onshore Natural Gas	0%	**55%**	0%	19%	15%	12%	0%
Offshore Natural Gas	0%	12%	0%	26%	1%	**62%**	0%
"Other Fossil Fuel"	0%	0%	0%	18%	**48%**	33%	1%
Corn Ethanol	**46%**	0%	0%	27%	19%	8%	0%

"Other Ethanol/Non-Woody Biomass"	12%	0%	0%	13%	27%	**47%**	0%
Woody Biomass/Cellulosic Biofuel	**55%**	0%	0%	13%	3%	29%	0%
Renewable diesel fuels	0%	0%	0%	7%	3%	**90%**	0%
Biodiesel fuels	0%	0%	0%	9%	7%	**84%**	0%
Waste fuels	0%	0%	0%	3%	2%	**95%**	0%
"Other Biofuels"	0%	0%	0%	3%	22%	**74%**	0%
Nuclear Fuel	0%	4%	0%	31%	10%	**55%**	0%
Other	0%	0%	0%	28%	**52%**	19%	0%

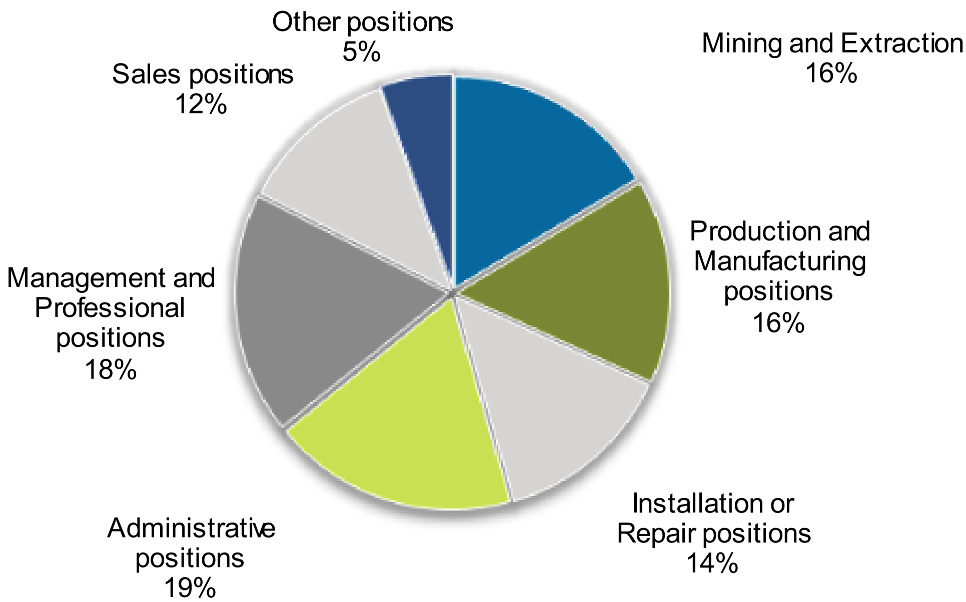
Lower carbon technologies in fuels—nuclear and those from biostock—grew from 111,751 in 2020 to 116,767 in 2021, an increase of 4.5% (Figure 50). This is still down from the 117,322 jobs in 2019 and represents a decline of 0.5%.

Figure 50. Fuels Low Emissions Technologies, 2019–2021



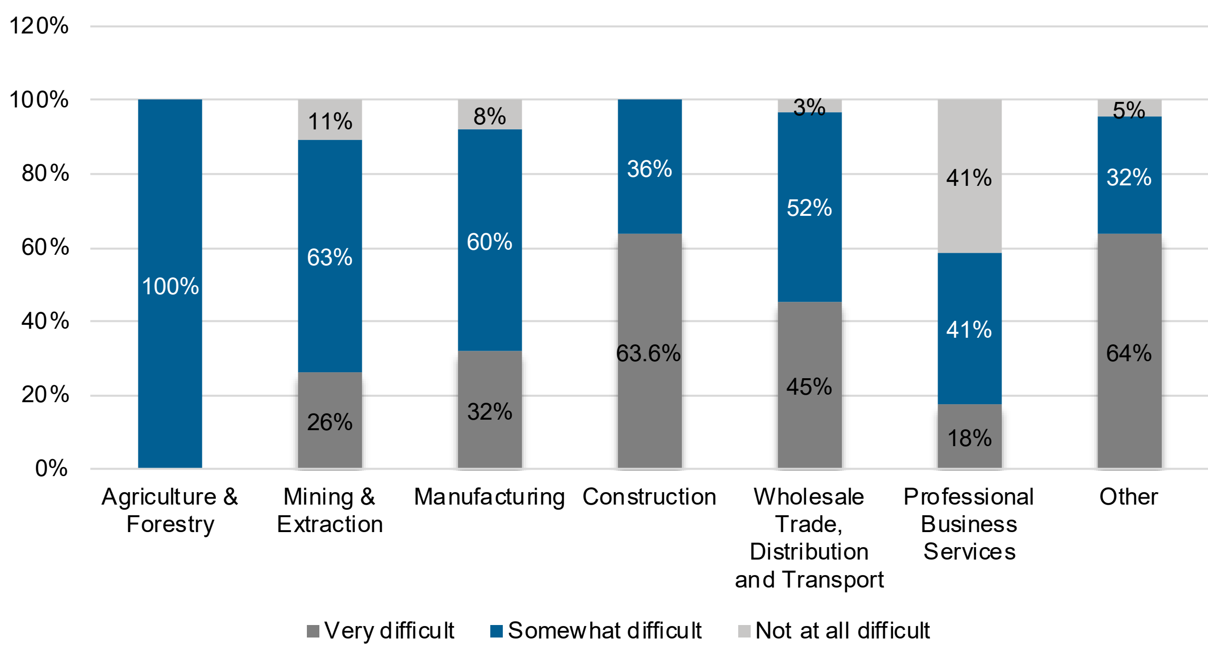
The largest occupational category of workers within fuels was administrative positions, with 19% (Figure 51). This is followed by management and professional occupations at 18%, and both mining and extraction and production and manufacturing positions at 16%.

Figure 51. Fuels Employment by Occupation



Within fuels industries, all construction employers, as well as all agriculture and forestry employers, reported at least some difficulty hiring workers (Figure 52). Construction firms also led in reporting of “very difficult” with 64% of respondents. Professional and business services reported the least problems with hiring; 41% of these respondents indicated that it is “not at all difficult” to hire qualified workers.

Figure 52. Fuels Hiring Difficulty by Industry



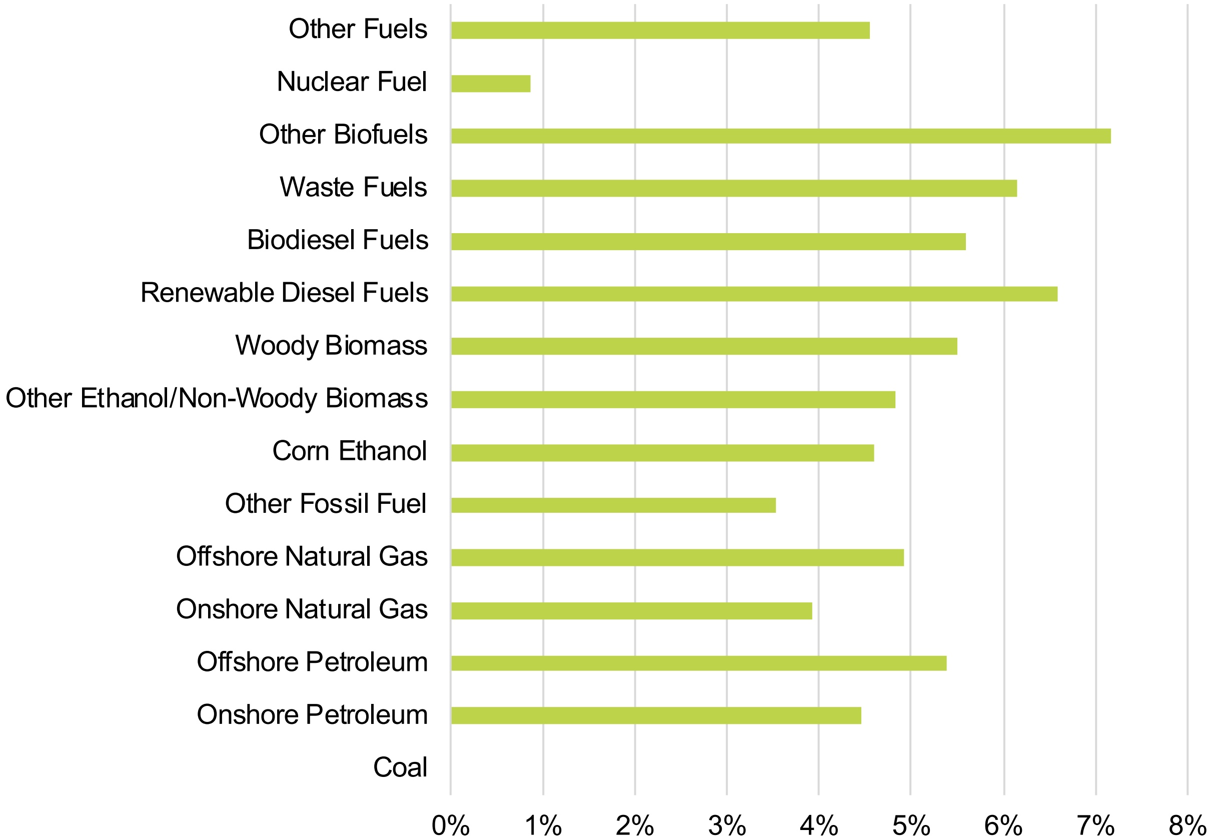
As shown in Table 24, competition and/or a small applicant pool were the most cited reasons for hiring difficulty by employers in all industries except for agriculture and forestry. Nearly all agriculture and forestry employers cited a lack of training or technical skills. This, along with a lack of education, training, and experience was one of the top three reasons for hiring difficulty for all employers. Manufacturing additionally cited location problems, while professional and business services and "other services" cited wage problems.

Table 24. Fuels Reasons for Hiring Difficulty

Industry	Most Common Reason	Second Most Common Reason	Third Most Common Reason
Agriculture and Forestry	Lack of experience, training, or technical skills (100%)		
Mining and Extraction	Competition/ small applicant pool (53%)	Insufficient non-technical skills (work ethic, dependability, critical thinking) (33%)	Lack of experience, training, or technical skills (27%)
Manufacturing	Competition/ small applicant pool (48%)	Location (22%)	Difficulty finding industry-specific knowledge, skills, and interest (22%)
Construction	Competition/ small applicant pool (55%)	Insufficient non-technical skills (work ethic, dependability, critical thinking) (36%)	Lack of experience, training, or technical skills (18%)
Wholesale Trade, Distribution, and Transport	Competition/ small applicant pool (72%)	Insufficient non-technical skills (work ethic, dependability, critical thinking) (28%)	Insufficient qualifications (certifications or education) (25%)
Professional and Business Services	Competition/ small applicant pool (60%)	Cannot provide competitive wages (30%)	Lack of experience, training, or technical skills (20%)
Other	Competition/ small applicant pool (62%)	Insufficient qualifications (certifications or education) (29%)	Cannot provide competitive wages (14%)

Despite recent declines, all fuel technologies anticipate growth in 2022 (Figure 53). Coal reported the lowest number with no changes. "Other biofuels" reported the highest number, 7.2%, followed by 6.6% for renewable diesel fuel.

Figure 53. Fuels Anticipated Employment Changes, 2021–2022



Fuels is less diverse than the rest of the economy in terms of gender; males make up 74% of the workforce, more than the 53% U.S. average (Table 25).

Table 25. Fuels Workforce Demographics and Characteristics

	Number of Workers	Fuels Average	National Workforce Averages	Energy Workforce Averages
Male	670,460	74%	53%	74%
Female	236,536	26%	47%	25%
Gender non-binary	1,426	<1%	insufficient data[21]	0%

[21] While the USEER asks male, female, and nonbinary no data from the Bureau of Labor Statistics or Census exists for the number of nonbinary workers within the national workforce.

Hispanic or Latino	115,635	13%	18%	17%
Not Hispanic or Latino	792,787	87%	82%	83%
American Indian or Alaska Native	14,026	2%	1%	2%
Asian	51,478	6%	7%	7%
Black or African American, not Indigenous	65,573	7%	12%	8%
Black Indigenous	6,372	1%	insufficient data[22]	1%
Native Hawaiian or other Pacific Islander	8,176	1%	<1%	1%
White	695,003	77%	78%	74%
Two or more races	67,795	7%	2%	8%
Veterans	79,789	9%	6%	9%
55 and over	169,967	19%	24%	17%
Disability	16,093	2%	4%	2%
Formerly Incarcerated	8,891	1%	2%	1%
Represented by a Union or Project Labor Agreement	66,325	7%	6%	10%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers is 13%, below the 18% national average.

The portion of non-White workers in fuels is 23%, higher than the national average of 22%. This is attributable to higher-than-average portions of workers of two or more races (7% in fuels compared to 2% nationally), Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally), and

[22] Data not available from the Census.

American Indian or Alaska Natives (2% compared to 1% nationally). The concentrations of other races is lower than national averages.

The concentration of veterans (9% compared to 6% nationally) is higher than the national average. The portion of formerly incarcerated workers is lower than the national average (1% compared to 2%), as is the portion of those with disabilities disclosed to employers (2% compared to 4% nationally) and workers over the age of 55 (19% compared to 24% nationally).

The concentration of workers represented by a union or project labor agreement is higher than the national average (7% compared to 6% nationally).

Petroleum Fuels

Petroleum fuels employed 463,617 workers in 2021, down 31,593 from the 495,210 employed in 2020 (-6.4%). Employment in 2019 stood at 615,528, so recovery from the 2020 recession would require an additional 151,911 jobs.

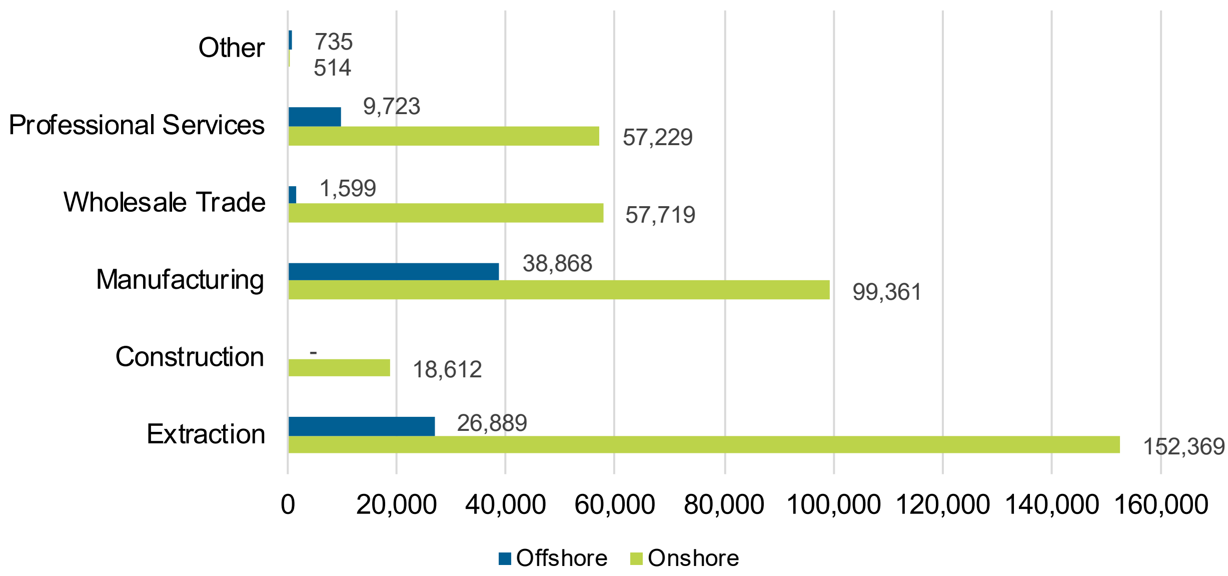
Trends and Key Takeaways

- The largest job gains were in the professional and business services industry, with 3,190 new jobs (5.0%). This is also the greatest percentage growth from any petroleum fuels industry.
- Declines in petroleum fuel jobs were limited to extraction and mining, which shed 39,057 jobs (-18%).
- Hiring difficulty varied between onshore and offshore petroleum fuels, but 100% of employers in manufacturing, construction, and wholesale trade, transportation, and distribution reported some difficulty for both activities.
- All offshore employers in mining and extraction, construction, wholesale trade, distribution, and transport, and “other services” reported the highest level of hiring difficulty.
- All employers in offshore petroleum fuels anticipated growth from 2021 to 2022 while all but two in onshore petroleum fuels expect positive changes.
- The percentage of workers covered by a union or project labor agreement in petroleum fuels (7%) is higher than the national average (6%).
- Petroleum fuels’ workforce tends to be disproportionately male, with 75% compared to 53% nationally.
- Racially, the petroleum fuels workforce has a higher percentage of non-White workers than the national average (25% compared to 22%). This is attributable to workers of two or more races (7% compared to 2% nationally), Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally), and American Indians and Alaska Natives (2% compared to 1%).
- Black or African American workers are underrepresented, making up 9% of the workforce compared to 12% of the overall U.S. workforce.
- Hispanic workers are less concentrated than the workforce average (14% compared to 18%).
- Veterans are more represented in petroleum fuels at 8% compared to 6% nationally.
- Those with disabilities are less represented in petroleum fuels at 1% compared to 4% nationally.
- The percentage of previously incarcerated workers is lower than the national workforce (1% compared to 2%).

Employment by Industry

The 2022 USEER splits petroleum into onshore and offshore, although previous reports aggregated the two. Figure 54 shows employment between the two in 2021 by industry. Onshore employed a total of 385,804 workers while offshore had 77,813 jobs. Onshore, then, was approximately 83% of the industry.

Figure 54. Onshore and Offshore Petroleum Fuels Employment by Industry



The largest number of petroleum fuels employees are in the extraction industry, with 179,258 workers, although this was also the largest source of job losses in 2021 (Figure 55, Table 26). Professional services added the most jobs, increasing by 3,190 or 5.0%. Despite gains in every industry except extraction, extraction losses were too significant to result in growth.

Figure 55. Petroleum Fuels Employment by Industry, 2019–2021

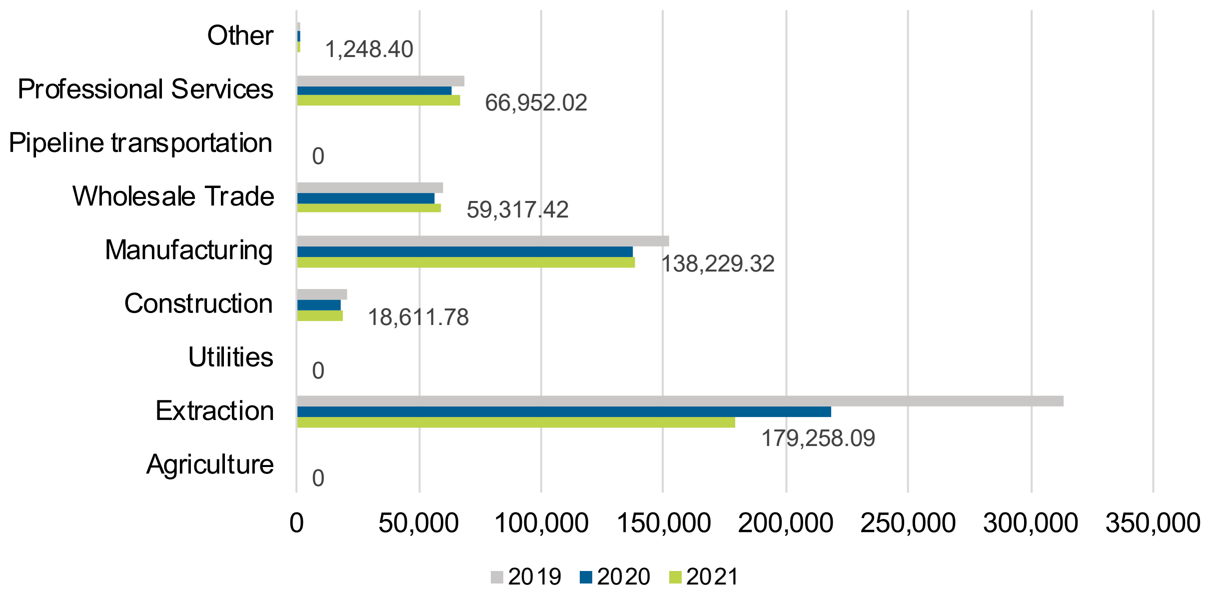


Table 26. Petroleum Fuels Employment by Industry, 2019–2021

	2019	2020	2021
Agriculture	-	-	-
Extraction	313,591	218,315	179,258
Utilities	-	-	-
Construction	20,409	17,839	18,612
Manufacturing	151,846	137,497	138,229
Wholesale Trade	59,563	56,605	59,317
Pipeline transportation	-	-	-
Professional Services	68,726	63,762	66,952
Other	1,393	1,191	1,248

Within petroleum fuel industries, half of the onshore industries reported 100% hiring difficulty and all but one offshore industry—professional and business services—reported the same (Figure 56, Figure 57). None of the onshore petroleum industries rated this as 100% "very difficult," whereas four offshore industries did.

Figure 56. Onshore Petroleum Fuels Hiring Difficulty

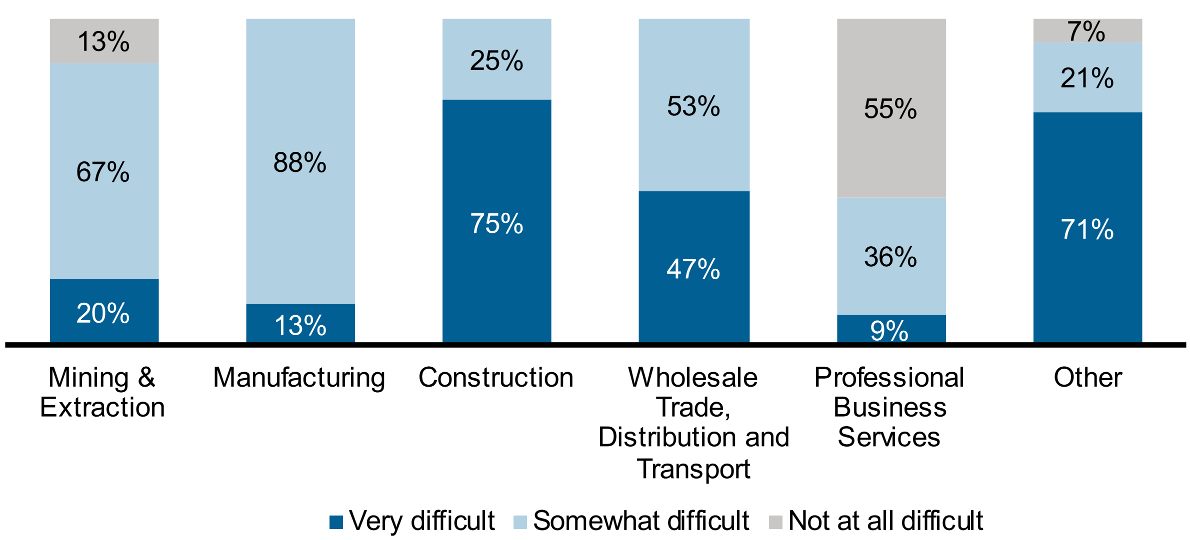
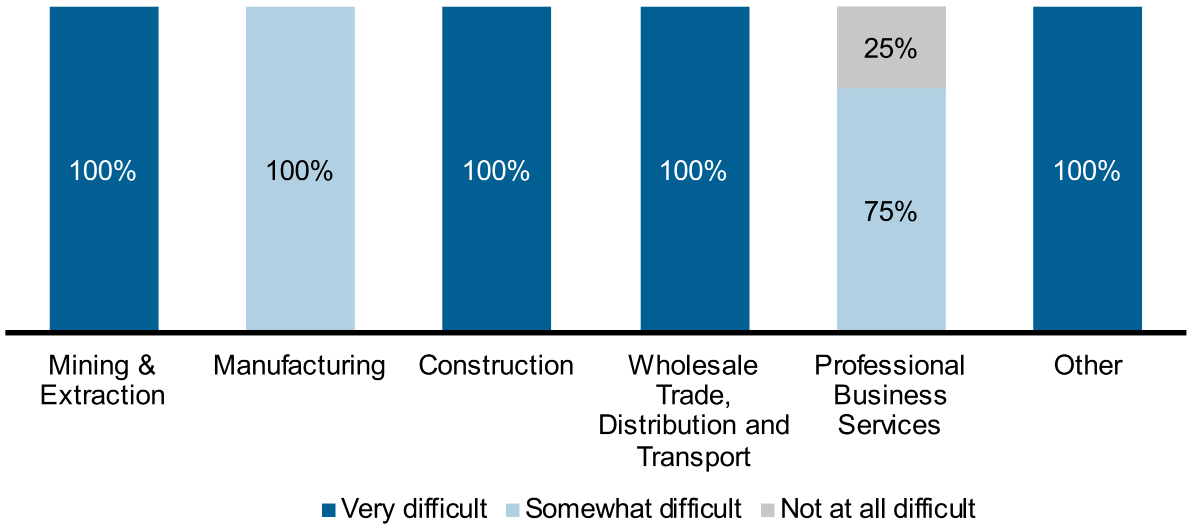


Figure 57. Offshore Petroleum Fuels Hiring Difficulty



Onshore and offshore petroleum have different expectations for growth. Within onshore, four out of six industries anticipate positive changes while the other two are negative; all offshore industries expect growth (Figure 58, Figure 59).

Positive onshore growth expectations range from 1.2% in wholesale trade to 5.7% in manufacturing. Professional and business services had the largest anticipated declines, -2.5%, while mining and extraction is expected to fall 0.6%. Offshore petroleum growth expectations range from 1.2% in wholesale trade to 7.7% in mining and extraction.

Figure 58. Onshore Petroleum Fuels Anticipated Employment Change by Industry, 2021–2022

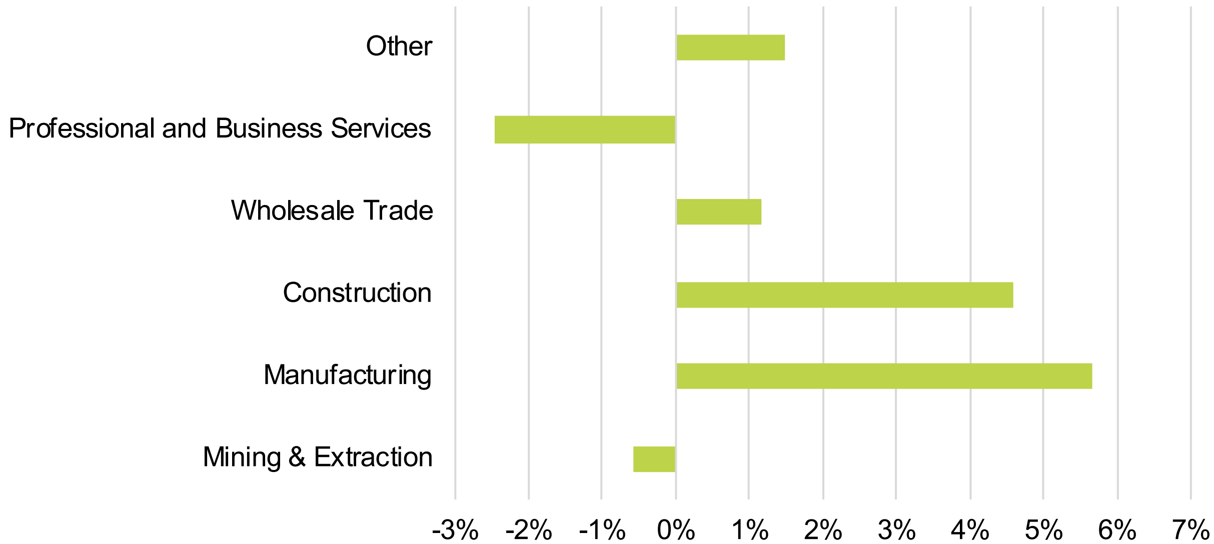
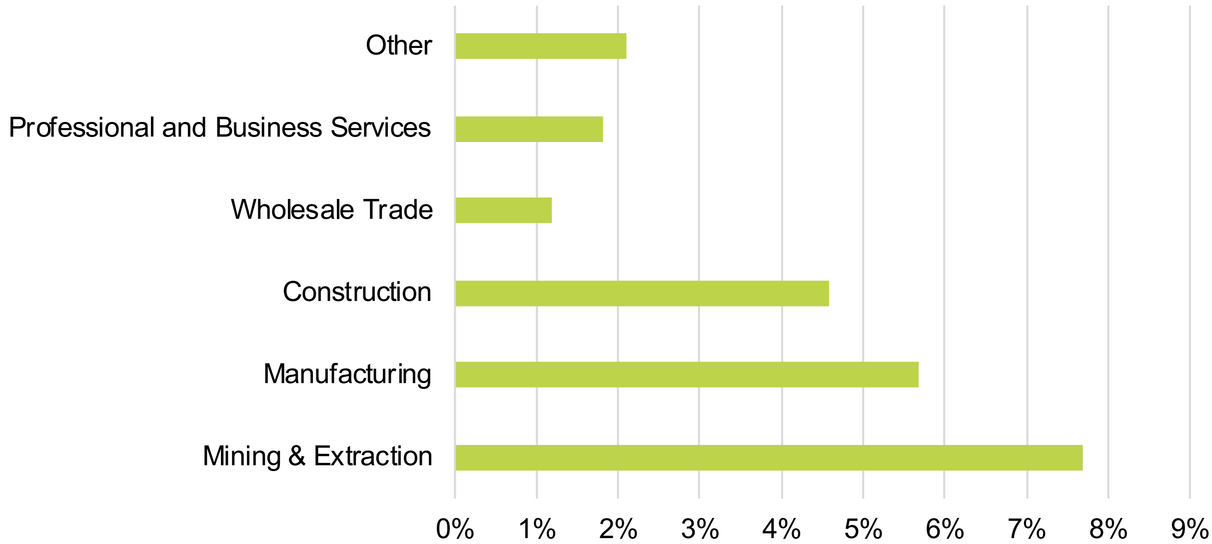


Figure 59. Offshore Petroleum Fuels Anticipated Employment Changes by Industry, 2021–2022



The petroleum fuel sector is less diverse than the rest of the economy in terms of gender; males make up 75% of the workforce, more than the 53% U.S. average (Table 27).

Table 27. Petroleum Fuels Workforce Demographics and Characteristics

	Number of Workers	Petroleum Fuels Average	National Workforce Averages	Energy Workforce Averages
Male	348,276	75%	53%	74%
Female	115,106	25%	47%	25%
Gender non-binary	234	<1%	insufficient data	0%
Hispanic or Latino	64,416	14%	18%	17%
Not Hispanic or Latino	399,201	86%	82%	83%
American Indian or Alaska Native	8,124	2%	1%	2%
Asian	27,566	6%	7%	7%
Black or African American, not Indigenous	39,600	9%	12%	8%

Black Indigenous	2,209	<1%	insufficient data	1%
Native Hawaiian or other Pacific Islander	4,734	1%	<1%	1%
White	347,447	75%	78%	74%
Two or more races	33,937	7%	2%	8%
Veterans	38,076	8%	6%	9%
55 and over	81,833	18%	24%	17%
Disability	5,154	1%	4%	2%
Formerly Incarcerated	4,217	1%	2%	1%
Represented by a Union or Project Labor Agreement	31,366	7%	6%	10%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers is lower than the national average, 14% compared to 18%.

Racially, the portion of non-White workers in petroleum fuels, 25%, is higher than the national average of 22%. This is attributable to higher-than-average portions of workers of two or more races (7% compared to 2% nationally), American Indian or Alaska Natives (2% compared to 1% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally).

The concentration of veterans (8% compared to 6% nationally) is higher than the national average, as is the portion of those represented by a union (7% compared to 6%). The portion of formerly incarcerated workers is lower than the national average (1% compared to 2%), which is also the case for those with disabilities disclosed to employers (1% compared to 4% nationally). The percentage of workers over the age of 55 (18% compared to 24% nationally) is also lower than the national average.

Natural Gas

Natural gas fuels employed 211,773 workers in 2021, up 1,803 from the 209,970 employed in 2020 (0.9%). Employment in 2019 stood at 275,924, so there is still a gap of 64,151 jobs.

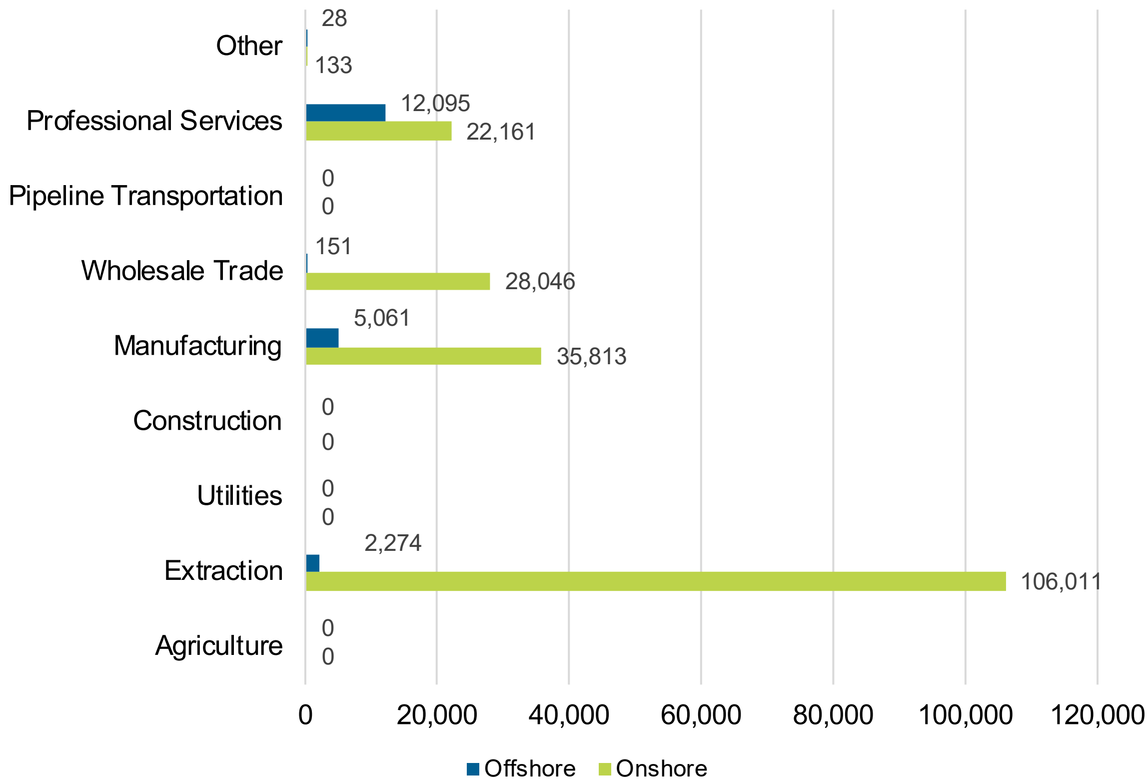
Trends and Key Takeaways

- The largest natural gas fuels job gains were in the professional and business services industry, with 1,479 new jobs (4.5%).
- Declines in natural gas fuels employment were limited to manufacturing, which shed 115 jobs (-0.3%).
- Hiring difficulty varied between onshore and offshore natural gas fuels, but employers in wholesale trade, transportation, and distribution reported the most difficulty for both types of natural gas activity.
- No offshore natural gas fuels employers anticipate negative changes in employment in 2022; only onshore employers in mining and extraction anticipate job losses.
- Natural gas fuels jobs are disproportionately held by males, with 74% compared to 53% nationally.
- Hispanic workers are less concentrated than the workforce average (12% compared to 18%).
- Racially, natural gas fuels has a higher percentage of non-White workers than the national average (25% compared to 22%). This higher level of diversity is largely attributable to a greater proportion of workers of two or more races (10% compared to 2% nationally).
- Black or African American are less represented (7% compared to 12%) as are Asian workers (5% compared to 7%).
- Veterans are more represented in natural gas fuels at 7% compared to 6% nationally.
- The percentage of union workers in natural gas fuels (7%) is also higher than the national average (6%)
- Those with disabilities are less represented in natural gas fuels at 2% compared to 4% nationally.
- The percentage of previously incarcerated workers is lower than the national workforce (1% compared to 2%).

Employment by Industry

The 2022 USEER splits natural gas fuels into onshore and offshore, although previous reports aggregated the two. Figure 60 shows employment between the two in 2021 by industry. Onshore employed a total of 192,164 workers in 2021, while offshore had 19,609 jobs. Onshore, then, was approximately 91% of the industry.

Figure 60. Onshore and Offshore Natural Gas Fuels Employment by Industry



The largest number of natural gas fuels employees were in the extraction industry, with 108,285 workers (Figure 61, Table 28). This is up 0.3%, or 361 jobs, from 2020 yet down 57,317 jobs from 2019. The largest number of new jobs in 2021 came from professional and business services, which gained 1,479 (4.5%).

Figure 61. Natural Gas Fuels Employment by Industry, 2019–2021

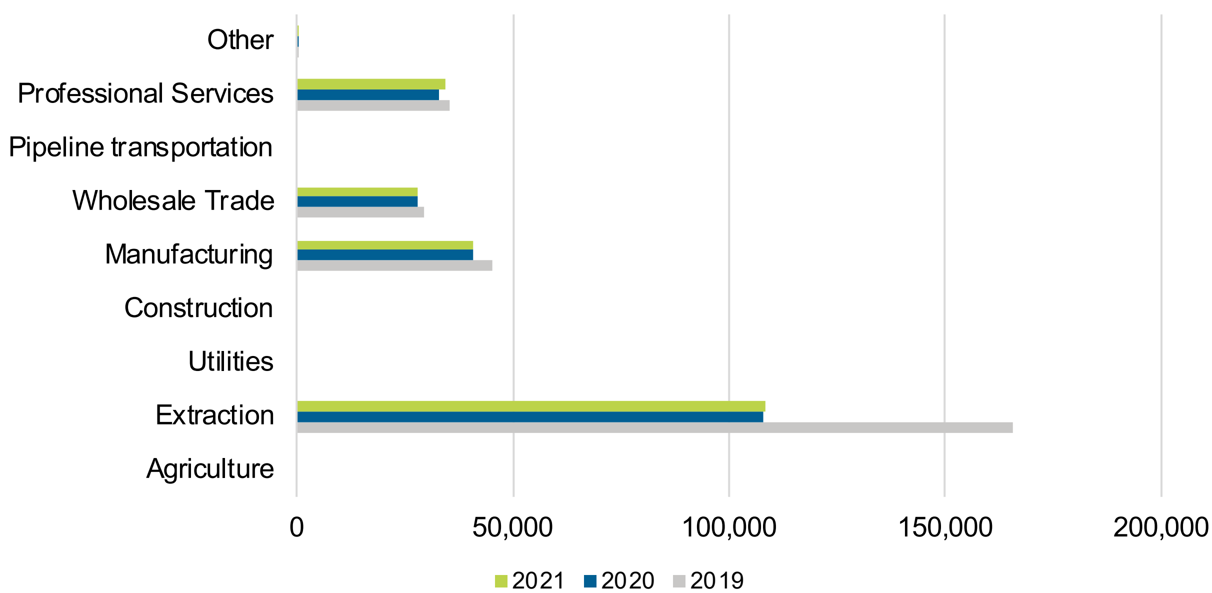


Table 28. Natural Gas Fuels Employment by Industry, 2019–2021

	2019	2020	2021
Agriculture	-	-	-
Extraction	165,602	107,925	108,285
Utilities	-	-	-
Construction	-	-	-
Manufacturing	45,276	40,988	40,873
Wholesale Trade	29,633	28,127	28,197
Pipeline transportation	-	-	-
Professional Services	35,235	32,777	34,256
Other	178	153	161

Wholesale trade employers in both onshore and offshore natural gas reported the highest hiring difficulty, with 89% of respondents for each indicating at least some difficulty (, Figure 63). Wholesale trade has the highest portion of employers indicating that it is "very difficult" to hire for onshore natural gas fuels, while for offshore, this highest level of difficulty is found within the "other services" industry.

Figure 62. Onshore Natural Gas Fuels Hiring Difficulty

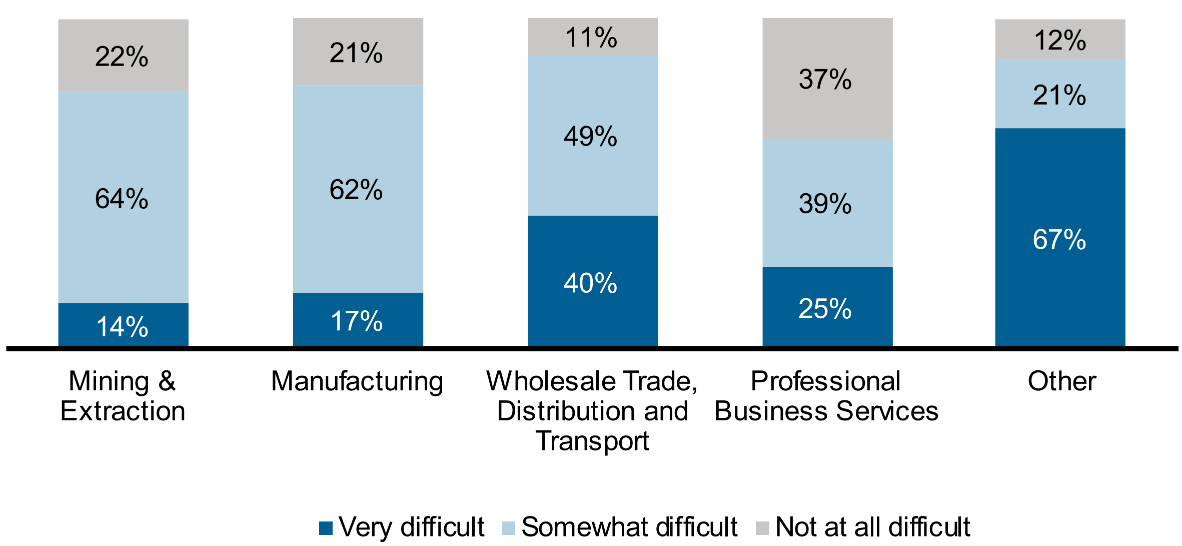
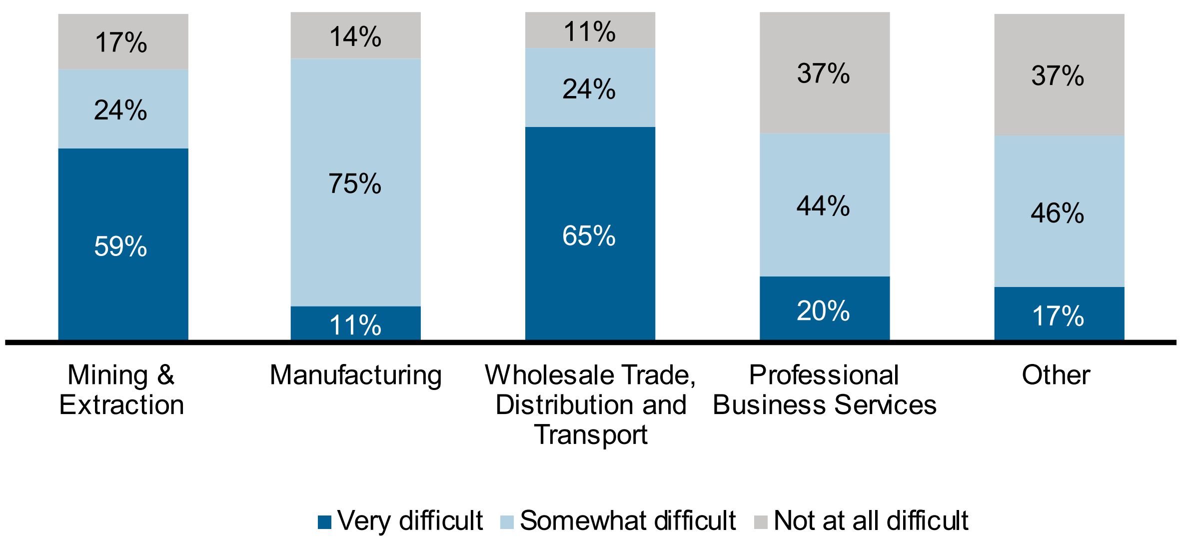


Figure 63. Offshore Natural Gas Fuels Hiring Difficulty



Onshore and offshore natural gas fuels have different expectations for growth. Within onshore, four out of six industries anticipate positive changes, while the other two are negative; all offshore industries expect either zero change or growth (Figure 64, Figure 65). Onshore growth expectations range from 0.2% in wholesale trade to 8.9% in professional and business services. Mining and extraction was the only onshore industry where employers expect declines: -2.8%. Offshore natural gas growth expectations range from 4.1% in manufacturing to 9.1% in professional and business services. Employers in wholesale trade did not expect changes.

Figure 64. Onshore Natural Gas Fuels Anticipated Employment Change, 2021–2022

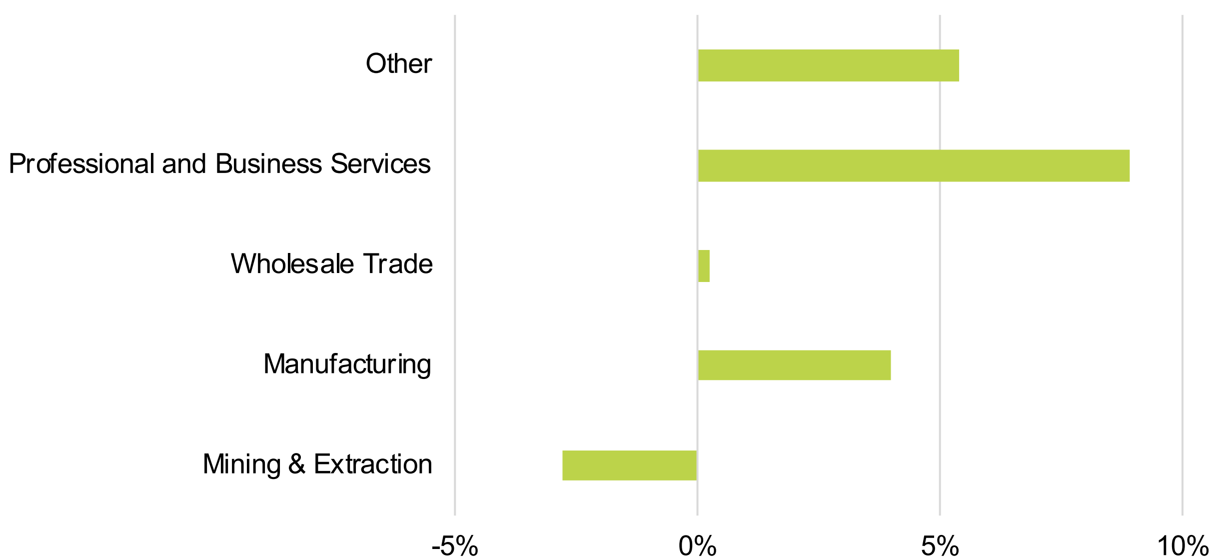
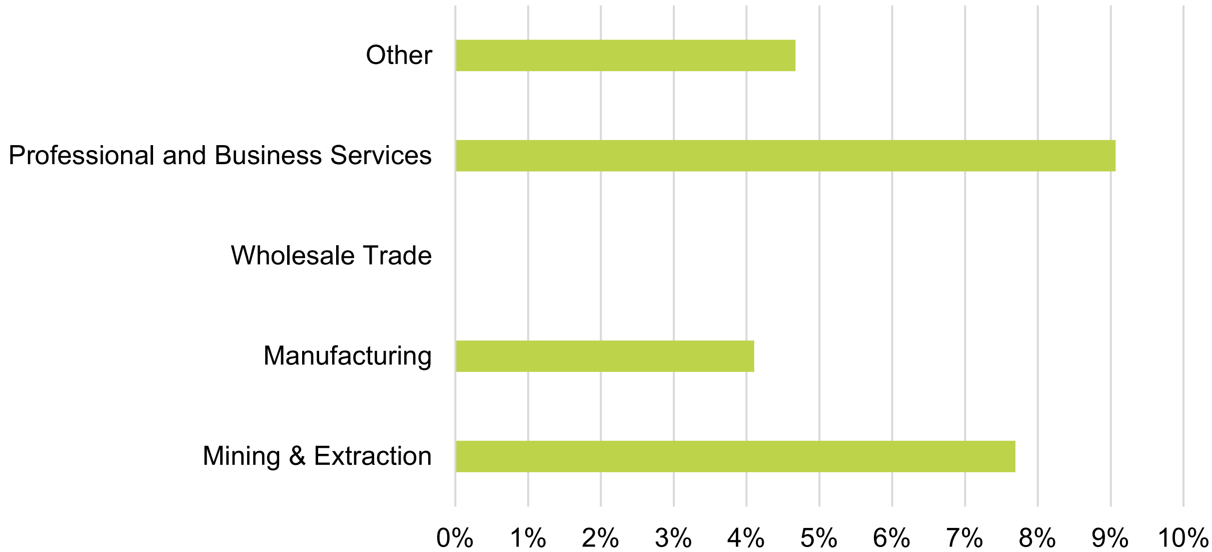


Figure 65. Offshore Natural Gas Fuels Anticipated Employment Changes, 2021–2022



The natural gas fuel sector is less diverse than the rest of the workforce in terms of gender; males make up 74% of the workforce, more than the 53% U.S. average (Table 29).

Table 29. Natural Gas Fuels Workforce Demographics and Characteristics

	Number of Workers	Petroleum Fuels Average	National Workforce Averages	Energy Workforce Averages
Male	155,767	74%	53%	74%
Female	55,896	26%	47%	25%
Gender non-binary	109	<1%	insufficient data	0%
Hispanic or Latino	25,649	12%	18%	17%
Not Hispanic or Latino	186,124	88%	82%	83%
American Indian or Alaska Native	3,023	1%	1%	2%
Asian	10,463	5%	7%	7%
Black or African American, not Indigenous	15,156	7%	12%	8%
Black Indigenous	1,678	1%	insufficient data	1%

Native Hawaiian or other Pacific Islander	1,036	<1%	<1%
White	159,395	75%	78%
Two or more races	21,021	10%	2%
Veterans	15,734	7%	6%
55 and over	42,205	20%	24%
Disability	4,823	2%	4%
Formerly Incarcerated	2,171	1%	2%
Represented by a Union or Project Labor Agreement	14,683	7%	6%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers is lower than the national average, 12% compared to 18%.

Racially, the portion of non-White workers in natural gas fuels, 25%, is higher than the national average of 22%. This is attributable to higher-than-average portions of workers of two or more races (10% compared to 2% nationally). The portions of other races in natural gas fuels are the same or less than national averages.

The concentration of veterans (7% compared to 6% nationally) is slightly higher than the national average. The portion of formerly incarcerated workers is lower than the national average (1% compared to 2%), which is also the case for those with disabilities disclosed to employers (2% compared to 4% nationally). The percentage of workers over the age of 55 (20% compared to 24% nationally) is also lower than the national average.

The concentration of workers represented by a union or project labor agreement is slightly higher than the national average (7% compared to 6%).

Coal Fuels

Coal fuels employed 53,312 workers in 2021, down 7,126 from the 60,438 employed in 2020 (-12%). This continues a trend of job losses, with the sector down 22,131 from its 2019 employment level of 75,443.

Trends and Key Takeaways

- Coal fuels declined 12% in 2021, a loss of 7,126 jobs
- Coal fuels jobs did increase in some industries, led by 268 in professional services, but not enough to offset losses in extraction
- Coal fuels employers in extraction and manufacturing had the most difficulty hiring workers, with 80% in both industries reporting difficulty.
- Coal fuels employers do not expect employment declines in 2022, although neither extraction nor wholesale trade anticipate growth.
- Coal fuels' workforce tends to be disproportionately male, with 76% compared to 53% nationally.
- Hispanic workers are less concentrated than the workforce average (11% compared to 18%).
- Racially, coal gas fuels has a lower percentage of non-White workers (16% compared to 22%). However, the percentage of the workforce that is of two or more races is higher than the national average (5% compared to 2%).
- Black or African American workers are underrepresented, making up 3% of the workforce compared to 12% of the overall U.S. workforce.
- Veterans are more represented in coal fuels at 7% compared to 6% nationally.
- The percentage of union workers in coal fuels (12%) is also higher than the national average (6%).
- Those with disabilities are less represented in coal fuels at 2% compared to 4% nationally.
- The percentage of previously incarcerated workers is lower than the national workforce (1% compared to 2%).
- The portion of the workforce over the age of 55 is the same as the national average (24%).

Employment by Industry

The largest number of coal fuels employees are in the extraction industry, with 34,970 workers (Figure 66, Table 30). Extraction also accounted for the most job losses, declining by 7,343 since 2020 (-17%) and 20,699 since 2019. Professional and business services did grow by 268 jobs in 2021 (3.6%), but this was not enough to offset losses from extraction.

Figure 66. Coal Fuels Employment by Industry, 2019–2021

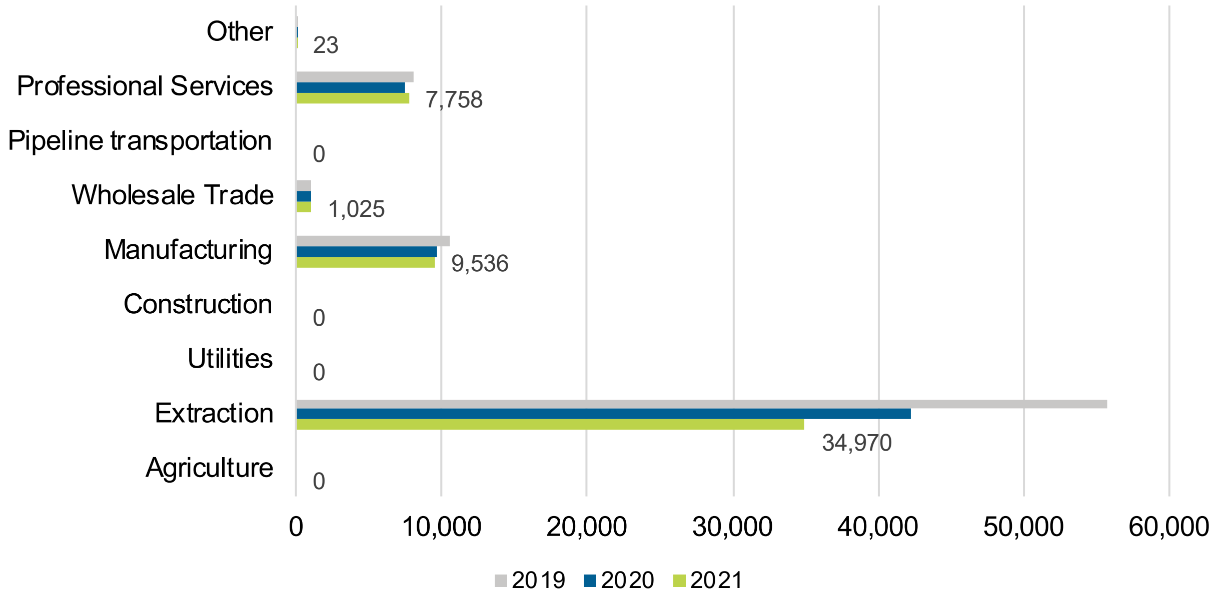
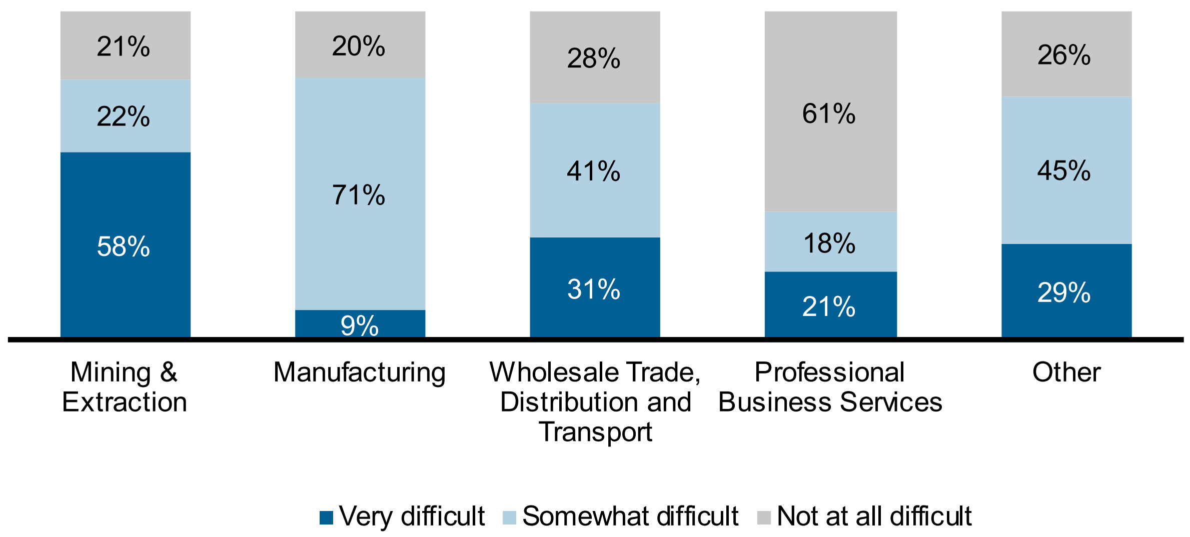


Table 30. Coal Fuels Employment by Industry, 2019–2021

	2019	2020	2021
Agriculture	-	-	-
Extraction	55,669	42,313	34,970
Utilities	-	-	-
Construction	-	-	-
Manufacturing	10,643	9,635	9,536
Wholesale Trade	1,031	978	1,025
Pipeline transportation	-	-	-
Professional Services	8,075	7,490	7,758
Other	25	22	23

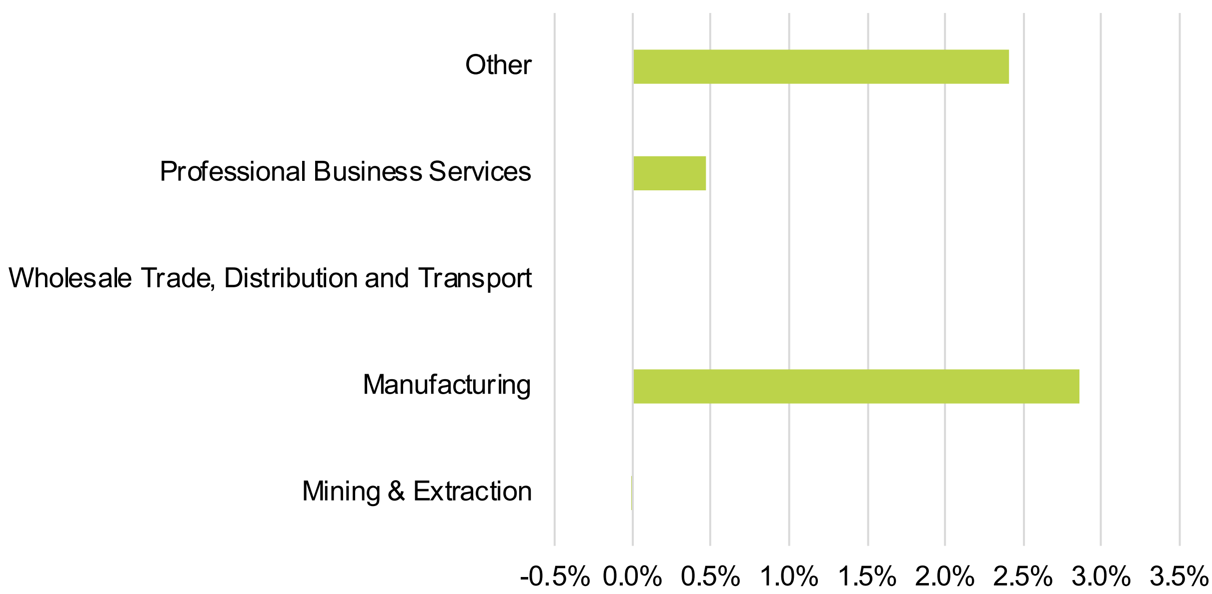
Within coal fuels industries, mining and extraction and manufacturing employers had the greatest difficulty hiring workers (Figure 67). Nearly 80% of employers in these two industries reported finding qualified workers as “very difficult” or “somewhat difficult.” Mining and extraction employers reported the highest percentage for “very difficult” at 58%. Professional and business services in coal fuels reported the least difficulty hiring, with 61% stating that it is “not at all difficult.”

Figure 67. Coal Fuels Hiring Difficulty



As shown in Figure 68, no coal fuels industries expect declines in 2022. Mining and extraction and wholesale trade employers indicated that they did not expect any changes while growth estimates in “other industries” range from 0.5% in professional business services to 2.9% in manufacturing.

Figure 68. Coal Fuels Anticipated Employment Change, 2021–2022



Coal fuels are less diverse than the rest of the economy in terms of gender; males make up 76% of the workforce, more than the 53% U.S. average (Table 31).

Table 31. Coal Fuels Workforce Demographics and Characteristics

	Number of Workers	Coal Fuels Average	National Workforce Averages	Energy Workforce Averages
Male	40,503	76%	53%	74%
Female	12,799	24%	47%	25%
Gender non-binary	11	<1%	insufficient data	0%
Hispanic or Latino	5,647	11%	18%	17%
Not Hispanic or Latino	47,665	89%	82%	83%
American Indian or Alaska Native	924	2%	1%	2%
Asian	2,627	5%	7%	7%
Black or African American, not Indigenous	1,590	3%	12%	8%
Black Indigenous	572	1%	insufficient data	1%
Native Hawaiian or other Pacific Islander	233	<1%	<1%	1%
White	44,535	84%	78%	74%
Two or more races	2,829	5%	2%	8%
Veterans	3,915	7%	6%	9%
55 and over	12,680	24%	24%	17%
Disability	1,040	2%	4%	2%
Formerly Incarcerated	565	1%	2%	1%
Represented by a Union or Project Labor Agreement	6,413	12%	6%	10%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers is lower than as the national average, 11% compared to 18%.

Racially, the portion of non-White workers in coal fuels, 16%, is higher than the national average of 22%, as is the portion of workers of two or more races (5% compared to 2% nationally). The portion of Black or African-American workers is significantly less than the national workforce average (3% compared to 12%).

The concentration of veterans (7% compared to 6% nationally) is higher than the national average, as is the portion of those represented by a union (12% compared to 6%). The portion of formerly incarcerated workers is lower than the national average (1% compared to 2%), which is also the case for those with disabilities disclosed to employers (2% compared to 4% nationally). The percentage of workers over the age of 55 in coal fuels is at the same percentage that they are in the national workforce (24%).

The concentration of workers represented by a union or project labor agreement is higher than the national average (12% compared to 6%).

Corn Ethanol

Corn ethanol employed 34,592 workers in 2021, up 1,086 from the 33,506 employed in 2020 (3.2%). It did, however, employ 34,866 workers in 2019, putting the technology's employment level 275 jobs short of its pre-COVID recession level.

Trends and Key Takeaways

- The largest corn ethanol fuels job gains were in the wholesale trade industry, with 369 new jobs (6.0%). This was also the greatest change on a percentage basis.
- Jobs did not decrease in any corn ethanol industry
- Wholesale trade, distribution, and transport employers had the highest percentage of companies reporting hiring difficulty, with 93% of respondents indicating it was "very difficult" or "somewhat difficult" to find employees.
- Corn ethanol employers in three out of five industries anticipate growth in 2022, with these expectations ranging from 0.2% to 4.5%. The other two industries anticipate no changes.
- Corn ethanol jobs are disproportionately held by males, with 69% compared to 53% nationally.
- Hispanic workers are less concentrated than the workforce average (12% compared to 18%).
- Racially, there are higher concentrations of those of two or more races (5% compared to 2% nationally), Native Hawaiian or other Pacific Islanders (2% compared with <1% nationally).
- The concentration of non-White workers is 21%, lower than the national average of 22%.
- Black or African American workers are underrepresented, making up 5% of the workforce compared to 12% of the overall U.S. workforce.
- Veterans make up 16% of the corn ethanol workforce, a higher concentration of veterans than any other energy technology and higher concentration than the 6% nationally.
- The percentage of union workers in corn ethanol (7%) is also higher than the national average (6%)
- Those with disabilities are equally represented in corn ethanol as they are nationally (4%), which is only true for two other technologies: "other biofuels" and woody biomass.
- The percentage of previously incarcerated workers is lower than the national workforce (1% compared to 2%).

Employment by Industry

The largest number of corn ethanol fuel jobs were in the agriculture industry, with 15,818 workers (Figure 69, Table 32).This is up 229 from 2020 (1.5%) and 399 from 2019. Wholesale trade contributed the largest number of corn ethanol new jobs in 2021, increasing by 369 or 6.0%. No corn ethanol industry contracted in 2021.

Figure 69. Corn Ethanol Fuels Employment by Industry, 2019–2021

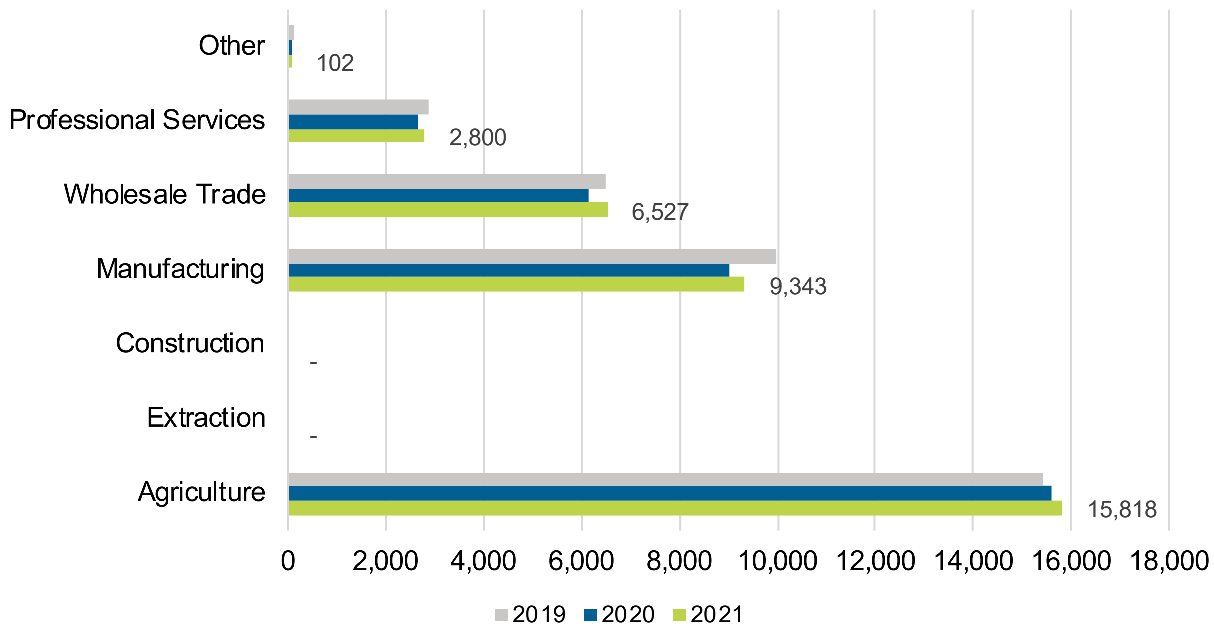
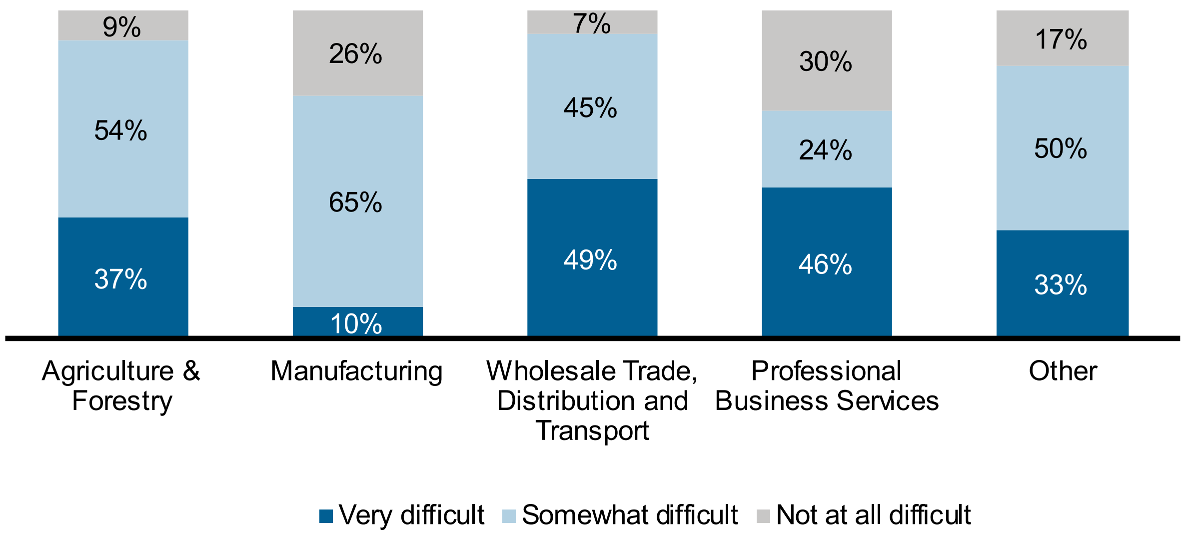


Table 32. Corn Ethanol Fuels Employment by Industry, 2019–2021

	2019	2020	2021
Agriculture	15,419	15,589	15,818
Extraction	-	-	-
Construction	-	-	-
Manufacturing	9,968	9,005	9,343
Wholesale Trade	6,493	6,158	6,527
Professional Services	2,873	2,656	2,800
Other	113	97	102

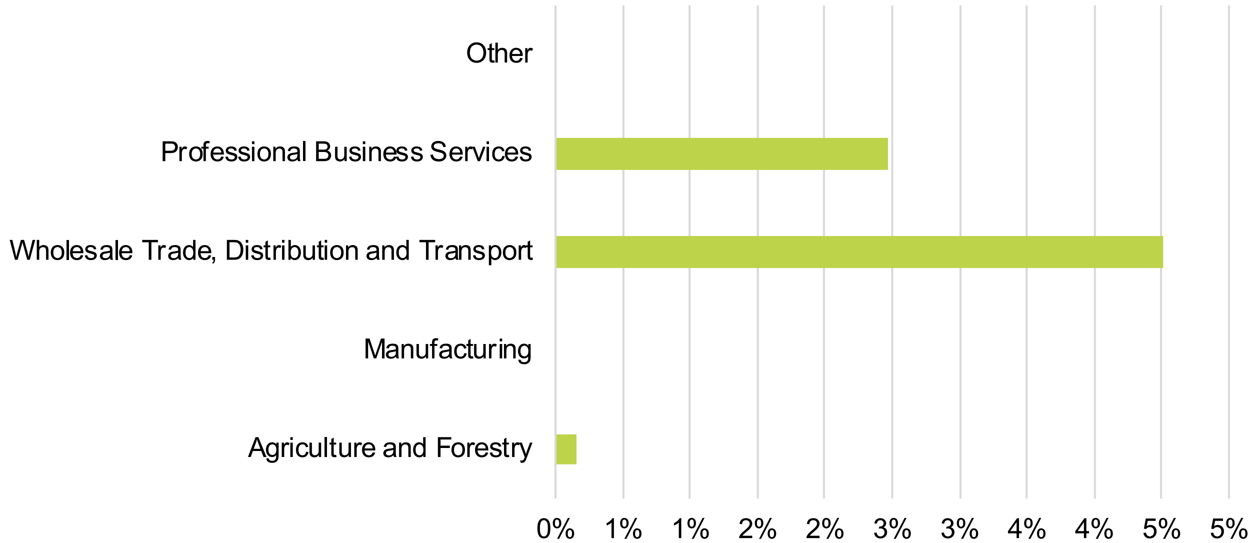
Within corn ethanol industries, employers in wholesale trade, distribution, and transport had the greatest difficulty hiring workers (Figure 70). Over 93% of these employers reported some difficulty finding qualified workers, with 49% claiming it is very difficult—the highest percentage in that category.

Figure 70. Corn Ethanol Fuels Hiring Difficulty



As shown in Figure 71, three out of the five industries in corn ethanol expect growth in 2022: Wholesale trade, distribution, and transport (4.5%), professional and business services (2.5%), and agriculture and forestry (0.2%). “Other services” and manufacturing do not anticipate changes.

Figure 71. Corn Ethanol Fuels Anticipated Employment Change, 2021–2022



Corn ethanol is less diverse than the rest of the economy in terms of gender; Males make up 69% of the workforce, more than the 53% U.S. average (Table 33).

Table 33. Corn Ethanol Fuels Workforce Demographics and Characteristics

	Number of Workers	Corn Ethanol Average	National Workforce Averages	Energy Workforce Averages
Male	23,972	69%	53%	74%
Female	10,378	30%	47%	25%
Gender non-binary	241	1%	insufficient data	0%
Hispanic or Latino	4,306	12%	18%	17%
Not Hispanic or Latino	30,285	88%	82%	83%
American Indian or Alaska Native	309	1%	1%	2%
Asian	2,248	6%	7%	7%
Black or African American, not Indigenous	1,626	5%	12%	8%
Black Indigenous	516	1%	insufficient data	1%
Native Hawaiian or other Pacific Islander	623	2%	<1%	1%
White	27,450	79%	78%	74%
Two or more races	1,820	5%	2%	8%
Veterans	5,694	16%	6%	9%
55 and over	8,126	23%	24%	17%
Disability	1,477	4%	4%	2%
Formerly Incarcerated	94	<1%	2%	1%
Represented by a Union or Project Labor Agreement	2,390	7%	6%	10%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers is lower than as the national average, 12% compared to 18%.

Racially, the portion of workers of two or more races is higher in corn ethanol than the U.S. workforce average (5% compared to 2%), as is the portion of Native Hawaiian or other Pacific Islanders (2% compared to <1%). The portion of non-White workers in corn ethanol fuels, 21%, is lower than the national average of 22% Black or African-American workers are significantly less represented (5% compared to 12%). Other races are either less represented or represented the same as the national average.

The concentration of veterans (16% compared to 6% nationally) is higher than the national average, as is the portion of those represented by a union (7% compared to 6%). The portion of formerly incarcerated workers is lower than the national average (<1% compared to 2%), which is also the case for workers over the age of 55 (23% compared to 24% nationally). Corn ethanol has the same portion of workers with disabilities as the U.S. workforce average.

Other Biofuels

"Other biofuels" industries include any fuel made from biomatter that is not classified elsewhere in the USEER, such as non-woody biomass, renewable diesel fuels, biodiesel fuels, waste fuels, and ethanol not produced from corn. This sector employed 34,592 workers in 2021, up 1,086 from the 33,506 employed in 2020 (3.2%). It did, however, employ 34,866 workers in 2019, indicating the technology has yet to fully recover from losses incurred in 2020.

Trends and Key Takeaways

- The largest job gains were in the professional and business services industry, with 1,525 new jobs (6.3%). On a percentage basis, both professional and business services and wholesale trade increased the most at 6.3%.
- Jobs decreased only in agriculture, which lost 27 workers (-1.1%) from 2020 to 2021, yet returned to its 2019 level.
- Wholesale trade had the highest percentage of companies reporting hiring difficulty, with 93% of respondents indicating it was "very difficult" or "somewhat difficult" to find employees.
- Within "other biofuels," only employers in manufacturing expect growth (5.8%)
- The percentage of workers covered by a union or project labor agreement in "other biofuels" (5%) is lower than the national average (6%).
- "Other biofuels" jobs are disproportionately held by males, with 66% compared to 53% nationally.
- The percent of non-White workers is higher than the national average (26% compared to 22%). This is primarily attributable higher concentrations of workers of two or more races (5% compared to 2% nationally) and Native Hawaiian or other Pacific Islanders (2% compared to <1% nationally).
- Black or African American workers are underrepresented, making up 8% of the workforce compared to 12% of the overall U.S. workforce.
- Veterans are more represented in "other biofuels" at 8% compared to 6% nationally.
- Those with disabilities are as concentrated in "other biofuels" as they are in the U.S. workforce (4%), which is only true for two other industries: corn ethanol and woody biomass.

Employment by Industry

The largest number of “other biofuels” employees are in the professional services industry, with 25,578 workers (Figure 72, Table 34). With 1,525 new jobs, this translates to 6.3% growth, which is the greatest in “other biofuels” along with wholesale trade, which also grew 6.3% (423 jobs). Only agriculture declined, losing 27 jobs or -1.1%. Most sectors were still below their 2019 numbers, with the exceptions of wholesale trade (62 more jobs) and agriculture, which reached its 2019 level but did not exceed it when the difference is rounded.

Figure 72. “Other Biofuels” Employment by Industry, 2019–2021

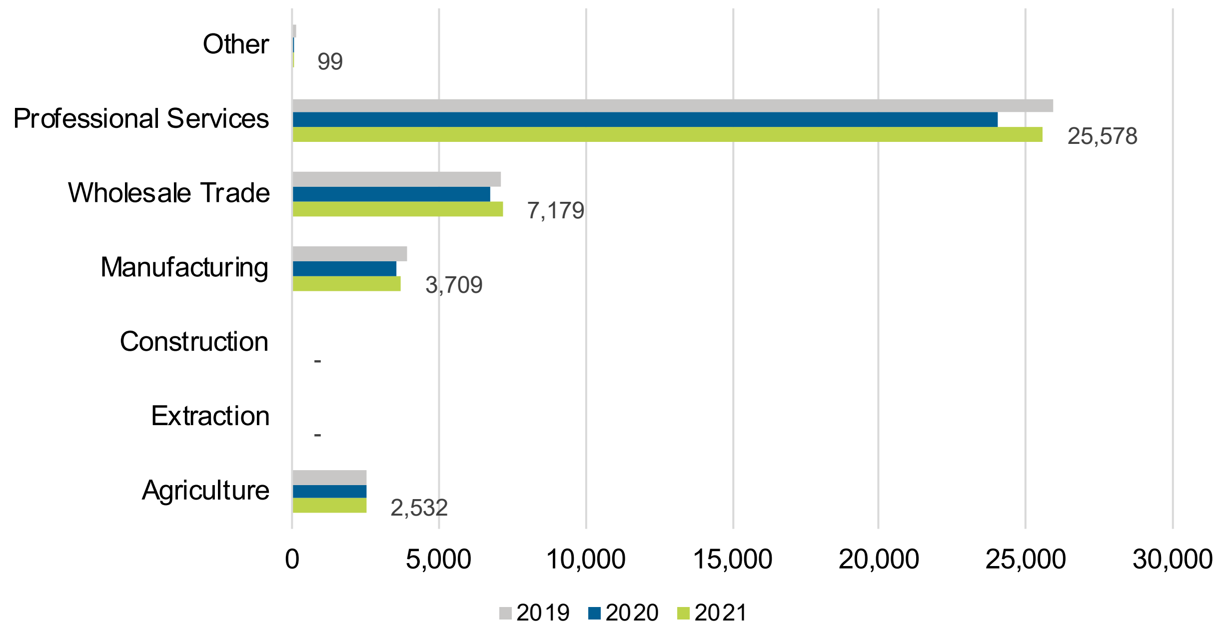
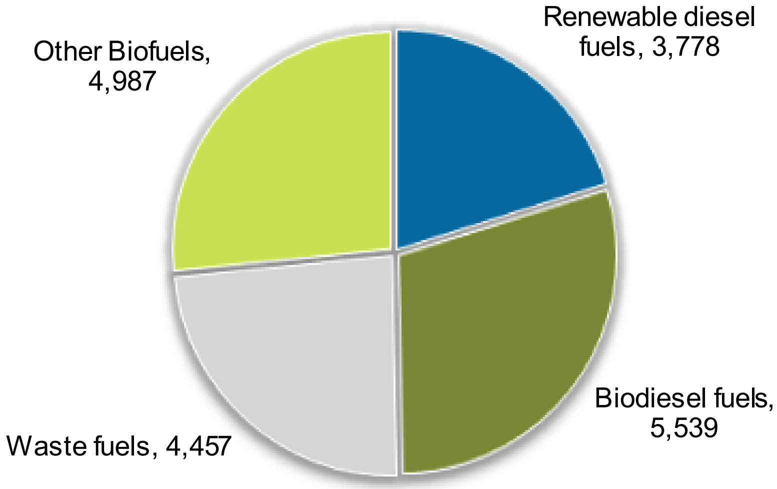


Table 34. “Other Biofuels” Employment by Industry, 2019–2021

	2019	2020	2021
Agriculture	2,531	2,559	2,532
Extraction	-	-	-
Construction	-	-	-
Manufacturing	3,950	3,575	3,709
Wholesale Trade	7,117	6,756	7,179
Professional Services	25,917	24,053	25,578
Other	108	93	99

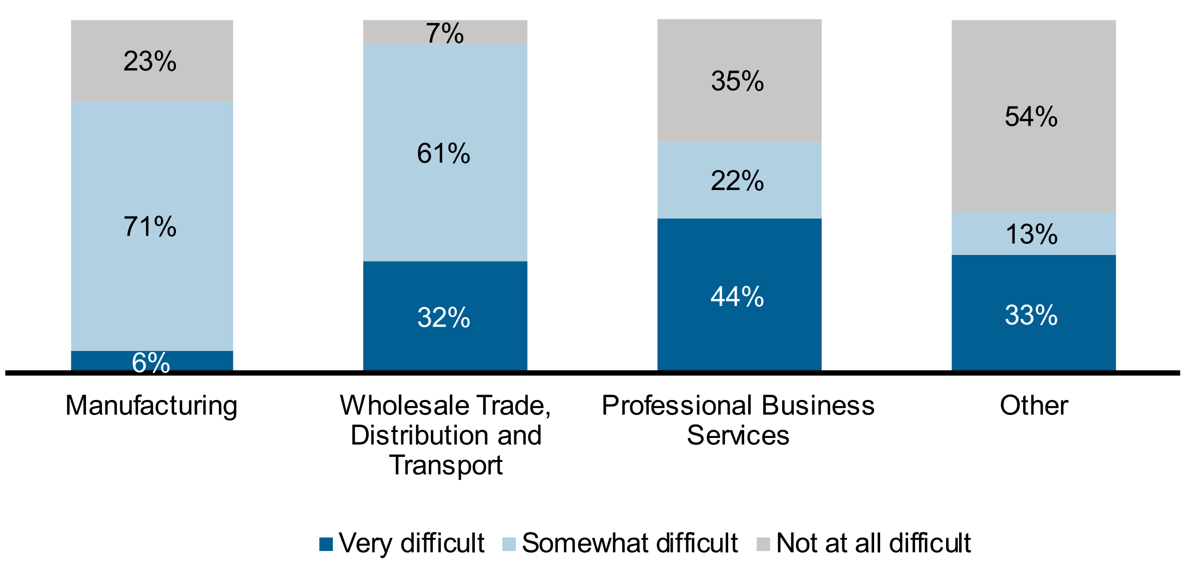
The 2022 USEER splits out "other biofuels" by several of its components: renewable diesel fuels, biodiesel fuels, waste fuels, other biofuels, and other ethanol/non-woody biomass. Figure 73 shows how these technologies are distributed. The largest category is biodiesel fuels, with 5,539 workers followed by "other biofuels" with 4,987.

Figure 73. "Other Biofuels" by Component



Within "other biofuels" industries, wholesale trade had the greatest difficulty hiring workers (Figure 74). Over 93% of these employers reported some difficulty finding qualified workers, with 32% claiming it is "very difficult." That is the third highest instance of "very difficult" among industries, following professional services (44%) and "other services" (33%). "Other services" in "other biofuels" reported the least difficulty hiring, with 54% stating that it is "not at all difficult."

Figure 74. Other Biofuels Hiring Difficulty



Within bioenergy, only manufacturing expects growth in 2022, projecting a 5.8% gain. All other industries do not expect changes.

The "other biofuels" sector is less diverse than the rest of the economy in terms of gender; males make up 70% of the workforce, more than the 53% U.S. average (Table 35).

Table 35. Other Biofuels Workforce Demographics and Characteristics

	Number of Workers	"Other Biofuels" Averages	National Workforce Averages
Male	25,931	66%	53%
Female	13,035	33%	47%
Gender non-binary	130	<1%	insufficient data
Hispanic or Latino	5,111	13%	18%
Not Hispanic or Latino	33,985	87%	82%
American Indian or Alaska Native	558	1%	1%
Asian	2,902	7%	7%
Black or African American, not Indigenous	3,230	8%	12%
Black Indigenous	534	1%	insufficient data
Native Hawaiian or other Pacific Islander	681	2%	<1%
White	29,093	74%	78%
Two or more races	2,098	5%	2%
Veterans	3,027	8%	6%
55 and over	4,731	12%	24%
Disability	1,750	4%	4%
Formerly Incarcerated	536	1%	2%
Represented by a Union or Project Labor Agreement	1,871	5%	6%

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers is lower than as the national average, 13% compared to 18%.

The portion of non-White workers in “other biofuels” is 28%, higher than the national average of 22%. This is attributable to higher-than-average portions of workers of two or more races (8% compared to 2% nationally), Asian workers (9% compared to 7% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally). American Indian or Alaska Natives are the same as the national average (1%) while the concentrations of other races are lower than national averages.

The concentration of veterans (8% compared to 6% nationally) is higher than the national average. The portion of formerly incarcerated workers is lower than the national average (1% compared to 2%), which is also the case for those with disabilities disclosed to employers (2% compared to 4% nationally). The percentage of workers over the age of 55 (11% compared to 24% nationally) is also lower than the national average.

The concentration of workers represented by a union or project labor agreement is higher than the national average (10% compared to 6%).

Woody Biomass Fuel for Energy and Cellulosic Biofuels

Woody biomass fuel for energy and cellulosic biofuels employed 33,898 workers in 2021, up 1,457 from the 32,442 employed in 2020 (4.5%). This is also a 472 job increase from 2019, which had 33,426 employees.

Trends and Key Takeaways

- The largest woody biomass job gains were in agriculture and forestry, with 629 new jobs (3.5%). On a percentage basis, professional services increased the most, expanding 6.5% from 9,391 to 10,000 jobs.
- Jobs did not decrease in any woody biomass industry.
- Wholesale trade employers had the highest percentage of companies reporting hiring difficulty, with 93% of respondents indicating it was "very difficult" or "somewhat difficult" to find employees.
- All woody biomass employers anticipate growth in 2022, with these expectations ranging from 0.1% to 7.6%.
- The percentage of workers covered by a union or project labor agreement in woody biomass (10%) is higher than the national average (6%).
- The woody biomass workforce tends to be disproportionately male, with 70% compared to 53% nationally.
- Woody biomass is 7% Hispanic compared to 18% in the national workforce. Two minority races exceeded national workforce averages: two or more races and Indigenous American or Alaska Native. The portion of non-White workers is 17%, lower than the 22% national average.
- Black or African American workers are underrepresented, making up 3% of the workforce compared to 12% of the overall U.S. workforce, as are Asian workers, making up 5% of the woody biomass workforce compared to 7% across the United States.
- The woody biomass workforce has the second highest portion of veterans out of any energy technology: 15%. Corn ethanol is the only technology with a higher percentage (16%). This compares with a 6% national average.
- Woody biomass is one of only three technologies in which those with disabilities are represented at the same percentage as the U.S. workforce (4%). Corn ethanol and "other biofuels" are the only other industries with the same representation.

Employment by Industry

The largest number of woody biomass employees were in the agriculture and forestry industry, with 18,490 workers (Figure 75, Table 36). Agriculture also showed both the largest number of new jobs (629) although, being the largest industry, its 3.5% growth rate was the lowest, behind professional services (6.5%), wholesale trade (6.2%), "other services" (5.2%), and manufacturing (3.8%). Despite losing jobs from 2019 to 2020, job gains from 2020 to 2021 put woody biomass 472 employees higher than its 2019 pre-recession number.

Figure 75. Woody Biomass Fuel for Energy and Cellulosic Biofuels Employment by Industry, 2019–2021

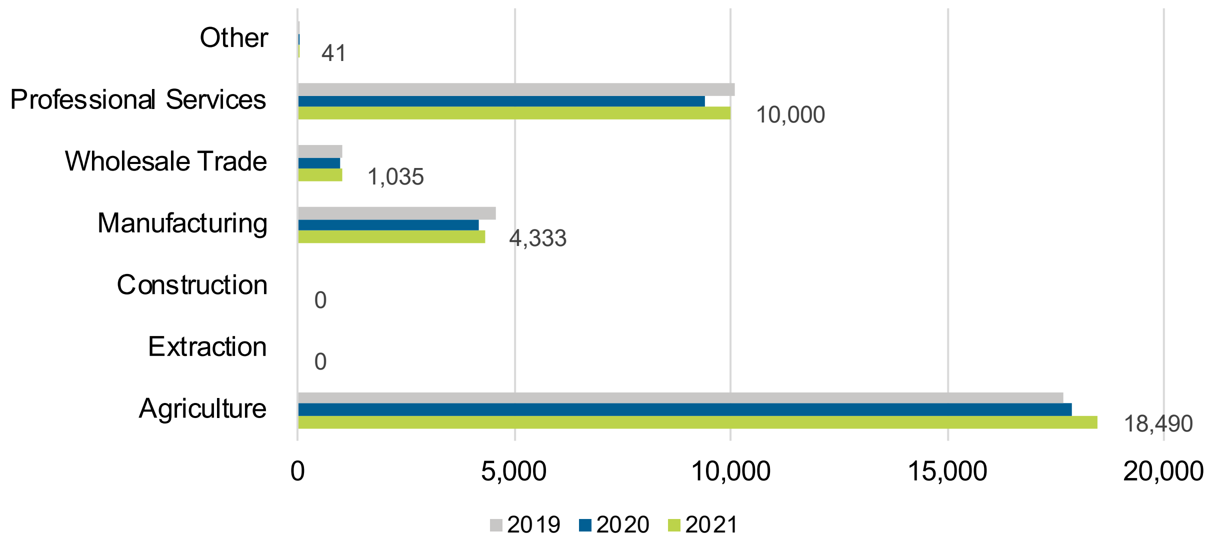


Table 36. Woody Biomass Fuel for Energy and Cellulosic Biofuels Employment by Industry, 2019–2021

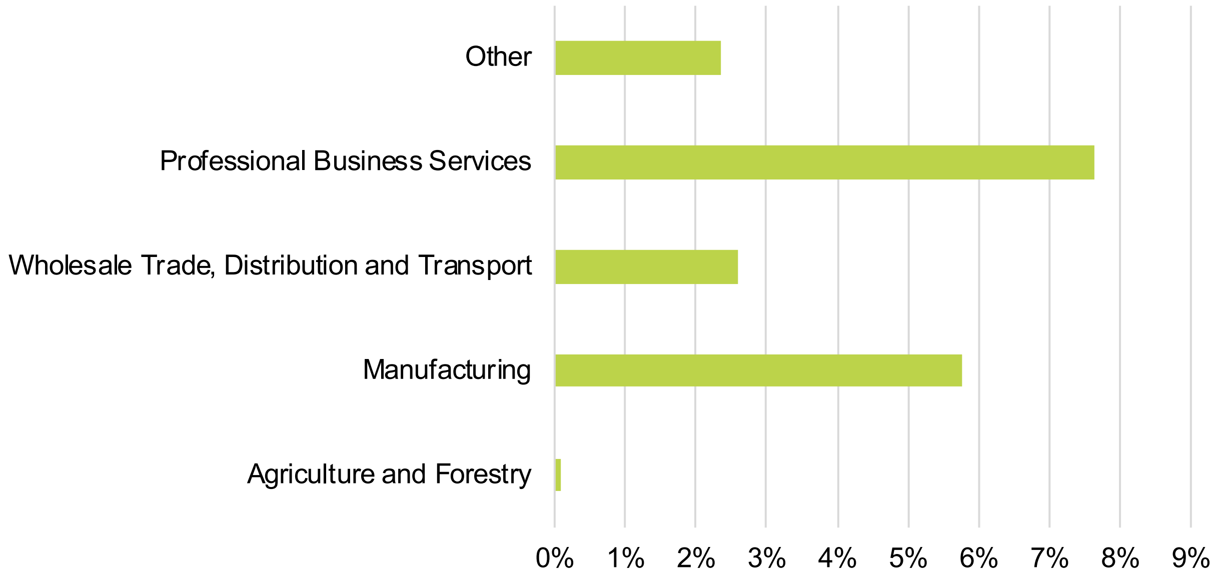
	2019	2020	2021
Agriculture	17,665	17,860	18,490
Extraction	-	-	-
Construction	-	-	-
Manufacturing	4,593	4,176	4,333
Wholesale Trade	1,028	975	1,035
Professional Services	10,096	9,391	10,000
Other	45	39	41

Within woody biomass industries, wholesale trade had the greatest difficulty hiring workers. Nearly 93% of these employers reported some difficulty finding qualified workers, with 65% claiming it is very difficult (Figure 76). That is the highest instance of "very difficult" among industries as well. "Other services" in woody biomass reported the least difficulty hiring, with 29% stating that it is "not at all difficult."

Figure 76. Woody Biomass Fuel for Energy and Cellulosic Biofuels Hiring Difficulty

As shown in Figure 77, no industries in woody biomass expect declines from 2021 to 2022. Employers in professional services expect a 7.6% increase, the highest among all industries. This is followed by manufacturing (5.8%) and wholesale trade (2.6%).

Figure 77. Woody Biomass Fuel for Energy and Cellulosic Biofuels Anticipated Changes in Employment, 2021–2022



Woody biomass is less diverse than the rest of the economy in terms of gender; males make up 70% of the workforce, more than the 53% U.S. average (Table 37).

Table 37. Woody Biomass Fuel for Energy and Cellulosic Biofuels Workforce Demographics and Characteristics

	Number of Workers	Woody Biomass Averages	National Workforce Averages	Energy Workforce Averages
Male	23,714	70%	53%	74%
Female	9,896	29%	47%	25%
Gender non-binary	289	1%	insufficient data	0%
Hispanic or Latino	2,421	7%	18%	17%
Not Hispanic or Latino	31,478	93%	82%	83%
American Indian or Alaska Native	357	1%	1%	2%
Asian	1,732	5%	7%	7%
Black or African American, not Indigenous	888	3%	12%	8%
Black Indigenous	612	2%	insufficient data	1%
Native Hawaiian or other Pacific Islander	298	1%	<1%	1%
White	28,014	83%	78%	74%
Two or more races	1,998	6%	2%	8%
Veterans	4,961	15%	6%	
55 and over	6,806	20%	24%	
Disability	1,225	4%	4%	

Formerly Incarcerated	1,002	3%	2%	
Represented by a Union or Project Labor Agreement	2,674	8%	6%	

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers is 7% compared to 18% in the entire national workforce.

The only minority races to exceed national workforce average were two or more races (6% compared to 2%) and Native Hawaiian or other Pacific Islander (1% compared to <1%). The portion of non-White workers, at 17%, was lower than the 22% national average. Indigenous American and Alaska Natives were the same as the national average (1%) while all other races were below national averages.

The concentration of veterans (15% compared to 6% nationally) is higher than the national average. Similarly, woody biomass is the only industry where those with disabilities are just as represented as they are within all U.S. industries (4%).

The portion of those represented by a union (8% compared to 6%) is higher-than-average, as is the portion of formerly incarcerated workers (3% compared to 2%). At 20%, the portion of workers over the age of 55 is lower than the 24% national average.

The concentration of workers represented by a union or project labor agreement is higher than the national average (8% compared to 6%).

Nuclear Fuels

Nuclear fuels employed 9,181 workers in 2021, up 413 from the 8,768 employed in 2020 (4.7%). It did, however, employ 9,406 workers in 2019, indicating the technology has yet to fully recover from losses in 2020.

Trends and Key Takeaways

- The largest job gains were in the professional services industry, with 293 new jobs (6.2%). This is also the largest nuclear fuels industry.
- Jobs did not decrease in any nuclear fuels industry.
- Manufacturing contained the highest percentage of companies reporting hiring difficulty, with 82% of respondents indicating it was "very difficult" or "somewhat difficult" to find employees.
- Only nuclear fuels employers in professional services expect growth in 2022 (4.7%). All other industries expect no changes.
- The percentage of workers covered by a union or project labor agreement in nuclear fuels (10%) is higher than the national average (6%).
- The nuclear fuels industry tends to be disproportionately male, with 71% of the workforce compared to 53% nationally.
- Hispanic workers are less concentrated than the workforce average (13% compared to 18%).
- The percent of non-White workers is 29%, higher than the 22% national average. This is attributable to Asian workers (9% compared to 7% nationally), those of two or more races (12% compared to 2% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally) being more concentrated in solar.
- The percent of American Indians is the same as the national average (1%).
- Black or African American workers are underrepresented, making up 5% of the workforce compared to 12% of the overall U.S. workforce.
- Veterans are more represented in nuclear fuels at 8% compared to 6% nationally.
- Those with disabilities are less represented in nuclear fuels at 3% compared to 4% nationally. The percentage of previously incarcerated workers is lower than the national workforce (1% compared to 2%).

Employment by Industry

The largest number of nuclear fuels employees were in the professional services industry, with 5,044 workers (Figure 78, Table 38). Professional services was also the source of the most new nuclear fuels jobs, increasing 293 (6.2%). No nuclear fuels industry lost jobs from 2020 to 2021, although the sector is 226 jobs shy of its 2019 total.

Figure 78. Nuclear Fuels Employment by Industry, 2019–2021

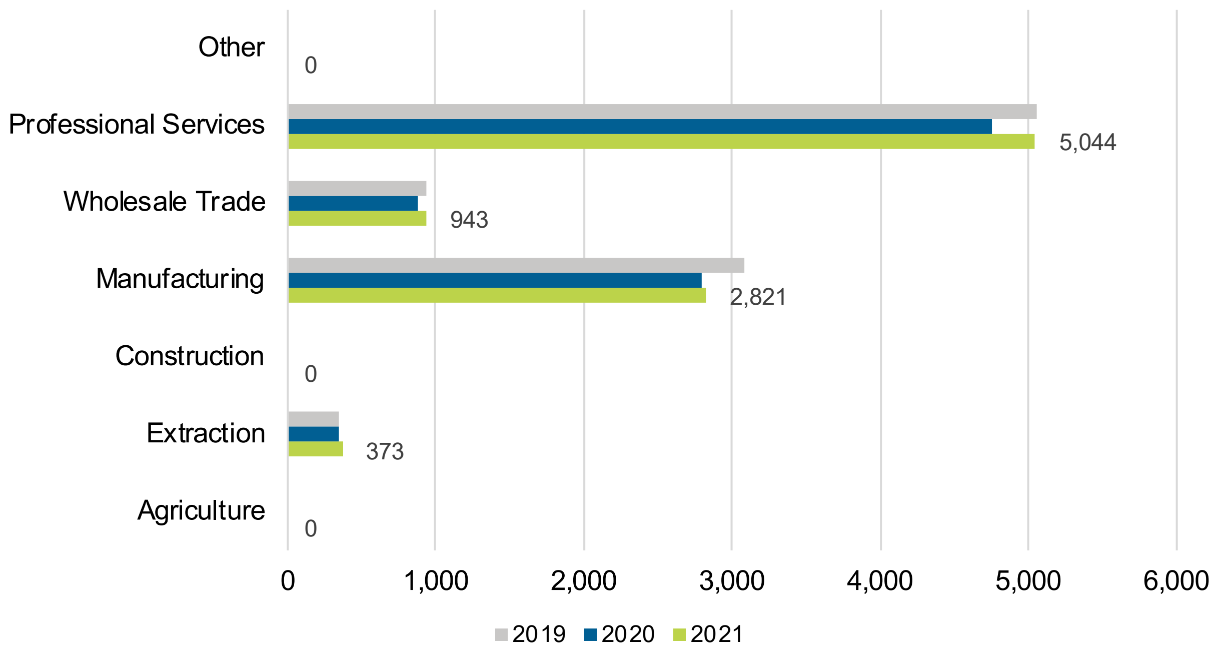
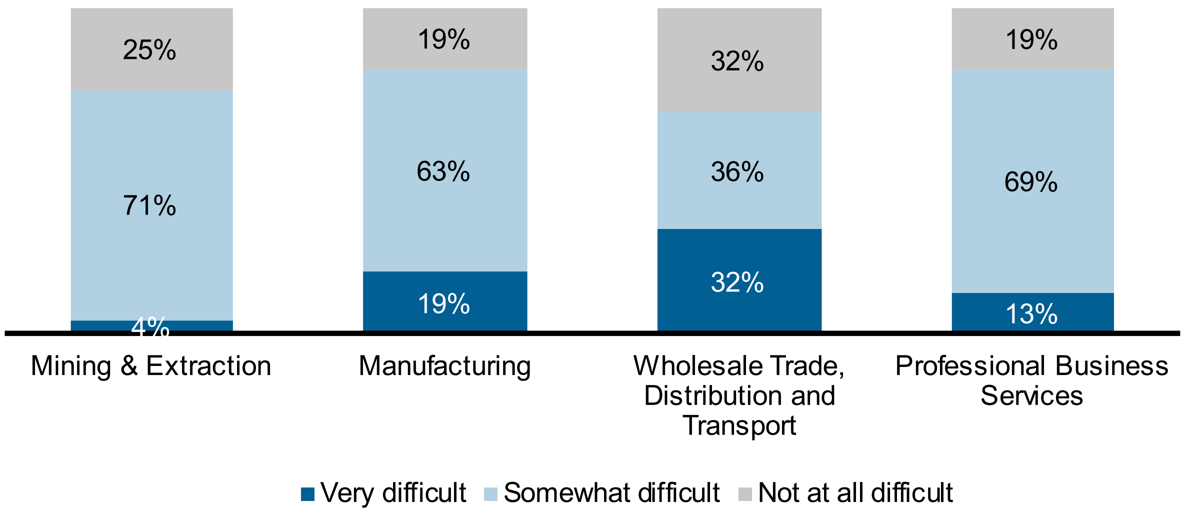


Table 38. Nuclear Fuels Employment by Industry, 2019–2021

	2019	2020	2021
Agriculture	-	-	-
Extraction	348	341	373
Construction	-	-	-
Manufacturing	3,078	2,794	2,821
Wholesale Trade	929	882	943
Professional Services	5,052	4,751	5,044
Other	-	-	-

Within nuclear fuels, manufacturing had the greatest difficulty hiring workers (Figure 79). Nearly 82% of these employers reported some difficulty finding qualified workers, with 19% claiming it is "very difficult." While only 68% of wholesale trade employers reported difficulty—the lowest in nuclear fuels—they also had the highest percentage of employers that had a "very difficult" time hiring (32%).

Figure 79. Nuclear Fuel Hiring Difficulty



Only one industry within nuclear fuels anticipates growth in 2022: professional and business services expects a 4.7% increase. No other industries anticipate changes.

The nuclear fuels industry is less diverse than the rest of the economy in terms of gender; males make up 71% of the workforce, more than the 53% U.S. average (Table 39).

Table 39. Nuclear Fuels Workforce Demographics and Characteristics

	Number of Workers	Nuclear Fuels Averages	National Workforce Averages	Energy Workforce Averages
Male	6,544	71%	53%	74%
Female	2,636	29%	47%	25%
Gender non-binary	1	<1%	insufficient data	0%
Hispanic or Latino	1,237	13%	18%	17%
Not Hispanic or Latino	7,944	87%	82%	83%
American Indian or Alaska Native	83	1%	1%	2%

Asian	797	9%	7%	7%
Black or African American, not Indigenous	484	5%	12%	8%
Black Indigenous	97	1%	insufficient data	1%
Native Hawaiian or other Pacific Islander	70	1%	<1%	1%
White	6,538	71%	78%	74%
Two or more races	1,112	12%	2%	8%
Veterans	761	8%	6%	
55 and over	1,430	16%	24%	
Disability	233	3%	4%	
Formerly Incarcerated	95	1%	2%	
Represented by a Union or Project Labor Agreement	732	8%	6%	

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

Racially, the portion of non-White workers in nuclear fuels, 29%, is higher than the 22% national average. This is attributable to higher-than-average portions of workers of two or more races (12% compared to 2% nationally), Asian workers (9% compared to 7% nationally), and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally). American Indian or Alaska Natives are the same as the national average (1%) while the concentrations of other races are lower than national averages.

The portion of the workforce made up of Hispanic or Latino workers is lower than the national average, 13% compared to 18%.

The concentration of veterans (8% compared to 6% nationally) is higher than the national average, as is the portion of those represented by a union (8% compared to 6%). The portion of formerly incarcerated workers is lower than the national average (1% compared to 2%), which is also the case for those with disabilities disclosed to employers (3% compared to 4% nationally). The percentage of workers over the age of 55 (16% compared to 24% nationally) is also lower than the national average.

Other Fuels

"Other fuels" employed 62,953 workers in 2021, up 2,629 from the 60,324 employed in 2020 (4.4%). It did, however, employ 64977 workers in 2019, indicating the technology has yet to fully recover from losses that occurred from 2019 to 2020.

Trends and Key Takeaways

- The largest job gains were in the wholesale trade industry, with 1,841 new jobs (6.1%). This is also the largest percent gain.
- Jobs did not decrease in any industry within "other fuels."
- "Other services" had the highest percentage of companies reporting hiring difficulty, with 92% of respondents indicating it was "very difficult" or "somewhat difficult" to find employees.
- "Other fuels" employers in professional services and wholesale trade expect growth from 2021 to 2020 at 6.1% and 1.7%, respectively.
- The percentage of workers covered by a union or project labor agreement in "other fuels" (11%) is higher than the national average (6%).
- The workforce in "other fuels" tends to be disproportionately male, with 72% compared to 53% nationally.
- Hispanic workers are less concentrated than the workforce average (10% compared to 18%).
- The only racial minority groups in "other fuels" that are more concentrated than national averages are two or more races (4% compared to 2%) and Native Hawaiian or other Pacific Islander (1% compared to < 1%). Non-White works make up 14% of the workforce, less than the 22% national average.
- Black or African American workers are underrepresented, making up 4% of the workforce compared to 12% of the overall U.S. workforce.
- Veterans are more represented in "other fuels" at 13% compared to 6% nationally.
- Those with disabilities are less represented in "other fuels" at <1% compared to 4% nationally. The percentage of previously incarcerated workers is lower than the national workforce (<1% compared to 2%).

Employment by Industry

The largest number of “other fuels” employees are in the wholesale trade industry, with 32,149 workers (Figure 80, Table 40). Additionally, wholesale trade showed both the largest number of new jobs, 1,841, and also grew by the largest percentage. Wholesale trade was the only industry within “other fuels” that, by 2021, had exceeded its 2019 level of employment.

Figure 80. “Other Fuels” Employment by Industry, 2019–2021

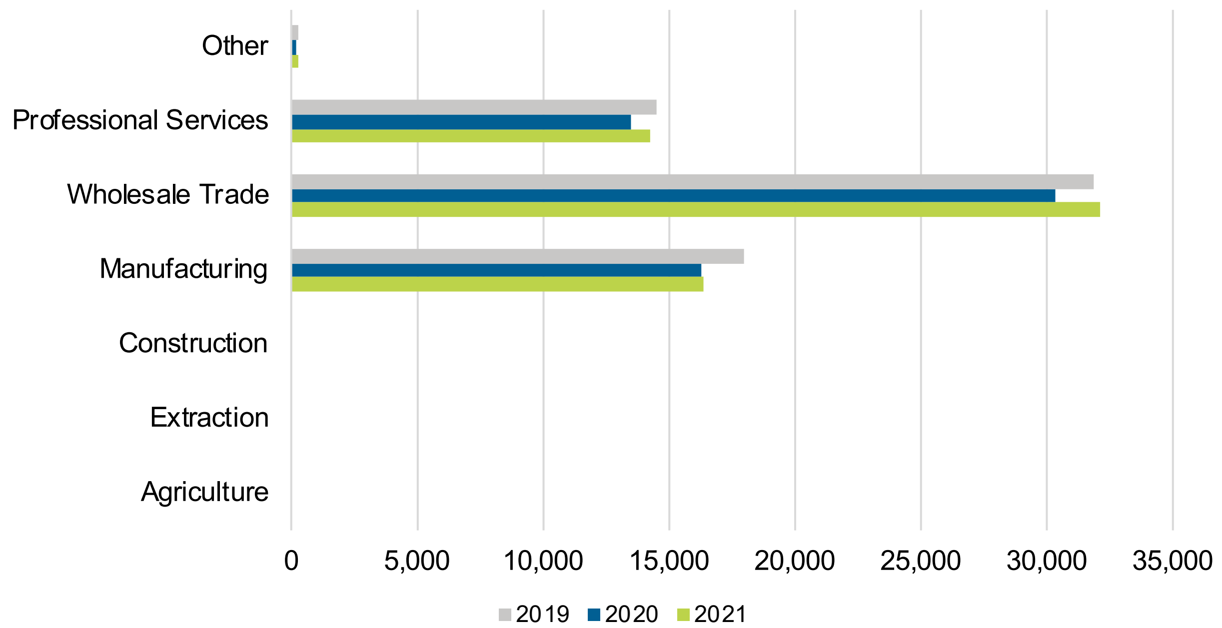
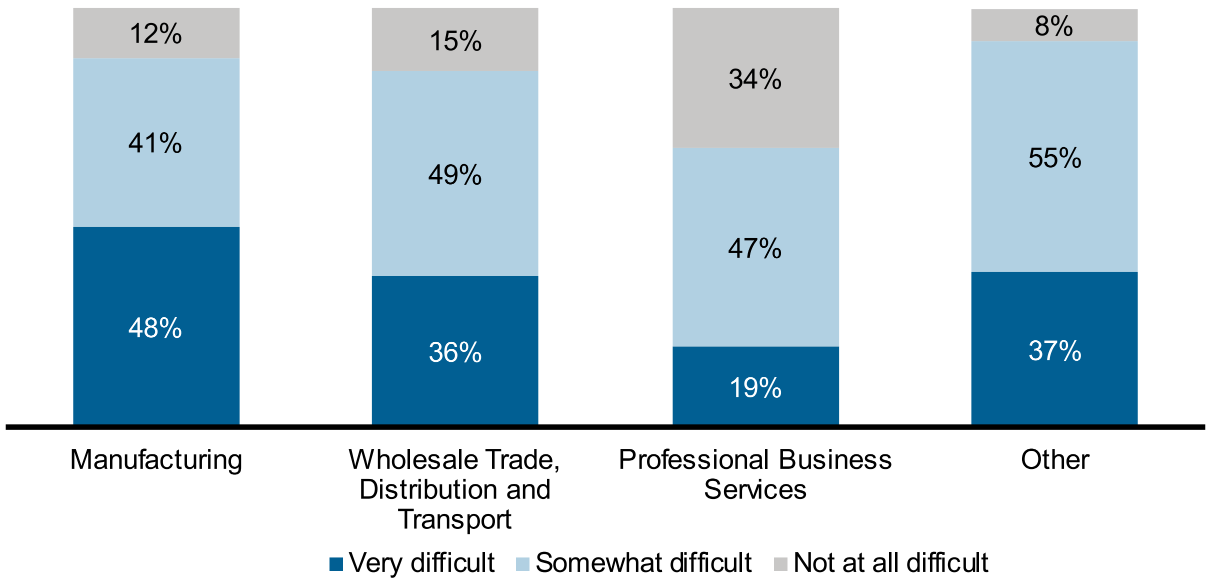


Table 40. “Other Fuels” Employment by Industry, 2019–2021

Industry	2019	2020	2021
Agriculture	0	0	0
Extraction	0	0	0
Construction	0	0	0
Manufacturing	17,982	16,269	16,338
Wholesale Trade	31,885	30,308	32,149
Professional Services	14,541	13,514	14,222
Other	269	232	243

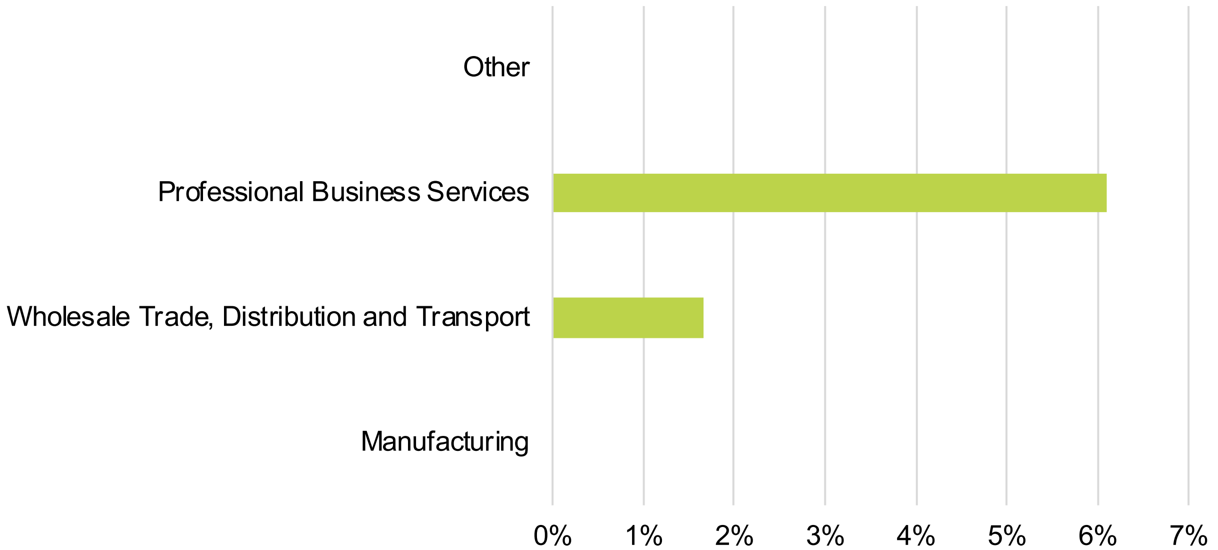
Within “other fuels” industries, “other services” had the greatest difficulty hiring workers (Figure 81). Nearly 92% of employers in this industry reported some difficulty finding qualified workers, with 37% claiming it is “very difficult.” That is not the highest for “very difficult” among industries; manufacturing, with 48%, was highest.

Figure 81. “Other Fuels” Hiring Difficulty



As shown in Figure 82, two out of the four industries with jobs in “other fuels” expect growth in 2022: Professional services (6.1%) and wholesale trade (1.7%). All others expect no changes.

Figure 82. “Other Fuels” Anticipated Change in Employment, 2021–2022



"Other fuels" is less diverse than the rest of the U.S. workforce in terms of gender; males make up 72% of the workforce, more than the 53% U.S. average (Table 41).

Table 41. "Other Fuels" Workforce Demographics and Characteristics

	Number of Workers	"Other Fuels" Averages	National Workforce Averages	Energy Workforce Averages
Male	45,263	72%	53%	74%
Female	17,158	27%	47%	25%
Gender non-binary	532	1%	insufficient data	0%
Hispanic or Latino	6,245	10%	18%	17%
Not Hispanic or Latino	56,708	90%	82%	83%
American Indian or Alaska Native	503	1%	1%	2%
Asian	2,951	5%	7%	7%
Black or African American, not Indigenous	2,241	4%	12%	8%
Black Indigenous	107	<1%	insufficient data	1%
Native Hawaiian or other Pacific Islander	456	1%	<1%	1%
White	54,230	86%	78%	74%
Two or more races	2,464	4%	2%	8%
Veterans	8,397	13%	6%	
55 and over	12,487	20%	24%	
Disability	292	<1%	4%	
Formerly Incarcerated	97	<1%	2%	
Represented by a Union or Project Labor Agreement	6,813	11%	6%	

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers is lower at 10% compared to 18%.

Racially, the portion of non-White workers in “other fuels,” 14%, is lower than the 22% national average. The only minority groups with higher-than-average representation were those of two or more races (4% compared to 2% nationally) and Native American or other Pacific Islanders (1% compared to <1%).

The concentration of veterans (13% compared to 6% nationally) is one of the highest among energy technologies, higher than the national average. Union representation, at 11%, is also higher than the 6% national average. The concentrations of workers over the age of 55 (20% compared with 24%), those with disabilities (<1% compared with 4%), and formerly incarcerated (<1% compared with 2%) are all lower than U.S. workforce averages.

Energy Efficiency

Energy Efficiency

The Energy Efficiency (EE) sector involves employment in the production and installation of products that increase energy efficiency and the provision of services that reduce energy consumption by the end-user. These jobs include building design and contracting services that provide insulation, improve natural lighting, and otherwise reduce energy consumption in residential and commercial areas. Additionally, this sector includes employment in the manufacture of ENERGY STAR labeled products.

EE employment has no NAICS codes entirely allocated to the sector. For this reason, there are no BLS data sets that exclusively count jobs in the sector. Furthermore, EE workers may work in multiple other sectors in the course of their jobs.

The ENERGY STAR program is an important component of the USEER survey. ENERGY STAR sets definitions in efficiency for different residential and commercial products. Identifying employment involved in the production and installation of these products is an important component of the USEER survey. The USEER survey also identifies the construction and maintenance component of these products.

The USEER also identifies employment in building design and contracting services that provide energy efficiency, such as insulation, an improvement in natural lighting, or otherwise reducing overall energy consumption across homes and businesses. The EE employment figures in the USEER include only work with these efficient technologies, designs, and retrofits. It does not include employment related to energy-efficient manufacturing processes. The numbers in this sector also do not include the direct employees of utility companies that are involved in the implementation of internal energy efficiency programs.

Additionally, the USEER captures employment associated with CHP and waste-heat to power (WHP), though this employment is included in the Electric Power Generation section. Retail workers are not included in the USEER, including those who sell EE products.

Utility Energy Efficiency Programs

There are many energy utilities and third parties in the United States that sponsor or manage energy efficiency programs for residential, commercial, and industrial properties. However, the USEER Energy Efficiency employment numbers do not include direct employees for the utilities that administer these programs. These employees are included in the numbers for “utility” employees in either the electricity or TDS sections of this report. Though the Energy Efficiency section does not capture these employees, the programs include many different incentives and tools that reduce energy consumption and improve energy efficiency in meaningful ways.

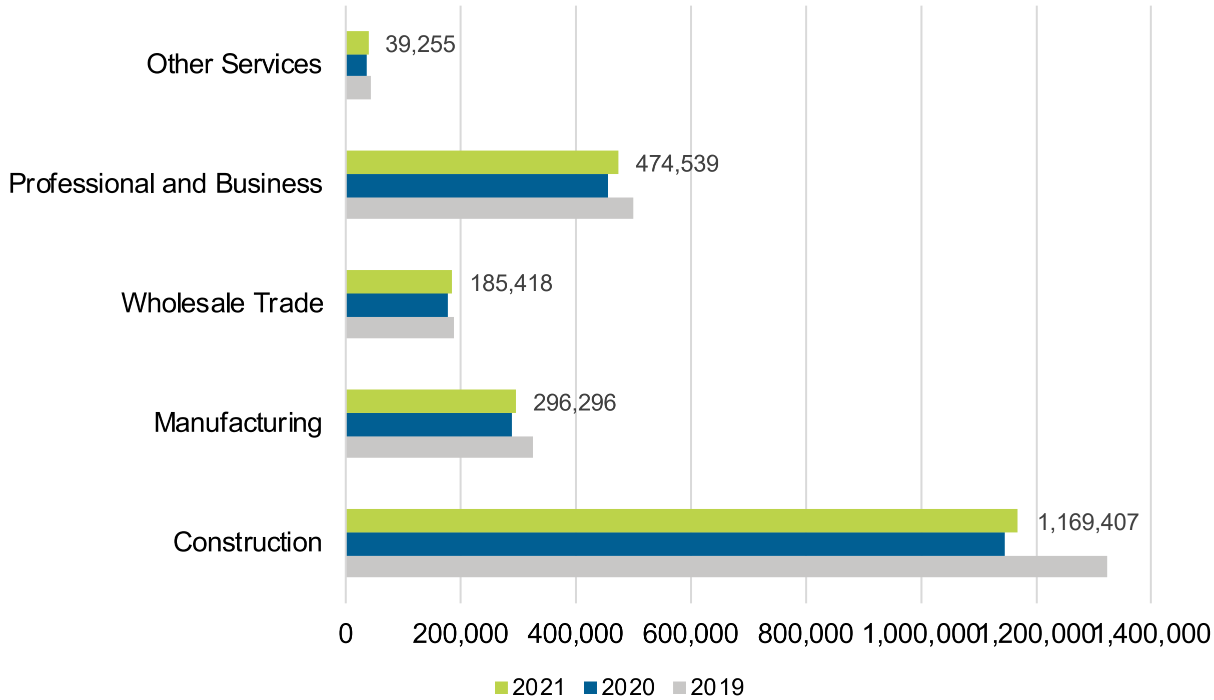
In 2021, EE employed 2,164,914 workers, an increase of 57,740 jobs or 2.7% from the 2,107,174 employed in 2020. This is, however, still smaller than the 2,378,893 employed in 2019, prior to the 2020 COVID-related job losses. The sector needs 213,978 new jobs to fully recover.

Trends and Key Takeaways

- EE grew by 57,740 jobs or 2.7% and is one of two USEER categories that does not contain a technology that lost jobs in 2021.
- Traditional HVAC, the largest EE technology, added the most jobs of any category, 17,740 (3.3%). "Other EE" and energy auditing services, however, had the most proportional growth, increasing 7.1% (6,326 new jobs).
- The largest gains were in the construction industry, with 25,131 new jobs (2.2% growth).
- Construction had the highest percentage of companies reporting hiring difficulty, with 91% of respondents indicating that it was "very difficult" or "somewhat difficult" to find employees.
- Employers in three out of five EE industries anticipate growth in 2022, with "other services" and manufacturing being the industries expecting losses.
- The percentage of workers covered by a union or project labor agreement in EE (11%) is higher than the national average (6%).
- EE's workforce tends to be disproportionately male, with 74% compared to 53% nationally.
- Hispanic workers are less concentrated than the workforce average (16% compared to 18%).
- The percent of non-White workers in energy efficiency is higher than the national average, 24% compared to 22%. This is attributable to those of two or more races (6% compared to 2% nationally) and Native Hawaiian or other Pacific Islanders (1% compared to <1% nationally).
- Black or African American workers are underrepresented, making up 8% of the workforce compared to 12% of the overall U.S. workforce.
- Veterans are more represented in EE at 8% compared to 6% nationally.
- Those with disabilities are less represented in EE at 3% compared to 4% nationally.
- The percentage of previously incarcerated workers (1%) is lower than the national workforce (2%).

Energy efficiency is largely concentrated in the construction industry, with 1,169,407 workers, up 25,131 jobs in 2021 from 2020, or 2.2% (Figure 83). Wholesale trade grew by the greatest percentage in 2021 at 4.4%, or 7,774 new jobs.

Figure 83. Energy Efficiency Employment by Industry, 2019–2021



The trend of construction being the largest industry within EE industries is true for all but four: ENERGY STAR Certified Electronics, ENERGY STAR Certified Data Center Equipment, Advanced building materials/insulation, and "other energy efficiency" (Table 42). Manufacturing was the largest industry for these four technologies.

Table 42. Energy Efficiency Employment by Technology and Industry, 2021

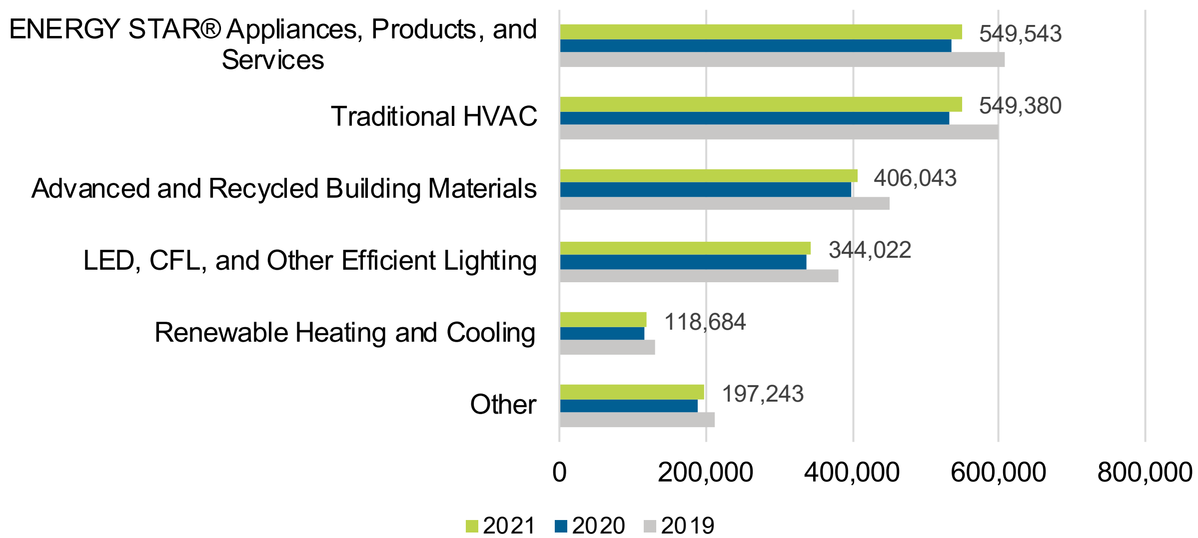
Detailed Tech	TOTAL	Construction	Manufac-turing	Wholesale Trade	Professional and Business Services	Other
ENERGY STAR® Certified Appliances (not including HVAC)	128,587	64,283	11,764	12,102	37,143	3,294
ENERGY STAR Certified Heating, Ventilation, and Cooling (HVAC), except for air-source. ground-source heat pumps, or geothermal heat pumps.	183,956	148,394	19,794	5,144	8,530	2,095

ENERGY STAR air-source heat pumps	62,808	25,086	13,404	11,976	11,634	708
ENERGY STAR ground-source or geothermal heat pumps	6,281	2,361	1,473	1,267	1,119	61
Other high efficiency HVAC that are out of scope for ENERGY STAR certification (e.g. indirect evaporative coolers, air to water heat pumps, energy recovery systems, etc.)	140,494	72,106	33,797	8,442	24,790	1,360
Traditional HVAC goods, control systems, and services	549,380	292,591	29,621	56,182	155,953	15,034
ENERGY STAR certified water heaters	19,752	13,739	332	1,427	4,172	82
ENERGY STAR Certified Electronics (TVs, Telephones, Audio/Video, etc.)	6,438	136	3,581	1,497	253	972
ENERGY STAR Certified Windows, Doors and Skylights	24,279	12,870	1,126	2,362	7,578	343
ENERGY STAR Certified Roofing	32,057	20,945	6,843	1,225	2,767	277
ENERGY STAR Certified Insulation	103,787	91,529	6,354	1,106	4,614	184
Air sealing	66,718	34,419	2,213	17,596	12,259	230
ENERGY STAR Certified Commercial Food Service Equipment	27,417	13,226	4,023	935	8,568	665

ENERGY STAR Certified Data Center Equipment	10,270	1,361	3,592	3,137	215	1,966
ENERGY STAR Certified LED lighting	140,871	54,939	12,816	17,700	52,732	2,684
Other LED, CFL, and efficient lighting	203,150	109,204	32,051	22,788	38,604	504
Other renewable heating and cooling (geothermal, bioenergy, solar heating, etc.)	98,932	61,463	6,711	6,682	23,426	650
Advanced building materials/insulation	104,328	25,048	51,792	1,174	25,177	1,137
Recycled building materials	74,874	41,299	11,043	2,809	17,011	2,712
Reduced water consumption products and appliances	84,693	52,430	5,546	5,355	20,129	1,233
Energy auditing services	2,396	1,162	-	-	1,109	125
Other	93,445	30,817	38,420	4,512	16,756	2,940
TOTAL	2,164,914	1,169,407	296,296	185,418	474,539	39,255

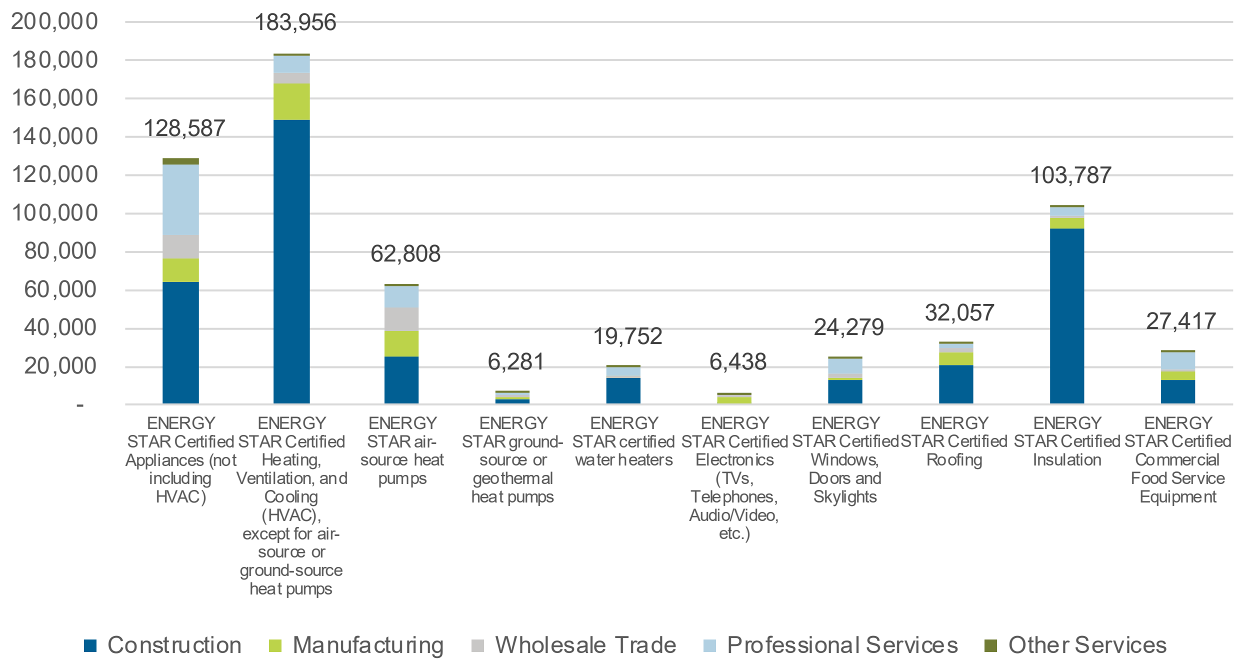
By technology group, 2021 employment was highest in ENERGY STAR appliance, products, and services with 549,543 workers (Figure 84). This is up 12,941 from 2020, or 2.4%. Traditional HVAC contributed the highest number of new jobs since 2020: 17,740 (3.3%).

Figure 84. Energy Efficiency Employment by Technology Group, 2019–2021



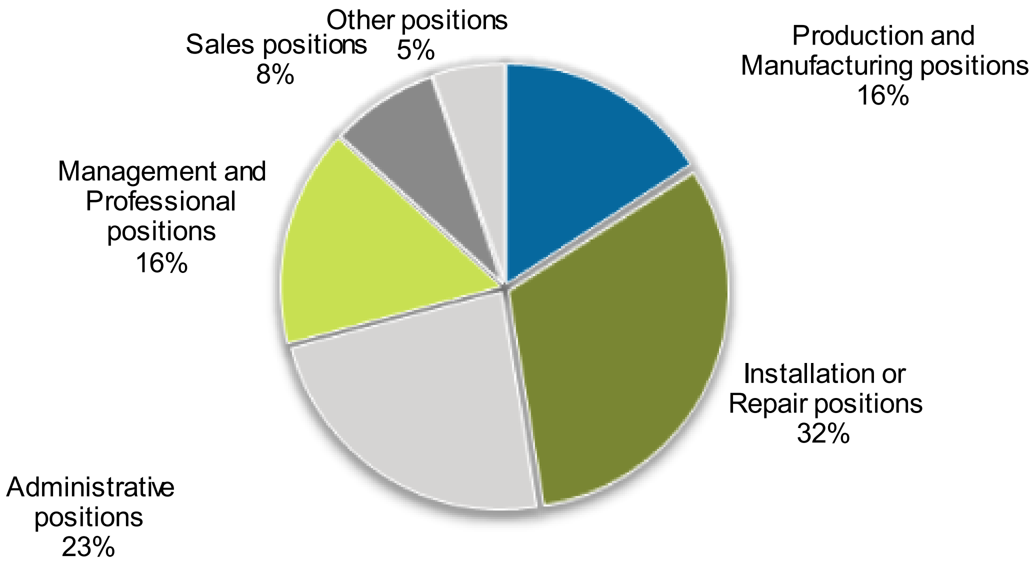
There are 12 ENERGY STAR technologies identified in EE, the largest being ENERGY STAR certified HVAC, which has 183,956 workers (Figure 85). ENERGY STAR certified appliances follows with 128,587 employees. Other ENERGY STAR technologies not identified in EE fall into the "other EE" category.

Figure 85. Energy Efficiency Employment in ENERGY STAR Programs, 2021



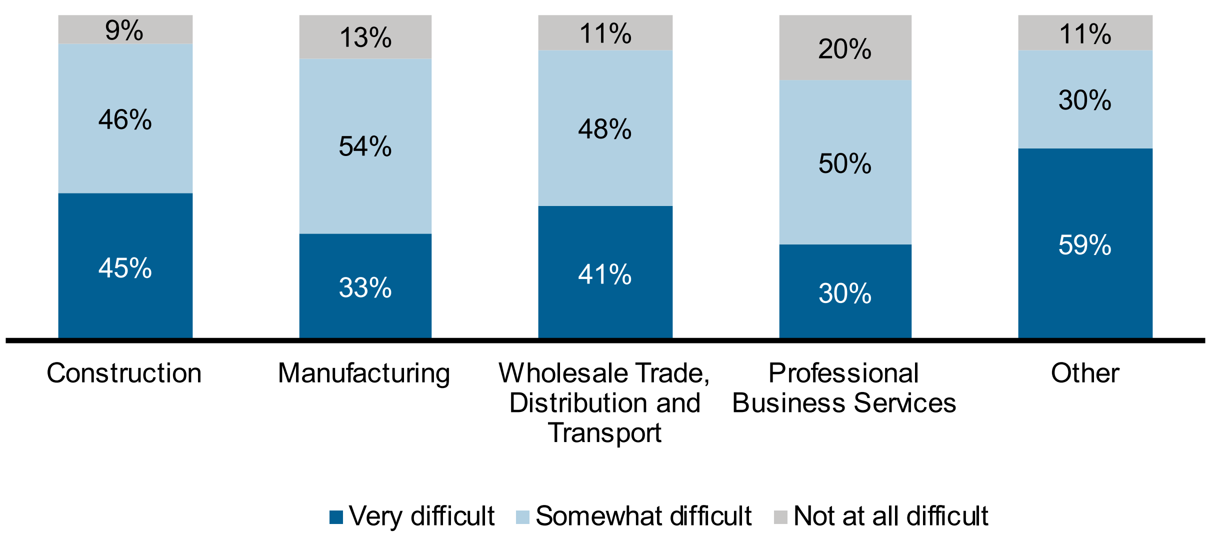
The largest occupation group within EE was installation or repair positions, which account for 32% of all efficiency jobs (Figure 86). This was followed by administrative positions (23%) and both management and professional positions and production and manufacturing positions (16%).

Figure 86. Energy Efficiency Employment by Occupation



Energy efficiency continues the trend of other industries with 80% to 91% of employers reporting hiring difficulties (Figure 87). Construction had the highest difficulty, with 91% reporting that it is "very difficult" or "somewhat difficult" to hire qualified workers, although "other services" responded with the highest percentage for "very difficult", 59%.

Figure 87. Energy Efficiency Hiring Difficulty



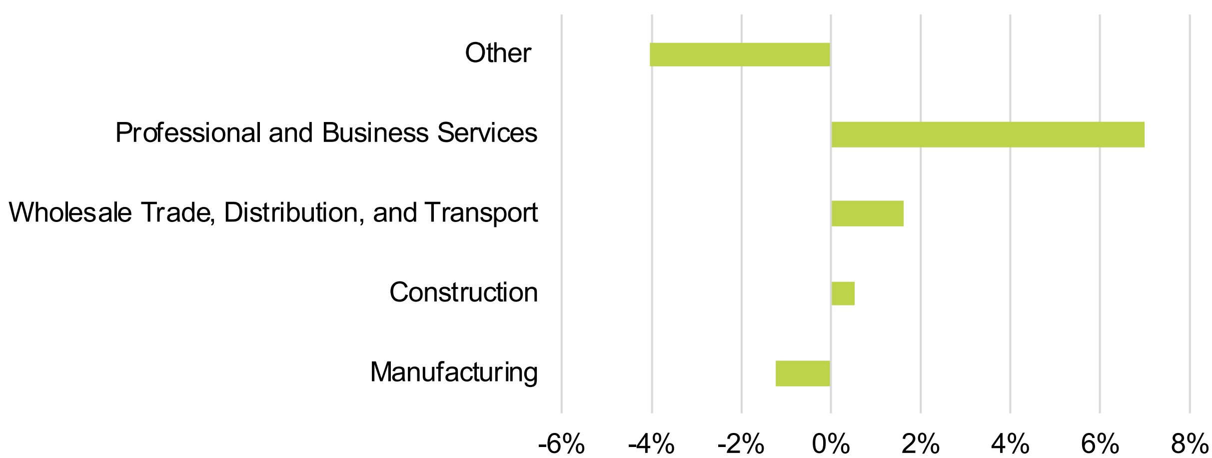
All industries indicated that competition or a small applicant pool is the primary reason that it is difficult to hire (Table 43). All but manufacturing reported problems due to insufficient skills or education or training as the next two reasons; manufacturing reported significant problems competing with other employers due to wages.

Table 43. Energy Efficiency Hiring Difficulty Reasons

Construction	Competition/ Small Applicant pool (48%)	Insufficient Non-technical Skills (26%)	Insufficient Qualifications (Certifications or Education) (26%)
Manufacturing	Competition/ small applicant pool (85%)	Cannot provide competitive wages (38%)	Insufficient non-technical skills (8%)
Wholesale Trade, Distribution, and Transport	Competition/ small applicant pool (71%)	Lack of experience, training, or technical skills (29%)	Insufficient qualifications (certifications or education) (14%)
Professional and Business Services	Competition/ small applicant pool (50%)	Lack of experience, training, or technical skills (32%)	Insufficient qualifications (certifications or education) (22%)

Employers in three out of five industries within EE anticipate growth in 2022 (Figure 88). This ranges from 0.5% in construction to 7.0% in professional and business services. Manufacturing expected a decline of 1.2%, and "other services" indicated a drop of 4.0%.

Figure 88. Energy Efficiency Anticipated Employment Changes, 2021–2022



EE is less diverse than the rest of the economy in terms of gender; males compose 74% of the workforce, more than the 53% U.S. average (Table 44).

Table 44. Energy Efficiency Workforce Demographics and Characteristics

	Number of Workers	Energy Efficiency Averages	National Workforce Averages	Energy Workforce Averages
Male	1,607,231	74%	53%	74%
Female	555,469	26%	47%	25%
Gender non-binary	2,214	<1%	insufficient data	0%
Hispanic or Latino	347,744	16%	18%	17%
Not Hispanic or Latino	1,817,171	84%	82%	83%
American Indian or Alaska Native	30,198	1%	1%	2%
Asian	134,564	6%	7%	7%
Black or African American, not Indigenous	177,386	8%	12%	8%
Black Indigenous	13,624	1%	insufficient data	1%
Native Hawaiian or other Pacific Islander	24,293	1%	<1%	1%
White	1,645,351	76%	78%	74%
Two or more races	139,499	6%	2%	8%
Veterans	183,360	8%	6%	
55 and over	276,562	13%	24%	
Disability	63,277	3%	4%	
Formerly Incarcerated	25,884	1%	2%	
Represented by a Union or Project Labor Agreement	236,361	11%	6%	

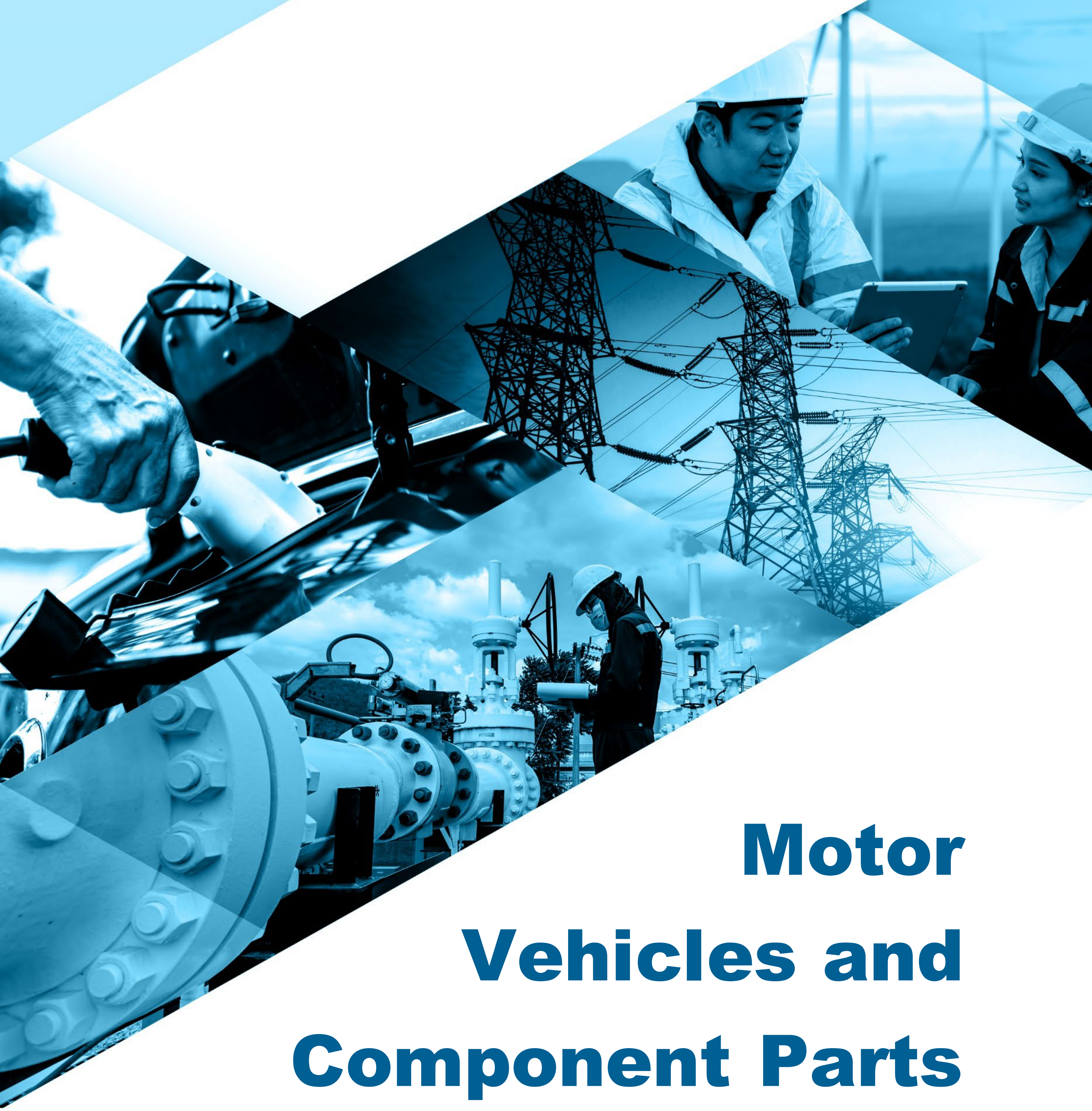
National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers is lower than the national average, 16% compared to 18%.

Racially, the portion of non-White workers in EE, 24%, is higher than the 22% national average. This is attributable to higher-than-average portions of workers of two or more races (6% in EE compared to 2% nationally) and Native Hawaiian or Pacific Islanders (1% compared to <1% nationally). The concentrations of other races are the same or lower than national averages.

The concentration of veterans (8% compared to 6% nationally) is higher than the national average. The portion of formerly incarcerated workers is lower than the national average (1% compared to 2%), as are those with disabilities disclosed to employers (3% compared to 4% nationally) and workers over the age of 55 (13% compared to 24% nationally).

The concentration of workers represented by a union or project labor agreement is higher than the national average (11% compared to 6%).



Motor Vehicles and Component Parts

Motor Vehicles and Component Parts

The Motor Vehicles (MV) and Component Parts (CP) sector includes the manufacture of new vehicles and parts, construction of manufacturing facilities, and vehicle repair services. MV is included in this report due to the high energy consumption of their manufacture and their contribution to end-use energy consumption.

In 2021, motor vehicles and component parts companies employed 2,553,368 workers, a 228,082, or 10%, increase from the 2,325,286 employed in 2020.[23] Jobs in motor vehicles grew by 144,300 jobs in 2021, increasing by 11.9%. Jobs in motor vehicle component parts grew 79,100 jobs, increasing by 7.9%. The total number of workers in 2022 is slightly smaller than the 2,556,492 workers employed in 2019, prior to the 2020 COVID-related job losses.

Trends and Key Takeaways

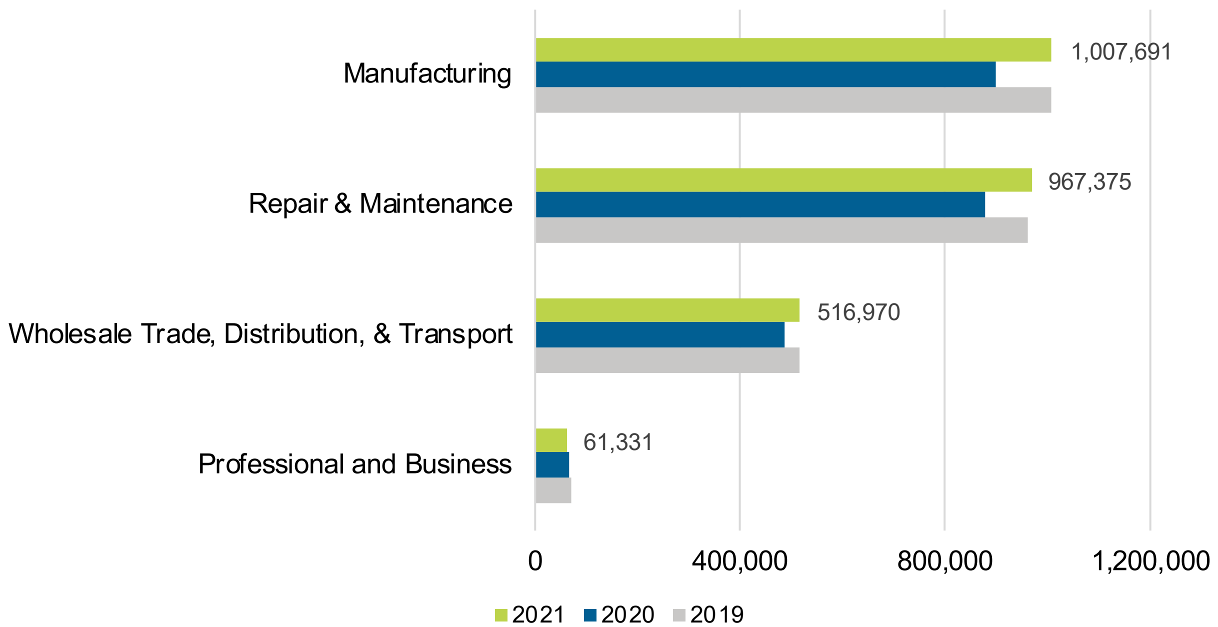
- Vehicle jobs grew by 228,082 jobs, or 10%, and is one of two USEER categories that do not contain a subtechnology that lost jobs in 2021
- Gasoline and diesel vehicles, the largest vehicles technology, added the most jobs of any category, 147,036 (8.0%), although hydrogen and fuel cell vehicle jobs grew most by percentage, increasing 41% (4,160 new jobs); electric vehicle jobs increased 26% (21,961 jobs); and hybrid vehicle jobs increased 20% (23,577 jobs).
- Jobs among hybrid, plug-in, and full electric vehicles increased by 64,489 or 25%.
- The largest gains were in the manufacturing industry, with 109,870 new jobs (12% growth).
- Professional and business services lost jobs, declining 3,129 or -4.9%.
- Both manufacturing and wholesale trade, distribution, and transport had the highest percentage of companies reporting hiring difficulty, with 100% of respondents indicating it was “very difficult” or “somewhat difficult” to find employees.
- Employers in three out of four vehicles industries anticipate growth in 2022, with professional and business services being the only industry to expect losses
- The percentage of workers covered by unions or project labor agreements in vehicles is the same as the national average (6%).
- Vehicles’ workforce is disproportionately male, with 76% of workers being male compared to 53% nationally.
- Hispanic workers are more concentrated than the workforce average (21% compared to 18%).
- The percent of non-White workers is higher than the national average, 25% compared to 22%. This is attributable to those of two or more races (9% compared to 2% nationally) and Native Hawaiian or Pacific Islanders (1% compared to <1% nationally)

[23] There are 2,437,068 MV workers employed in identifiable technologies such as those in Figure 90 and Figure 91. The difference between this and the 2,553,368 total is due to the flow of commodities that are technology agnostic.

- Black or African American workers are underrepresented, making up 7% of the workforce compared to 12% of the overall U.S. workforce.
- Veterans are more represented in vehicles at 10% compared to 6% nationally.
- Those with disabilities are less represented in vehicles at 2% compared to 4% nationally.
- The percentage of previously incarcerated workers (1%) is slightly lower than the national workforce (2%).

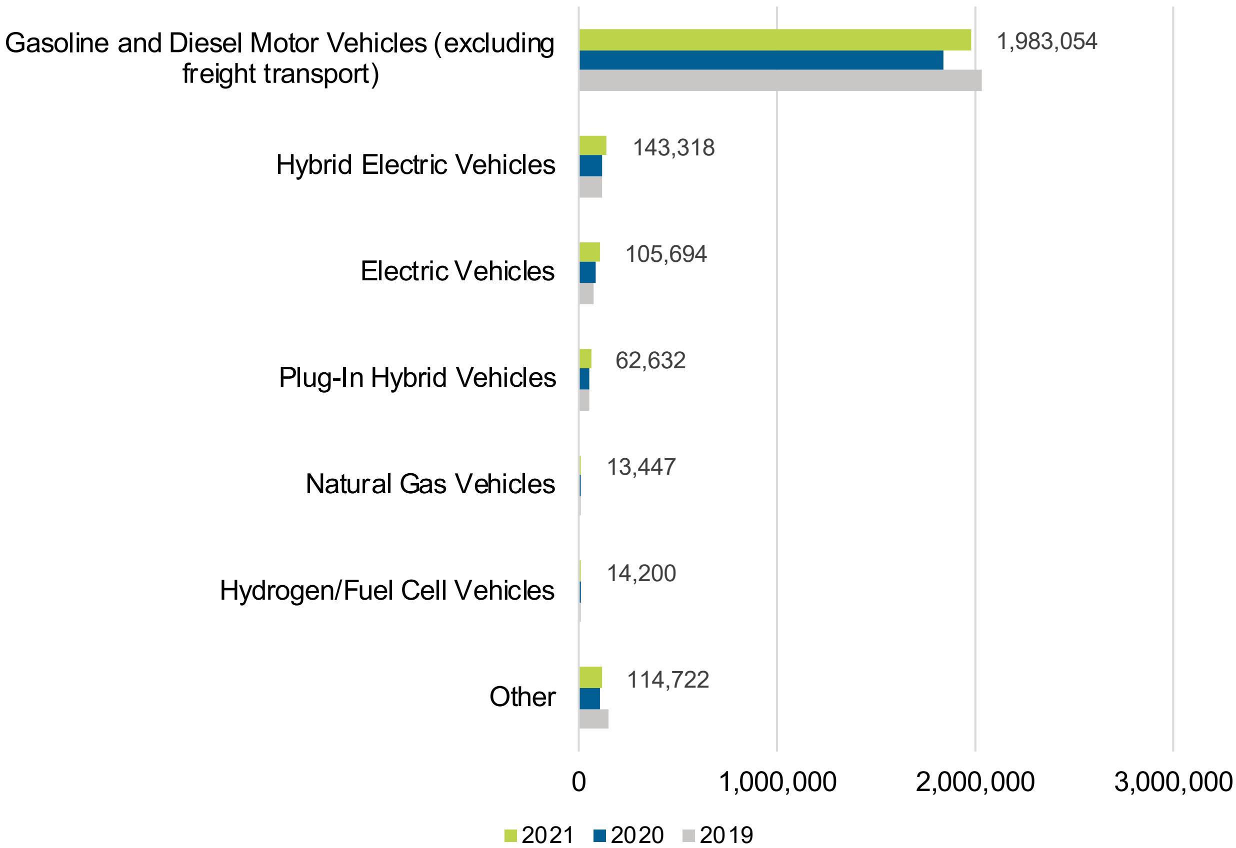
Vehicles employment is largely concentrated in the manufacturing industry, with 1,007,691 workers in 2021, up 109,870 jobs from 2020, or 12% (Figure 89). Manufacturing also grew the greatest in terms of percentage, exceeding the 10% growth (90,424 jobs) in repair and maintenance.

Figure 89. Motor Vehicles Employment by Industry, 2019–2021



By technology, 2021 employment was highest in gasoline and diesel vehicles, the largest sector (Figure 90). This is up 147,036 from 2020, or 8.0%. Hydrogen and fuel cell vehicles employment, though still quite low, grew by the greatest percentage, expanding over 41% or by 4,160 jobs. All alternative technology vehicle jobs exceeded 2019 employment levels in 2021.

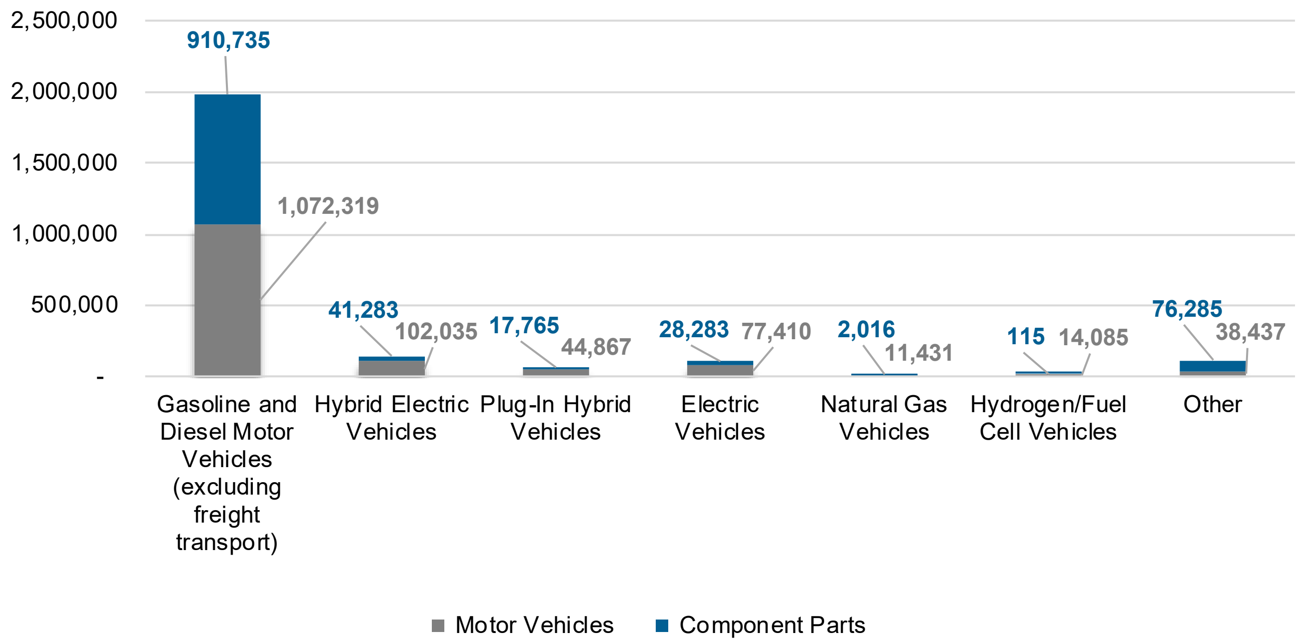
Figure 90. Motor Vehicles and Component Parts Employment by Technology, 2019–2021



Carbon-reducing vehicle jobs, which include jobs in electric vehicles, plug-in hybrid, hybrid electric vehicles, and hydrogen and fuel cell vehicles, grew a collective 25%, led by 29,869 new jobs in hybrid electric vehicles (20% growth) and 28,027 jobs in electric vehicles (26% growth). Plug-in hybrid vehicle jobs grew by 11,013 jobs (31% growth). Hydrogen and fuel cell vehicles employment, though still quite low, grew by the greatest percentage, expanding over 41% or by 4,160 jobs.

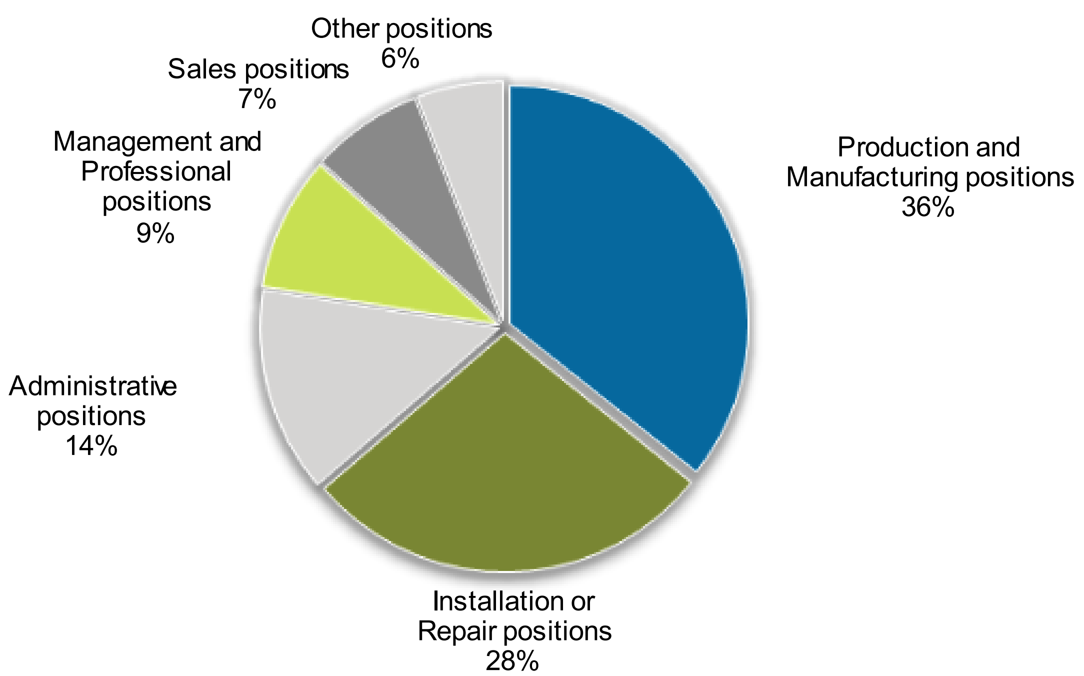
The majority of vehicles employment is in the motor vehicle category, with 1,360,585 workers (Figure 91). Component parts employed 1,076,483 in 2021. The only technology with higher CP employment is "other vehicles."

Figure 91. Motor Vehicles and Component Parts Employment by Activity



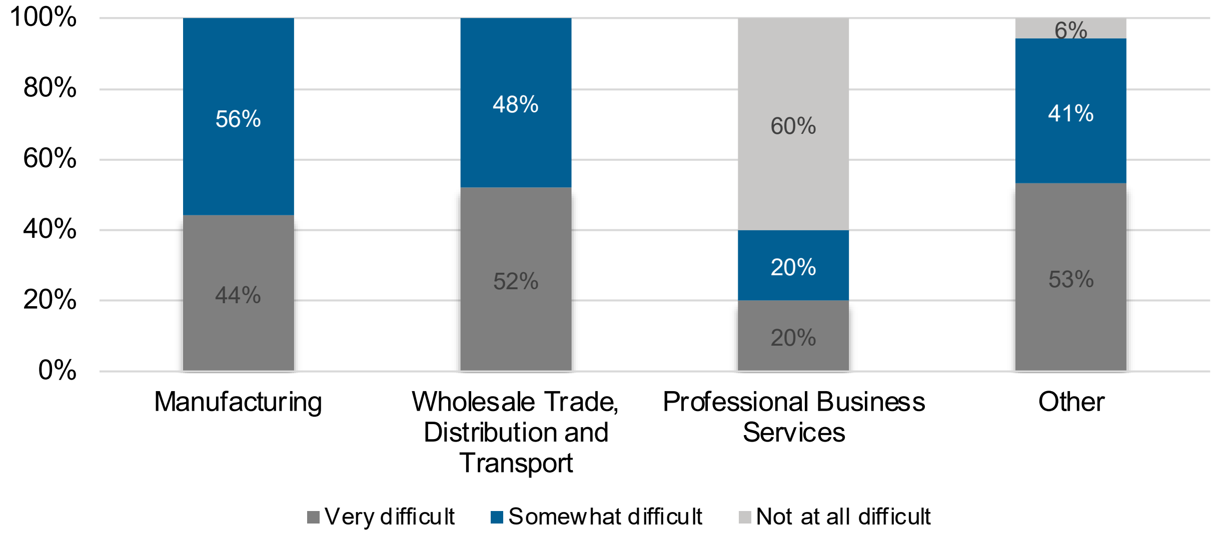
The largest occupation group within vehicles was production and manufacturing positions, which accounted for 36% of all vehicles jobs (Figure 92). This was followed by installation or repair positions (28%) and administrative positions (14%).

Figure 92. Motor Vehicles and Component Parts Employment by Occupation



One hundred percent of employers within two industries within vehicles—manufacturing and wholesale trade, distribution, and transport—reported at least some hiring difficulty in 2021 (Figure 93). "Other vehicles" had the highest percentage of employers reporting that hiring is very difficult, 53%, followed by wholesale trade, distribution, and transport with 52%.

Figure 93. Motor Vehicles and Component Parts Hiring Difficulty



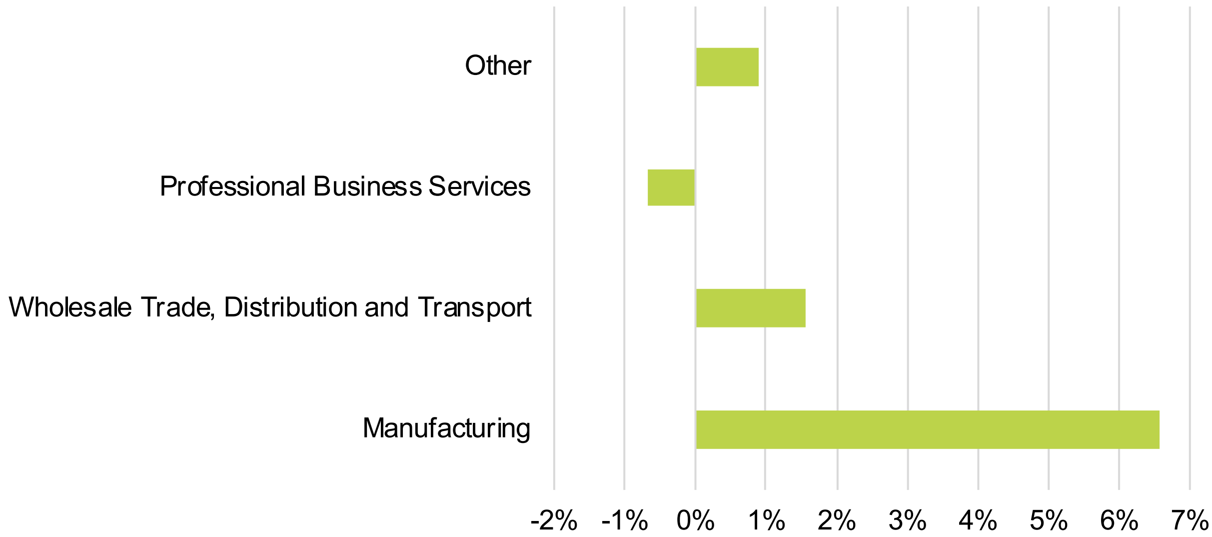
All industries except manufacturing indicated that competition or a small applicant pool is the primary reason that it is difficult to hire (Table 45). All industries reported insufficient skills, experience, training, or qualifications, and professional and business services reported an inability to provide competitive wages.

Table 45. Motor Vehicles and Component Parts Hiring Difficulty Reasons

Manufacturing	Insufficient Non-technical Skills (38%)	Competition/Small Applicant Pool (31%)	Insufficient Qualifications (Certifications or Education) (25%)
Wholesale Trade, Distribution, and Transport	Competition/small applicant pool (60%)	Insufficient non-technical skills (16%)	Insufficient qualifications (certifications or education) (16%)
Professional and Business Services	Competition/small applicant pool (50%)	Insufficient qualifications (certifications or education) (50%)	Cannot provide competitive wages (50%)
Other	Competition/small applicant pool (63%)	Difficulty finding industry-specific knowledge, skills, and interest (31%)	Insufficient non-technical skills (28%)

Employers in three out of four industries within vehicles anticipate growth in 2022 (Figure 94). This ranges from 0.5% in construction to 7.0% in professional and business services. Manufacturing expected a decline of 1.2% and "other services" indicated a drop of 4.0%.

Figure 94. Motor Vehicles and Component Parts Anticipated Change in Employment, 2021–2022



Vehicles is less diverse than the rest of the economy in terms of gender; males make up 76% of the workforce, more than the 53% U.S. average (Table 46).

Table 46. Motor Vehicles and Component Parts Workforce Demographics and Characteristics

	Number of Workers	Motor Vehicles Average	National Workforce Averages	Energy Workforce Averages
Male	1,863,613	76%	53%	74%
Female	570,364	23%	47%	25%
Gender non-binary	3,091	<1%	insufficient data	0%
Hispanic or Latino	501,587	21%	18%	17%
Not Hispanic or Latino	1,935,481	79%	82%	83%
American Indian or Alaska Native	37,646	2%	1%	2%
Asian	122,813	5%	7%	7%

Black or African American, not Indigenous	180,363	7%	12%	8%
Black Indigenous	15,512	1%	insufficient data	1%
Native Hawaiian or other Pacific Islander	20,913	1%	<1%	1%
White	1,831,359	75%	78%	74%
Two or more races	228,462	9%	2%	8%
Veterans	238,916	10%	6%	
55 and over	508,497	21%	24%	
Disability	36,815	2%	4%	
Formerly Incarcerated	18,928	1%	2%	
Represented by a Union or Project Labor Agreement	149,135	6%	6%	

National sources: BLS (2022a, 2022b, 2022c, 2022d), Jobs EQ (2021), Prison Policy (2022)

The portion of the workforce made up of Hispanic or Latino workers is higher than the national average, 21% compared to 18%.

The portion of non-White workers in vehicles is 25%, higher than the 22% national average. This is attributable to higher-than-average portions of workers of two or more races (9% in EE compared to 2% nationally), the portion of American Indian or Alaska Natives (2% compared to 1% nationally), and the portion of Native Hawaiian or Pacific Islanders (1% compared to <1% nationally). The concentrations of other races are lower than national averages.

The portion of veterans (10% compared to 6% nationally) is higher than the national average. The portion of formerly incarcerated workers is lower than the national average (1% compared to 2%), as are those with disabilities disclosed to employers (2% compared to 4% nationally) and workers over the age of 55 (21% compared to 24% nationally).

Workers represented by a union or project labor agreement (6%) is the same as the national average.

Multi-Sector Technologies

Multi-Sector Technologies

Several technologies are present in all three major areas of this report: Electric Power Generation; Transmission, Distribution, and Storage; and Fuels.[24] These use fuels for electricity generation and are responsible for transmission, such as pipelines that transport natural gas or railroads that move coal. This section presents results for technologies across all three areas to represent full employment for each technology.

Natural Gas

In 2021, the natural gas sector employed 535,284 workers across all technologies, with the largest concentration (211,773) in fuels, although this was closely followed by fuel transmission and distribution (Table 47). Together, these two technologies make up 79% of all natural gas jobs.

Table 47. Natural Gas Employment by Technology Group and Industry

	Fuels	Conventional Gas Generation	Advanced Gas	Fuel Transmission + Distribution	Storage	Total
Total	211,773	42,083	69,113	210,684	1,631	535,284
Extraction	108,285	-	-	-	-	108,285
Utilities	-	16,936	42,077	117,621	-	176,635
Construction	-	9,625	8,808	61,203	506	80,142
Manufacturing	40,873	3,325	2,551	-	262	47,011
Wholesale Trade, Distribution, + Transport (including Pipeline)	28,197	3,158	4,979	31,859	215	68,408
Professional and Business Services	34,256	8,031	9,893	-	637	52,817
"Other Services"	161	1,008	805	-	11	1,985

Most natural gas jobs are in the utilities industry, although this industry is not represented within natural gas storage or fuels. The largest concentration of natural gas workers in any energy or technology is fuel transmission and distribution within utilities, which totals 117,621 jobs—approximately 22%.

24 Previous USEERs referred to this section as "crosscuts."

Coal

In 2021, the coal sector employed 155,884 workers across all technologies, with the largest concentration—70,831—in electricity. Coal fuels totaled 53,312 jobs with another 31,741 in fuel transmission and distribution (Table 48).

Table 48. Coal Employment by Technology Group and Industry

	Fuels	Coal Electric Power Generation	Fuel Transmission + Distribution	TOTAL
Total	53,312	70,831	31,741	155,884
Mining and Extraction	34,970	-	-	34,970
Utilities	-	33,721	-	33,721
Construction	-	6,925	-	6,925
Manufacturing	9,536	961	-	10,497
Wholesale Trade, Distribution, + Transport (including Pipeline)	1,025	5,796	31,741	38,562
Professional and Business Services	7,758	22,565	-	30,323
"Other Services"	23	863	-	886

Coal employment is concentrated in three industries: mining and extraction for fuels, utilities for electricity, and wholesale trade, distribution, and transport for coal TDS. One hundred percent of TDS transport is in wholesale trade, distribution, and transport, while 66% of fuels jobs are in mining and extraction and 48% of coal electricity jobs are in utilities.

Petroleum

In 2021, the petroleum sector employed 669,042 workers across all technologies. Petroleum employment is concentrated in fuels, which accounts for 69% of jobs within that technology area (Table 49). There are more jobs in mining and extraction—which is only represented within fuels—than any other petroleum industry. These are 39% of fuels and 27% of all petroleum jobs.

Table 49. Petroleum Employment by Technology and Industry

	Fuels	Oil & Other Petrol Generation	Fuel Transmission + Distribution	Storage	TOTAL
Total	463,617	11,741	191,877	1,807	669,042
Mining and Extraction	179,258	-	-	-	179,258
Utilities	-	388	-	-	388
Construction	18,612	-	77,432	1,099	97,142
Manufacturing	138,229	5,164	-	255	143,648
Wholesale Trade, Distribution, + Transport (including Pipeline)	59,317	1,965	114,445	31	175,758
Professional and Business Services	66,952	4,103	-	-	71,055
“Other Services”	1,248	121	-	423	1,792

Nuclear

In 2021, the nuclear sector employed 64,743 workers across all technologies. Nuclear jobs fall under fuels and electricity, although 86% are in electricity (Table 50). Within electricity, utilities is the largest industry, with 72% of nuclear electricity jobs and 61% of all nuclear jobs. Nuclear fuels do not contain utility jobs.

Table 50. Nuclear Employment by Technology and Industry

	Fuels	Nuclear Generation	TOTAL
Total	9,181	55,562	64,743
Mining and Extraction	373	-	373
Utilities	-	39,815	39,815
Construction	-	2,011	2,011
Manufacturing	2,821	1,687	4,508
Wholesale Trade, Distribution, + Transport	943	2,607	3,550
Professional and Business Services	5,044	9,363	14,407
Other	-	79	79

While not as significant as jobs in utilities, the professional and business services industry plays a prominent role in both fuels and electricity. It is the largest single industry that employs individuals in fuels and second largest in nuclear electricity. In total, these account for 22% of all nuclear jobs.

Storage

Storage technologies fall under the transportation, distribution, and storage category and employed 86,584 workers in 2021 (Table 51). Of these, 80% were in battery storage, which was also the largest employer within each industry category.

Table 51. Storage Employment by Technology and Industry

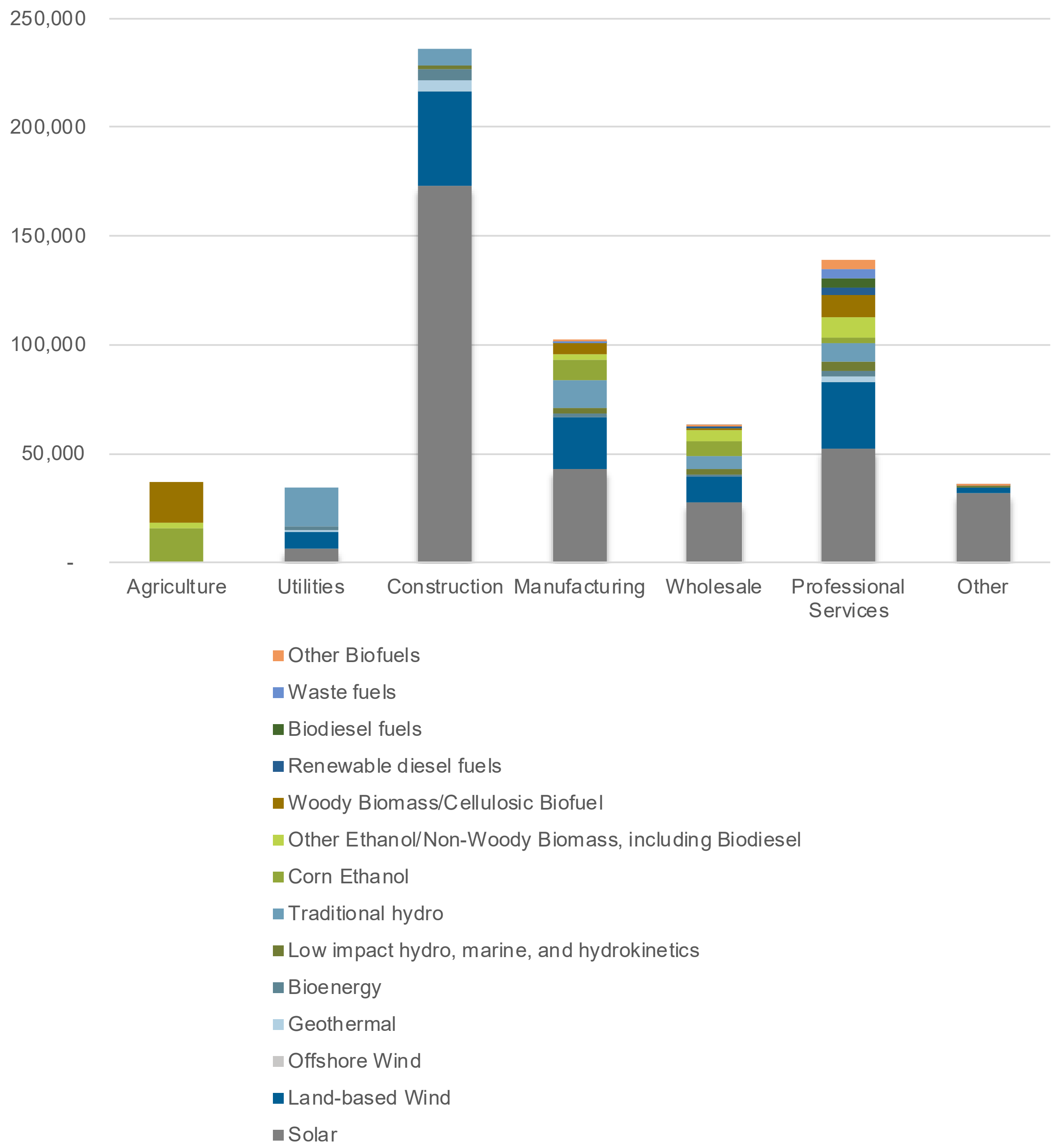
	Pumped Hydro	Battery Storage	Other Storage	Petroleum Storage	Natural Gas Storage	Other Fuels Storage	TOTAL
Total	7,901	69,698	3,214	1,807	1,631	2,333	86,584
Mining and Extraction	--	--	--	--	--	--	--
Utilities	--	--	--	--	--	--	--
Construction	3,019	36,824	805	1,099	506	1,673	43,926
Manufacturing	2,391	12,241	1,552	255	262	--	16,701
Wholesale Trade, Distribution, + Transport (including Pipeline)	1,032	7,876	47	31	215	2	9,203
Professional and Business Services	1,382	11,685	724	--	637	606	15,034

Construction employed the most workers, 43,926, 51% of all storage jobs. Manufacturing of storage components was the second largest industry, employing 16,701 or 19% of all storage jobs. Battery manufacturing was 14% of all storage jobs.

Renewable Energy

As with fossil fuels, renewable energy technologies span industries that are classified by traditional NAICS codes. Figure 95 shows how renewable electric power generation and fuels technologies are distributed by these sub-industries.

Figure 95. Renewable Energy Industries



The largest category of activity is within the construction sector (236,339 jobs), which is driven by solar. Solar has 173,283 jobs in construction, which includes solar panel installation—27% of all renewable energy employment. The next largest technology in construction is wind, with 43,164 jobs.

Professional services is the second largest sub-industry with 138,770 jobs. While solar is still the largest technology within professional services (52,466 jobs or 38%), it is more evenly distributed across all technologies.

Manufacturing, the third largest industry, employs 101,500. Solar is the largest technology within manufacturing, employing 43,091 or 42%. This is followed by wind with 23,477 or 23%.

Solar is the largest technology in all sub-industries except for utilities and agriculture. Biofuels are the only sub-industry within agriculture, led by woody biomass (18,490) and corn ethanol (15,818). Traditional hydropower is the largest renewable energy technology within utilities (17,683; 52%).

Conclusion

The findings of the 2022 USEER show that U.S. energy sector jobs outpaced overall U.S. employment in 2021. In recent years, jobs in the energy sector were among the fastest-growing of any sector of the economy, but like most other sectors, energy was deeply affected by the COVID-19 pandemic and the associated economic impacts.

In 2021, nearly all energy technologies added jobs, but most technologies have not rebounded to pre-pandemic numbers. As the nation continues to invest in energy infrastructure and diversifying our energy mix, employers across virtually all energy technology groups are optimistic about the future, reporting that they expect job growth in their sectors in 2022.

Works Cited

Works Cited

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Appendices

Appendix A: Survey Instrument

The following is the survey given to respondents as delivered by surveyors. This was reviewed and approved by the Office of Management and Budget for the Paperwork Reduction Act of 1980.

Introduction:

Hello, my name is ________ and I am calling on behalf of the United States Department of Energy. We are conducting a national survey about the energy, energy-related, and advanced manufacturing industries. May I please speak to the person most knowledgeable about staffing at [organization]?

Is now a convenient time?

This survey uses specific terms to describe various technologies and activities. If you require any definitions for clarification, please ask me at any time.

The survey is **voluntary** and can take up to 45 minutes of your time.

(If needed): This important survey addresses businesses that research, develop, manufacture, install or work with products that generate, distribute or save energy.

(If needed): This includes organizations involved in fossil and renewable energy production, energy efficiency products and services, motor vehicles, solar, wind, fossil and other energy sources, and other energy related products and services.

(If needed): Your individual responses will **not** be published; only aggregated information will be used in reporting the survey results.

(If needed): Your participation will help determine how investments of time and money should be made to support the industry and prepare the present and future labor pool.

(If needed):: If you have any questions about DOE's involvement in this survey, please contact David Keyser at [insert phone]

Paperwork Reduction Act Burden Disclosure Statement

These data are being collected to allow energy-related employment to be assigned by primary value chain activity, including: research and development; manufacturing; sales and distribution; installation, repair and maintenance; and professional services. It will also provide insight on workforce demographics and employers' ability to recruit qualified workers.

The data you supply will be used by industry, training organizations, community colleges, job seekers, federal agencies and other stakeholders, to better inform the workforce development system by highlighting changes in the industry that are driving demand for workers. The data will also inform energy economic development planning activities at the local, state and regional levels by providing a more detailed assessment of energy jobs, as well as the changing energy landscape and how such changes influence labor markets.

Public reporting burden for this collection of information is estimated to up to 45 minutes, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Office of the Chief Information Officer, Enterprise Policy Development & Implementation Office, IM-22, Paperwork Reduction Project OMB Control Number 1910-5179, U.S. Department of Energy, 1000 Independence Ave SW, Washington, DC, 20585-1290; and to the Office of Management and Budget (OMB), OIRA, Paperwork Reduction Project OMB Control Number 1910-5179, Washington, DC 20503.

Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a currently valid OMB control number.

Submission of this data is voluntary.

````````````````````````````````````````````````````````````````````````````````````````````````

A. Does your organization have at least one location with employees in the United States, including territories? (Please count yourself as an employee if you are an owner-operated business or sole proprietor).

   1 Yes [CONTINUE]
   2 No [TERMINATE]

For this survey, please only answer for your current business location. If your organization has other U.S. locations, please do not include their data. What is the zip code of your current location? [SHOW ADDRESS FROM SAMPLE FILE]

____________________ (Accept all five-digit responses)

(DON'T READ) Have check box for Refused (Terminate if Refused)
````````````````````````````````````````````````````````````````````````````````````````````````

B. Is your organization involved, in whole or part, with an activity related to energy? (PAUSE, IF UNSURE OR NO READ REMAINDER OF QUESTION, IF YES GO TO SC) We define this as being directly involved with researching, developing, producing, manufacturing, distributing, selling, implementing, installing, or repairing components, goods or services related to Electric Power Generation; Electric Power Transmission, Distribution, and Storage; Energy Efficiency, Including Heating, Cooling and Building Envelope; Fuels, including Extraction, Processing, Production, and Distribution; and Transportation, including Motor Vehicles. This also includes supporting services such as consulting, finance, tax, and legal services related to energy.

1 Yes [CONTINUE]
2 No [TERMINATE]
3 Not sure [TERMINATE]

C. Which of the following industries describes your organization's work? [ALLOW MULTIPLE RESPONSES] [IF NEEDED: If your organization is involved in energy research or professional services for the industry, please select the options that are most relevant to your organization.]

1. Electric Power Generation
2. Electric Power Transmission and Distribution, including electric vehicle charging stations
3. Storage, including electric vehicle batteries
4. Energy Efficiency, Including Heating, Cooling and Building Envelope (IF NEEDED THIS INCLUDES THERMAL OR HOT WATER SOLAR)
5. Fuels
6. Transportation Vehicles, including Motor Vehicles (IF NEEDED: Including industrial and agricultural vehicles, such as forklifts, tractors, and recreational vehicles, such as golf carts)
7. Component Parts for Transportation Vehicles
8. Carbon Capture and Storage
9. Other (Specify _______) TERMINATE
10. DK/NA TERMINATE

[ASK SCREENER D IF SC COUNT>1]]

D. Which do you consider your organization's **primary** industry, based on the majority of labor hours performed at your location? [PIPE IN SC CATEGORIES, ACCEPT ONE]

1. Electric Power Generation
2. Electric Power Transmission and Distribution, including electric vehicle charging stations
3. Storage, including electric vehicle batteries
4. Energy Efficiency, Including Heating, Cooling and Building Envelope (IF NEEDED THIS INCLUDES THERMAL OR HOT WATER SOLAR)
5. Fuels
6. Transportation, including Motor Vehicles (IF NEEDED: Including industrial and agricultural vehicles, such as forklifts, tractors, and recreational vehicles, such as golf carts)
7. Component Parts for Transportation Vehicles
8. Carbon Capture and Storage

CREATE **SDPRIME** FROM SC IF SC COUNT=1, OR SD IF SC COUNT>1

E. [ASK FOR EACH SC] Which of the following [INSERT SC RESPONSE] technologies is your organization directly engaged with? [READ LIST, ALLOW MULTIPLE RESPONSES]

A. Electric Power Generation (IF SC=1) [RANDOMIZE]

1. Solar Electric Generation [SET SOLAR=1]
2. Land-based Wind Generation
3. Offshore Wind Generation
4. Geothermal Generation
5. Bioenergy/Bioenergy Generation
6. Low-Impact Hydroelectric Generation including Wave/Kinetic Generation
7. Traditional Hydroelectric Generation
8. Advanced/Low Emission Natural Gas
9. Nuclear Generation
10. Coal Generation
11. Oil and other Petroleum Generation
12. Natural Gas Generation
13. Combined Heat and Power
14. Other Generation (Specify)

B. Electric Power Transmission and Distribution (IF SC=2) [RANDOMIZE]

1. Traditional Transmission and Distribution
2. Electric Vehicle Charging Stations
3. Smart Grid
4. Micro Grids
5. Other Grid Modernization
6. Other (Specify)

C. Storage (IF SC=3) [RANDOMIZE] [IF SEA=1, "(including battery storage for solar generation)"

1. Pumped hydro-power storage
2. Battery storage, including electric vehicle batteries [IF SEA=1, "(including battery storage for solar generation)"
3. Mechanical storage (flywheels, compressed air energy storage, etc.)
4. Thermal storage
5. Liquefied natural gas
6. Compressed natural gas
7. Crude oil
8. Refined petroleum fuels (liquid)
9. Refined petroleum fuels (gas)
10. Coal storage (piles, domes, etc.)
11. Biofuels, including ethanol and biodiesel
12. Nuclear fuel
13. Other gas fuel (Specify)
14. Other liquid fuel (Specify)
15. Other Storage
16. Other (Specify)

IF SEC=2, ASK C_2 AND C_3

C_2. What type of Battery Storage do you work with? [READ LIST, ALLOW MULTIPLE RESPONSES] [RANDOMIZE]

1. Lithium batteries
2. Lead-based batteries
3. Other solid-electrode batteries (Specify)
4. Vanadium redox flow batteries
5. Other flow batteries (Specify)

C_3. What is the application of your battery storage work? [READ LIST, ALLOW MULTIPLE RESPONSES] [RANDOMIZE]

1. Consumer devices
2. Vehicles or other transportation (including electric vehicles)
3. Behind-the-meter (buildings or industrial facilities)
4. Front-of-meter (electric grid)
5. Other (Specify)

D. Energy Efficiency, Including Heating, Cooling and Building Envelope (IF SC=4) [RANDOMIZE]

1. ENERGY STAR® Certified Appliances (not including HVAC)
2. ENERGY STAR Certified Heating, Ventilation, and Cooling (HVAC), except air-source and ground-source heat pumps
3. ENERGY STAR Air-Source Heat Pumps
4. ENERGY STAR Ground-source or geothermal heat pumps
5. Other high efficiency HVAC that are out of scope for ENERGY STAR certification (e.g. indirect evaporative coolers, air to water heat pumps, energy recovery systems, etc.)
6. Traditional HVAC goods, control systems, and services
7. ENERGY STAR certified water heaters
8. ENERGY STAR Certified Electronics (TVs, Telephones, Audio/Video, etc.)
9. ENERGY STAR Certified Windows, Doors and Skylights
10. ENERGY STAR Certified Roofing
11. ENERGY STAR Certified Insulation
12. Air sealing
13. ENERGY STAR Certified Commercial Food Service Equipment
14. ENERGY STAR Certified Data Center Equipment
15. ENERGY STAR Certified LED lighting
16. Other LED, CFL, and efficient lighting
17. Solar thermal water heating and cooling [SET SOLAR=1]
18. Other renewable heating and cooling (bioenergy, etc.)
19. Advanced building materials/insulation
20. Recycled building materials
21. Reduced water consumption products and appliances
22. Energy auditing services
23. Other (Specify)

E. Fuels (IF SC=5) [RANDOMIZE]

1. Coal
2. Onshore petroleum, including gasoline and diesel
3. Offshore petroleum, including gasoline and diesel
4. Onshore natural gas
5. Offshore natural gas
6. Other Fossil Fuel

7. Corn Ethanol
8. Renewable Diesel
9. Biodiesel
10. Other Ethanol/Non-Woody Biomass
11. Woody Biomass/Cellulosic Biofuel
12. Waste Fuels
13. Other Biofuels
14. Nuclear Fuel
15. Other (Specify)

ASK EA IF SEE = 2 & 3

EA. Do you primarily work with onshore or offshore petroleum?

1. Onshore petroleum
2. Offshore petroleum
3. Don't know/ Refused

ASK EB IF SEE = 4 & 5

EB. Do you primarily work with onshore or offshore natural gas?

1. Onshore natural gas
2. Offshore natural gas
3. Don't know/ Refused

F. Transportation Vehicles, Including Motor Vehicles (IF SC=6) [RANDOMIZE]

1. Gasoline and Diesel Motor Vehicles (excluding freight transport)
2. Hybrid Electric Vehicles
3. Plug-In Hybrid Vehicles
4. Electric Vehicles
5. Natural Gas Vehicles
6. Hydrogen Vehicles
7. Fuel Cell Vehicles
8. Other (Specify __________)

G. Component Parts for Transportation Vehicles (IF SC=7) [RANDOMIZE]

1. Transportation Vehicle Engine & Drive Parts
2. Transportation Vehicle Exhaust System Parts
3. Transportation Vehicle Body Parts
4. Other Transportation Vehicle Parts (Specify _______)

SET SOLAR=1 IF SEA=1 OR 2, OR TSF=1, AND SED=5

IF SE TOTAL>1, ASK SEPRIME, IF NOT, SKIP

SEPRIME. Which of the following technologies is your organization *PRIMARILY* engaged with?

[PIPE-IN RESPONSES FROM SEA-SEG]

[IF RESPONDENT ONLY IDENTIFIES WITH ONE INDUSTRY AT SCREENER E (QC), USE THAT INDUSTRY FOR THE REMAINDER OF THE SURVEY IN PLACE OF “ENERGY” / IF MORE THAN ONE, CONTINUE TO USE “ENERGY.” EXCEPTION - IF THE ONLY SELECTION AT SCREENER C IS “OTHER” OR “DK/NA,” USE “ENERGY”]

F. Which of the following industry descriptions describe your organization’s focus as it relates to the [energy/ SC] industry? [ALLOW MULTIPLE RESPONSES]

1. An organization involved in agricultural goods and services
2. An organization involved in mining and extraction
3. An organization that manufactures and/or assembles [energy/ SC] goods or produces components that go into energy products
4. An organization that conducts research and development and related services for [energy/ SC]
5. An organization involved in the wholesale trade and distribution of [energy/ SC] products and services
6. An organization that installs [energy/ SC] systems or provides services for installation of [energy/ SC] systems
7. A public or private utility
8. An organization that provides consulting, engineering, finance, legal, or other professional services related to energy
9. An organization that conducts operations and maintenance (O&M) for [energy/ SC] systems
10. An organization primarily involved in education and training
11. Other support services (Specify: ______)
12. Other (Specify: ______)
13. (DON’T READ) Not sure

[ASK SCREENER G IF MORE THAN ONE SELECTED AT SCREENER F]

G. Which do you consider your organization’s **primary** focus as it relates to the [energy/ SC] industry, based on the labor hours performed at your location

1. An organization involved in agricultural goods and services
2. An organization involved in mining and extraction
3. An organization that manufactures and/or assembles [energy/ SC] goods or produces components that go into energy products
4. An organization that conducts research and development and related services for [energy/ SC]
5. An organization involved in the wholesale trade and distribution of [energy/ SC] products and services
6. An organization that installs [energy/ SC] systems or provides services for installation of [energy/ SC] systems
7. A public or private utility
8. An organization that provides consulting, engineering, finance, legal, or other professional services related to energy
9. An organization that conducts operations and maintenance (O&M) for [energy/ SC] systems
10. An organization primarily involved in education and training
11. Other support services (Specify: ______)
12. Other (Specify: ______)
13. (DON’T READ) Not sure

SET SGPRIME BASED ON SCREENER G RESPONSE OR SCREENER F RESPONSE IF SCREENER F COUNT=1

ASK SFA IF SEA=14 **OR** SEB=6 **OR** SEC = 13, 14, 15, OR 16 **OR** SEE = 15, **AND** SF = 4, 8, OR 10

SFA. Does your organization work with hydrogen fuel in any capacity?

1. Yes (Please specify)_____
2. No
3. Don't know/ Refused

ASK SGA IF SC=4, OR IF SF = 4, 6, 8, OR 9

SGA. Is your organization considered an Energy Service Company (ESCO)?

1. Yes
2. No
3. Don't know/ Refused

IF SGPRIME=6, ASK SCREENER H, OTHERWISE SKIP

H. Does your organization work on ENERGY STAR certified new home construction?

1. Yes
2. No
3. DK/NA

I. Does your organization work on ENERGY STAR certified buildings and plants (commercial and industrial)?

1. Yes
2. No
3. DK/NA

J. Does your organization have an energy manager or director responsible for energy management at one or more facilities?

1. Yes
2. No
3. DK/NA

IF SGPRIME=7, ASK SCREENER K

K. Does your organization employ workers that are in charge of administering, managing, evaluating, or otherwise working on utility-led energy efficiency programs, rebates, and other activities?

1. Yes
2. No
3. DK/NA

``````````````````````````````````````````````````````````````````````````````````````````
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For this survey, we will just be asking about the employees that work from or directly report to your current location.

1. Including all full-time and part-time employees, how many **permanent** employees work at or from your current location?

    Record # of employees ___________

    (DON'T READ) Have check box for Refused

2. Based on [Take Q1 #] full-time and part-time permanent employees at your location, how many employees do you expect to have at your location 12 months from now?

    1 More [record #_______]
    2 Fewer [record #_______]
    3 (DON'T READ) Same number
    4 (DON'T READ) Refused

    [If amount differs by 10% or more in either direction, ask:]
    Just to confirm, you currently have ____ permanent employees at your current location and you expect to have _____ (more/fewer) employees, for a total of ____ permanent employees 12 months from now.

3. Of the [Take Q1 #] full time and part-time permanent employees at your current location, how many of these workers support the [energy/ SC] portion of your business? Please note that your response should include administrative staff supporting the energy portion of your business.

    Record # of employees ___________

    (DON'T READ) Have check box for Refused

[IF NEEDED: SUPPORT WORKERS ARE DEFINED AS THOSE INDIVIDUALS THAT SPEND ANY AMOUNT OF TIME, DIRECTLY WORKING ON ENERGY RELATED PROJECTS INCLUDING ADMINSTRATIVE SUPPORT WORKERS]
[Q3 SHOULD BE LESS THAN OR EQUAL TO Q1 - BUILD IN CHECK]

4. Of your [Take Q3 #] energy staff at your location (office staff and in the field), please classify them into the area where they spent most of their time over the last 12 months. Please count each employee only once.

    a. In-state within your region/metropolitan area [Record #]______
    b. In-state outside your region/metropolitan area [Record #]_______
    c. Out-of-state [Record #]_______

5. How many full-time and part-time **permanent** employees did you have working at your current location 12 months ago that supported the [energy/ SC] portion of your business?

    Record # of employees ___________

    (DON'T READ) Have check box for Refused

6. Based on [Take Q3 #] full-time and part-time permanent employees at your location that support the [energy/SC] portion of your business, how many employees do you expect to have at your location 12 months from now?

   1 More [record #_______]
   2 Fewer [record #_______]
   3 (DON'T READ) Same number
   4 (DON'T READ) Refused

   Just to confirm, you currently have ____ permanent employees supporting the energy portion of your business and you expect that number to be _____ (more/fewer) 12 months from now, for a total of ____

7. Thinking of your [INSERT Q3] energy employees, how many spend at least 50% of their time supporting the energy portion of your business?

   ____

8. Thinking of your [Q3 ANSWER] energy employees, how many spend all of their time supporting the energy portion of your business?

   Record: _______

SECTION 2 – Workforce Profile Questions

If SC COUNT > 1 response, ASK Q9

9. Thinking of your [Take Q3] [energy/ SC] workers at your location, please classify them in the following categories. Please count each employee only once and categorize them in the area where they spend the most time.

PIPE IN SCREENER C RESPONSES

Record # of employees ___________

If SC COUNT > 1 response and Q7>0, ASK Q0

Thinking of your [Take Q7] [energy/ SC] workers that spend at least 50% of their time supporting the energy portion of your business, please classify them in the following categories. Please count each employee only once and categorize them in the area where they spend the most time.

PIPE IN SCREENER C RESPONSES AND EMPLOYMENT FROM Q8

Record # of employees ___________

BUILD CHECK SO TOTAL MUST = Q7

IF SC = 1 and Screener E.A > 1 response, ASK Q10 OTHERWISE SKIP

USE Q3 IN PLACE OF Q9 IF SELECTED COUNT AT SCREENER C WAS ONE (ONE CHOICE)

10. Thinking of your [PIPE IN Q9/Q3 GENERATION ANSWER] energy generation workers at your location, please classify them in the following categories. Please count each employee only once and categorize them in the technology area where they spend the most time.

PIPE IN SCREENER E.A RESPONSES

Record # of employees ___________

IF SC = 2 and Screener E.B > 1 response, ASK Q11 OTHERWISE SKIP

11. Thinking of your [PIPE IN Q8/Q3 ELECTRIC POWER TRANSMISSION AND DISTRIBUTION ANSWER] energy transmission, distribution, and storage workers at your location, please classify them in the following categories. Please count each employee only once and categorize them in the technology area where they spend the most time.

PIPE IN SCREENER E.B RESPONSES

Record # of employees ___________

IF SC = 3 and Screener E.C > 1 response, ASK Q12 OTHERWISE SKIP

12. Thinking of your [PIPE IN Q9/Q3 STORAGE ANSWER] storage workers at your location, please classify them in the following categories. Please count each employee only once and categorize them in the technology area where they spend the most time.

PIPE IN SCREENER E.C RESPONSES

Record # of employees ___________

IF Q12_2(BATTERY STORAGE)>0, ASK Q13

13. Thinking of your [PIPE IN Q12_2 #] battery storage workers at your location, please classify in them in the following categories. Please count each employee only once and categorize them in the battery storage application category where they spend the most time.

    1. Consumer devices [Record # of employees]
    2. Vehicles or other transportation [Record # of employees]
    3. Buildings or industrial facilities [Record # of employees]
    4. Electric Grid [Record # of employees]
    5. Other (Specify) [Record # of employees]

IF SC = 4 and Screener E.D > 1 response, ASK Q14 OTHERWISE SKIP

14. Thinking of your [PIPE IN Q9/Q3 ENERGY EFFICIENCY, INCLUDING HEATING, COOLING AND BUILDING ENVELOPE ANSWER] energy efficiency, including heating, cooling and building envelope, workers at your location, please classify them in the following categories. Please count each employee only once and categorize them in the technology area where they spend the most time.

PIPE IN SCREENER E.D RESPONSES

Record # of employees ___________

IF SC = 5 and Screener E.E > 1 response, ASK Q15 OTHERWISE SKIP

15. Thinking of your [PIPE IN Q9/Q3 FUELS ANSWER] fuels-related workers at your location, please classify them in the following categories. Please count each employee only once and categorize them in the technology area where they spend the most time.

PIPE IN SCREENER E.E RESPONSES

Record # of employees ___________

IF SC = 6 and Screener E.F > 1 response, ASK Q16 OTHERWISE SKIP

16. Thinking of your [PIPE IN Q9/Q3 TRANSPORTATION VEHICLES ANSWER] motor-vehicle related workers at your location, please classify them in the following categories. Please count each employee only once and categorize them in the technology area where they spend the most time.

PIPE IN SCREENER E.F RESPONSES

Record # of employees ___________

IF SC = 5 and Screener E.G > 1 response, ASK Q17 OTHERWISE SKIP

17. Thinking of your [PIPE IN Q9/Q3 COMPONENT PARTS ANSWER] energy generation workers at your location, please classify them in the following categories. Please count each employee only once and categorize them in the technology area where they spend the most time.

PIPE IN SCREENER E.G RESPONSES

Record # of employees ___________

Demographic questions

18. Thinking of your [Take Q3] [energy/ SC] employees, how many are:

    a) Male: Record # employees ____________
    b) Female: Record # of employees _________
    c) Gender non-binary: Record # of employees _________
    d) (DON'T READ) Refused

Q18 a+b must = Q3

19. Thinking of your [Take Q3] [energy/ SC] employees, please indicate the ethnicity:

    (a) Hispanic
    (b) Not Hispanic or Latinx
    (c) (DON'T READ) Refused

Q19 a+b must = Q3

20. Thinking of your [Take Q3][energy/SC] employees, please indicate the race and choose all that apply:

    a) American Indian or Alaskan Native: Record # of employees ________
    b) Asian: Record # of employees ___________
    c) Black or African American, not Indigenous: Record # of employees ________
    d) Black Indigenous: Record # of employees
    e) Native Hawaiian or other Pacific Islander: Record # of employees ____
    f) White Record # of employees ___________

g) Two or more races: Record # of employees________
h) (DON'T READ) Refused

Q20 a-f must = Q3

21. Thinking of your [Take Q3] [energy/ SC] employees, how many:

    a) Are Veterans of the U.S. Armed Forces Record # of employees ___________
    b) Are 55 and over Record # of employees ___________
    c) Represented by Unions, Collective Bargaining Agreements, and/or Project Labor Agreements Record # of employees ___________
    d) Identify as LGBQT+
    e) Have a disability that requires accommodation
    f) Were formerly incarcerated
    g) (DON'T READ) Refused

22. Thinking of the current [Take Q3] [energy/ SC] employees at your location, how many are in the following occupational categories?

    (Please only assign one category to each employee that supports the [energy/ SC] portion of your business. If they fall into more than one category, please assign them to the category in which they devote more of their time.)

    a. Mining and Extraction Field positions (includes oil field workers, miners, etc.)

    b. Production/Manufacturing positions (includes workers in refineries and assembly workers and those involved in the design, quality control and manufacturing process)

        Record # of employees ____________

        (DON'T READ) Have check box for Refused

    c. Installation or repair positions (includes technicians, building trades people, and supervisors that are working at project site)

        Record # of employees ____________

        (DON'T READ) Have check box for Refused

    d. Administrative positions (includes customer service representatives, clerks, office and operations support)

        Record # of employees ___________

        (DON'T READ) Have check box for Refused

    e. Management/Professional positions (***does not include*** those supervisors that spend a majority of their time at project sites or sales managers)

        Record # of employees ___________

        (DON'T READ) Have check box for Refused

    f. Sales positions (includes cost estimators, sales representatives and sales managers)

        Record # of employees ___________

        (DON'T READ) Have check box for Refused

g. Other (Specify: _______________)
Record # of employees ___________

(DON'T READ) Have check box for Refused

(CREATE INTERNAL CONTROL SO Q22 A+B+C+D+E+F+G EQUALS Q3]

SECTION 3 – Workforce Development & Training Needs

24. How many energy workers have you hired over the last 12 months, either for new positions or to replace former workers?

Record __________

IF Q24>0, ask Q25-28 otherwise SKIP

25. Thinking of the [Insert Q24] energy workers that you have hired at your location over the last 12 months, please indicate your level of difficulty finding qualified applicants to fill the positions.

    1. Very difficult
    2. Somewhat difficult
    3. Not at all difficult
    4. DK/NA

IF Q25 = 1 or 2 ask Q26 and Q27, otherwise SKIP

26. What are the two most significant reasons for the reported difficulty?

_____
_____

27. Please provide the two most difficult positions for your organization to fill at your location.

_____
_____

28. You reported [insert Q24] additional workers at your organization over the last 12 months. Of these [insert Q24] positions, how many:

a. Were newly created positions?

Record # of employees ___________

b. Were existing employees that added energy responsibilities?

Record # of employees ___________

c. Were hired to replace workers due to turnover or retirement?

Record # of employees ___________

d. Were positions that required previous work experience related to the position?

Record # of employees ___________

e. Required a bachelor's degree or beyond: __________

Record # of employees ___________

f. Required an associate degree or academic certificate from an accredited college, but not a bachelor's degree: __________________

Record # of employees ___________

g. Required a vocational or technical postsecondary certificate or credential: __________________

Record # of employees ___________

h. Are represented by a union, collective bargaining agreement, or a project labor agreement: __________________

Record # of employees ___________

29. Does your firm have a formal or informal mentorship/sponsorship program?
    1. Yes
    2. No
    3. DK/NA

30. Briefly describe the mentorship/sponsorship program?

____

31. Has your firm adopted any specific strategies, policies, or programs to increase the number of female hires?

    1. Yes
    2. No
    3. DK/NA

IF Q31 = 1, ASK Q32

32. Briefly describe the strategies, policies, or programs to increase female hires?

____

33. Has your firm adopted any specific strategies, policies, or programs to increase the number of ethnic or racial minority hires?

    1. Yes
    2. No
    3. DK/NA

IF Q33 = 1, ASK Q34

34. Briefly describe the strategies, policies, or programs to increase minority hires?

____

35. Has your firm adopted any specific strategies, policies, or programs to increase the number of LGBTQ+ hires?

    1. Yes
    2. No
    3. DK/NA

IF Q35 = 1, ASK Q36

36. Briefly describe the strategies, policies, or programs to increase LGBTQ+ hires?

---

37. Does your firm offer or require a diversity and/or inclusion training program aimed at advocating workplace diversity and inclusion?

    1. Yes
    2. No
    3. DK/NA

SECTION 4 – Business Questions

38. The following is a list of factors that may contribute to difficulty growing a profitable business. Please rate the significance of each factor. [READ ITEM, THEN SAY] is it very significant, somewhat significant, or not at all significant. [RANDOMIZE]

    a. Lack of capital
    b. Lack of qualified talent
    c. Poor demand
    d. Cost or supply of materials
    e. Permitting delays
    f. Interconnection delays
    g. Policy challenges

39. Thinking about your organization's energy related suppliers and vendors, what percent of your supply chain purchases (in dollars/value), are:
    a. In-state (Enter %)_____
    b. Out of state but in the United States (Enter %)_____
    c. Outside of the United States (Enter %)_____ (WEB ONLY SPECIFY COUNTRIES_____)
    d. DK/NA

40. Thinking about your organization's energy related customers, what percent are located:

    1. In-State (Enter %)_____
    2. In a bordering state but out of state (Enter %)_____
    3. In the United States, but outside of a bordering state (Enter %)_____
    4. Outside of the United States (Enter %)_____ (WEB ONLY SPECIFY COUNTRIES ____)
    5. DK/NA

SECTION 5 – Revenue Questions

Ask Q41 if SGPRIME = 5 or 6

41. Can you name any specific rebates or incentives that can reduce the cost of selling, distributing or installing energy for your customers? [Record up to 3]

    Record: ___

42. Approximately how much of your organization's work at your current location, in terms of total gross revenue, is related to energy?

    Record $:_____________________________

ASK Q43 if SE has multiple responses, otherwise SKIP

43. Approximately how much of your organization's work at your current location, in terms of total gross revenue, is related to each of the following products or services? (Use numbers to indicate percentages, for instance 20=20%)

    1. INSERT SE RESPONSE 1 ____%
    2. INSERT SE RESPONSE 2 ____%
    3. INSERT SE RESPONSE 3 ____%
    4. …
    5. All other revenue not related to energy ____%

Q43 total must equal 100%

SECTION 6 – Motor Vehicles & Component Parts

ASK Q44 if SC = 6, otherwise SKIP

44. With which of the following types of transportation vehicles does your firm primarily design, manufacture, sell, repair, or otherwise work with? [SELECT ONE]

    1. Automobiles
    2. Light- or Medium- Duty Vehicles
    3. Heavy Duty Vehicles
    4. Industrial Vehicles, such as forklifts
    5. Recreational Vehicles, such as golf carts
    6. Rail
    7. Other (specify ________)

    ASK Q45-Q47 if SC = 7, otherwise SKIP

45. Does your firm manufacture, design, sell, and/or distribute parts solely used for alternative vehicles, or vehicles with a fuel source other than gasoline or diesel?

    1. Yes, electric vehicles
    2. Yes, hydrogen fuel cell vehicles
    3. Yes, other (Specify)____
    4. No
    5. Don't know/ Refused

ASK Q46 IF Q45=1, otherwise SKIP

46. How much of your firm's work, as a percentage of your total revenue, is attributed to parts solely used for alternative vehicles, or vehicles with a fuel source other than gasoline or diesel?

    1. All of it (100%)
    2. Half to most of it (50% to 99%)
    3. A quarter to almost half of it (25% to 49%)
    4. Less than a quarter (1% to 24%)
    5. (DON'T READ) DK/NA

47. Thinking of the type of fuel used, does your organization offer parts or products for any of the following types of transportation vehicles? [ALLOW MULTIPLE]

    1. Gasoline and Diesel Motor Vehicles (excluding freight transport)
    2. Hybrid Electric Vehicles
    3. Plug-In Hybrid Vehicles
    4. Electric Vehicles
    5. Natural Gas Vehicles
    6. Hydrogen Vehicles
    7. Fuel Cell Vehicles
    8. Other (Specify _________)

[If Q47 = 2,3, or 4, ask Q48, otherwise SKIP]

48. Which systems for electric and hybrid vehicles does your firm primarily work with?

    a. Body design or structure
    b. Batteries
    c. Charging components
    d. Electric propulsion (i.e. converter, controller, transmission, etc.)
    e. Auxiliaries (i.e. brakes, steering, climate control, etc.)
    f. Other (Specify___________)

SECTION 7 – Energy Efficiency

IF SCREENER H=1, ASK Q49

49. How many of your [Take Q3#] energy employees work on ENERGY STAR certified new home construction?

    Record # of employees: ______________

IF SCREENER I=1, ASK Q50

50. How many of your [Take Q3#] energy employees work on ENERGY STAR certified buildings and plants (commercial and industrial)?

    Record # of employees: ______________

IF SCREENER K=1, ASK Q51

51. How many of your [Take Q3#] energy employees work on administering, managing, evaluating, or otherwise working on utility-led energy efficiency programs, rebates, and other activities?

    Record # of employees: ______________

Thank you for completing the survey. Since it sometimes becomes necessary for the project manager to confirm responses to certain questions, please verify your contact information.

da. First and Last Name (Interview note enter 99 for REF)
1. First Name
2. Last name

db. Position (Interview note enter 99 for REF)
dc. Phone (Interviewer Note 9999999999 for REF)
dd. Email (Interview note enter 99 for REF)
de. Organization Name (Interview note enter 99 for REF)
df. Organization Street Address (Interview note enter 99 for REF)
dg. Organization City (Interview note enter 99 for REF)
dh. Organization State (Interview note enter 99 for REF)
di. Organization Zip (Interviewer Note 99999 for REF)

Thank you very much for your time.

HOW DID THE CALL END?

1 COMPLETED INTERVIEW
2 SURVEY SAID THEY DID NOT QUALIFY
3 CALLBACK NEEDED, PARTIAL
4 REFUSAL
5 SOMETHING ELSE

Appendix B: Survey Definitions

The following appendix contains definitions given to respondents should they ask.

Technology Group

- Electric Power Generation – the process of generating electric power from other sources of primary energy whether connected to a distribution gird or not
- Electric Power Transmission, Distribution, and Storage – stores electricity or carries electricity from suppliers to demand sites
- Energy Efficiency, Including Heating, Cooling and Building Envelope (IF NEEDED THIS INCLUDES THERMAL OR HOT WATER SOLAR) – Goods and services that reduce electricity demand pursuant to EPA's Energy Star Standards or Department of Energy Efficiency Standards or refers to establishments that are involved with heating, ventilation and air conditioning (HVAC) from Renewable Energy sources or work that increases the Energy Efficiency of HVAC systems
- Fuel Production, including Fossil, Nuclear, and Renewable – substances that produces useful energy when they undergo a chemical or nuclear reaction
- Transportation Vehicles, including Motor Vehicles – includes fossil and non-fossil fuel related rail, aircraft, vessels, and vehicles
- Component Parts for Transportation Vehicles – parts for fossil and non-fossil fuel related rail, aircraft, vessels, and vehicles

Electric Power Generation

- Solar Photovoltaic Electric Generation – generating electrical power by converting solar radiation into direct current electricity using semiconductors that exhibit the photovoltaic effect.
- Concentrated Solar Electric Generation – generating solar power by using mirrors or lenses to concentrate a large area of sunlight, or solar thermal energy, onto a small area.
- Wind Generation – converting the wind's kinetic energy into electrical power.
- Geothermal Generation – using steam produced from reservoirs of hot water found a few miles or more below the Earth's surface to produce electricity.
- Bioenergy/Bioenergy Generation – generating electricity from materials derived from biological sources or any organic material which has stored sunlight in the form of chemical energy.
- Low-Impact Hydroelectric Generation including Wave/Kinetic Generation – similar to traditional, but certification criteria are aimed at ensuring that the certified dam adequately protects or mitigates its impacts in eight key resource areas: river flows, water quality, fish passage and protection, watersheds, threatened and endangered species, cultural

resources, and public access and recreation opportunities. The eighth criterion requires that the dam not have been recommended for removal (LIHI – Low Impact Hydropower Institute).

- Traditional Hydroelectric Generation – electricity generated by hydropower; the production of electrical power through the use of the gravitational force of falling or flowing water.
- Advanced/Low Emission Natural Gas – efficient, low emission, leak free natural gas, including systems that use any of the following technologies High Efficiency Compressor, Advanced Low NOx Combustion Technology, First Application of Closed Loop Steam Cooling in an Industrial Gas Turbine, Advanced Turbine Blade and Vane Materials, High Temperature TBC and Abradable Coatings, Advanced Row 4 Turbine Blades, 3-D Aero Technology, Advanced Brush Seal.
- Nuclear Generation – converting atomic energy into usable power.
- Coal Generation – the burning of thermal coal to create electricity.
- Oil and other Petroleum Generation – the burning of oil or other petroleum to create electricity.
- Natural Gas Generation, other than Advanced Natural Gas Generation – the burning of natural gas to create electricity.
- Combined Heat and Power – generating electricity and useful thermal energy in a single, integrated system. Heat that is normally wasted in conventional power generation is recovered as useful energy

Electric Power Transmission, Distribution, and Storage

- Traditional Transmission and Distribution – allow electricity to move across the country through infrastructure commonly referred to as "poles and wires."
- Pumped Hydro Storage – hydroelectric energy storage used by electric power systems for load balancing. The method stores energy in the form of gravitational potential energy of water, pumped from a lower elevation reservoir to a higher elevation.
- Battery Storage – using a cell or connected group of cells to convert chemical energy into electrical energy by reversible chemical reactions and that may be recharged by passing a current through it in the direction opposite to that of its discharge
- Smart Grid – an electricity supply network that uses digital communications technology to detect and react to local changes in usage.
- Micro Grids – a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid.
- Other Grid Modernization – other modernization of the Nation's electricity transmission and distribution system to maintain a reliable and secure electricity infrastructure that can meet future demand growth.

Energy Efficiency, Including Heating, Cooling and Building Envelope

- Energy Star Appliances – appliances that meet the international Energy Star standard for energy efficient consumer products originated in the United States.
- LED, CFL and Other Efficient Lighting – energy efficient lighting sources.
- Traditional HVAC goods, control systems, and services – heating, ventilation, and air conditioning systems (HVAC), including building retro-commissioning and retrofits connected to heating and cooling.
- Energy Star/ High AFUE HVAC – HVAC that meets the international Energy Star standard for energy efficient consumer products originated in the United States or has high Average Fuel Utilization Efficiency (AFUE) rating of 90 or greater or 15 SEER or greater.
- Renewable Heating and Cooling (including Solar Thermal) – refers to establishments that are involved with heating, ventilation and air conditioning (HVAC) from Renewable Energy sources or work that increases the Energy Efficiency of HVAC systems (solar thermal – uses the sun's energy to generate thermal energy).
- Advanced Building Materials/Insulation – all materials that represent advances in efficiency over the traditional materials.
- Recycled building materials
- Reduced water consumption products and appliances high efficiency (HE) washing machines, faucet aerators, low flow shower heads, etc.

Fuels

- Coal – a combustible black or dark brown rock consisting mainly of carbonized plant matter, found mainly in underground deposits and widely used as fuel.
- Petroleum – a liquid mixture of hydrocarbons that is present in certain rock strata and can be extracted and refined to produce fuels including gasoline, kerosene, and diesel oil; oil.
- Natural Gas – flammable gas, consisting largely of methane and other hydrocarbons, occurring naturally underground (often in association with petroleum) and used as fuel.
- Other Fossil Fuel – a natural fuel such as coal or gas, formed in the geological past from the remains of living organisms.
- Corn Ethanol – ethanol produced from corn that is used as a bioenergy.
- Other Ethanol/Non-Woody Biomass Fuel, including Biodiesel – fuel made from other materials such as straw, manure, vegetable oil, animal fats, etc.
- Woody Biomass/Cellulosic Biofuel – fuel developed from the by-product of management, restoration, and hazardous fuel reduction treatments, as well as the product of natural disasters, including trees and woody plants (limbs, tops, needles, leaves, and other woody parts, grown in a forest, woodland, or rangeland environment)
- Other Biofuels – other fuel derived directly from living matter.
- Nuclear Fuel – a substance that will sustain a fission chain reaction so that it can be used as a source of nuclear energy.

Motor Vehicles

Transportation Vehicles, Including Motor Vehicles

- Gasoline and Diesel Motor Vehicles (excluding freight transport) – Vehicles that run on gasoline and diesel internal combustion engines.
- Hybrid Electric Vehicles – Vehicles that use two or more distinct types of power, such as internal combustion engine + electric motor.
- Plug-In Hybrid Vehicles – A hybrid electric vehicle that uses two or more distinct types of power, such as internal combustion engine and an electric motor that is powered by rechargeable batteries, or another energy storage device, that can be recharged by plugging it in to an external source of electric power.
- Electric Vehicles – A vehicle which uses one or more electric motors for propulsion, that recharges with batteries plugged in with external sources of electric power, and that have no onboard generator or non-electric motor.
- Natural Gas Vehicles – An alternative fuel vehicle that uses compressed natural gas (CNG) or liquefied natural gas (LNG) an alternative to petroleum.
- Hydrogen Vehicles – A vehicle that uses hydrogen as its onboard fuel for motive power.
- Fuel Cell Vehicles – A type of hybrid vehicle which uses a fuel cell, instead of an engine, in combination with a storage device, such as a battery, to power its on-board electric motor.

Component Parts for Transportation Vehicles

- Widely Commercially Available – Products that are sold in the regular course of business through developed sales channels.
- Development Stage – Products are either not yet commercially available or are available to customers in a pilot stage.
- Concept – Products that have been designed and sketched but are not available in physical form.
- Product Development – Products are in the early test phase with some engineering and early stage manufacturing but not yet in pilot stage.
- Pilot – Prototypes have been produced and are in test phase.
- Automobile – a passenger vehicle designed for operation on ordinary roads and typically having four wheels and a gasoline or diesel internal-combustion engine.
- Light Duty Vehicle – Trucks or truck-based vehicles with a payload capacity of less than 4,000 pounds.
- Heavy Duty Vehicle – Trucks or truck-based vehicles with a payload capacity of 4,000 pounds or greater.
- Industrial Vehicle – Any mobile power-propelled truck used to carry, push, pull, lift, stack or tier materials. Powered industrial trucks can be driven or controlled by a walking operator.
- Recreational Vehicles – a vehicle designed for recreational use, including golf carts and camping vehicles.

Appendix C: Overall Methodology

Introduction and Overview

The 2022 USEER methodology relies on the most recently available data from the Bureau of Labor Statistics (BLS) Quarterly Census of Employment and Wages (QCEW) (QCEW, third quarter 2021), the BLS Employment Situation Table B-1 monthly reports, together with a detailed supplemental survey of business establishments across the United States designed and conducted by BW Research Partnership hired by and in coordination with the U.S. Department of Energy (DOE). During a time of rapid change in energy technology and business employment structure, supplemental surveys are an important tool to capture developing trends. Taken together, the BLS and survey data provide the most comprehensive calculation of energy-related employment available. The methodology has been used for local, state, and federal energy related data collection and analysis for a decade, including SEIA's *National Solar Jobs Census* series, traditional and clean energy reports for state agencies in the Commonwealth of Massachusetts, New York State, the State of Vermont, the Commonwealth of Pennsylvania, the State of California, the State of Connecticut, the State of New Hampshire, the State of Rhode Island, the State of Maryland, the State of Minnesota, and numerous nonprofit agencies across the United States.

The 2022 USEER survey uses a stratified sampling plan that is representative by industry code (North American Industry Classification System [NAICS] or ANAICS),[25] establishment size, and geography to determine the proportion of establishments that work with specific energy-related technologies, as well as the proportion of workers in such establishments that work with the same. These data are then analyzed and applied to existing public data published by the BLS, effectively constraining the potential universe of energy establishments and employment. For more detail, see the "USEER Sampling Plan" section below (section III).

The 2022 USEER survey was administered by telephone (more than 247,500 outbound calls) and by web, with more than 104,000 emails sent to participants throughout the United States. An additional 33,000 business locations were mailed an invite letter instructing respondents to complete the survey via phone or web (included a link). The phone survey was conducted by ReconMR. The web instrument was programmed internally, and each respondent was required to use a unique ID in order to prevent duplication.

The sample was split into two categories, referred to as the known and unknown universes. The known universe includes establishments that have previously been identified as energy-related, either in prior research or in some other manner, such as membership in an industry association or participation in government programs. These establishments were surveyed census-style, and their associated establishment and employment totals were removed from the unknown universe for both sampling and for resulting employment calculations and estimates.

The unknown universe included tens of thousands of businesses in potentially energy-related NAICS codes, across agriculture, mining and extraction, utilities, construction, manufacturing, wholesale

[25] ANAICS is a term used by BLS, which means Allocation NAICS, and refers to the industries included in the aggregation of industries likely to participate in said activities. https://www.bls.gov/ggs/ggs_technote_extended.pdf

trade, distribution (including pipeline distribution), professional services, and repair and maintenance. Each of these segments and their total reported establishments (within the BLS QCEW) were carefully analyzed by size (employment) and state to develop representative clusters for sampling. In total, approximately 33,000 business establishments participated in the survey effort, with approximately 7,500 providing full responses to the survey. These responses were used to develop incidence rates among industries (by state) as well as to apportion employment across various industry categories in ways currently not provided by state and federal labor market information agencies. The margin of error for incidence in the USEER is +/-0.54% at a 95% confidence interval.

For several industries, particularly transportation of goods, the USEER uses the methodology developed by the DOE and the National Renewable Energy Laboratory for the first installment of the QER. Proportion of employment was calculated by dividing commodity shipments by value (in millions of dollars) for coal, fuel oil, gas, motor vehicles, petroleum, and other coal and petroleum products out of total commodity value at the state level by truck, rail, air, and water transport. This proportion was applied to NAICS employment for truck transportation (NAICS 484), water transportation (NAICS 483), air transportation (NAICS 481), and Railroad Retirement Board employment for rail transportation at the state level. With this analysis, truck transportation represents the majority of energy-related transportation employment (70%), followed by rail (22%), water (7%), and air (1%).

Of important note, the USEER expressly excludes any employment in retail trade NAICS codes. This excludes motor vehicle dealerships, gas stations,[26] appliance and hardware stores, and other retail establishments.

All data in the USEER rely on the BLS QCEW data for the end of the third quarter of 2021, and the BLS Employment Situation Table B1 monthly reports through December 2021. Employment extrapolations are based off BLS QCEW and survey data, resulting in totals that carry precise decimal values. As a result, some employment totals for tables in the report will sum differently due to rounding. The USEER survey was administered between January 13, 2022, and April 18, 2022, and averaged 16 minutes in length.

Methodology Discussion

Employment data collected by the BLS provide information on many, but not all, energy-related job categories. Most notably, BLS does not collect data on employment levels by energy technology across business segments. For instance, residential solar installation establishments are typically labeled as electrical contractors (together with all other traditional electrical businesses) without being identified specifically as solar companies. Petroleum-engineering firms are included in engineering services, with civil, mechanical, and other engineers, while electric vehicle prototype manufacturers are combined with gasoline and diesel-fueled vehicle manufacturing. As a result, BLS employment data does not capture the full scope of energy employment trends.[27]

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[26] Gas station employment had been reported in previous years. The 2022 USEER excludes mention of employment in this industry.

[27] DOE, *Quadrennial Energy Review: Energy Transmission, Storage, and Distribution Infrastructure*, 8-7.

Given the complex relationship between energy and the overall economy, the 2022 USEER investigates, with a special supplemental survey, the three Traditional Energy sectors—Electric Power Generation, Fuels and Transmission, Distribution, and Storage —followed by individual analyses of employment in two important energy end-use sectors—Energy Efficiency and Motor Vehicles. The spread of business activities within each of the five analyzed sectors presents additional taxonomic challenges, as early-stage research and development, repair and maintenance, or professional and technical services vary across energy, energy efficiency, and manufacturing. Natural gas business activities, for instance, differ from business activities relating to advanced building materials and solar photovoltaic (PV) materials.

Historically, the BLS has conducted supplemental surveys to acquire more complete information on new industries, specific demographic profiles within the workforce, or new labor force trends such as the role of contingent workers. In this way, significant modification to the current BLS structure of industry and occupational classifications is avoided by capturing the required energy employment data using a supplemental survey tool based on existing BLS data and classifications.

The survey data are used to filter and analyze the concentration, intensity, and distribution of various energy technologies and activities throughout traditional industry sectors, using third-quarter 2021 employment data from the BLS QCEW and the BLS Employment Situation Table B-1 monthly reports through December 2021. USEER data also provides an additional layer of information to track sector-specific growth potential, obstacles, and opportunities. The data presented in the USEER are not intended to remove, replace, or replicate existing data from the BLS QCEW, but instead to reorganize categories and provide insight for policymakers and the public regarding trends in energy employment, energy production, and energy consumption across the United States.

The USEER provides data for direct employment only and does not attempt to estimate indirect employment or induced employment related to the analyzed sectors. Many employment studies, such as those included in chapter 8 of the first installment of the QER, generate employment estimates that rely on input/output modeling. These studies typically define an activity based on reported expenditures or expenditures and associated levels of employment reported by a defined industry or activity, such as U.S. solar PV installation. In this example, solar PV installation firm employment would be the "direct" jobs. Most studies go at least one step further, identifying "indirect" employment, which includes the supply chain or other support services to the industry. In the solar example, these would include U.S. manufacturing jobs related to producing PV equipment used in domestic installations (and their suppliers and vendors) as well as consulting, tax, legal, and other professional services to support domestic PV installation companies. Another typical calculation is "induced" jobs, which includes jobs created or supported by wages paid and other benefits provided by employers of direct and indirect employees.

In the USEER, by comparison, the direct job category of interest is defined as the solar industry generally, including utility-scale solar, residential, and commercial installations, as well as the manufacturing, professional services, and wholesale trade that make up the sector. However, the indirect jobs that support this industry are <u>not</u> included, such as polysilicon production (the raw material used in solar panels), aluminum production and extrusion activities for frame manufacturing, or other aspects of the solar energy value chain. Induced jobs—those created throughout the economy as a result of the spending of wages by the employees whose income derives, in whole or part, from this industry—are also not included.

For this survey, a Qualifying Firm is—

An organization with employees in the United States that can be directly involved with researching, developing, producing, manufacturing, distributing, selling, implementing, installing, or repairing components, goods or services related to Electric Power Generation; Electric Power Transmission, Distribution, and Storage; Energy Efficiency, including Heating, Cooling and Building Envelope; Fuels, including Extraction, Processing, Production, and Distribution; and Transportation,[28] including Motor Vehicles. This also includes supporting services such as consulting, finance, tax, and legal services related to energy, fuels, energy efficiency, or motor vehicles.

Qualifying Workers are—

Employees of a qualifying firm that spend some portion of their time supporting the qualifying energy, energy-efficiency, or motor vehicle portion of the business.[29]

This report provides detail into levels of employment activity that include both "a portion of their time" and "a majority of their time" when referencing qualifying workers. This is especially true within the Energy Efficiency sector where the employing construction or repair firms frequently are engaged in both traditional energy-related construction or installation as well as in high-efficiency activities that qualify for ENERGY STAR designation.

Primary energy consumption[30] in the United States is divided among four groups: Electric Power (37.8%), Buildings (11.5%), Industrial (23.2%), and Transportation (27.6%). This distribution of energy consumption by sector is based on total 2021 estimates published by the Energy Information Administration (EIA).[31]

End-use electricity consumption, in turn, is divided with 73.8% consumed by Residential and Commercial Buildings, 26.0% by Industrial; and 0.2% by Transportation.[32] Thus, Buildings consumed 39.3% of all energy (an amount consisting of their direct energy end-use, their electricity end-use, and the electrical system energy losses allocated to the sector by EIA).[33]

As with the 2021 report, the 2022 USEER identifies jobs that manufacture ENERGY STAR appliances and other ENERGY STAR labeled products, as well as employment in building design

[28] "Transportation" refers to the transportation of fuels. This includes pipeline, rail, and truck transportation. It additionally includes companies involved with the production of vehicles used for transporting goods.
[29] Data presented in this report exclude retail employees. Qualifying Workers in energy will be referenced as energy-related jobs. Where "portion of their time" includes employees whose activities are less than 50% of their time, specific reference will be made of that fact.
[30] Primary energy consumption is the direct consumption of energy at its first point of use. Importantly, this does not include consumption of electricity, so that primary energy consumption in the Residential and Commercial Building sector includes direct use of fuels like natural gas for heating, but not electricity used for lighting and cooling.
[31] EIA, *Monthly Energy Review*, Table 2.1. Percentages are based on primary energy consumption in 2021 and do not add up to 100.0% due to rounding.
[32] EIA, *Monthly Energy Review*, Table 7.6. Percentages of retail electricity sales in 2021.
[33] EIA, *Monthly Energy Review*, Table 2.1. Percentage based on total energy consumption in 2021.

and contracting services that provide insulation, improve natural lighting, and reduce overall energy consumption across homes and businesses.[34] As with the 2021 report, the 2022 USEER includes a section that disaggregates ENERGY STAR technologies more thoroughly, further highlighting the employment impacts of the program.

Motor Vehicles are included in this report primarily due to their intensive use of energy and contribution to carbon emissions.[35] This report delineates employment between traditional gas and diesel motor vehicles, hybrid and plug-in hybrid, all-electric, natural gas, hydrogen, and fuel cell technologies, as well as Motor Vehicle component parts for such vehicles. USEER does not, however, cover all sectors of transportation, such as aviation and maritime transportation. According to the EIA, the transportation sector accounted for 27.6% of primary energy consumption.[36] The transportation sector accounted for 67.2% of U.S. petroleum consumption.[37]

Motor Vehicles employment reported at the state level includes overall value chain (manufacturing, wholesale trade, commodity flows or freight transport of motor vehicles, professional and business services, and repair and maintenance) and employment by detailed technology (gas and diesel, hybrid, plug-in hybrid, electric, hydrogen and fuel cell, natural gas, and other). Employment at the state level is not reported by value chain within detailed technology.

BW Research Partnership, an independent research organization, collected and analyzed the data. The data set includes technology, value-chain, and energy employment data in all 50 U.S. states and the District of Columbia. In a time of rapid change in energy technologies across the board, continued refinement of supplemental surveys will continue to be an important tool in analyzing existing BLS data sets.

Another benefit of using the QCEW framework and a supplemental survey is the ability to understand and report the concentration of energy-related activities within traditional industries, such as construction, manufacturing, and utilities. This helps to illustrate the significant impact that energy and energy-related activities have on the overall economy. The impacts to the various selected industries are illustrated briefly below.[38]

USEER Sampling Plan

Universe

Geographic coverage includes the 50 States and the District of Columbia, and the U.S. Territories. Private establishments and government units are included, but units with average employment of zero over the last 12 months are excluded. Data are to be collected for establishments in 266

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[34] Estimates do not include retail employment.

[35] The USEER covers motor vehicle employment across vehicle parts manufacturing, automotive repair and maintenance, as well as vehicle, parts, and supplies wholesalers, including air, rail, water, and truck transportation of motor vehicle parts and supplies. It does not capture jobs associated with the final assembly of some transportation equipment such as forklifts and golf carts.

[36] EIA, *Monthly Energy Review*, Table 2.1.

[37] EIA, *Monthly Energy Review*, Table 3.7c. Percentage calculated using the sum of sector totals in Tables 3.7a through 3.7c.

[38] Because the USEER uses modeling to estimate fuel-stock employment in agriculture and forestry, and because these industry codes are not effectively captured by QCEW, no estimate is made as to the percent of the total industry captured by the USEER.

detailed industries identified to be of specific interest for the USEER Survey. The industries are defined using the 6-digit detail of NAICS, includes 1,099 6-digit industries.

The sampling frame is a representative sample of employers drawn from establishment totals from the Quarterly Census of Employment and Wages (QCEW) Longitudinal Database (LDB) maintained by the Bureau of Labor Statistics, stratified by employment size categories developed by the Census Bureau County Business Patterns data set. The actual contact information and business names are drawn from a private dataset, DataAxleUSA, because the QCEW is confidential. About 2.7 million establishments with employment of 26 million are in the 266 in-scope industries.

For the purposes of USEER sample allocation, we aggregate 266 detailed industries into 7 groups of industries or “allocation” NAICS (ANAICS). For most in-scope industries, the ANAICS is the 2-digit NAICS and includes all in-scope NAICS-defined industries within the 2-digit. Within some 2-digit industries, ANAICS splits out specific 5- and 6-digit NAICS industries where we have historically had a higher incidence of energy activity. ANAICS 2- and 3-digit coding is the same as for NAICS, though restricted to USEER-eligible industries.

Industry sectors are also defined for use in allocation. Industry sectors are 2-digit ANAICS with two exceptions. The manufacturing sector combines three 2-digit codes. The trade sector combines retail trade and wholesale trade.

About 16,100 in-scope “Known Universe” establishments with one million employees were pre-identified as having energy activity. A database of Known Universe establishments was developed internally by BW Research by collecting industry association databases, approved utility contractor lists, and other public and private sources, as well as prior indication in a USEER survey collection. By comparing the information obtained through these sources and comparing the NAICS codes of these establishments in the QCEW, Known Universe establishments were matched to the QCEW/DataAxleUSA dataset and a “known” indicator was used to assist in oversampling “known” establishments.

Sample

BW Research Partnership contacts between 30,000 and 35,000 establishments per year. The total survey completion targets were based on a sample selected using the QCEW/DataAxleUSA frame for the second quarter of 2021. Quotas were established for each NAICS code or ANAICS code by size and state.

Stratification – The USEER is stratified by 6-digit NAICS and size class (1-9, 10-19, 20-49, 50-99, and 100+ employees) and systematic samples selected in the noncertainty strata. Known establishments can be of any ownership, are processed separately, and are excluded from the other portions of the frame. Federal government stratification is State by industry sector. State government stratification is State by industry sector. Local government stratification is State by industry sector for these sectors: utilities; transportation and warehousing; professional, scientific, and technical services; remediation services; educational services; arts, entertainment, and recreation; public administration (all other sectors combined to a residual category). For private establishments (excluding the Known Universe) three levels of stratification are examined during sample allocation:

1) State by industry sector, 2) national ANAICS, and 3) national 6-digit NAICS. Further stratification by establishment size did not prove to be practical for similar studies.

Sample Design

USEER panels have a probability-based sample aimed at satisfying data needs at both the State by industry sector level and the national ANAICS level. The basic sampling unit is an establishment. Response quotas are established based on the representation of total establishments by 6-digit NAICS, times the proportion of establishments in each size category as identified in the most recent available data from Census Bureau County Business Patterns.

Restricted to in-scope industries, establishment on the QCEW frame are separated into 5 mutually exclusive parts that are separately sampled. Approximate sample counts refer to a sample selected from the QCEW frame for quarter 2 of 2020.

- Known Universe; census, with up to six attempts; stratification industry by size class (can have any ownership code)
- Federal Government; sample 50; stratification state by industry sector
- State Government; sample 50; stratification state by industry sector
- Private; sample 29,900; complex stratification using state, industry

Known Sampling – All establishments in the Known Universe will be contacted up to six times. The responses will be treated separately, and the overall employment from the Known Universe sample will be deduplicated from the appropriate panel of ANAICS, based on the Known Universe respondent NAICS code.

Private Establishments and Government (excluding Known Universe) –The allocation has 4 basic steps.

- Establishments by State – relying on the most recent data available from QCEW, the proportion of establishments in each selected NAICS is determined, as a percentage of the total establishments in all selected NAICS.
- NAICS Establishments by Size– relying on the most recent data available in the Census Bureau’s County Business Patterns, the proportion of establishments within each size category in each 6-digit NAICS is determined. The total NAICS quota is allocated by the size proportions to develop the percentage of total state-level sample.
- Deduplicate Known Universe Establishments from Sampling Universe – verifying by name, NAICS, contact name, address, phone, and other identifying information, Known Universe establishments are removed from the private, state, and federal government sampling universes.
- Establish Quotas – State-level quotas are established by multiplying the total number of proposed survey completions per state by the percentage established in “Establishments by State” above, and by the percentage established in “NAICS Establishments by Size” above.

Union Methodology Update

A new feature of this year's USEER includes a methodology revision for union membership and union coverage rates. These data have been revised due to feedback from industry and concerns over both non-response bias and questions of what counts as union coverage, notably whether project labor agreements should be considered. As a result, the data on union membership are not comparable to previous USEERs. The updated methodology includes Current Population Statistics (CPS), CIC-NAICS crosswalks, and data from the Bureau of Labor Statistics (BLS), in addition to USEER survey data. Union membership is weighted by NAICS codes within each detailed technology and summed within each category to calculate final detailed technology union membership and coverage rates.

The question on union coverage was expanded from "Thinking of your energy employees, how many are represented by unions?" to "Thinking of your energy employees, how many are represented by unions, collective bargaining agreements, and/or project labor agreements?" for clarity.

Workers are counted as covered if they are a member of a labor union or of an employee association similar to a union or subject to a project labor agreement. Workers are counted as covered by a collective bargaining agreement if they are union members or if they are not members but say they are covered by a union contract." Definitions are from Barry T. Hirsch and David A. Macpherson, "Union Membership and Coverage Database from the Current Population Survey: Note," Industrial and Labor Relations Review, 56, no. 2 (January 2003): 349-54, http://unionstats.gsu.edu/UnionStats.pdf.

Appendix D: Union Methodology

Introduction

The Department of Energy requested unionization rate estimates to be created as part of its contract with BW Research Partnership to conduct research and analysis to develop the 2021 United States Energy and Employment Report (USEER). BW Research developed a comprehensive approach relying on multiple datasets to produce accurate and reliable estimates. This memorandum outlines the technical derivation of these estimates under the Unionization Methodology section, and explores results from alternative methodological approaches, using Solar Electric Power Generation and Coal Fuels unionization as examples. The alternate approaches result in largely similar results for unionization in these sectors.

Unionization Methodology

Workers are counted as union members if they are a member of a labor union or of an employee association similar to a union or subject to a project labor agreement. Workers are counted as covered by a collective bargaining agreement if they are union members or if they are not members but say they are covered by a union contract or if they are covered by a project labor agreement. This differs from previous reports where respondents were simply asked how many of their employees are represented by unions.[39]

The unionization rate extrapolation process relies on two datasets to calculate union membership and coverage rates: the USEER survey and Unionstats.com, which derives its data from the Bureau of Labor Statistics (BLS) Current Population Survey (CPS). To account for variations in unionization within between industries, BW Research uses union rates by industry from the USEER survey and Unionstats.com weighted by industry employment within each subtechnology. To account for variations based on geographic employment trends, BW Research uses state level Unionstats data weighted by state subtechnology employment.

BW Research Partnership did not rely on Unionstats data because it uses BLS data, the same source organization that is used in the USEER employment extrapolations. The methodology behind the BLS CPS union data is consistent across categories like geography and industry, and the data produced is reliable. By using the CPS outgoing rotation group monthly files, Unionstats uses the same methodology and definitions of unionization as BLS and provides estimates with greater granularity than BLS.

BW Research used the Final Unionization approach outlined below to account for the limitations in both primary and secondary data. The USEER survey data is limited by non-response bias and low sample size for union employment. The Unionstats data is limited because the data is not energy-specific and the industries reported are not sufficiently granular. However, the approach used for the USEER makes use of available data in a way that acknowledges data limitations and attempts to account for the different factors impacting union rates. Below is a step-by-step outline of the process in full, using Solar Electric Power Generation and Coal Fuels as examples

Step 1: USEER Survey Data Analysis

Analyze raw USEER survey response union data and weight by industry. The resulting industry weighted union rates for solar electricity and Coal Fuels are listed below.

[39] Previously respondents were asked, "Thinking of your energy employees, how many are represented by unions?" This was updated to "Thinking of your energy employees, how many are represented by unions, collective bargaining agreements, and/or project labor agreements?"

Table 52. Raw Survey Responses for Solar Electric Power Generation and Coal Fuels

Solar Electricity Industry Weighted	7.4%
Coal Fuel Industry Weighted	2.7%

Step 2: Unionstats Data Analysis

Use Unionstats industry union data (derived from BLS CPS) at national level

1. CIC to NAICS code crosswalk is found in the table below.

2. The Unionstats manufacturing rate is a sum of employment, membership, and covered data from durable and nondurable goods manufacturing.[40]

Table 53. Unionstats Union Membership and Coverage by NAICS and CIC Code

CIC	NAICS	Unionstats Membership	Unionstats Coverage
0380	2121	11.3%	11.6%
0570	2211	24.5%	25.8%
0770	23	13.4%	14.2%
1070-3990	32-33	8.5%	9.3%
4070-4590	42-45	4.2%	4.7%
see footnote	51-56	3.7%	4.5%
8770-9290	81	2.6%	3.2%
	Solar Emp Weighted	9.6%	10.3%
	Coal Fuel Emp Weighted	9.8%	10.2%

Step 3: Combine Datasets

Average the industry union rates from step 1 and 2 (weighted 50/50) to combine USEER survey data and Unionstats data. The resulting union membership and coverage rates for coal fuels and solar electricity are listed below. Note that due to the low responses to the unionization question and potential non-response bias among coal fuels employers, the research team used Unionstats coal mining unionization rate as a substitute in the coal fuel industry weighted union response data.

[40] All union figures in Appendix C are from the 2021 USEER and represent membership and coverage in 2020.

Table 54. USEER Union Membership and Coverage for Solar Electric Power Generation and Coal Fuels

	Union Membership	Union Coverage
Solar Electricity	8.5%	8.9%
Coal Fuels	10.0%	10.2%

Step 4: State Weighting

Create state level weighted average union rate to adjust for geographic differences in unionization. Take Unionstats private union rates by state and divide by the national private union rate. Then multiply by the overall technology union rate detailed in section 2. Multiply this final rate by USEER employment within each state, then sum the state unionization numbers and divide by nationwide employment to calculate the state weighted average union rates. Below are tables detailing the process for solar and coal fuels as examples.

Table 55. USEER Solar Electric Power Generation Union Data By State

State	Solar Employment	State Union Membership	State Union Coverage	Solar Union Membership Employment	Solar Union Coverage Employment
Alabama	854	8.2%	8.9%	70	76
Alaska	83	14.3%	15.4%	12	13
Arizona	9,043	4.6%	4.9%	413	445
Arkansas	413	5.5%	5.9%	23	24
California	113,005	14.6%	15.8%	16,510	17,813
Colorado	7,719	7.6%	8.2%	587	634
Connecticut	2,645	13.1%	14.1%	346	373
Delaware	564	6.8%	7.4%	39	42
D.C.	1,431	7.2%	7.7%	102	110
Florida	11,271	5.5%	5.9%	618	666
Georgia	6,923	4.6%	4.9%	316	341
Hawaii	4,018	20.2%	21.8%	813	877
Idaho	693	5.3%	5.7%	37	40
Illinois	5,526	12.9%	14.0%	715	771
Indiana	3,612	8.8%	9.5%	319	344
Iowa	896	5.8%	6.2%	52	56

Kansas	951	9.7%	10.5%	93	100
Kentucky	1,566	9.9%	10.7%	155	167
Louisiana	3,478	5.8%	6.2%	201	217
Maine	727	9.7%	10.5%	71	76
Maryland	6,104	9.6%	10.3%	585	631
Massachusetts	15,096	9.7%	10.5%	1,470	1,586
Michigan	4,555	16.9%	18.2%	769	830
Minnesota	4,442	11.4%	12.3%	507	547
Mississippi	1,141	7.9%	8.5%	90	97
Missouri	2,872	9.7%	10.5%	280	302
Montana	293	8.5%	9.2%	25	27
Nebraska	1,733	7.0%	7.6%	121	131
Nevada	8,722	14.6%	15.8%	1,274	1,375
New Hampshire	1,393	6.5%	7.1%	91	98
New Jersey	7,907	12.6%	13.6%	999	1,078
New Mexico	3,073	5.5%	5.9%	168	182
New York	12,314	19.2%	20.7%	2,361	2,548
North Carolina	8,068	2.7%	3.0%	221	238
North Dakota	229	5.5%	5.9%	13	14
Ohio	7,647	10.8%	11.7%	826	892
Oklahoma	1,160	5.8%	6.2%	67	72
Oregon	5,265	13.5%	14.6%	713	769
Pennsylvania	5,158	12.5%	13.5%	644	694
Rhode Island	1,391	15.1%	16.3%	210	226
South Carolina	3,530	2.9%	3.1%	102	110
South Dakota	605	4.1%	4.4%	25	27
Tennessee	4,540	4.3%	4.6%	193	209
Texas	11,782	4.1%	4.4%	484	522
Utah	7,033	2.7%	3.0%	193	208

Vermont	1,701	8.4%	9.0%	142	154
Virginia	4,444	3.0%	3.3%	135	146
Washington	4,688	15.7%	16.9%	735	793
West Virginia	431	11.1%	12.0%	48	52
Wisconsin	3,768	9.9%	10.7%	373	402
Wyoming	174	7.8%	8.4%	13	15
Total Solar State Weighted	316,675	11.2%	12.1%	35,370	38,161

Table 56. Coal fuels Union Data By State

State	Coal Fuels Employment	State Union Membership	State Union Coverage	Coal Union Membership Employment	Coal Union Coverage Employment
Alabama	2,978	8.4%	8.4%	250	250
Alaska	188	14.6%	15.1%	27	28
Arizona	423	4.7%	5.0%	20	21
Arkansas	101	5.6%	6.5%	6	7
California	1,774	14.9%	15.1%	265	267
Colorado	1,568	7.8%	7.5%	122	118
Connecticut	211	13.4%	13.9%	28	29
Delaware	58	7.0%	7.0%	4	4
D.C.	178	7.3%	7.1%	13	13
Florida	1,059	5.6%	6.4%	59	68
Georgia	455	4.7%	6.1%	21	28
Hawaii	48	20.7%	20.9%	10	10
Idaho	71	5.4%	5.7%	4	4
Illinois	2,728	13.2%	12.9%	361	353
Indiana	2,100	9.0%	9.2%	189	194
Iowa	135	5.9%	6.5%	8	9
Kansas	165	10.0%	11.7%	16	19
Kentucky	5,687	10.1%	11.7%	575	663

Louisiana	557	5.9%	6.3%	33	35
Maine	81	10.0%	9.7%	8	8
Maryland	666	9.8%	9.8%	65	65
Massachusetts	489	10.0%	10.2%	49	50
Michigan	500	17.3%	17.3%	86	87
Minnesota	262	11.7%	11.7%	31	31
Mississippi	326	8.1%	8.7%	26	28
Missouri	380	10.0%	9.7%	38	37
Montana	1,176	8.7%	8.8%	102	104
Nebraska	92	7.2%	7.1%	7	7
Nevada	119	14.9%	15.1%	18	18
New Hampshire	83	6.7%	6.7%	6	6
New Jersey	431	12.9%	13.7%	56	59
New Mexico	902	5.6%	5.8%	51	53
New York	1,035	19.6%	19.9%	203	206
North Carolina	475	2.8%	3.6%	13	17
North Dakota	1,143	5.6%	6.3%	64	72
Ohio	1,452	11.0%	11.1%	160	161
Oklahoma	332	5.9%	6.3%	20	21
Oregon	166	13.8%	13.2%	23	22
Pennsylvania	5,224	12.8%	12.7%	666	661
Rhode Island	59	15.4%	15.5%	9	9
South Carolina	225	3.0%	3.4%	7	8
South Dakota	31	4.2%	4.8%	1	1
Tennessee	450	4.4%	4.8%	20	22
Texas	3,717	4.2%	4.8%	156	180
Utah	1,345	2.8%	4.4%	38	59
Vermont	39	8.6%	9.7%	3	4
Virginia	2,443	3.1%	3.7%	76	90

Washington	321	16.0%	15.5%	51	50
West Virginia	11,241	11.4%	11.1%	1,276	1,247
Wisconsin	278	10.1%	10.4%	28	29
Wyoming	4,470	7.9%	9.0%	355	400
Total Coal Fuels State Weighted	60,438	9.5%	9.8%	5,723	5,929

Step 5: Final Data Weighting

Take the simple average (weight 50/50) of the overall union rates from steps 3 and 4 in order to incorporate variance in both industrial unionization and geographic unionization. This calculates the final solar unionization rates, 10% union membership and 10% union coverage. This calculates the final coal fuels unionization rates, 10% union membership and 10% union coverage.

Alternative Approaches

This section details three alternative approaches to calculating the overall unionization rate of a subtechnology, using USEER survey data only (outlined in step 1 in the Methodology section above), using Unionstats industry data only (outlined in step 2 in the Methodology section above), and using Unionstats industry data incorporating the EIA & MSHA data for coal fuels.

USEER Industry-Weighted Survey Data Only

To calculate union rates using only USEER survey data, BW Research ran USEER survey responses by industry code and weights on the appropriate employment within those corresponding industries. This process is detailed in Step 1 of the above Methodology section, below are the resulting union rates using this technique. Please note that survey data for coal mining & extraction is not available because mining & extraction is not a response option in the USEER survey. Calculating union rates using this technique is ineffective because it relies on data that is subject to non-response bias and small sample sizes.

Table 57. USEER Industry-weighted Survey Union Data Only Results

	Union Rate
Solar Electricity	7%
Coal Fuels	3%

Unionstats Industry-Weighted Data Only

To calculate union rates using only Unionstats data, BW Research pulled 2020 industry level data from Unionstats.com and weights the data on the corresponding industry employment within each subtechnology. This technique is ineffective because the industry codes used for the available union data are not granular enough to properly map to energy industries at the precision that is required.

Table 58. Unionstats Industry-weighted Union Data Only Results

	Union Membership	Union Coverage
Solar Electricity	10%	10%
Coal Fuels	10%	10%

MSHA Data (Coal Only)

BW Research reviewed unionization data from the US Energy Information Administration (EIA) and the US Mine Safety and Health Administration (MSHA). The data is useful because it has mine-specific data but is also limited in a number of ways. First, the data are not new, with the most recent from 2019. Second, the data set only tells you the total number of employees at mines and whether the mine is unionized, not the rate of membership or coverage. Some unknown percentage of the workers at a unionized mine are not members of or covered by a union (management and professional staff, etc.). Finally, the data cover direct mine employees only, not others in coal fuels such as support staff, contractors, and others in the supply chain, which make up more than one-third of the coal fuels sector.

When analyzing active mines during 2019, 19.9% of all workers at coal mines work at a unionized mine. However, not all these workers are part of the union – management and other supporting workers would not be covered. After running a staffing pattern analysis, BW Research determined a high-end estimate of 88.6% of coal mine occupations could be covered by unions – these are extraction, construction, installation, production, and transportation workers. After applying this rate to the 19.9%, the final coal mining and extraction unionization rate is 17.6%. Since this rate only applies to the coal mining & extraction industry within coal fuels, and coal mining & extraction accounts for 70% of coal fuels employment, Unionstats industry rates are applied to the other industries, the process of which is detailed in previous sections. This results in a final high-end estimate for coal fuels union membership of 14% and union coverage rate of 14%.

U.S. DEPARTMENT OF
ENERGY

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June 2022

ENERGY EMPLOYMENT BY STATE 2022

UNITED STATES ENERGY & EMPLOYMENT REPORT

U.S. DEPARTMENT OF ENERGY

ENERGY.GOV/USEER

DEPARTMENT OF ENERGY
Secretary Jennifer M. Granholm

DEPARTMENT OF ENERGY OFFICE OF POLICY
OFFICE OF ENERGY JOBS

Preparation and Authorship

This report was prepared by the U.S Department of Energy's Office of Policy, Office of Energy Jobs.

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This underlying survey and data collection was funded by the U.S. Department of Energy under Award Number 89303021COP000001 to BW Research Partnership.

Table of Contents

About the 2022 United States Energy and Employment Report

The United States Energy and Employment Report (USEER) captures employment, workforce, industry, occupation, unionization, demographic, and hiring information by energy industry technology groups. These groups represent the fields of electric power generation; transmission, distribution, and storage; fuels; energy efficiency; and motor vehicles and component parts.

This state-level report is a companion to the national report, which is available at energy.gov/useer.

The data in these reports are based on a combination of data from the Bureau of Labor Statistics (BLS), U.S. Census Bureau, and surveys completed by about 33,000 employers in the energy sector. A job is counted when a company reports that an individual spends any of their time in the technology group.

The BLS employment data used in these reports considers anyone who is employed each month as a job regardless of whether they are part time or full time. Someone who works 20 hours per week for a year, then would be considered one job. Someone who works full time for six months would be considered half of a job.

Each technology contains sub-technologies that fit within the technology group. For example, solar electric power generation and wind power generation fit within the electric power generation group. Some technologies fit within multiple groups—for example, natural gas is both a fuel and an electric power generation technology.

The USEER includes employment information by industry within each technology. These industries are organized according to North American Industry Classification System (NAICS) codes.[1] NAICS codes are a standard way of organizing industrial activity in the United States, Mexico, and Canada. Each technology fits within multiple NAICS codes—portions of industry activity within most sectors are considered "energy" while other portions are not.[2] This split is determined by a survey of businesses, which can be found in Appendix A. There are exceptions: all employment in some NAICS industries such as coal extraction is considered energy and is included in the USEER. Appendix B contains definitions of each technology. The USEER Appendices can be found at energy.gov/useer.

The USEER was published in 2016, 2017, and 2021 by the U.S. Department of Energy (DOE) upon recommendation of the first 2015 installment of the Quadrennial Energy Review (QER), "to reform existing data collection systems to provide consistent and complete definitions and quantification of energy jobs across all sectors of the economy." The 2016, 2017, and 2021 reports can all be found at energy.gov/useer.

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1 More information about NAICS codes can be found at https://www.census.gov/naics/.

2 Employment within each industry prior to being split by energy and non-energy activity comes from the Bureau of Labor Statistics Quarterly Census of Employment and Wages (QCEW). More information about the QCEW can be found at https://www.bls.gov/cew/.

About the 2022 USEER State Report

The 2022 USEER was prepared by DOE, which contracted with BW Research Partnership (BWR) on survey collection and data processing. In recent years, the 2018 USEER, 2019 USEER, and 2020 USEER were prepared under a Memorandum of Understanding between the Energy Futures Initiative (EFI) and the National Association of State Energy Officials (NASEO) and a contract between EFI and BWR.

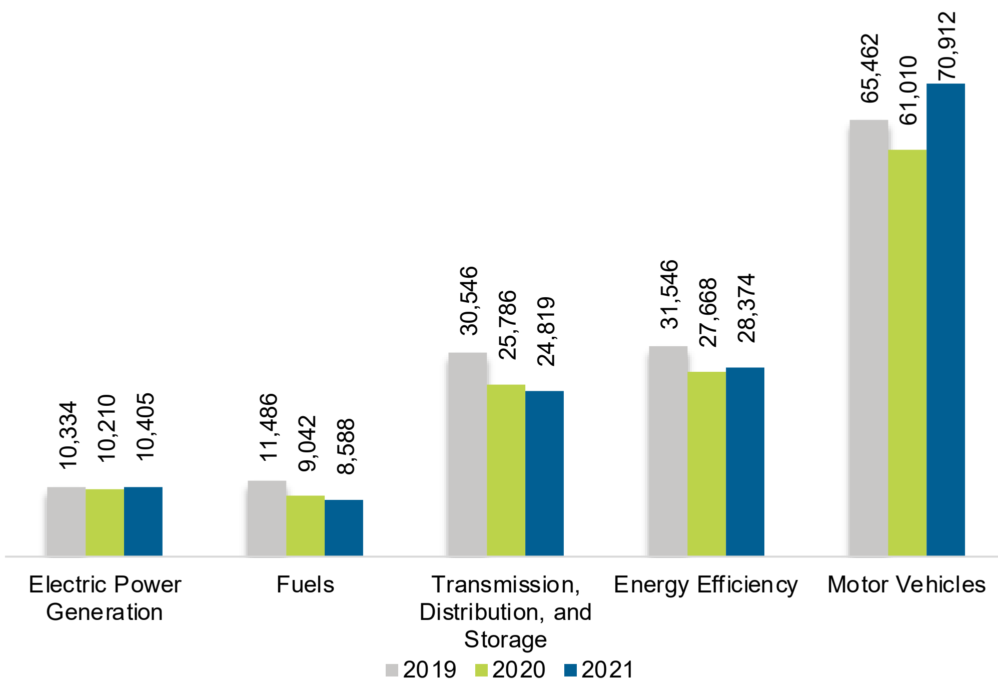
Alabama

ENERGY AND EMPLOYMENT — 2022

Overview

Alabama had 143,098 energy workers statewide in 2021, representing 1.8% of all U.S. energy jobs. Of these energy jobs, 10,405 are in electric power generation; 8,588 in fuels; 24,819 in transmission, distribution, and storage; 28,374 in energy efficiency; and 70,912 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 9,382 jobs, or 7%. The energy sector in Alabama represents 7.3% of total state employment.

Figure AL-1.
Employment by Major Energy Technology Application

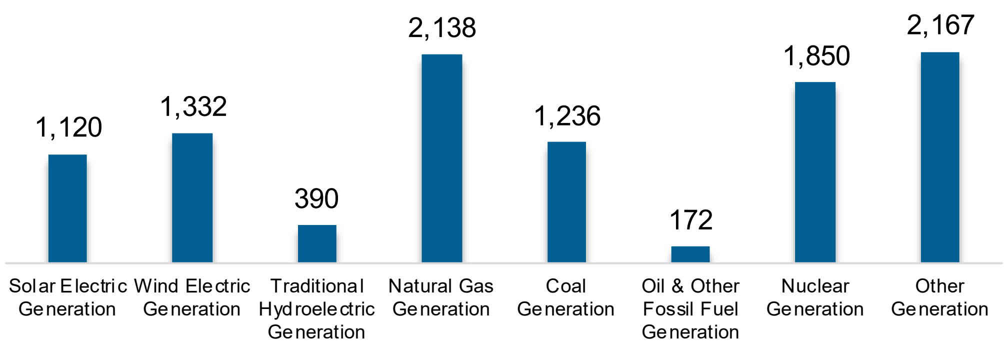


Breakdown by Technology Applications

Electric Power Generation

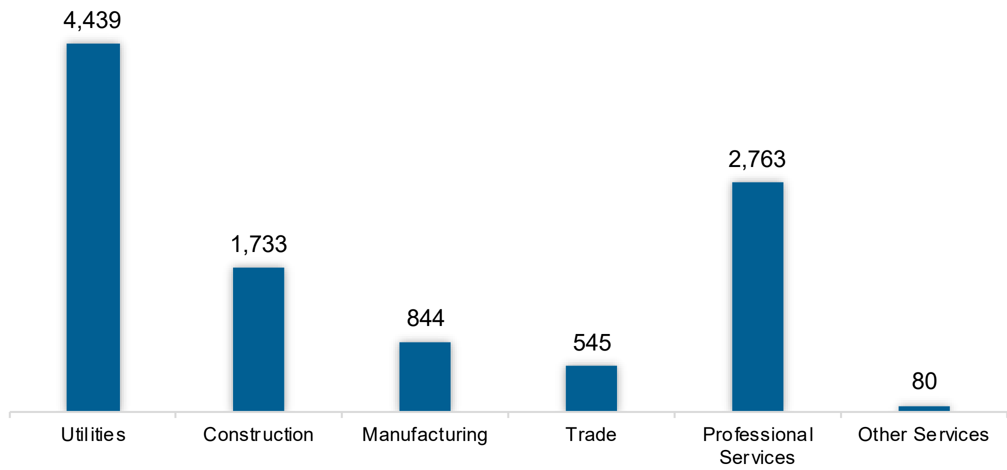
The electric power generation sector employed 10,405 workers in Alabama, 1.2% of the national electricity total, and added 196 jobs over the past year (1.9%).

Figure AL-2.
Electric Power Generation Employment by Detailed Technology Application



Utilities work represents the largest industry sector in the electric power generation sector, with 42.7% of jobs. Professional and business services is second largest with 26.6%.

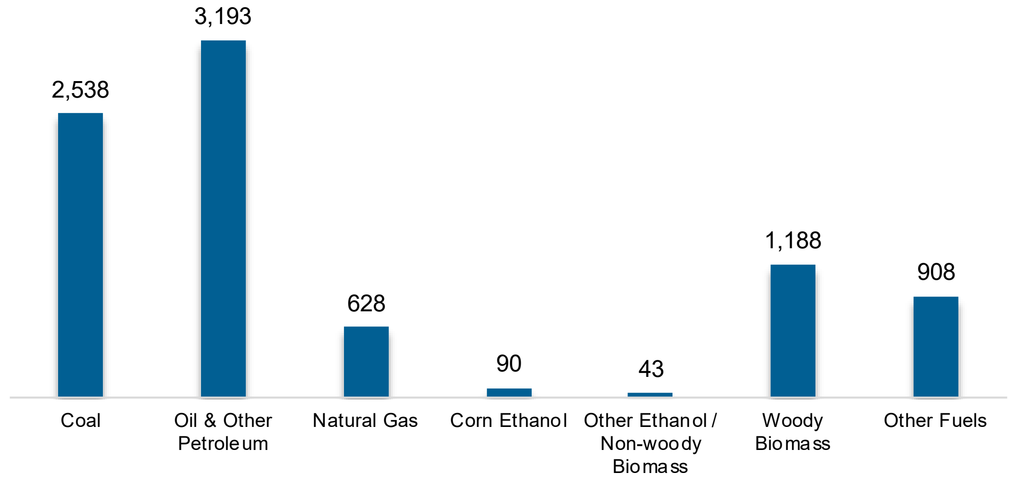
Figure AL-3.
Electric Power Generation Employment by Industry Sector



Fuels

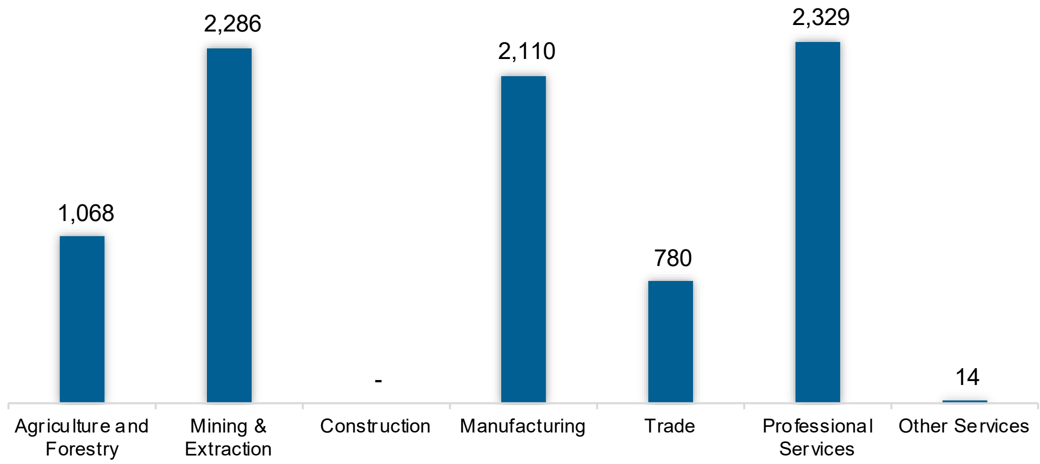
The fuel sector employed 8,588 workers in Alabama, 0.9% of the national total in fuels. The sector lost 453 jobs and decreased 5% in the past year.

Figure AL-4.
Fuels Employment by Detailed Technology Application



Professional and business services jobs represent 27.1% of fuel jobs in Alabama.

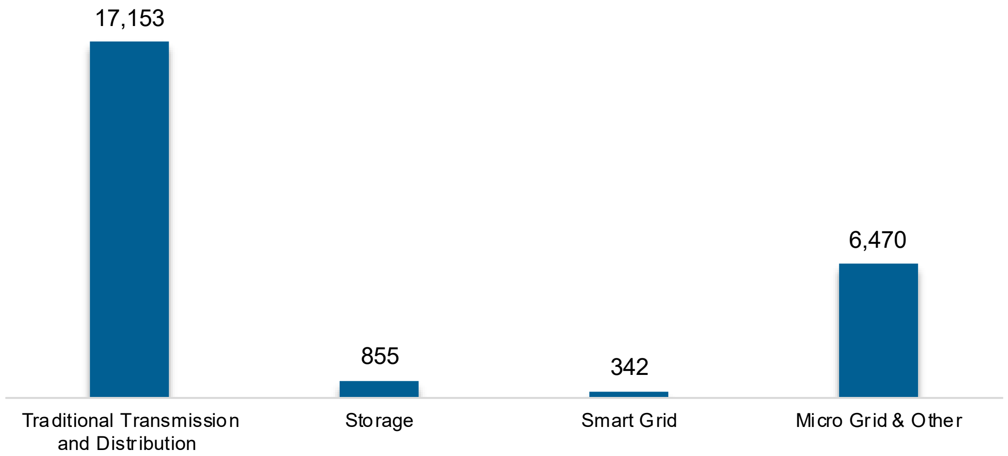
Figure AL-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

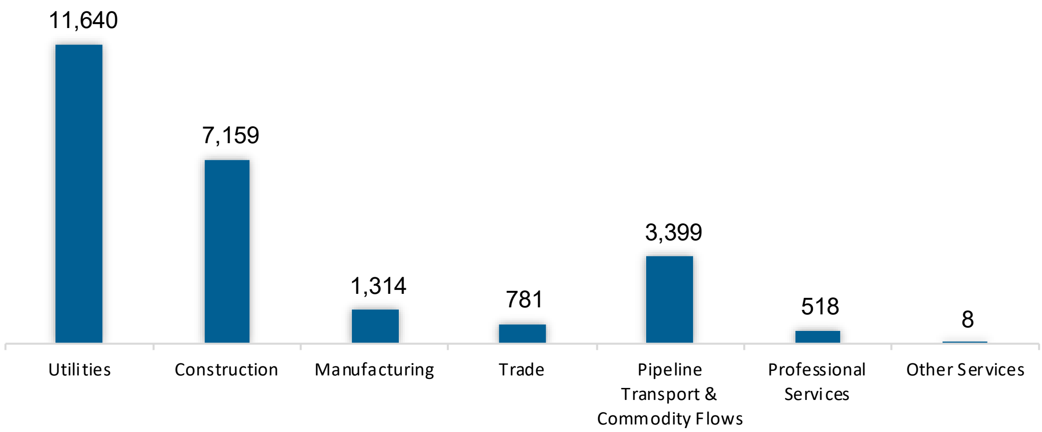
The transmission, distribution, and storage (TDS) sector employed 24,819 workers in Alabama, 0.9% of the national TDS total. The sector lost 967 jobs and decreased 3.8% in the past year.

Figure AL-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Alabama, accounting for 46.9% of the sector's jobs statewide.

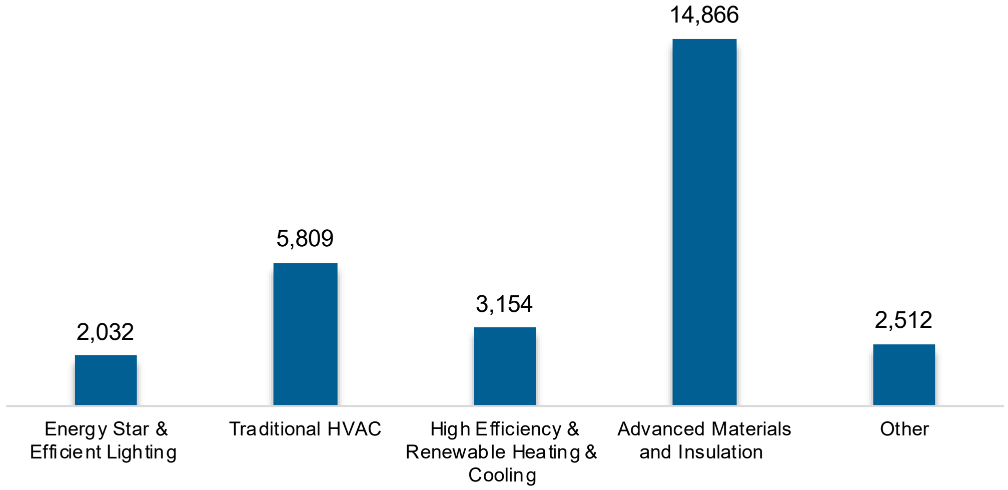
Figure AL-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

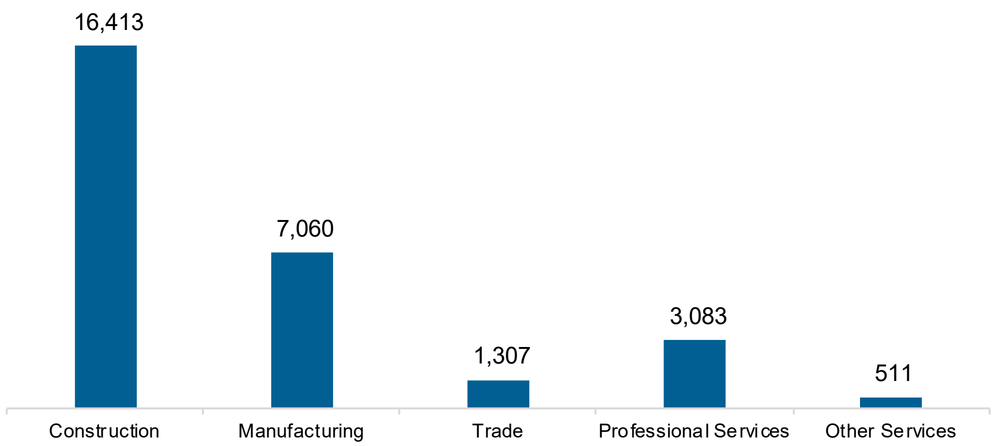
The energy efficiency (EE) sector employed 28,374 workers in Alabama, 1.3% of the national EE total. The EE sector added 706 jobs and increased 2.6% in the past year.

Figure AL-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

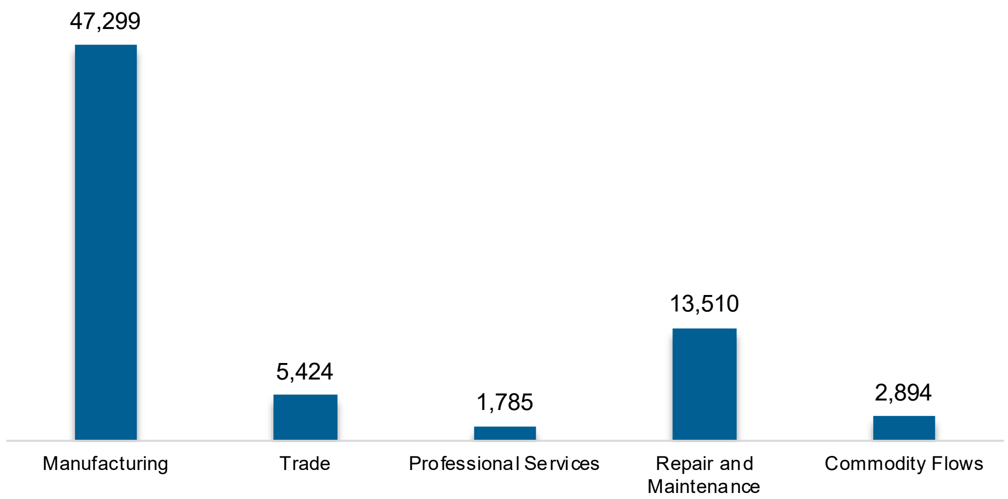
Figure AL-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 70,912 workers in Alabama, 2.8% of the national total for the sector. Motor vehicles and component parts added 9,901 jobs and increased 16.2% in the past year. Manufacturing work represents the largest proportion of motor vehicle jobs.

Figure AL-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Alabama are less optimistic than their peers across the country about energy sector job growth over the next year.

Table AL-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.9	2.2
Electric Power Transmission, Distribution, and Storage	1.4	1.1
Energy Efficiency	1.7	1.7
Fuels	2.3	3.0
Motor Vehicles	2.4	3.2

Hiring Difficulty

Employers in Alabama reported 50.4% overall hiring difficulty.

Table AL-2

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	23.6	26.8	8.6	41.1	50.4

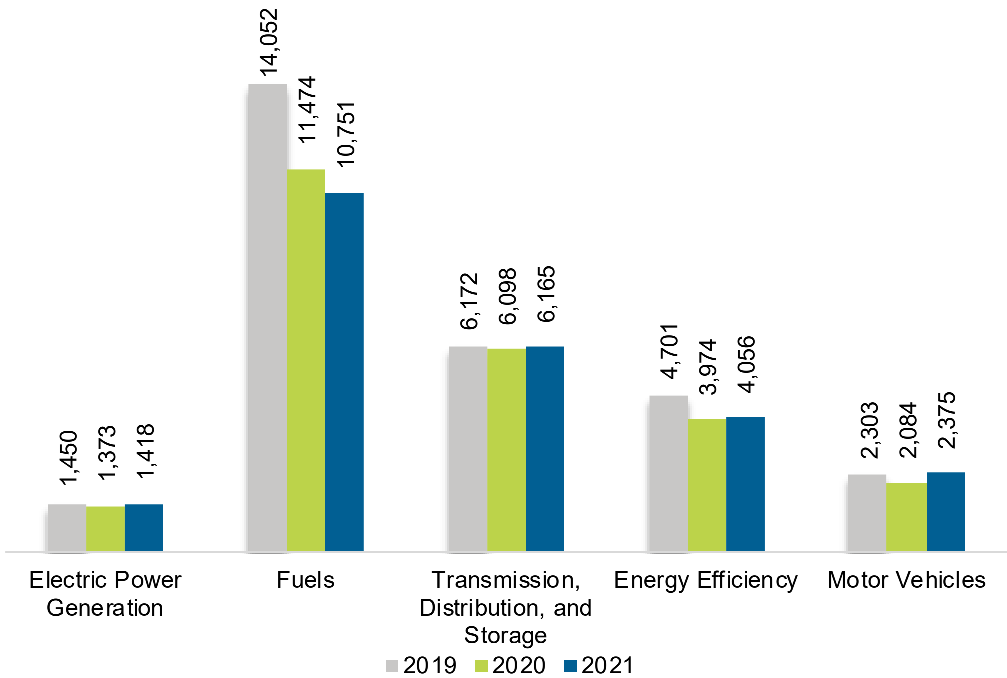
Alaska

ENERGY AND EMPLOYMENT — 2022

Overview

Alaska had 24,765 energy workers statewide in 2021, representing 0.3% of all U.S. energy jobs. Of these energy jobs, 1,418 are in electric power generation; 10,751 in fuels; 6,165 in transmission, distribution, and storage; 4,056 in energy efficiency; and 2,375 in motor vehicles. From 2020 to 2021, energy jobs in the state decreased by 238 jobs, or 1%. The energy sector in Alaska represents 8.1% of total state employment.

Figure AK-1.
Employment by Major Energy Technology Application

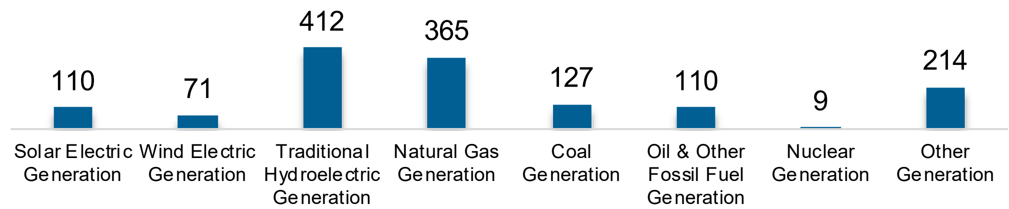


Breakdown by Technology Applications

Electric Power Generation

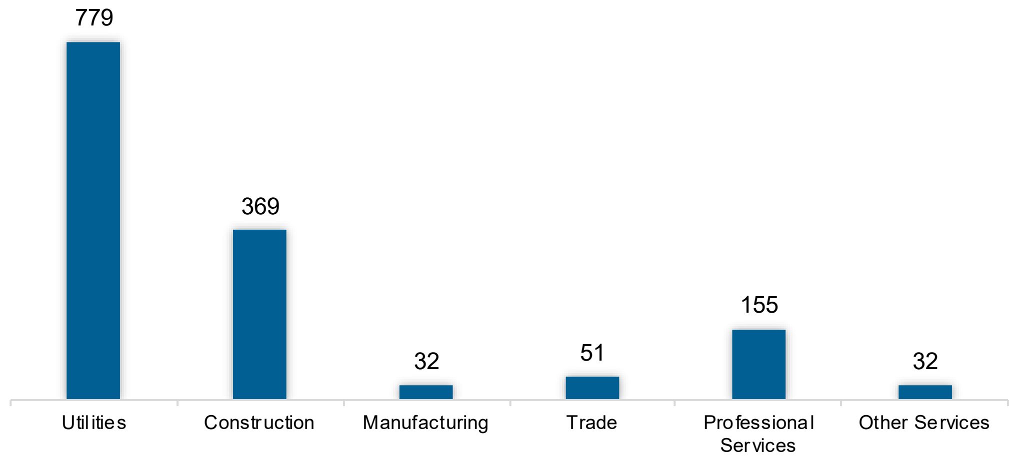
The electric power generation sector employed 1,418 workers in Alaska, 0.2% of the national electricity total, and added 45 jobs over the past year (3.3%).

Figure AK-2.
Electric Power Generation Employment by Detailed Technology Application



Utilities work represents the largest industry sector in the electric power generation sector, with 55% of jobs. Construction is second largest with 26%.

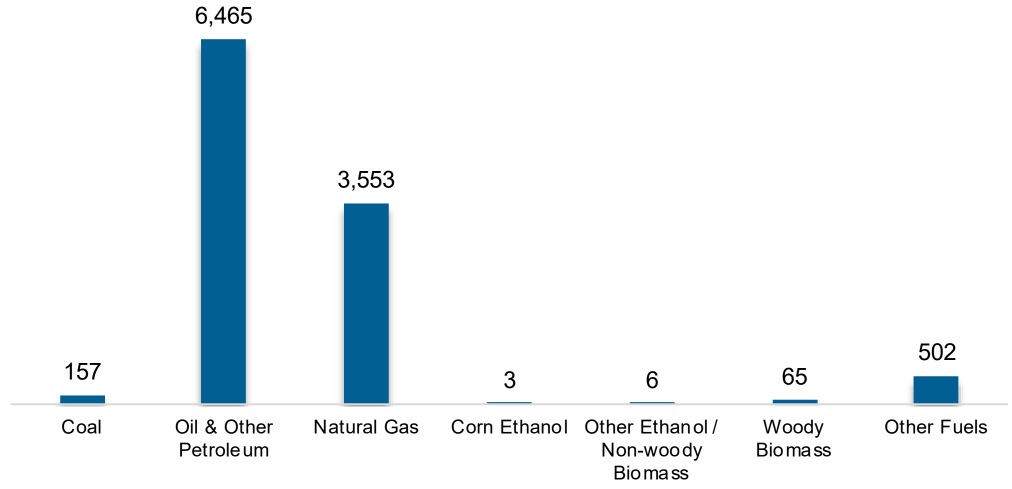
Figure AK-3.
Electric Power Generation Employment by Industry Sector



Fuels

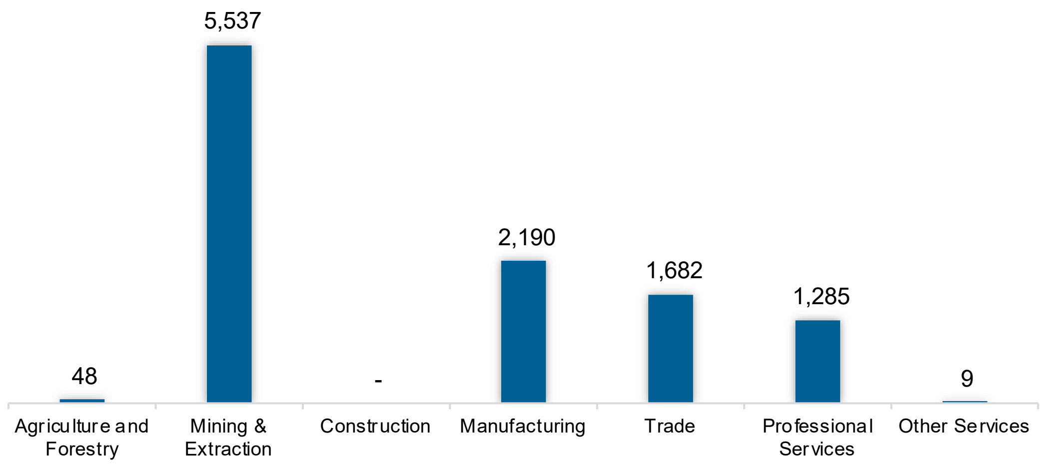
The Fuel sector employed 10,751 workers in Alaska, 1.2% of the national total in fuels. The sector lost 722 jobs and decreased 6.3% in the past year.

Figure AK-4.
Fuels Employment by Detailed Technology Application



Mining and extraction jobs represent 51.5% of fuel jobs in Alaska.

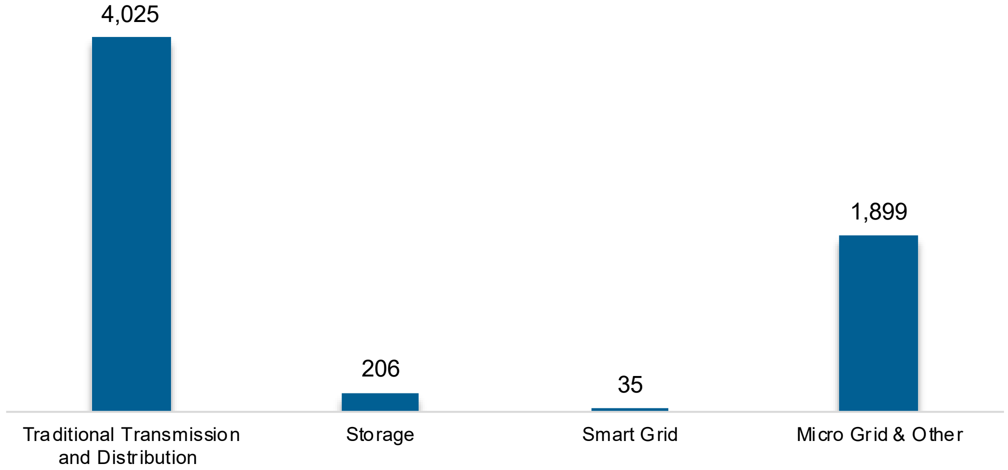
Figure AK-5.
Fuels Employment by Industry Sector



Transmission, Distribution, and Storage

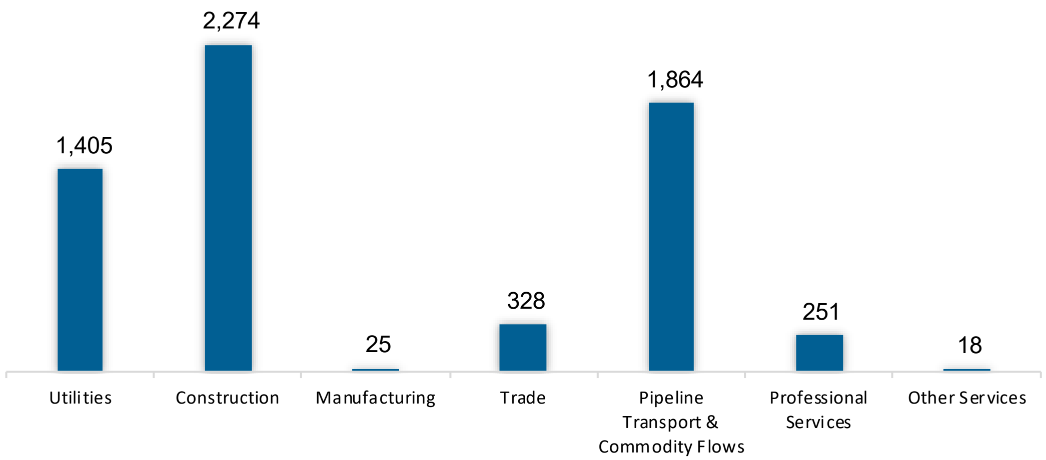
The transmission, distribution, and storage (TDS) sector employed 6,165 workers in Alaska, 1.2% of the national TDS total. The sector gained 67 jobs and increased 1.1% in the past year.

Figure AK-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in Alaska, accounting for 36.9% of the sector's jobs statewide.

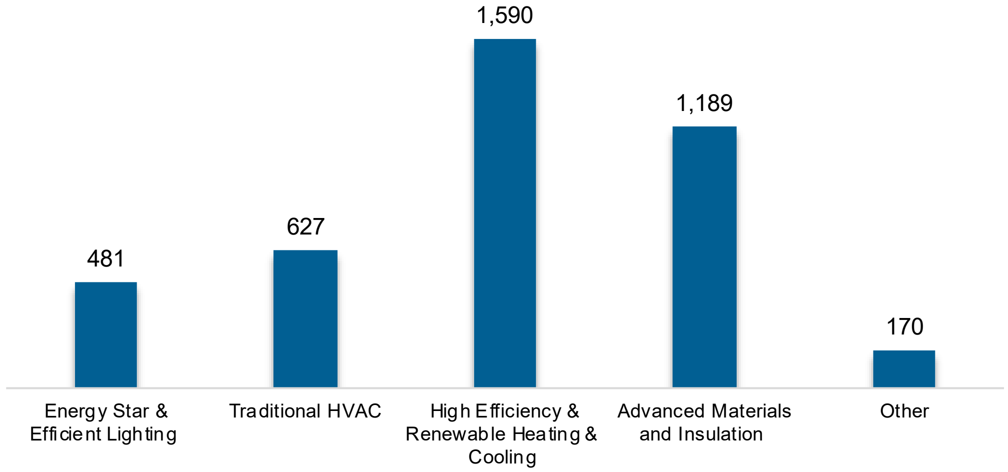
Figure AK-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

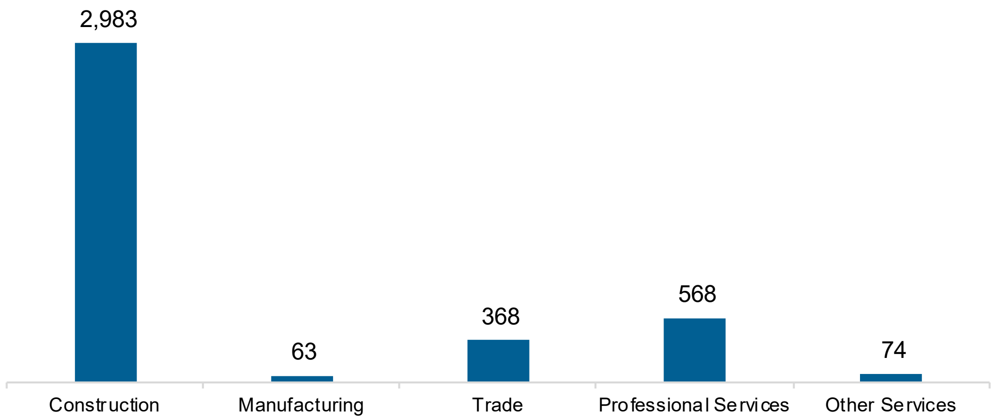
The energy efficiency (EE) sector employed 4,056 workers in Alaska, 0.2% of the national EE total. The EE sector added 82 jobs and increased 2.1% in the past year.

Figure AK-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

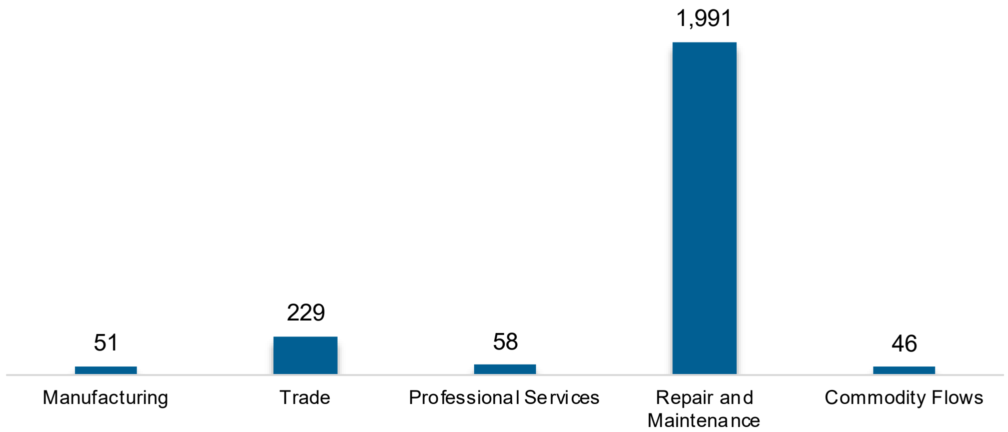
Figure AK-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 2,375 workers in Alaska, 0.1% of the national total for the sector. Motor vehicles and component parts added 291 jobs and increased 14% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure AK-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Alaska are less optimistic than their peers across the country about energy sector job growth over the next year.

Table AK-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	-1.2	2.2
Electric Power Transmission, Distribution, and Storage	-1.7	1.1
Energy Efficiency	-1.4	1.7
Fuels	-0.8	3.0
Motor Vehicles	-0.7	3.2

Hiring Difficulty

Employers in Alaska reported 56.1% overall hiring difficulty.

Table AK-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	26.5	29.6	7.6	36.3	56.1

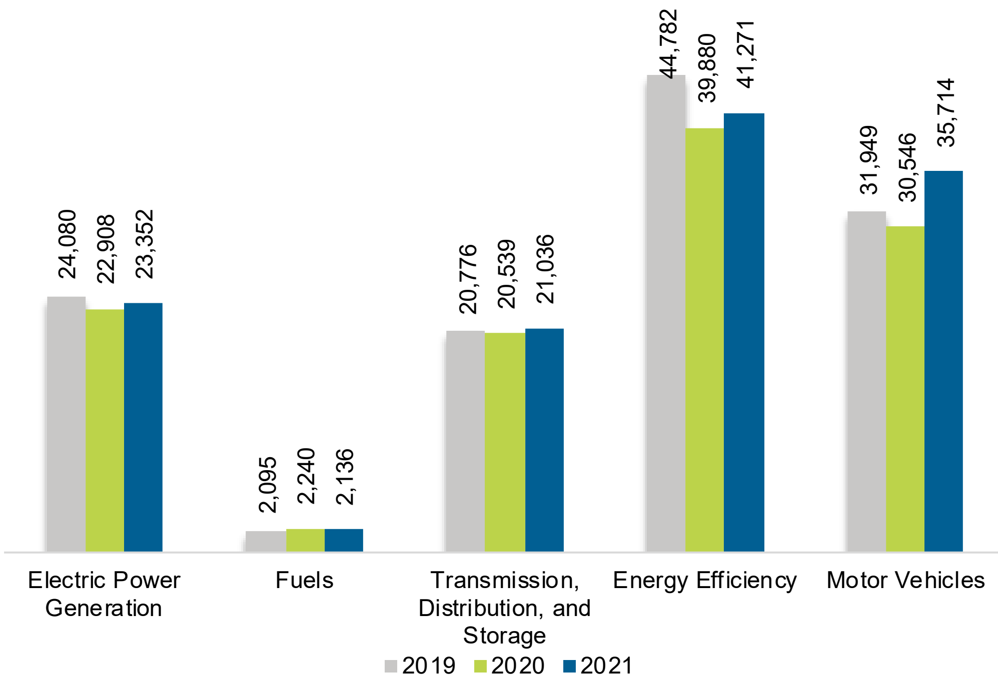
Arizona

ENERGY AND EMPLOYMENT — 2022

Overview

Arizona had 123,508 energy workers statewide in 2021, representing 1.6% of all U.S. energy jobs. Of these energy jobs, 23,352 are in electric power generation; 2,136 in fuels; 21,036 in transmission, distribution, and storage; 41,271 in energy efficiency; and 35,714 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 7,395 jobs, or 6.4%. The energy sector in Arizona represents 4.2% of total state employment.

Figure AZ-1.
Employment by Major Energy Technology Application

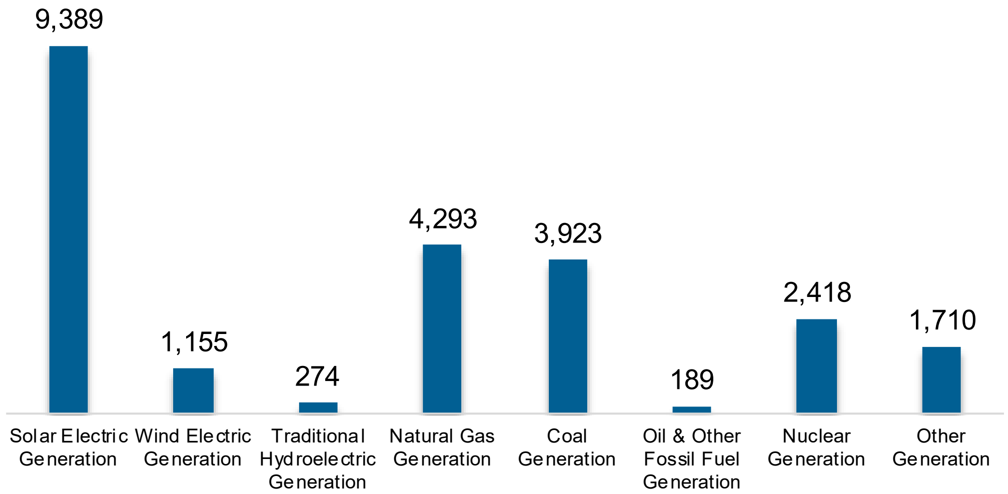


Breakdown by Technology Applications

Electric Power Generation

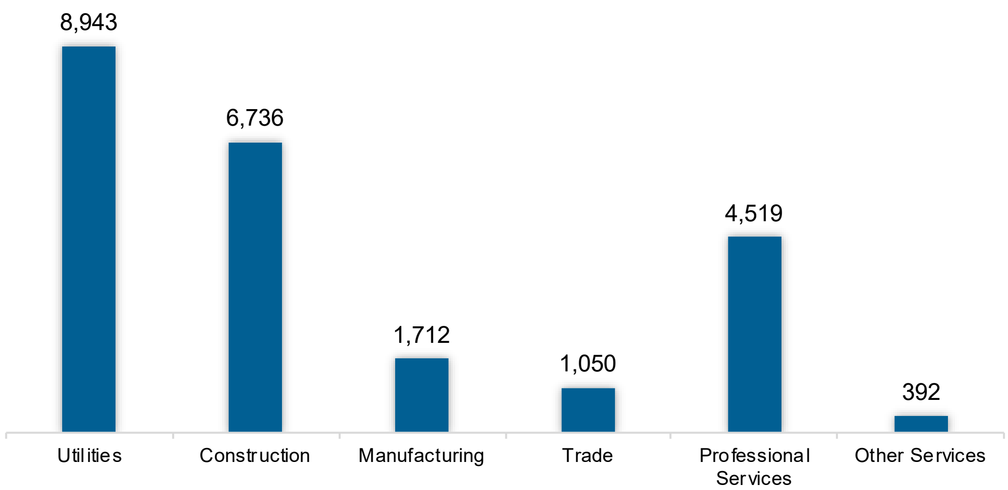
The electric power generation sector employed 23,352 workers in Arizona, 2.7% of the national electricity total, and added 445 jobs over the past year (1.9%).

Figure AZ-2.
Electric Power Generation Employment by Detailed Technology Application



Utilities work represents the largest industry sector in the electric power generation sector, with 38.3% of jobs. Construction is second largest with 28.8%.

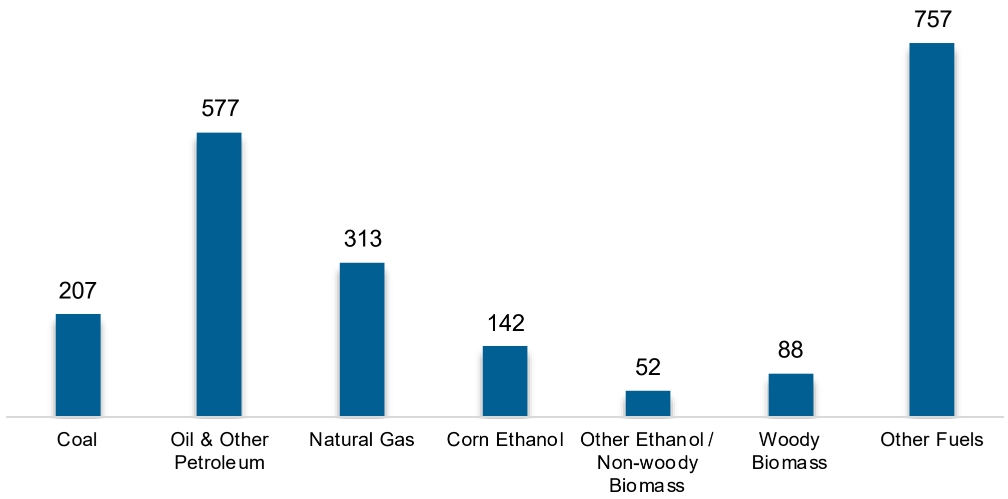
Figure AZ-3.
Electric Power Generation Employment by Industry Sector



Fuels

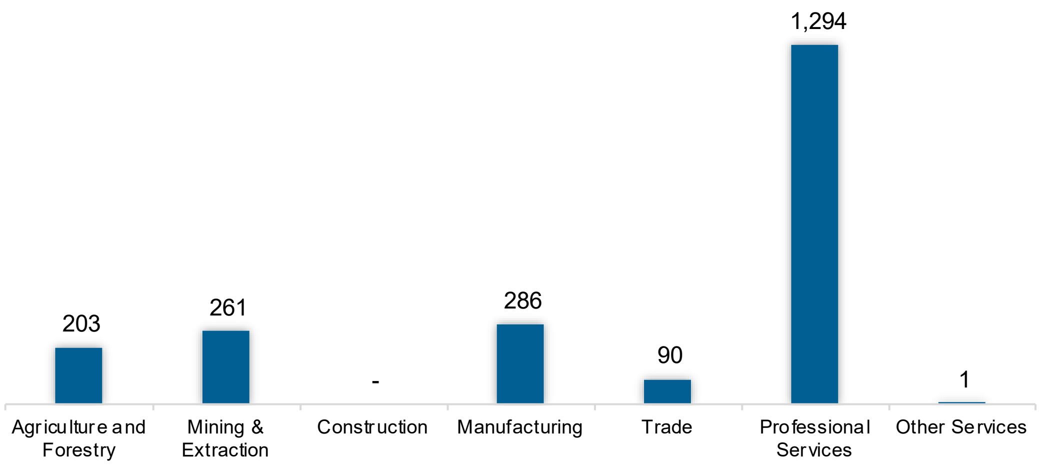
The fuel sector employed 2,136 workers in Arizona, 0.2% of the national total in fuels. The sector lost 105 jobs and decreased 4.7% in the past year.

Figure AZ-4.
Fuels Employment by Detailed Technology Application



Professional and business services jobs represent 60.6% of fuels jobs in Arizona.

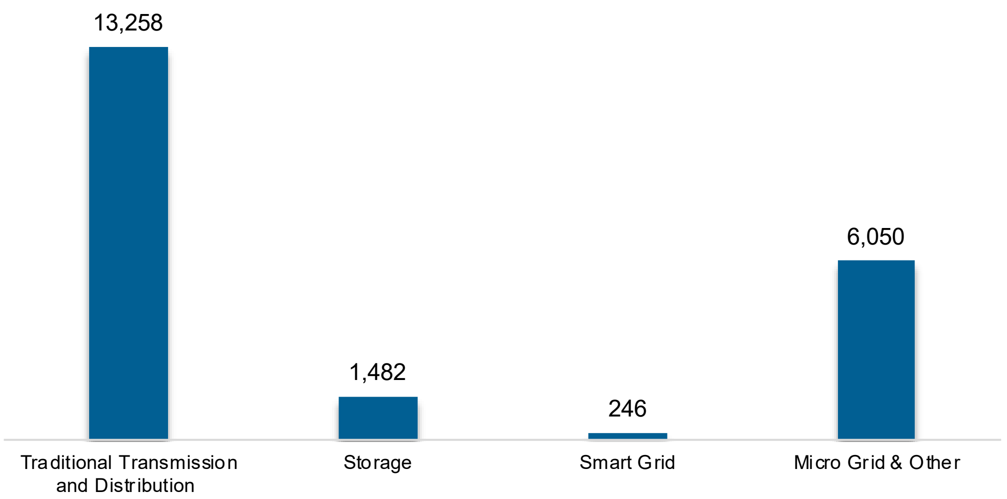
Figure AZ-5.
Fuels Employment by Industry Sector



Transmission, Distribution, and Storage

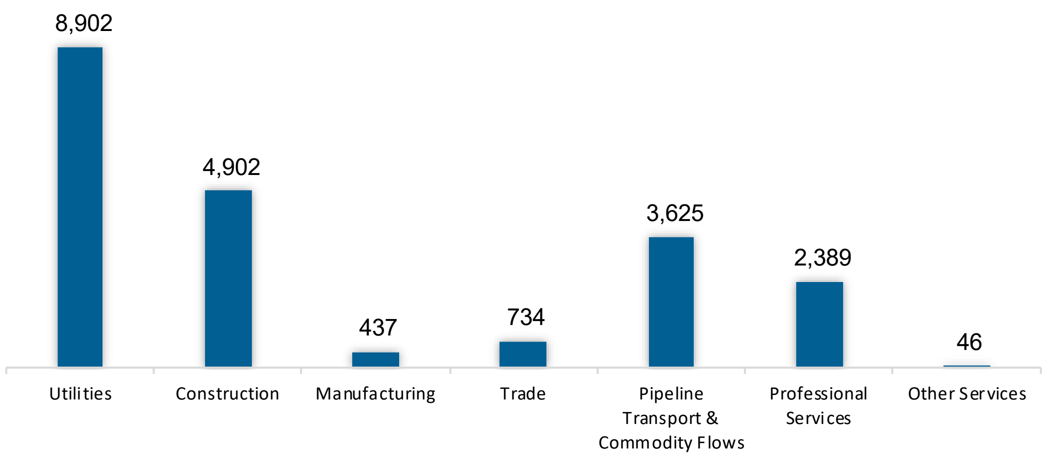
The transmission, distribution, and storage (TDS) sector employed 21,036 workers in Arizona, 0.2% of the national TDS total. The sector gained 496 jobs and increased 2.4% in the past year.

Figure AZ-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Arizona, accounting for 42.3% of the sector's jobs statewide.

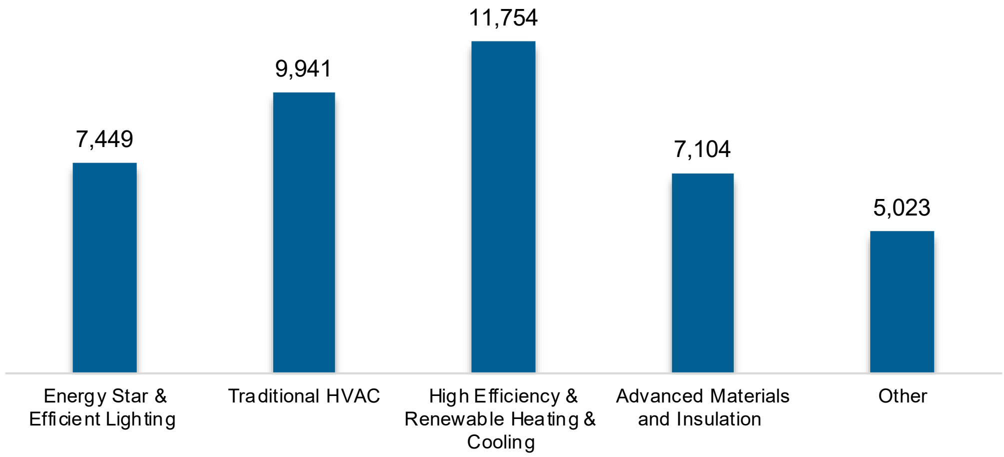
Figure AZ-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

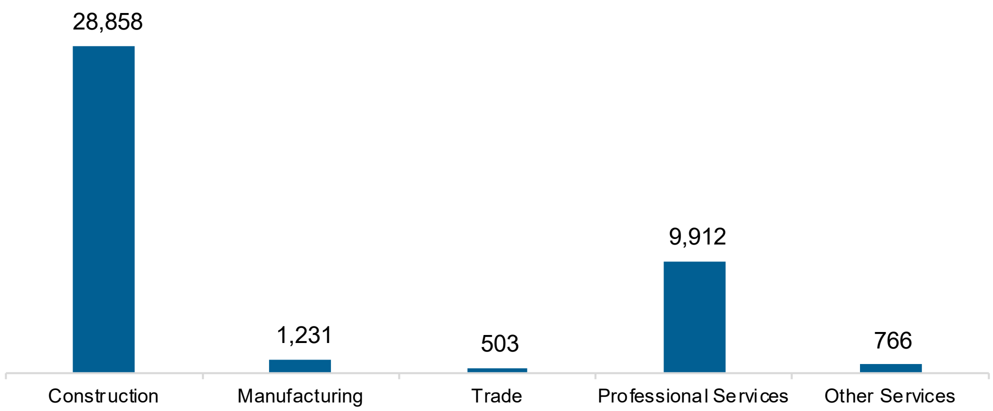
The energy efficiency (EE) sector employed 41,271 workers in Arizona, 1.9% of the national EE total. The EE sector added 1,390 jobs and increased 3.5% in the past year.

Figure AZ-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

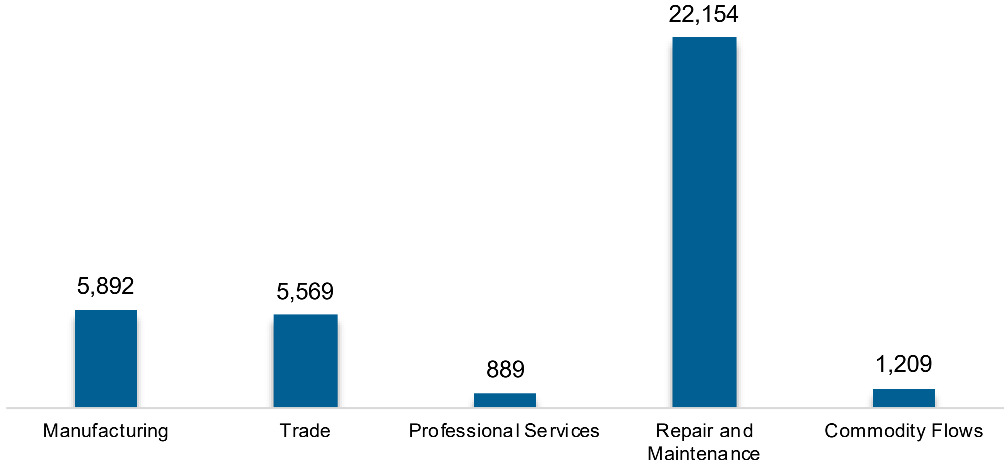
Figure AZ-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 35,714 workers in Arizona, 1.4% of the national total for the sector. Motor vehicles and component parts added 5,168 jobs and increased 16.9% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure AZ-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Arizona are less optimistic than their peers across the country about energy sector job growth over the next year.

Table AZ-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 1 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.6	2.2
Electric Power Transmission, Distribution, and Storage	1.1	1.1
Energy Efficiency	1.4	1.7
Fuels	2.0	3.0
Motor Vehicles	2.1	3.2

Hiring Difficulty

Employers in Arizona reported 58.8% overall hiring difficulty.

Table AZ-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	29.8	29.1	7.8	33.4	58.8

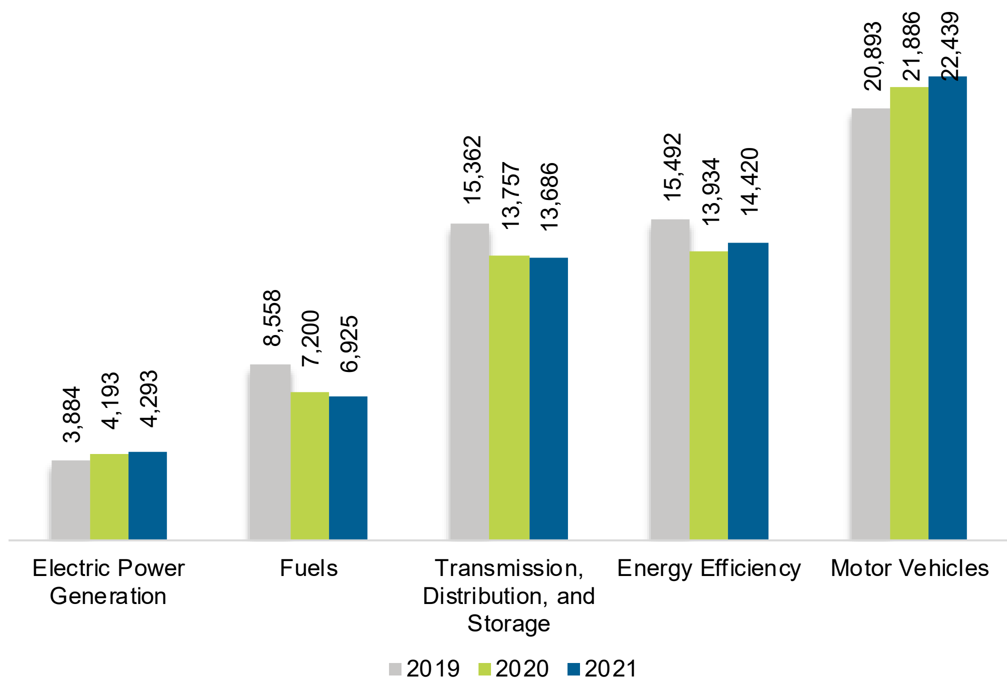
Arkansas

ENERGY AND EMPLOYMENT — 2022

Overview

Arkansas had 61,763 energy workers statewide in 2021, representing 0.8% of all U.S. energy jobs. Of these energy jobs, 4,293 are in electric power generation; 6,925 in fuels; 13,686 in transmission, distribution, and storage; 14,420 in energy efficiency; and 22,439 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 794 jobs, or 1.3%. The energy sector in Arkansas represents 5.1% of total state employment.

Figure AR-1.
Employment by Major Energy Technology Application

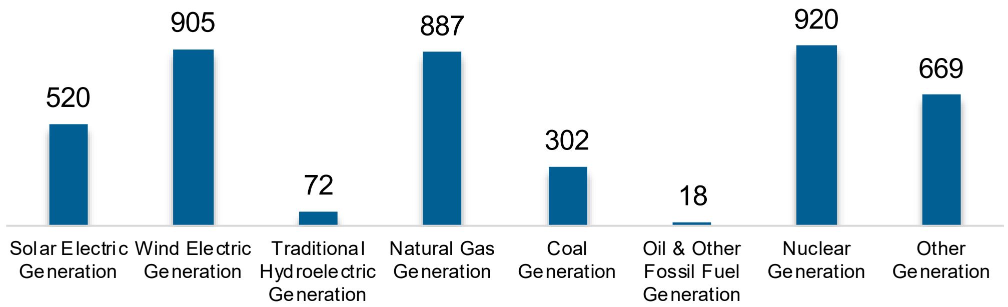


Breakdown by Technology Applications

Electric Power Generation

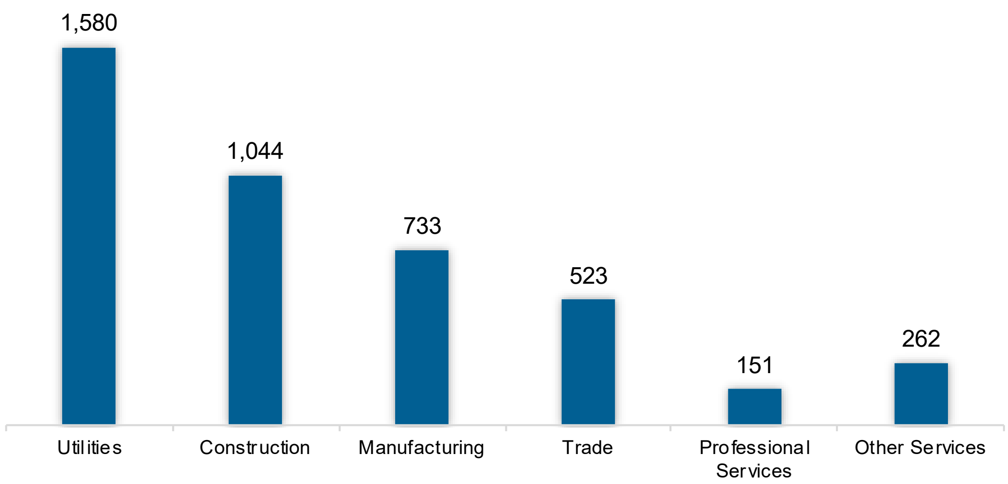
The electric power generation sector employed 4,293 workers in Arkansas, 0.5% of the national electricity total, and added 100 jobs over the past year (2.4%).

Figure AR-2.
Electric Power Generation Employment by Detailed Technology Application



Utilities work represents the largest industry sector in the electric power generation sector, with 36.8% of jobs. Construction is second largest with 24.3%.

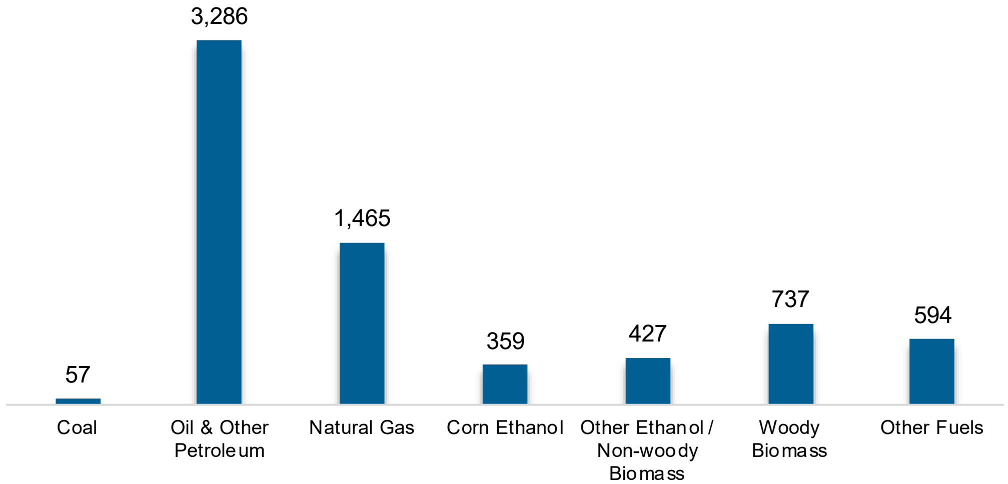
Figure AR-3.
Electric Power Generation Employment by Industry Sector



Fuels

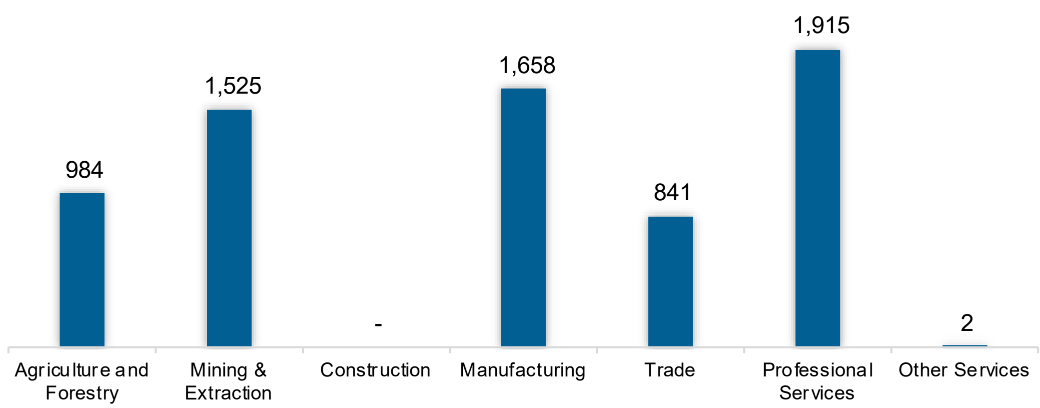
The fuel sector employed 6,925 workers in Arkansas, 0.8% of the national total in fuels. The sector lost 274 jobs and decreased 3.8% in the past year.

Figure AR-4.
Fuels Employment by Detailed Technology Application



Professional and business services jobs represent 27.7% of fuel jobs in Arkansas.

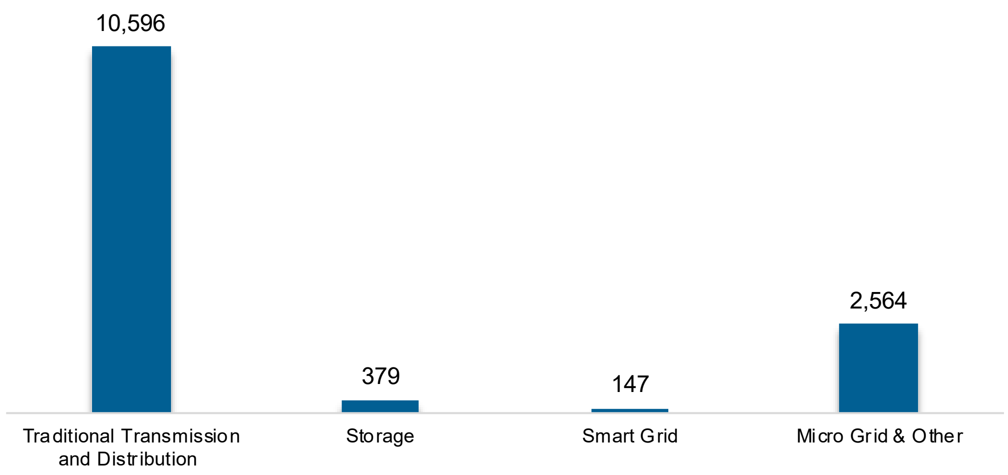
Figure AR-5.
Fuels Employment by Industry Sector



Transmission, Distribution, and Storage

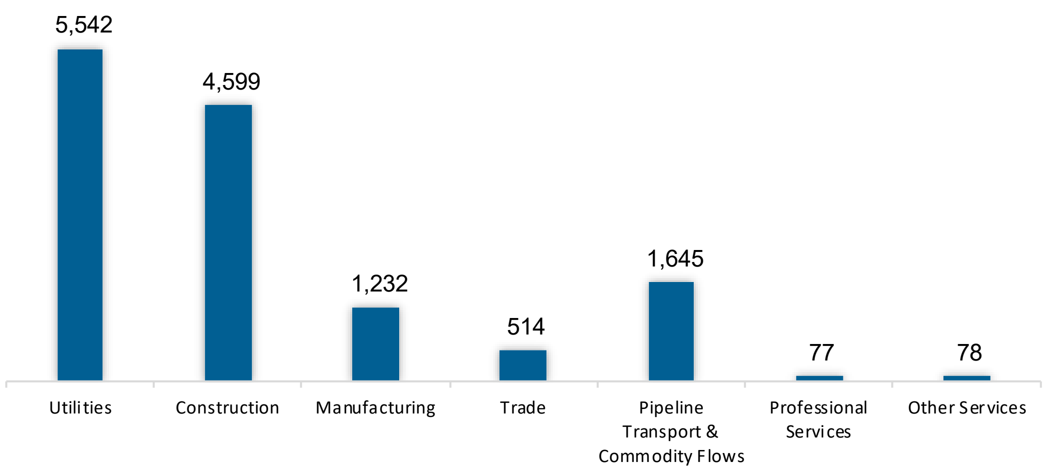
The transmission, distribution, and storage (TDS) sector employed 13,686 workers in Arkansas, 0.8% of the national TDS total. The sector lost 71 jobs and decreased 0.5% in the past year.

Figure AR-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Arkansas, accounting for 40.5% of the sector's jobs statewide.

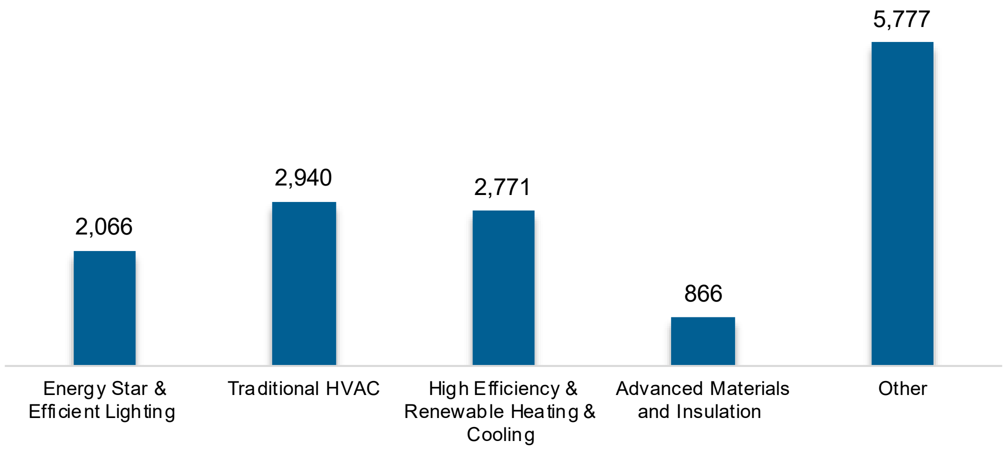
Figure AR-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

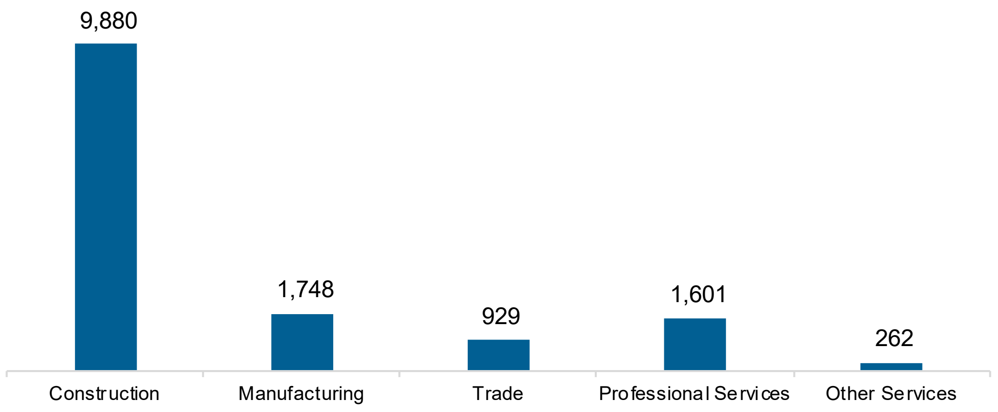
The energy efficiency (EE) sector employed 14,420 workers in Arkansas, 0.7% of the national EE total. The EE sector added 486 jobs and increased 3.5% in the past year.

Figure AR-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

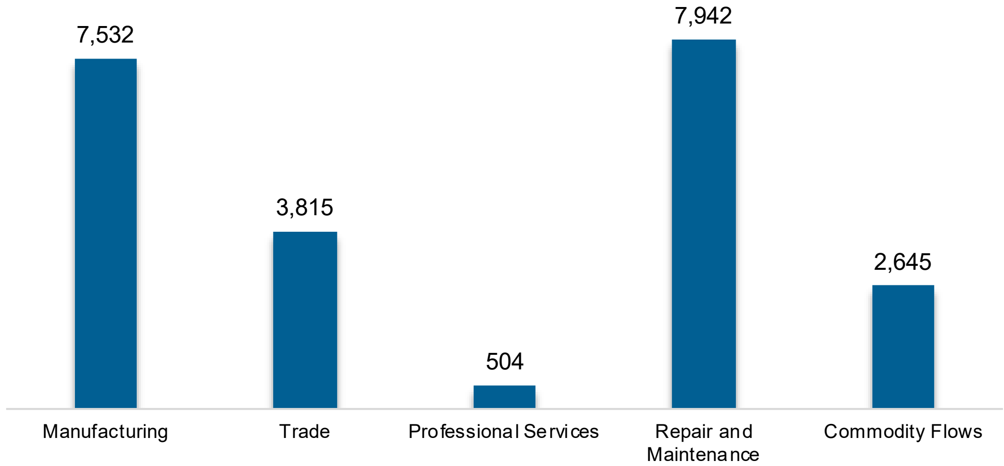
Figure AR-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 22,439 workers in Arkansas, 0.9% of the national total for the sector. Motor vehicles and component parts added 552 jobs and increased 2.5% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure AR-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Arkansas are less optimistic than their peers across the country about energy sector job growth over the next year.

Table AR-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.4	2.2
Electric Power Transmission, Distribution, and Storage	0.9	1.1
Energy Efficiency	1.2	1.7
Fuels	1.8	3.0
Motor Vehicles	1.9	3.2

Hiring Difficulty

Employers in Arkansas reported 52.2% overall hiring difficulty.

Table AR-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	20.0	32.2	8.3	39.5	52.2

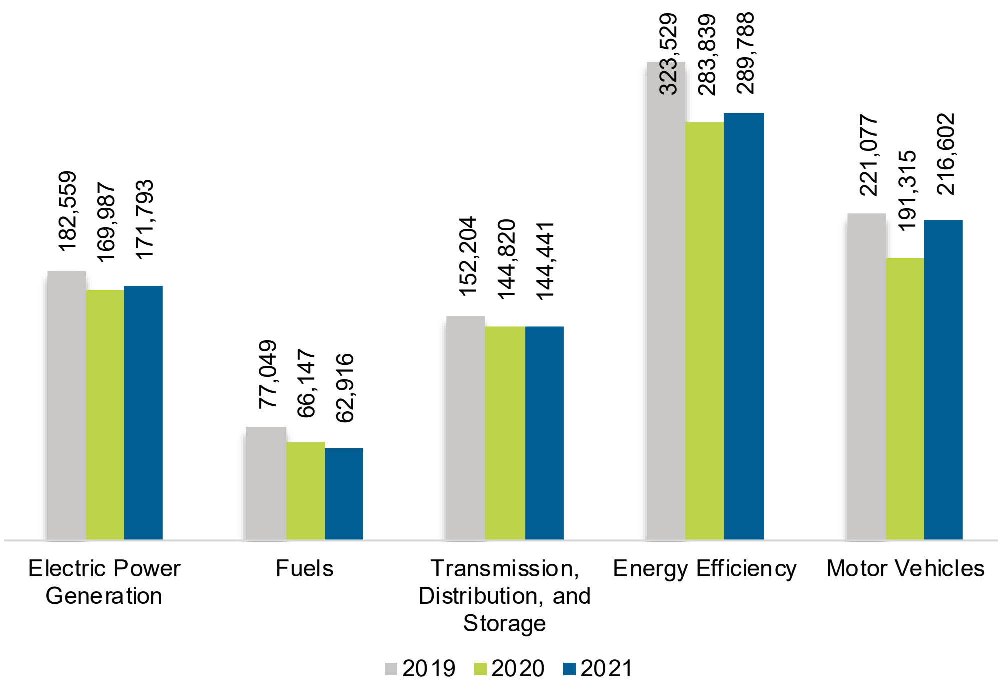
California

ENERGY AND EMPLOYMENT — 2022

Overview

California had 885,539 energy workers statewide in 2021, representing 11.3% of all U.S. energy jobs. Of these energy jobs, 171,793 are in electric power generation; 62,916 in fuels; 144,441 in transmission, distribution, and storage; 289,788 in energy efficiency; and 216,602 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 29,429 jobs, or 3.4%. The energy sector in California represents 5.2% of total state employment.

Figure CA-1.
Employment by Major Energy Technology Application

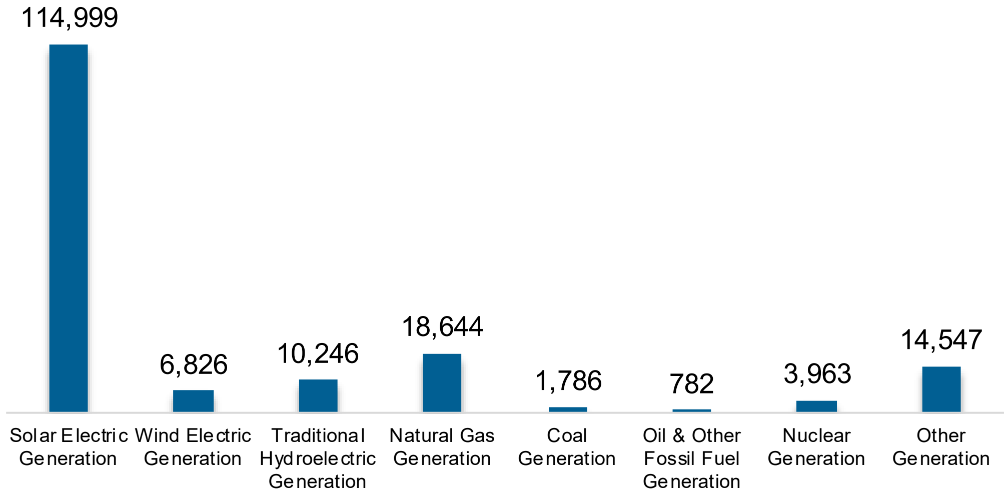


Breakdown by Technology Applications

Electric Power Generation

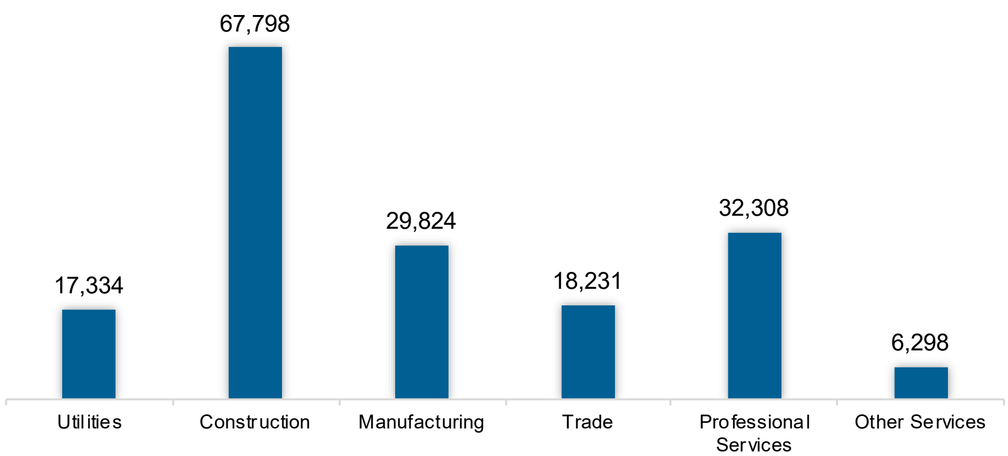
The electric power generation sector employed 171,793 workers in California, 20% of the national electricity total, and added 1,805 jobs over the past year (1.1%).

Figure CA-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 39.5% of jobs. Professional and business services is second largest with 18.8%.

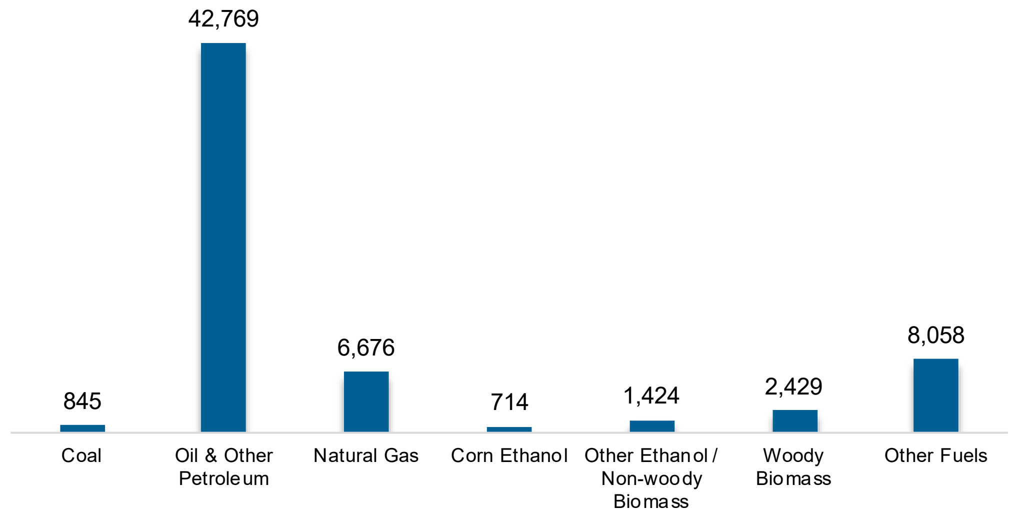
Figure CA-3.
Electric Power Generation Employment by Industry Sector



Fuels

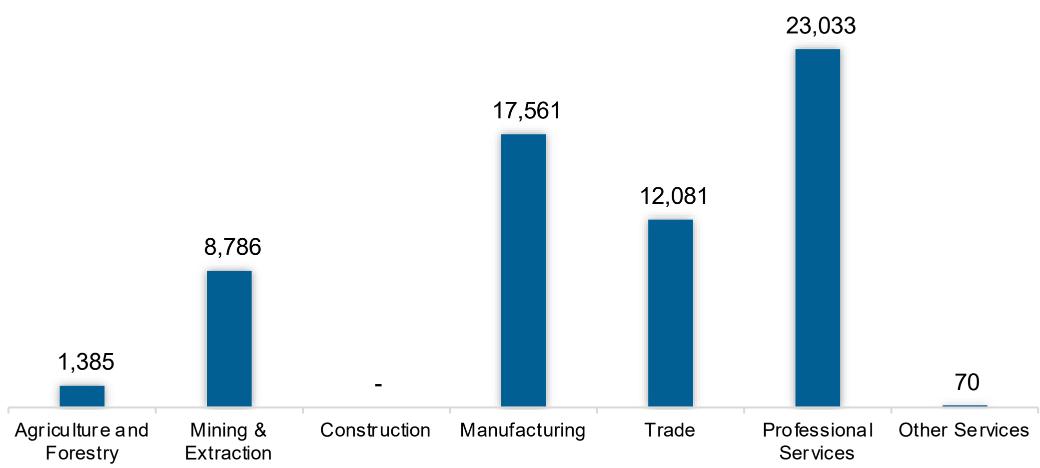
The fuel sector employed 62,916 workers in California, 6.9% of the national total in fuels. The sector lost 3,232 jobs and decreased 4.9% in the past year.

Figure CA-4.
Fuels Employment by Detailed Technology Application



Professional and business services jobs represent 36.6% of fuels jobs in California.

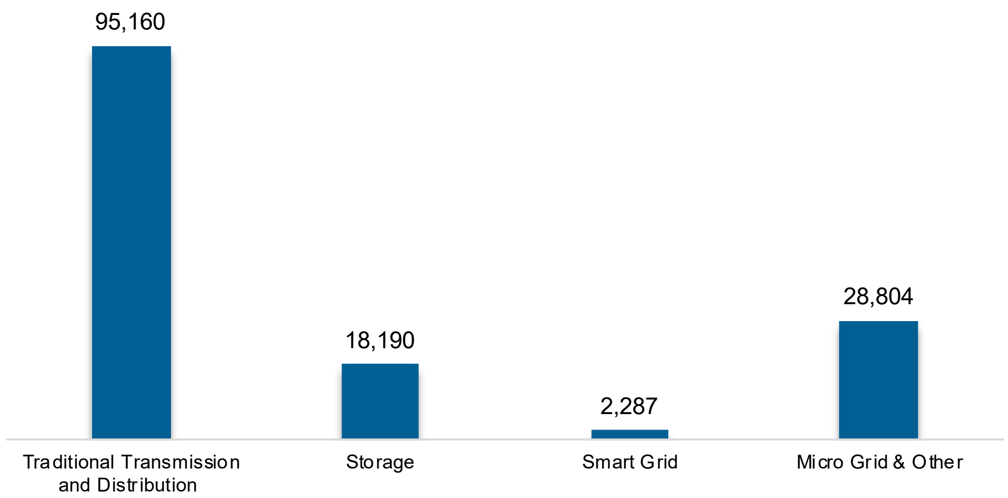
Figure CA-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

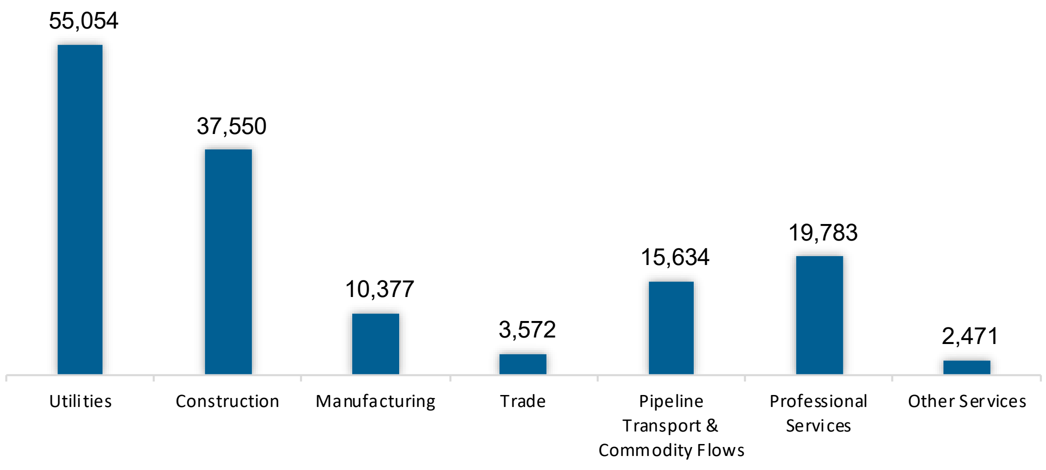
The transmission, distribution, and storage (TDS) sector employed 144,441 workers in California, 6.9% of the national TDS total. The sector lost 380 jobs and decreased 0.3% in the past year.

Figure CA-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in California, accounting for 38.1% of the sector's jobs statewide.

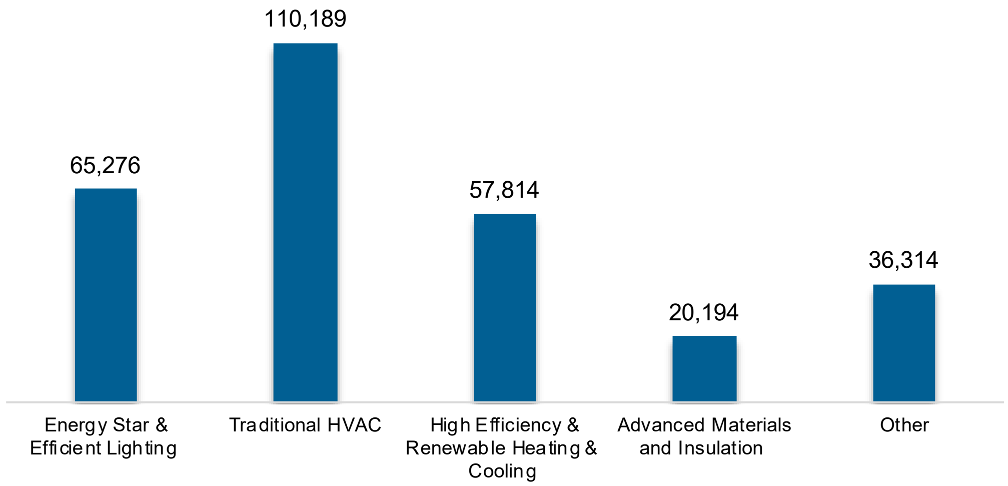
Figure CA-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

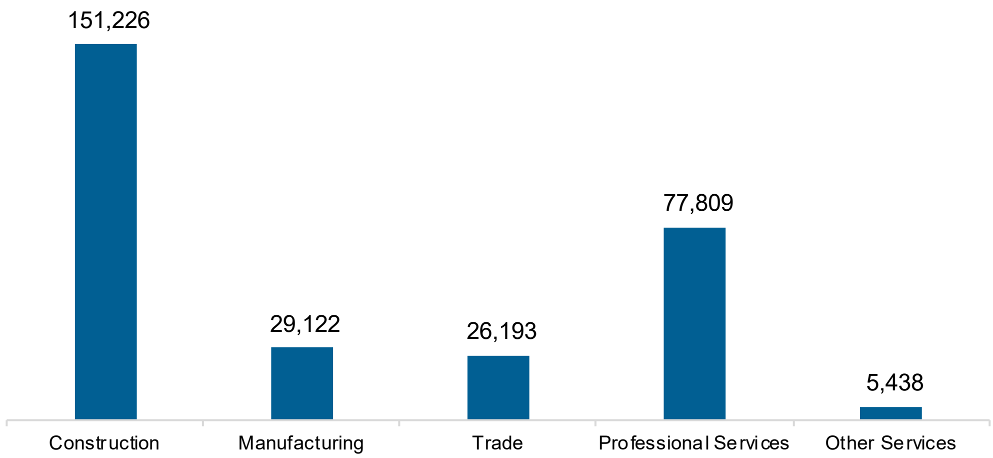
The energy efficiency (EE) sector employed 289,788 workers in California, 13.4% of the national EE total. The EE sector added 5,949 jobs and increased 2.1% in the past year.

Figure CA-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

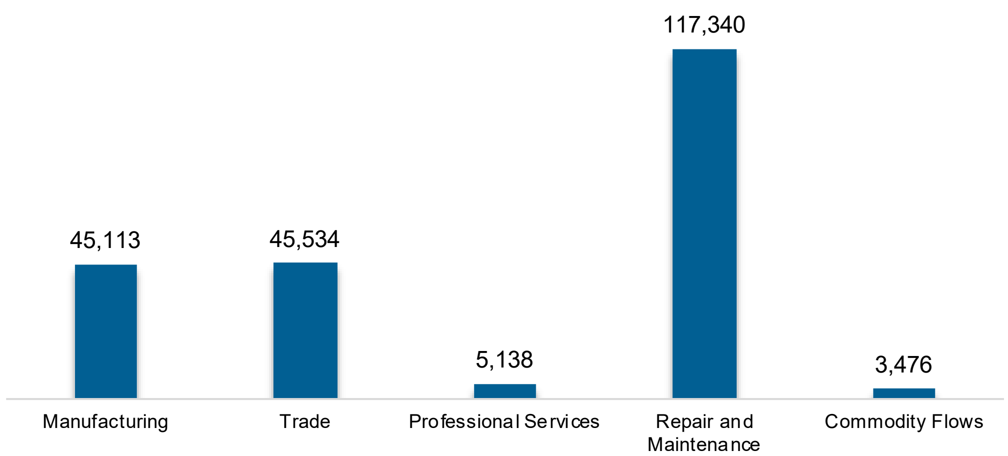
Figure CA-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 216,602 workers in California, 8.5% of the national total for the sector. Motor vehicles and component parts added 25,287 jobs and increased 13.2% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure CA-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in California are more optimistic than their peers across the country about energy sector job growth over the next year.

Table CA-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	2.6	2.2
Electric Power Transmission, Distribution, and Storage	2.1	1.1
Energy Efficiency	2.4	1.7
Fuels	3.0	3.0
Motor Vehicles	3.1	3.2

Hiring Difficulty

Employers in California reported 56.4% overall hiring difficulty.

Table CA-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	25.0	31.4	7.3	36.3	56.4

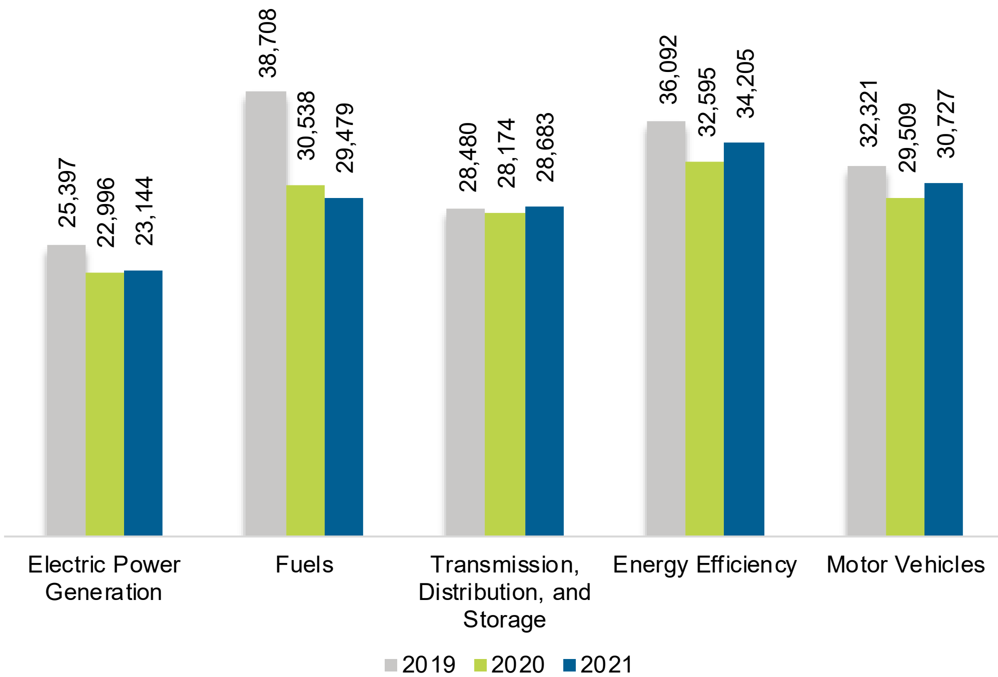
Colorado

ENERGY AND EMPLOYMENT — 2022

Overview

Colorado had 146,238 energy workers statewide in 2021, representing 1.9% of all U.S. energy jobs. Of these energy jobs, 23,144 are in electric power generation; 29,479 in fuels; 28,683 in transmission, distribution, and storage; 34,205 in energy efficiency; and 30,727 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 2,425 jobs, or 1.7%. The energy sector in Colorado represents 5.4% of total state employment.

Figure CO-1.
Employment by Major Energy Technology Application

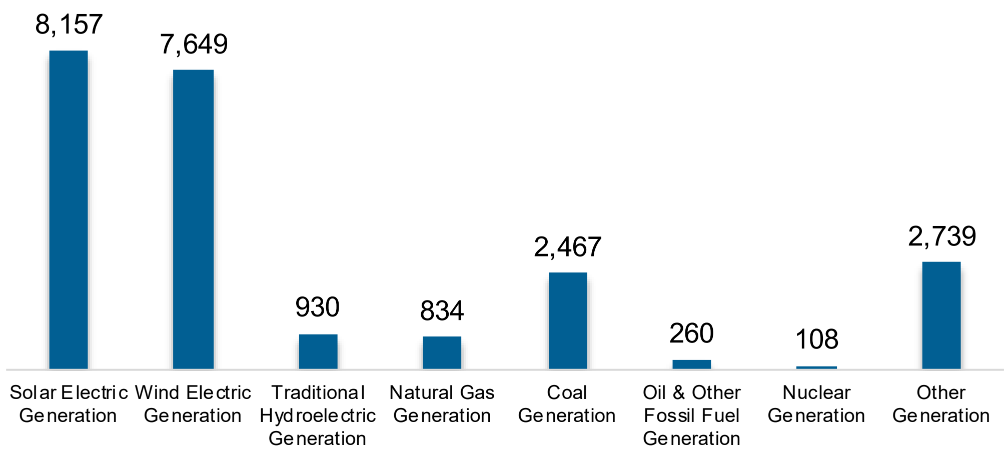


Breakdown by Technology Applications

Electric Power Generation

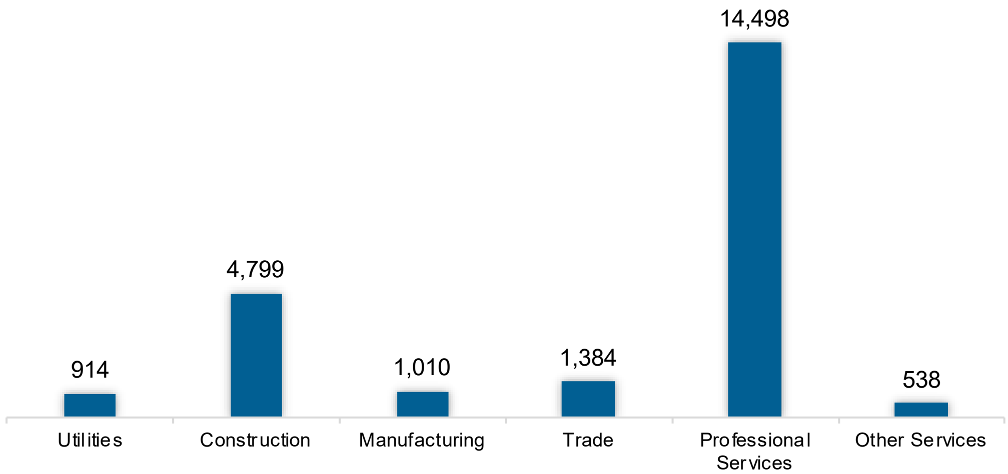
The electric power generation sector employed 23,144 workers in Colorado, 2.7% of the national electricity total, and added 148 jobs over the past year (0.6%).

Figure CO-2.
Electric Power Generation Employment by Detailed Technology Application



Professional and business services work represents the largest industry sector in the electric power generation sector, with 62.6% of jobs. Construction is second largest with 20.7%.

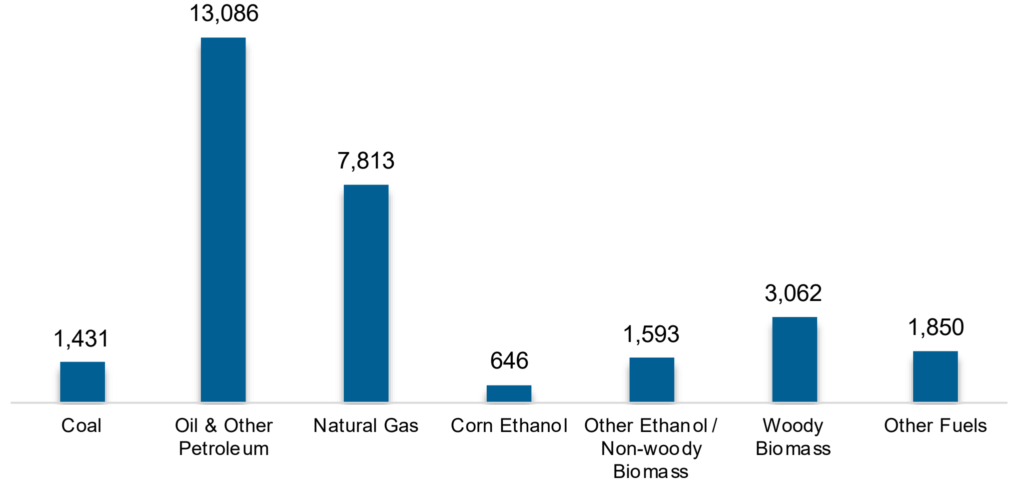
Figure CO-3.
Electric Power Generation Employment by Industry Sector



Fuels

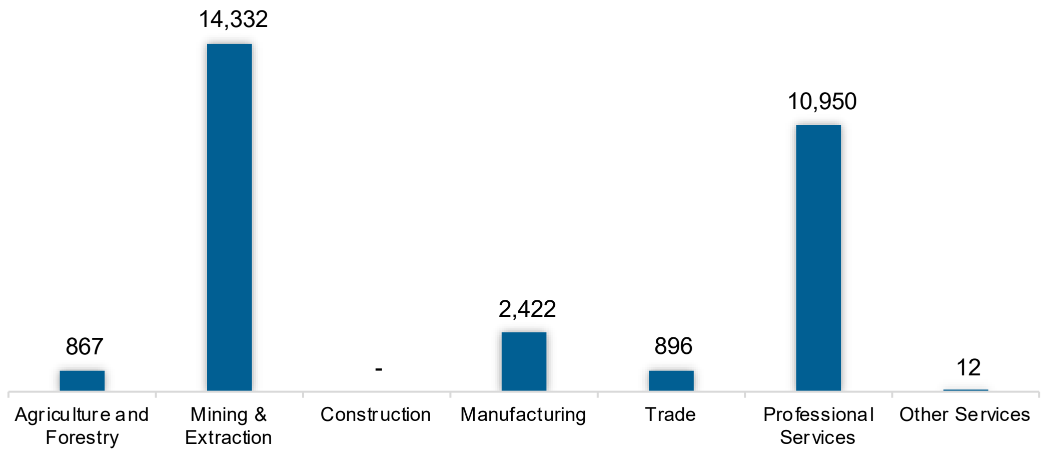
The fuel sector employed 29,479 workers in Colorado, 3.2% of the national total in fuels. The sector lost 1,059 jobs and decreased 3.5% in the past year.

Figure CO-4.
Fuels Employment by Detailed Technology Application



Mining and extraction jobs represent 48.6% of fuels jobs in Colorado.

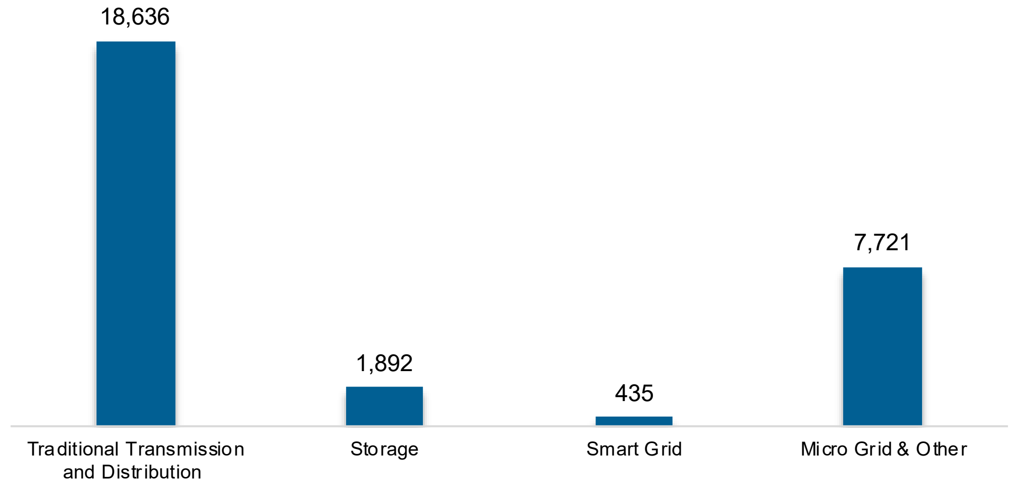
Figure CO-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

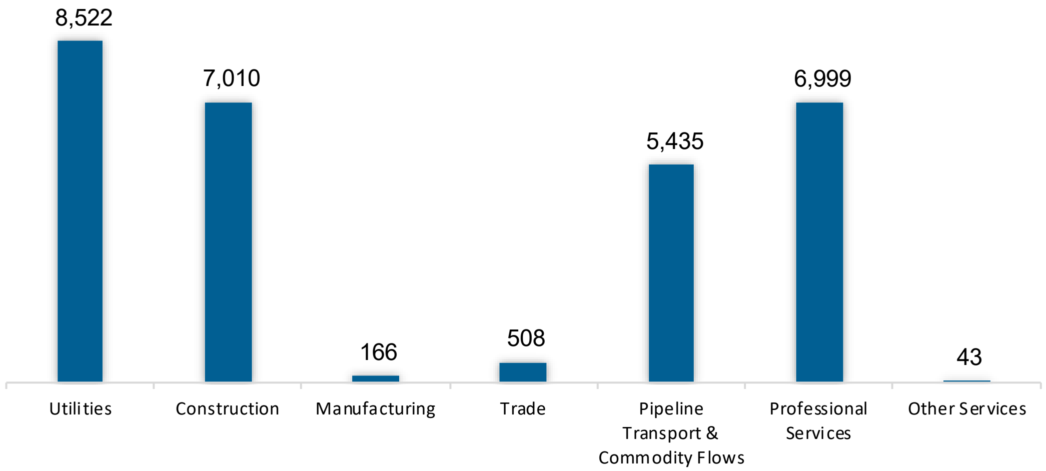
The transmission, distribution, and storage (TDS) sector employed 28,683 workers in Colorado, 3.2% of the national TDS total. The sector gained 509 jobs and increased 1.8% in the past year.

Figure CO-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Colorado, accounting for 29.7% of the sector's jobs statewide.

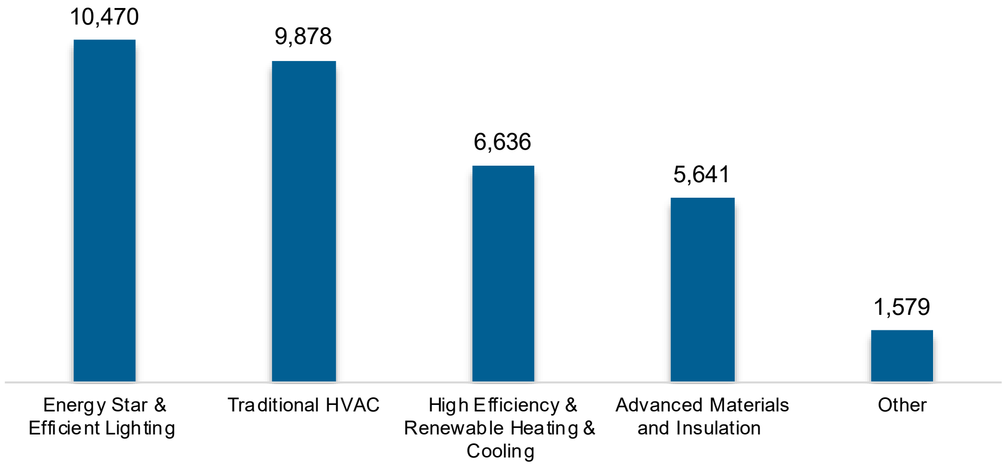
Figure CO-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

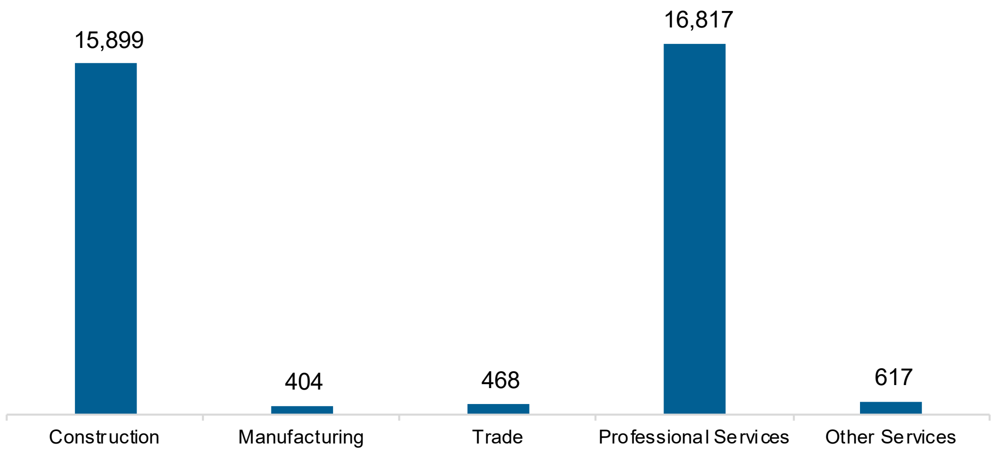
The energy efficiency (EE) sector employed 34,205 workers in Colorado, 1.6% of the national EE total. The EE sector added 1,610 jobs and increased 4.9% in the past year.

Figure CO-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the professional and business services industry.

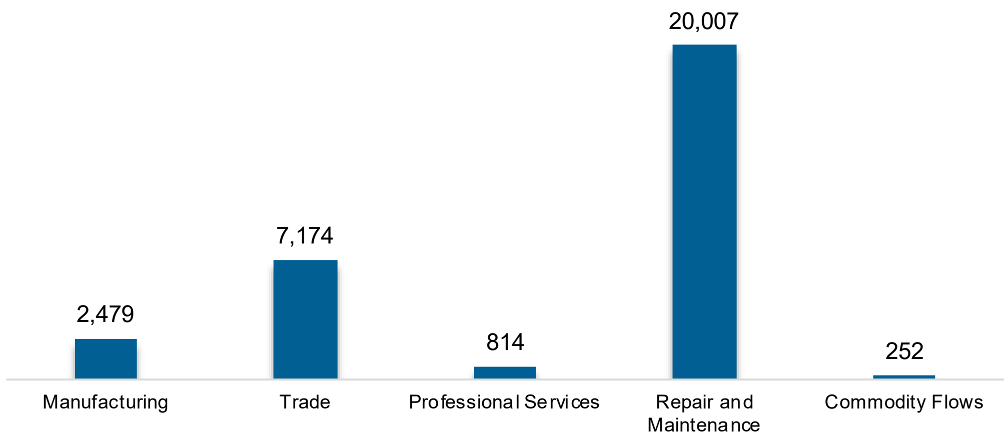
Figure CO-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 30,727 workers in Colorado, 1.2% of the national total for the sector. Motor vehicles and component parts added 1,218 jobs and increased 4.1% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure CO-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Colorado are more optimistic than their peers across the country about energy sector job growth over the next year.

Table CO-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	2.5	2.2
Electric Power Transmission, Distribution, and Storage	2.0	1.1
Energy Efficiency	2.3	1.7
Fuels	2.9	3.0
Motor Vehicles	3.0	3.2

Hiring Difficulty

Employers in Colorado reported 53.2% overall hiring difficulty.

Table CO-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	22.5	30.7	7.6	39.2	53.2

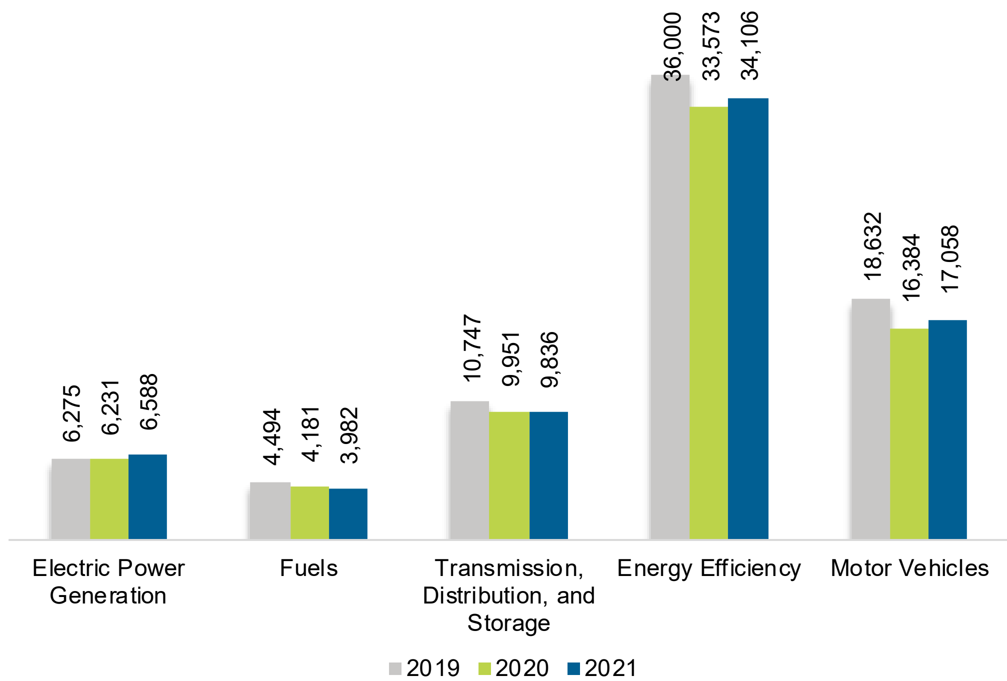
Connecticut

ENERGY AND EMPLOYMENT — 2022

Overview

Connecticut had 71,570 energy workers statewide in 2021, representing 0.9% of all U.S. energy jobs. Of these energy jobs, 6,588 are in electric power generation; 3,982 in fuels; 9,836 in transmission, distribution, and storage; 34,106 in energy efficiency; and 17,058 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 1,250 jobs, or 1.8%. The energy sector in Connecticut represents 4.5% of total state employment.

Figure CT-1.
Employment by Major Energy Technology Application

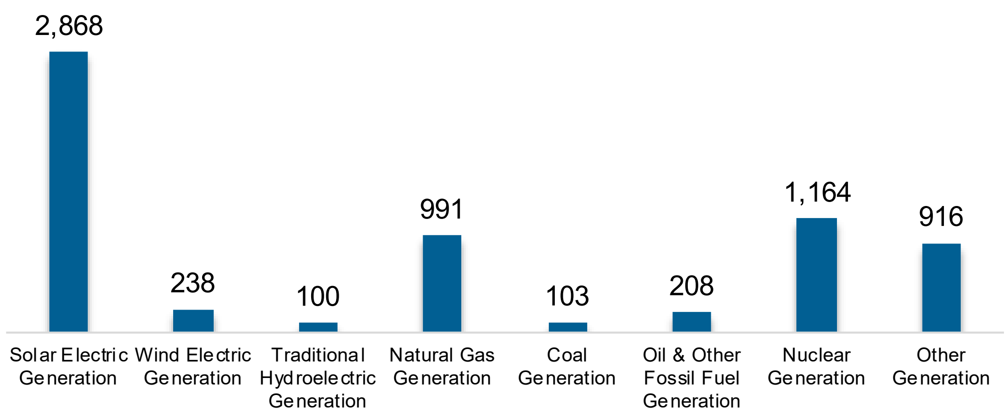


Breakdown by Technology Applications

Electric Power Generation

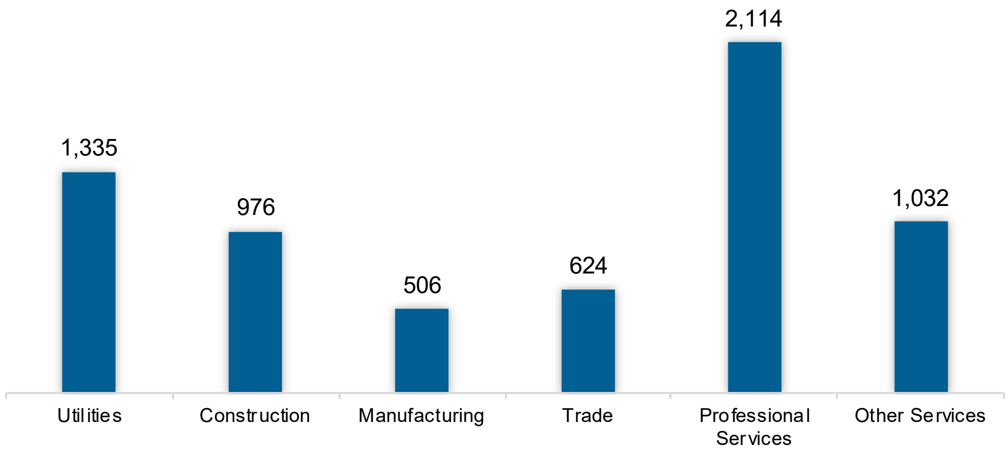
The electric power generation sector employed 6,588 workers in Connecticut, 0.8% of the national electricity total, and added 357 jobs over the past year (5.7%).

Figure CT-2.
Electric Power Generation Employment by Detailed Technology Application



Professional and business services work represents the largest industry sector in the electric power generation sector, with 32.1% of jobs. Utilities is second largest with 20.3%.

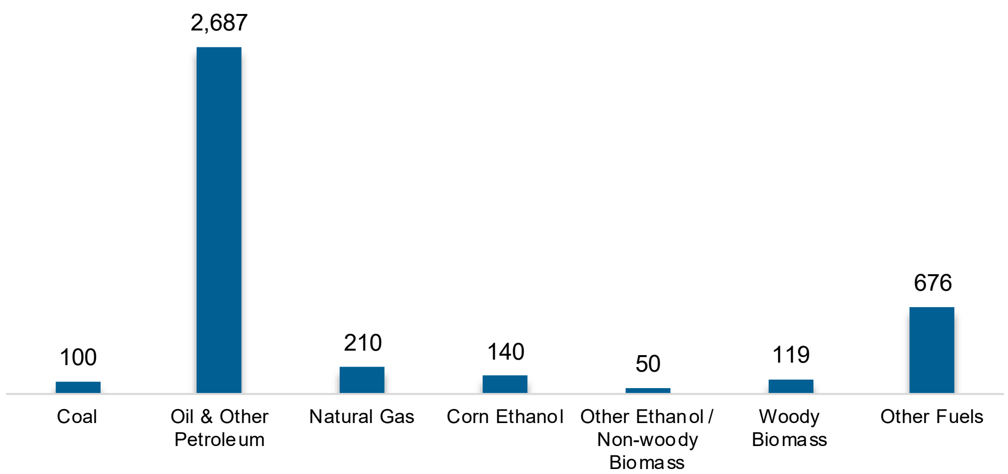
Figure CT-3.
Electric Power Generation Employment by Industry Sector



Fuels

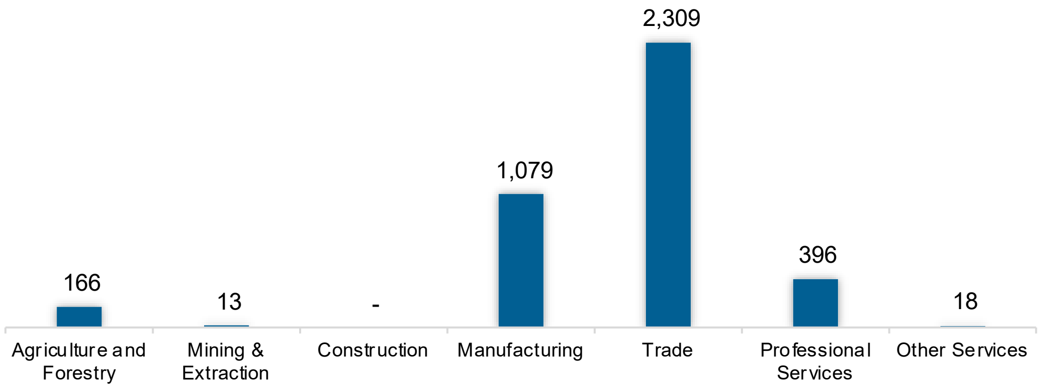
The fuel sector employed 3,982 workers in Connecticut, 0.4% of the national total in fuels. The sector lost 199 jobs and decreased 4.8% in the past year.

Figure CT-4.
Fuels Employment by Detailed Technology Application



Wholesale trade jobs represent 58.0% of fuels jobs in Connecticut.

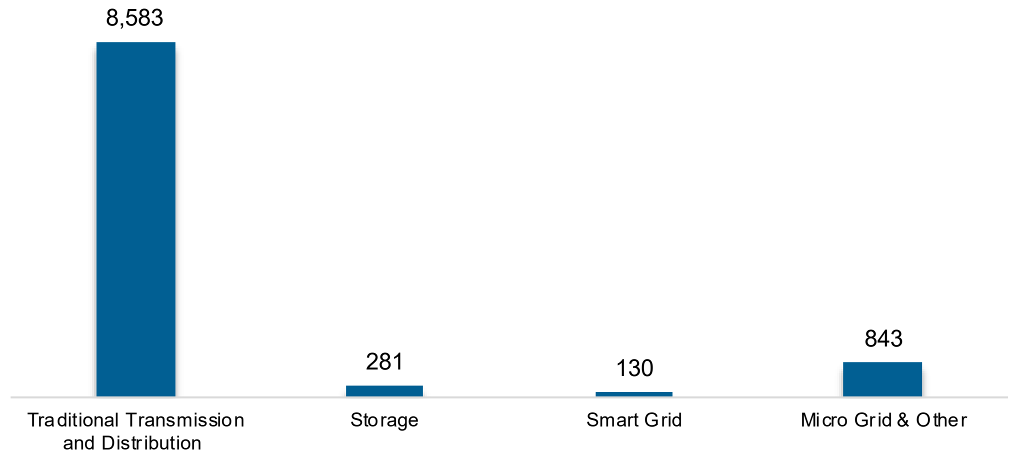
Figure CT-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

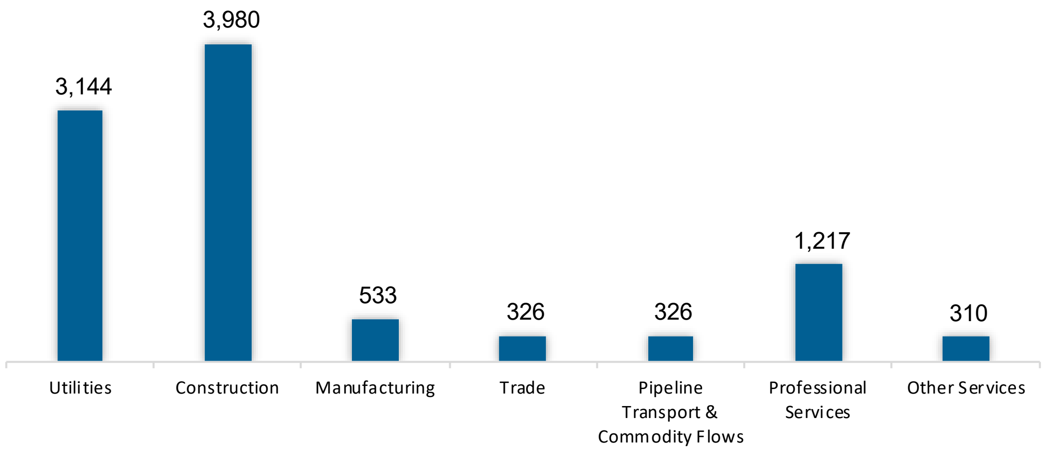
The transmission, distribution, and storage (TDS) sector employed 9,836 workers in Connecticut, 0.4% of the national TDS total. The sector lost 115 jobs and decreased 1.2% in the past year.

Figure CT-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in Connecticut, accounting for 40.5% of the sector's jobs statewide.

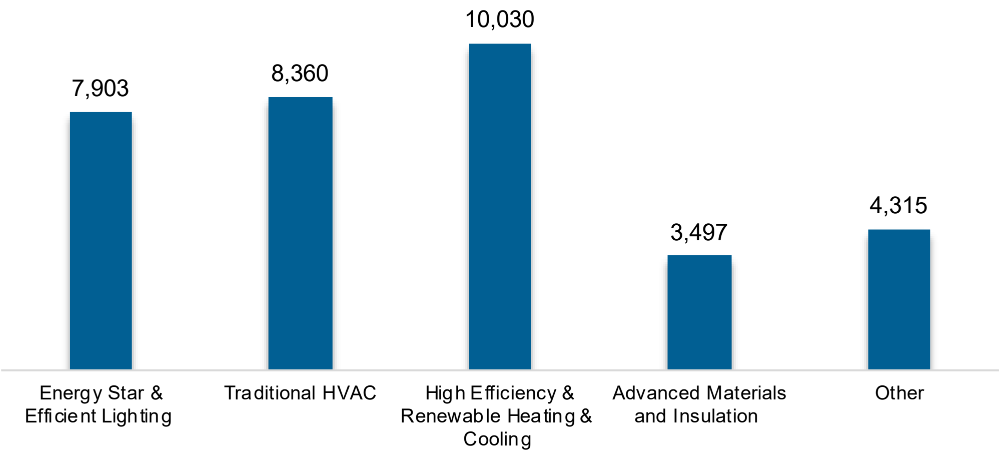
Figure CT-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

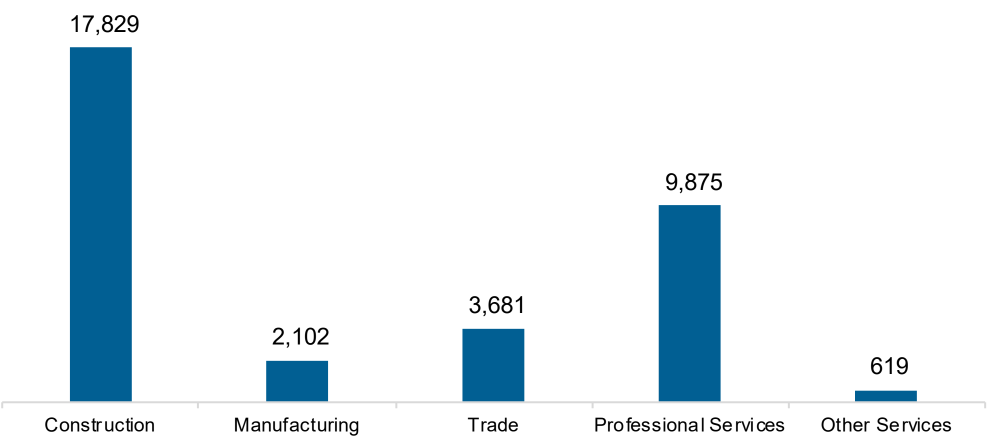
The energy efficiency (EE) sector employed 34,106 workers in Connecticut, 1.6% of the national EE total. The EE sector added 533 jobs and increased 1.6% in the past year.

Figure CT-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

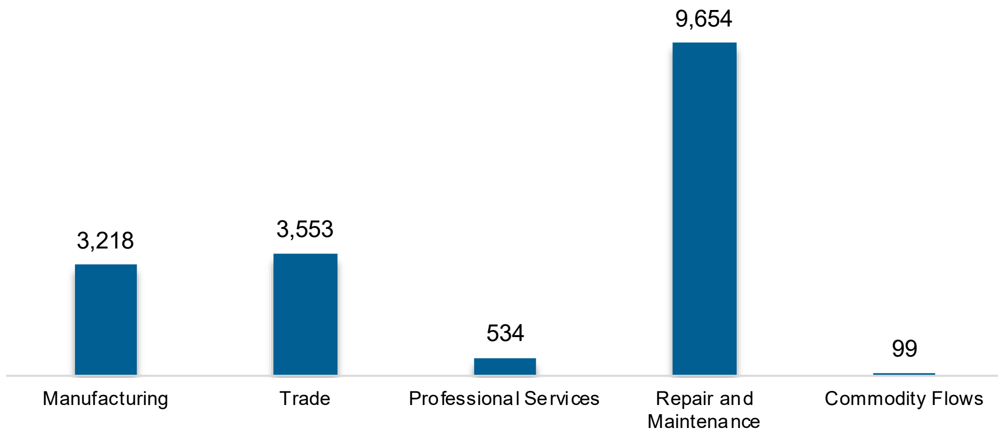
Figure CT-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 17,058 workers in Connecticut, 0.7% of the national total for the sector. Motor vehicles and component parts added 675 jobs and increased 4.1% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure CT-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Connecticut are more optimistic than their peers across the country about energy sector job growth over the next year.

Table CT-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	4.7	2.2
Electric Power Transmission, Distribution, and Storage	4.2	1.1
Energy Efficiency	4.5	1.7
Fuels	5.1	3.0
Motor Vehicles	5.2	3.2

Hiring Difficulty

Employers in Connecticut reported 51.9% overall hiring difficulty.

Table CT-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	23.1	28.7	6.5	41.7	51.9

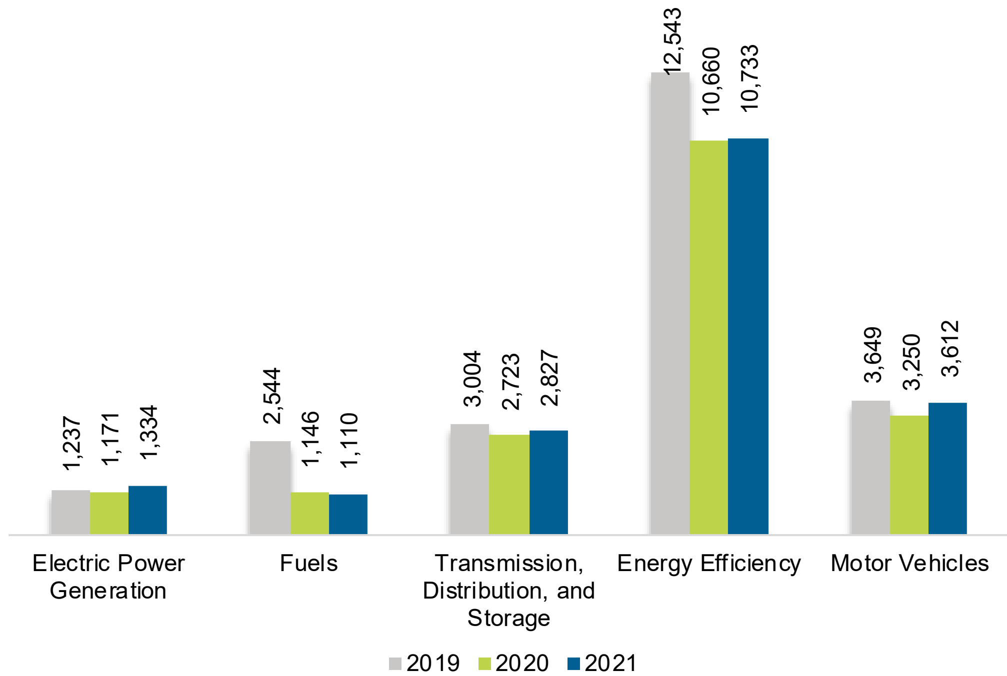
Delaware

ENERGY AND EMPLOYMENT — 2022

Overview

Delaware had 19,617 energy workers statewide in 2021, representing 0.3% of all U.S. energy jobs. Of these energy jobs, 1,334 are in electric power generation; 1,110 in fuels; 2,827 in transmission, distribution, and storage; 10,733 in energy efficiency; and 3,612 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 667 jobs, or 3.5%. The energy sector in Delaware represents 4.4% of total state employment.

Figure DE-1.
Employment by Major Energy Technology Application

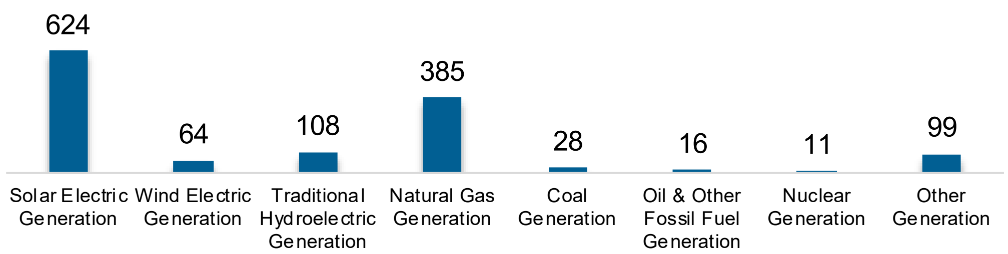


Breakdown by Technology Applications

Electric Power Generation

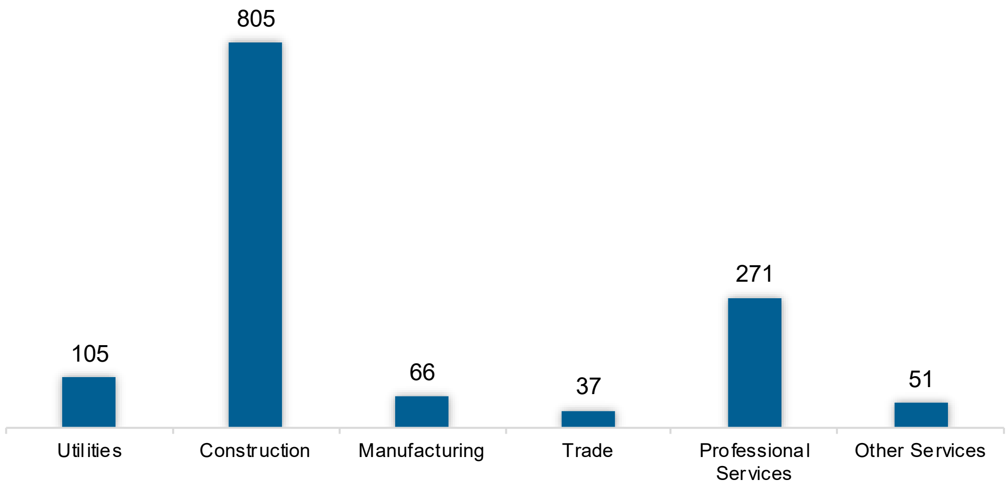
The electric power generation sector employed 1,334 workers in Delaware, 0.2% of the national electricity total, and added 164 jobs over the past year (14%).

Figure DE-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 60.3% of jobs. Professional and business services are next with 20.3%.

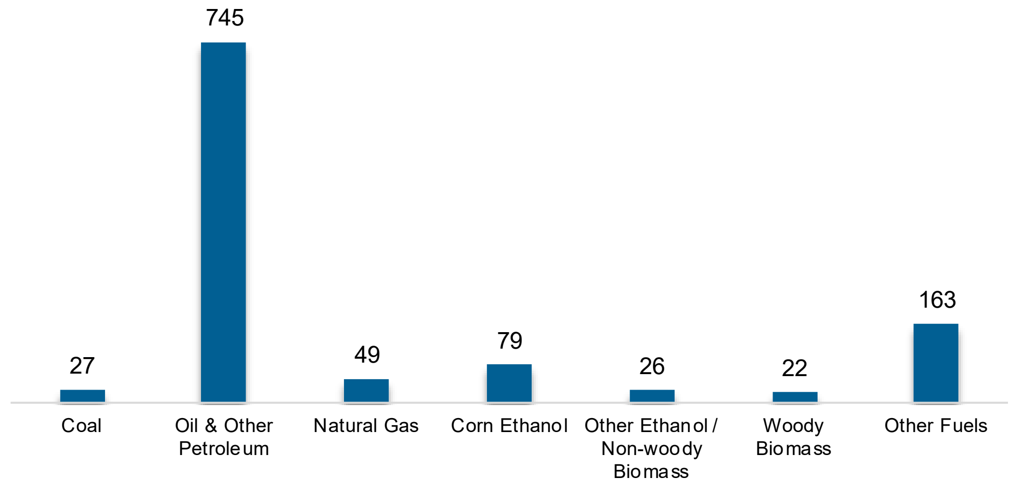
Figure DE-3.
Electric Power Generation Employment by Industry Sector



Fuels

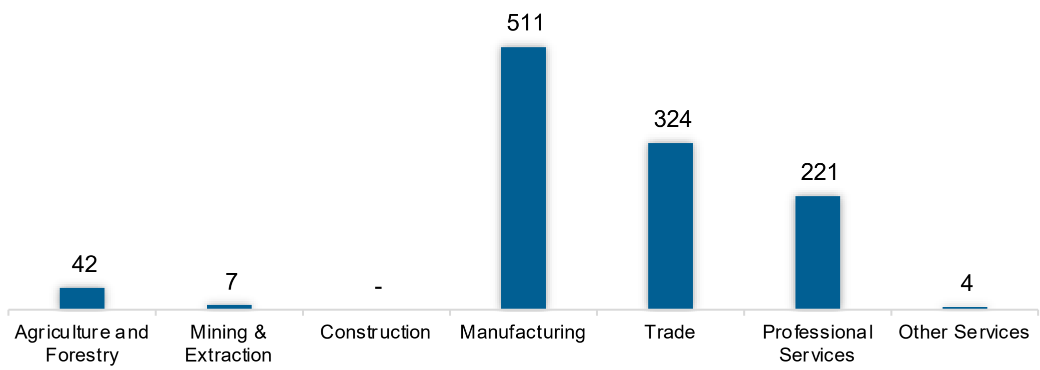
The Fuel sector employed 1,110 workers in Delaware, 0.1% of the national total in fuels. The sector lost 37 jobs and decreased 3.2% in the past year.

Figure DE-4.
Fuels Employment by Detailed Technology Application



Manufacturing jobs represent 46.1% of fuel jobs in Delaware.

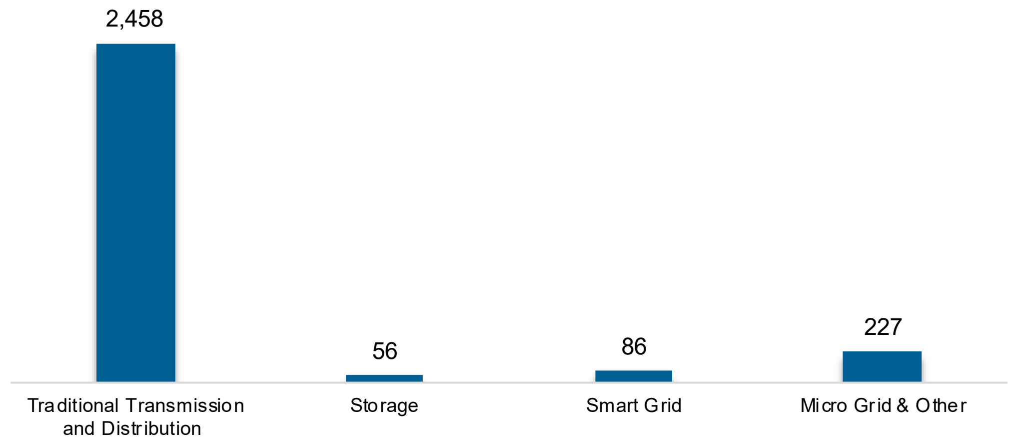
Figure DE-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

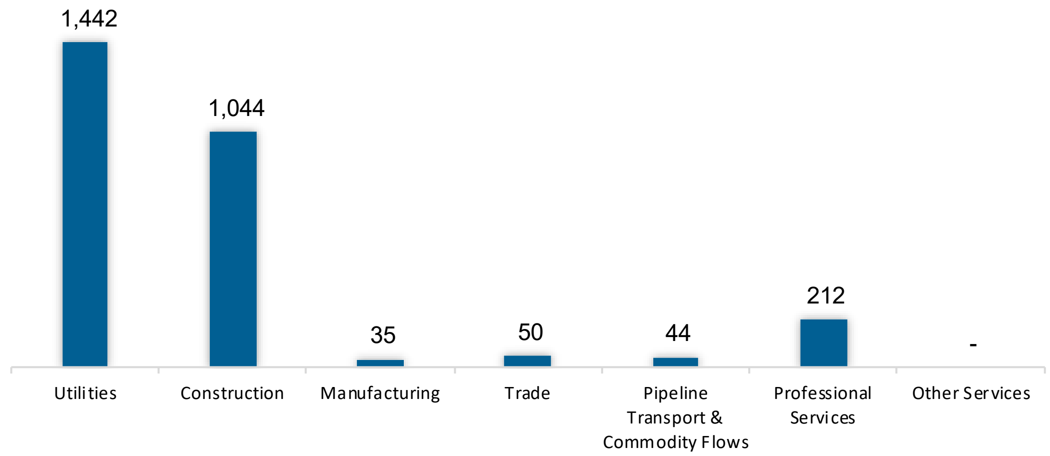
The transmission, distribution, and storage (TDS) sector employed 2,827 workers in Delaware, 0.1% of the national TDS total. The sector gained 105 jobs and increased 3.8% in the past year.

Figure DE-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Delaware, accounting for 51% of the sector's jobs statewide.

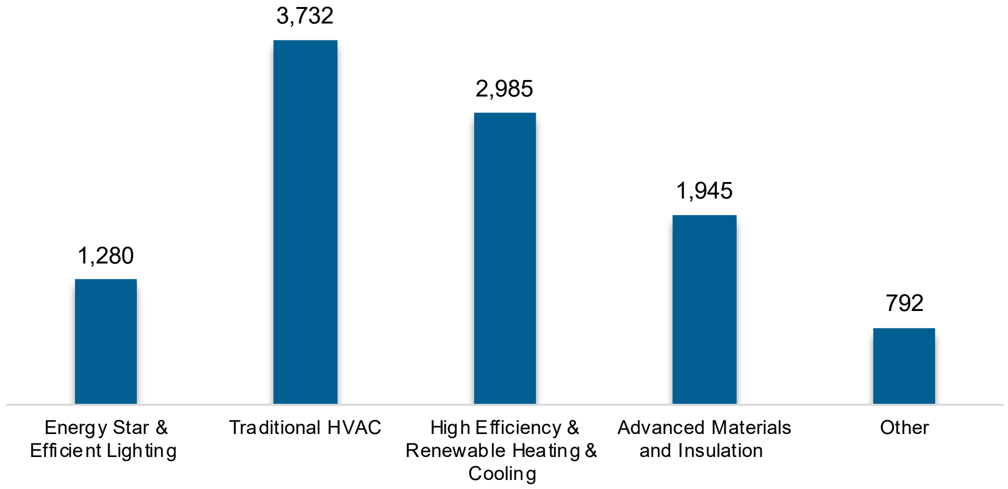
Figure DE-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

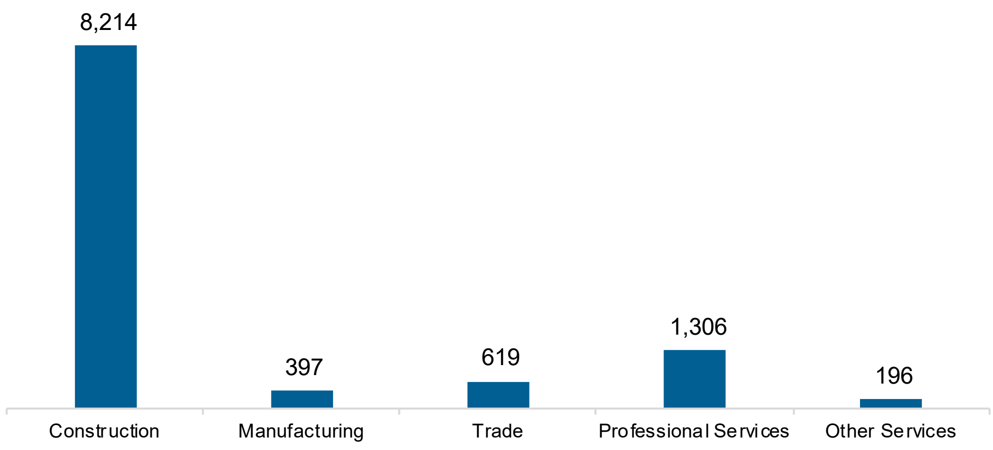
The energy efficiency (EE) sector employed 10,733 workers in Delaware, 0.5% of the national EE total. The EE sector added 73 jobs and increased 0.7% in the past year.

Figure DE-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

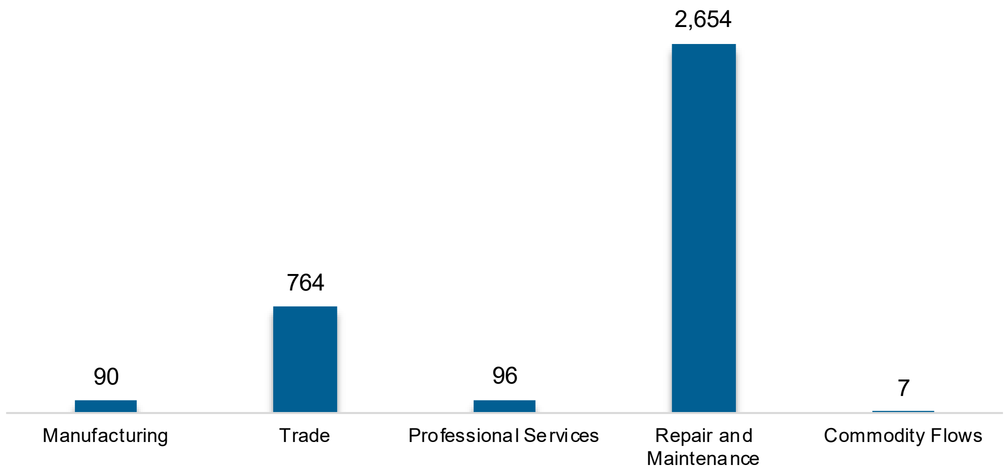
Figure DE-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 3,612 workers in Delaware, 0.1% of the national total for the sector. Motor vehicles and component parts added 362 jobs and increased 11.1% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure DE-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Delaware are more optimistic than their peers across the country about energy sector job growth over the next year.

Table DE-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	3.3	2.2
Electric Power Transmission, Distribution, and Storage	2.7	1.1
Energy Efficiency	3.0	1.7
Fuels	3.7	3.0
Motor Vehicles	3.8	3.2

Hiring Difficulty

Employers in Delaware reported 70.4% overall hiring difficulty.

Table DE-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	39.2	31.2	5.2	24.4	70.4

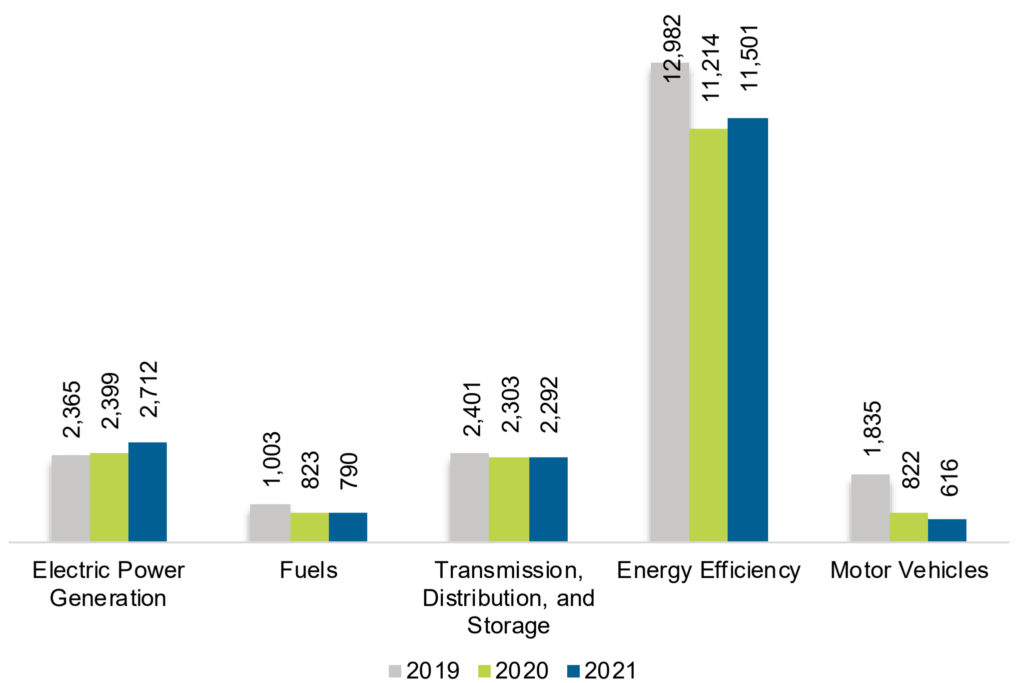
District of Columbia

ENERGY AND EMPLOYMENT — 2022

Overview

District of Columbia had 17,911 energy workers statewide in 2021, representing 0.2% of all U.S. energy jobs. Of these energy jobs, 2,712 are in electric power generation; 790 in fuels; 2,292 in transmission, distribution, and storage; 11,501 in energy efficiency; and 616 in motor vehicles. From 2020 to 2021, energy jobs in the state increased 350 jobs, or 2%. The energy sector in District of Columbia represents 2.5% of total state employment.

Figure DC-1.
Employment by Major Energy Technology Application

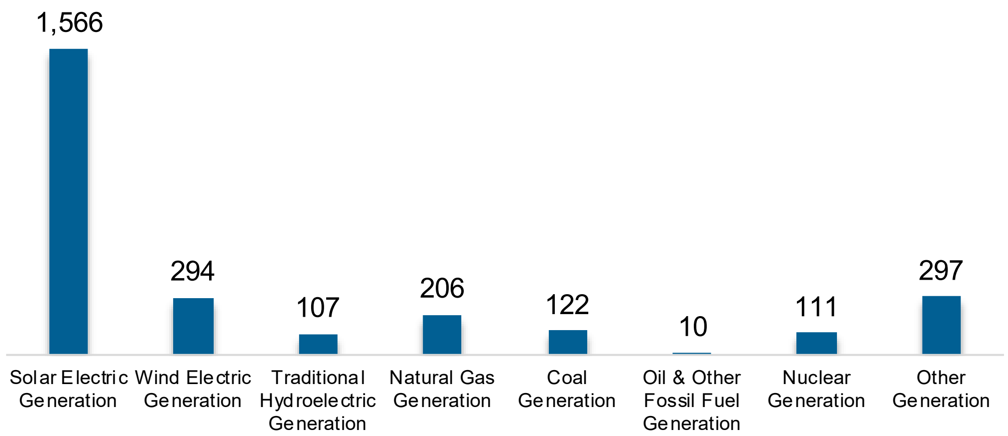


Breakdown by Technology Applications

Electric Power Generation

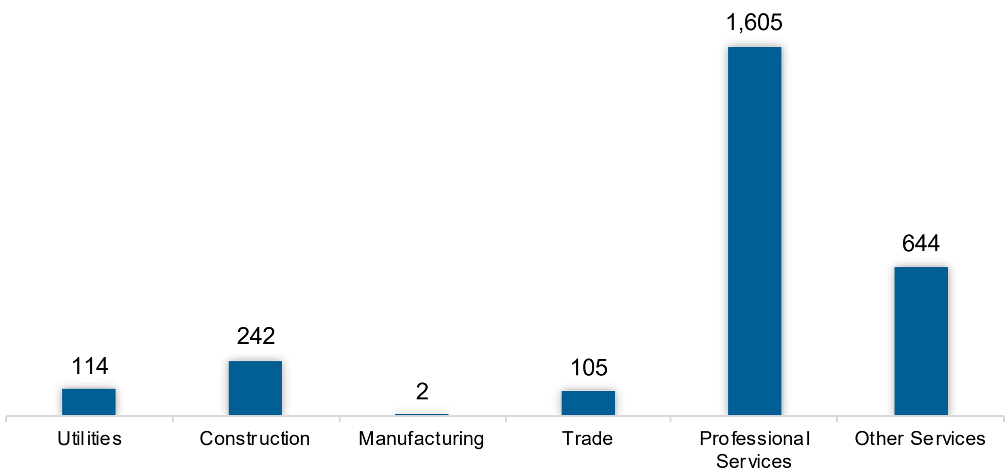
The electric power generation sector employed 2,712 workers in District of Columbia, 0.3% of the national electricity total, and added 313 jobs over the past year (13%).

Figure DC-2.
Electric Power Generation Employment by Detailed Technology Application



Professional and business services are the largest industry sector in the electric power generation sector, with 59.2% of jobs. Other services next with 23.7%.

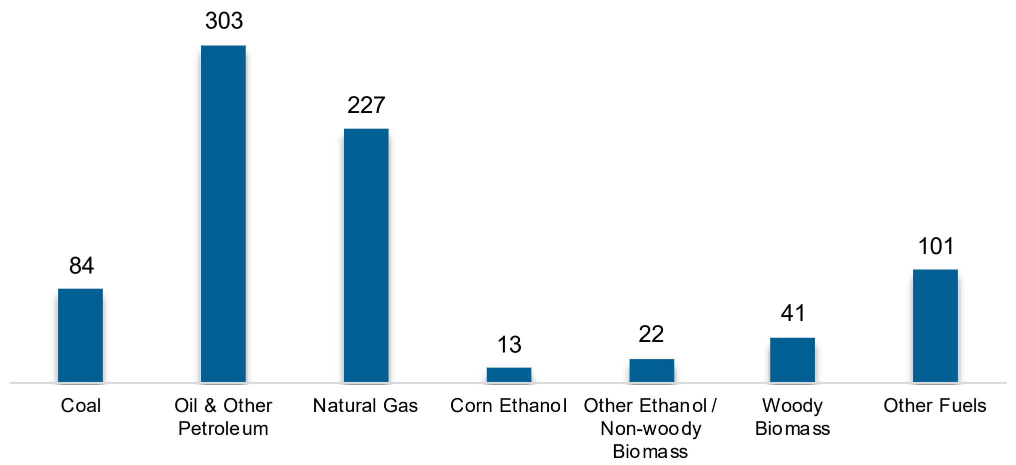
Figure DC-3.
Electric Power Generation Employment by Industry Sector



Fuels

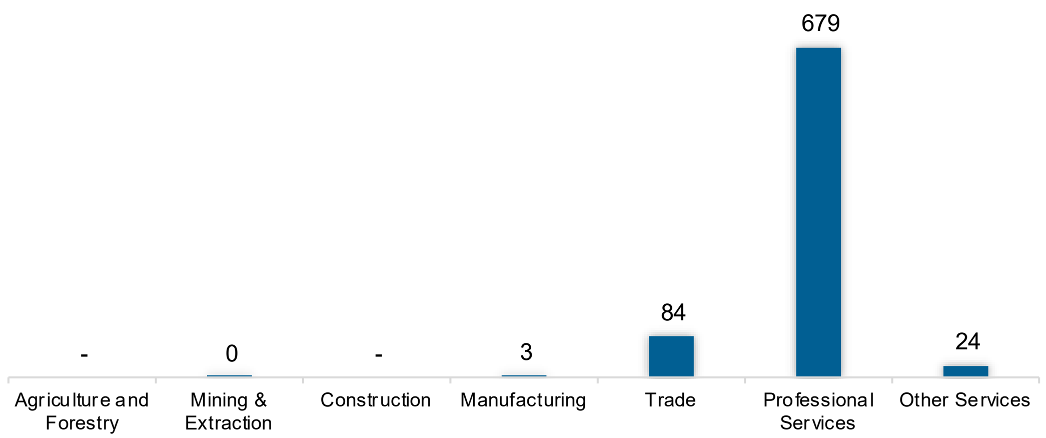
The fuel sector employed 790 workers in District of Columbia, 0.1% of the national total in fuels. The sector lost 33 jobs and decreased 4% in the past year.

Figure DC-4.
Fuels Employment by Detailed Technology Application



Professional and business services jobs represent 85.9% of fuels jobs in District of Columbia.

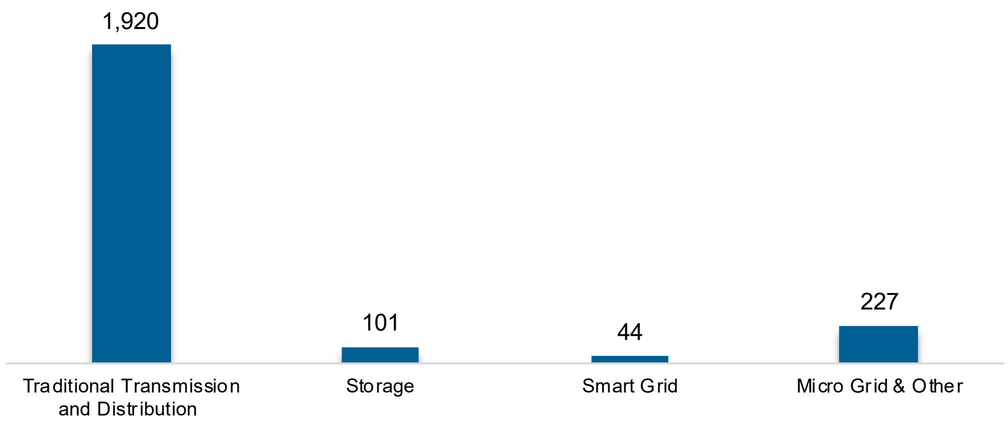
Figure DC-5.
Fuels Employment by Industry Sector



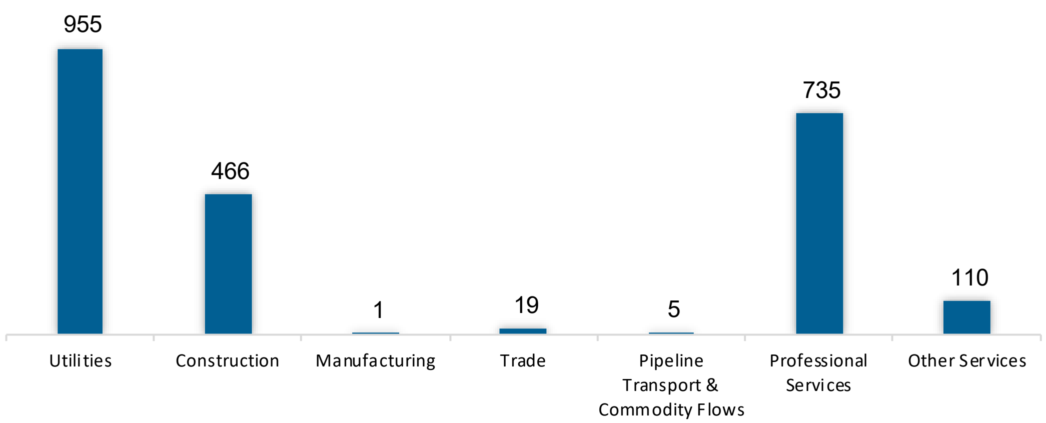
Transmission, Distribution and Storage

The transmission, distribution, and storage (TDS) sector employed 2,292 workers in District of Columbia, 0.1% of the national TDS total. The sector lost 11 jobs and decreased 0.5% in the past year.

Figure DC-6.
Transmission, Distribution and Storage Employment by Detailed Technology



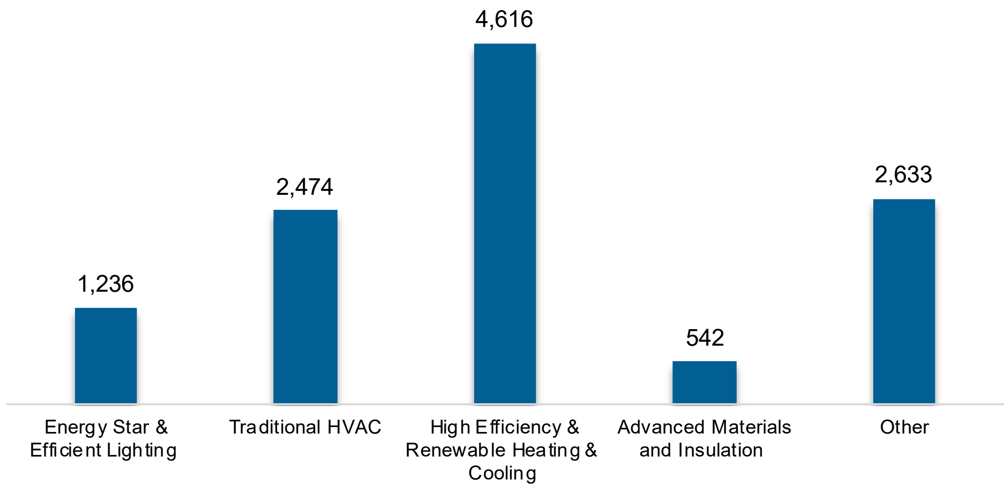
Utilities work represents the greatest proportion of TDS jobs in District of Columbia, accounting for 41.7% of the sector's jobs statewide.



Energy Efficiency

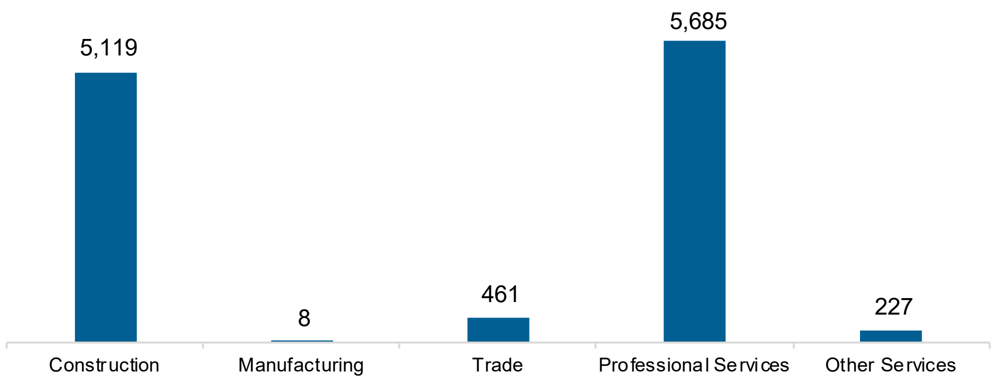
The energy efficiency (EE) sector employed 11,501 workers in District of Columbia, 0.5% of the national EE total. The EE sector added 287 jobs and increased 2.6% in the past year.

Figure DC-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the professional and business services industry.

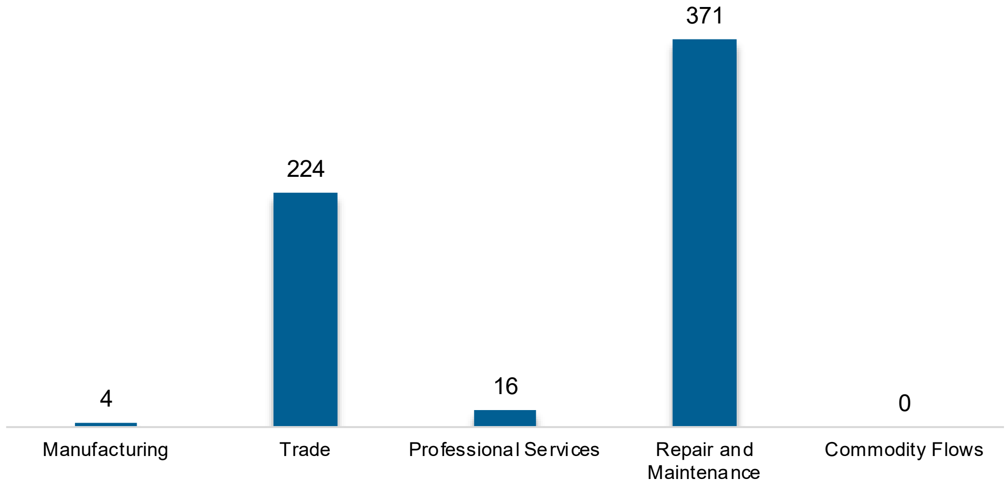
Figure DC-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 616 workers in District of Columbia. Motor vehicles and component parts lost 206 jobs and decreased 25.1% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure DC-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in District of Columbia are more optimistic than their peers across the country about energy sector job growth over the next year.

Table DC-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	2.4	2.2
Electric Power Transmission, Distribution, and Storage	1.9	1.1
Energy Efficiency	2.2	1.7
Fuels	2.8	3.0
Motor Vehicles	2.9	3.2

Hiring Difficulty

Employers in District of Columbia reported 52.2% overall hiring difficulty.

Table DC-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	23.0	29.2	14.3	33.5	52.2

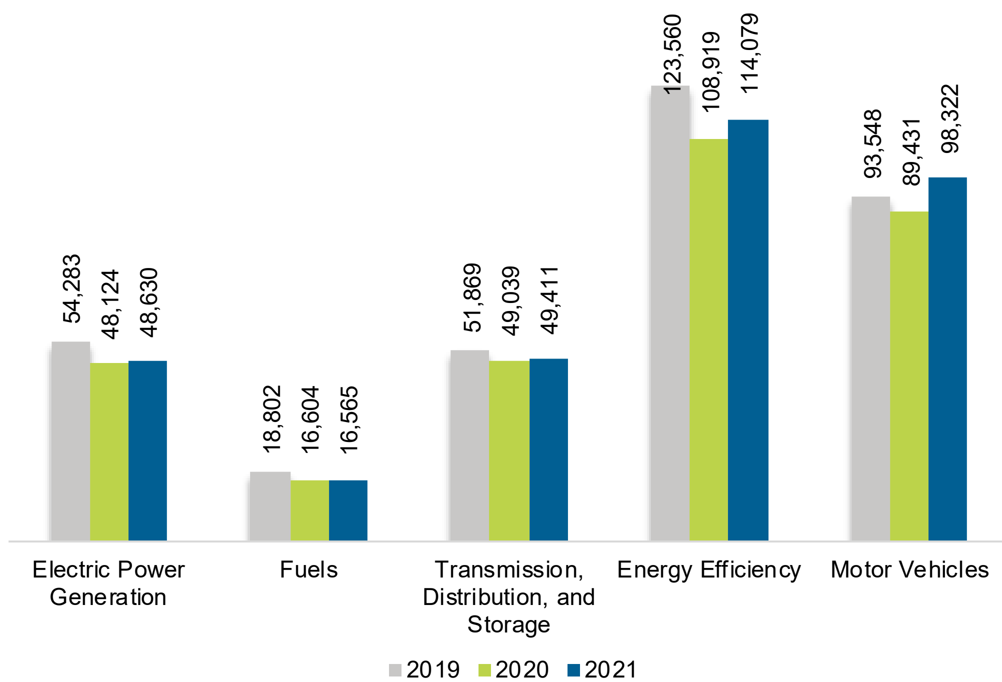
Florida

ENERGY AND EMPLOYMENT — 2022

Overview

Florida had 327,007 energy workers statewide in 2021, representing 4.2% of all U.S. energy jobs. Of these energy jobs, 48,630 are in electric power generation; 16,565 in fuels; 49,411 in transmission, distribution, and storage; 114,079 in energy efficiency; and 98,322 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 14,890 jobs, or 4.8%. The energy sector in Florida represents 3.7% of total state employment.

Figure FL-1.
Employment by Major Energy Technology Application

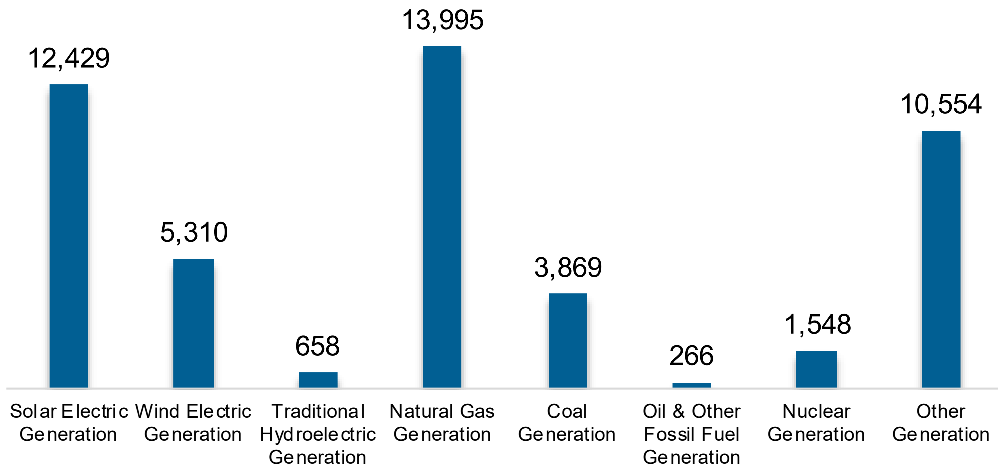


Breakdown by Technology Applications

Electric Power Generation

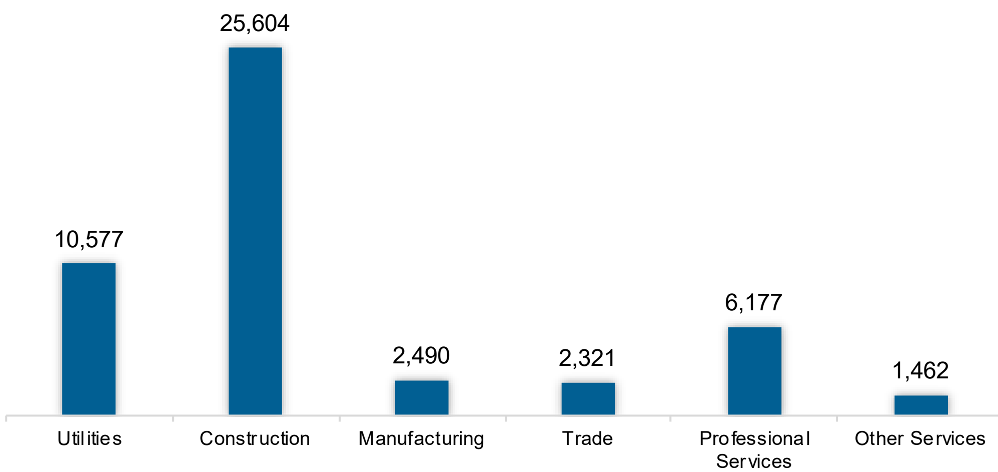
The electric power generation sector employed 48,630 workers in Florida, 5.7% of the national electricity total, and added 507 jobs over the past year (1.1%).

Figure FL-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 52.7% of jobs. Utilities is second largest with 21.8%.

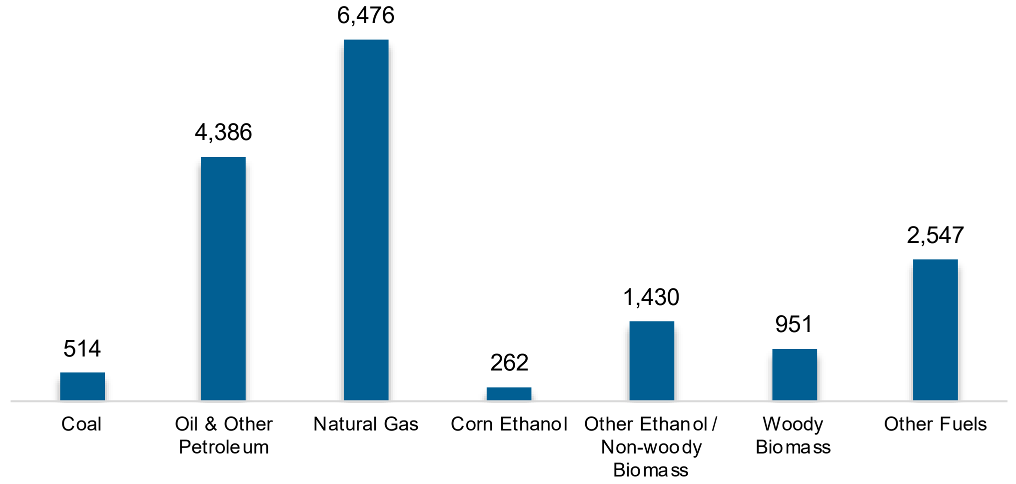
Figure FL-3.
Electric Power Generation Employment by Industry Sector



Fuels

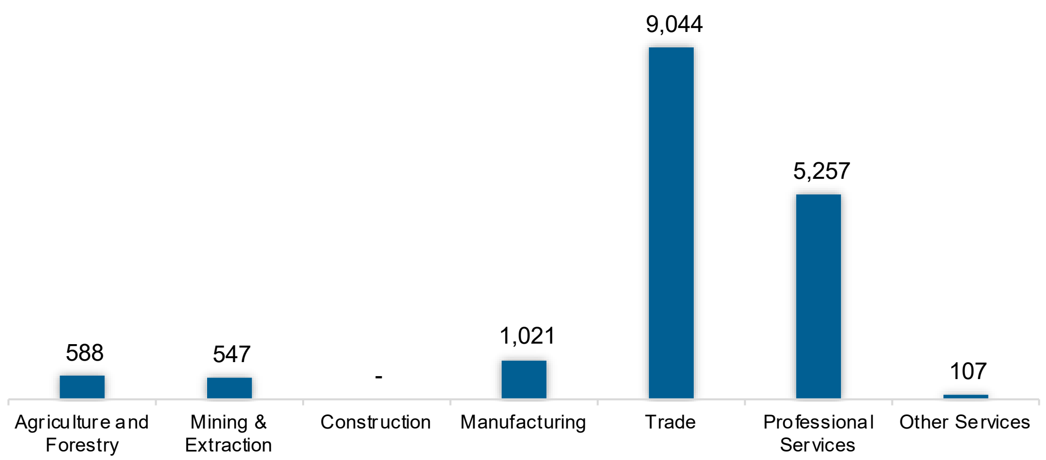
The fuel sector employed 16,565 workers in Florida, 1.8% of the national total in fuels. The sector lost 40 jobs and decreased 0.2% in the past year.

Figure FL-4.
Fuels Employment by Detailed Technology Application



Wholesale trade jobs represent 54.6% of fuel jobs in Florida.

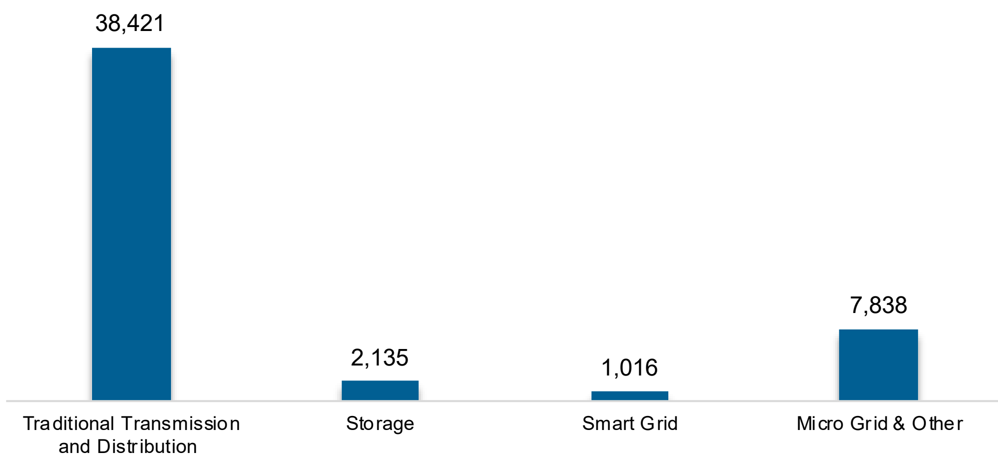
Figure FL-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

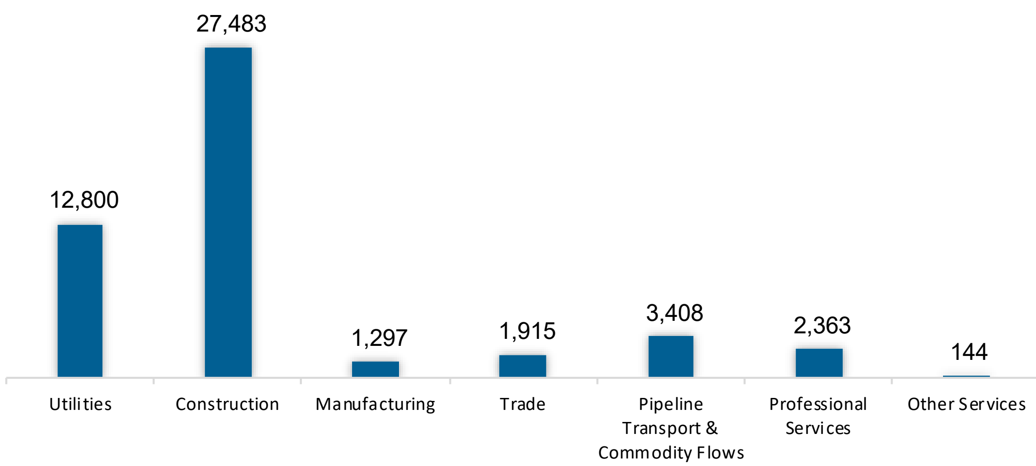
The transmission, distribution, and storage (TDS) sector employed 49,411 workers in Florida, 1.8% of the national TDS total. The sector gained 372 jobs and increased 0.8% in the past year.

Figure FL-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in Florida, accounting for 55.6% of the sector's jobs statewide.

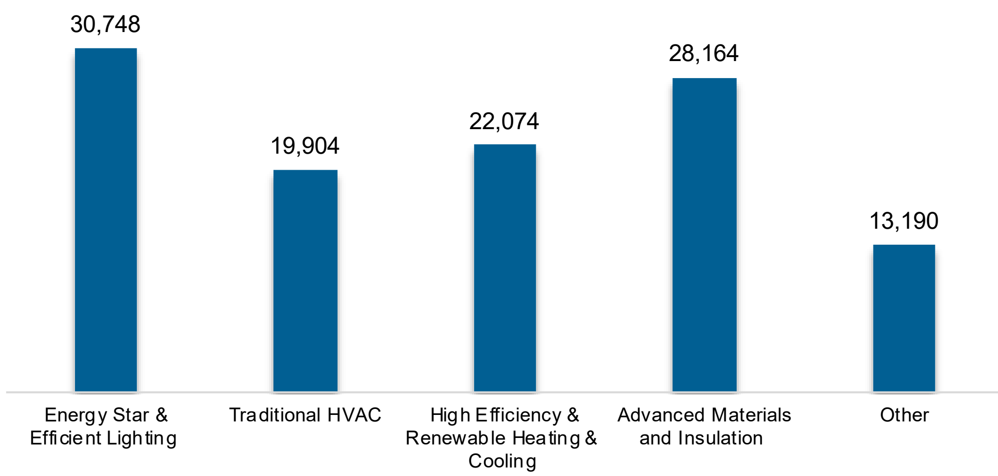
Figure FL-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

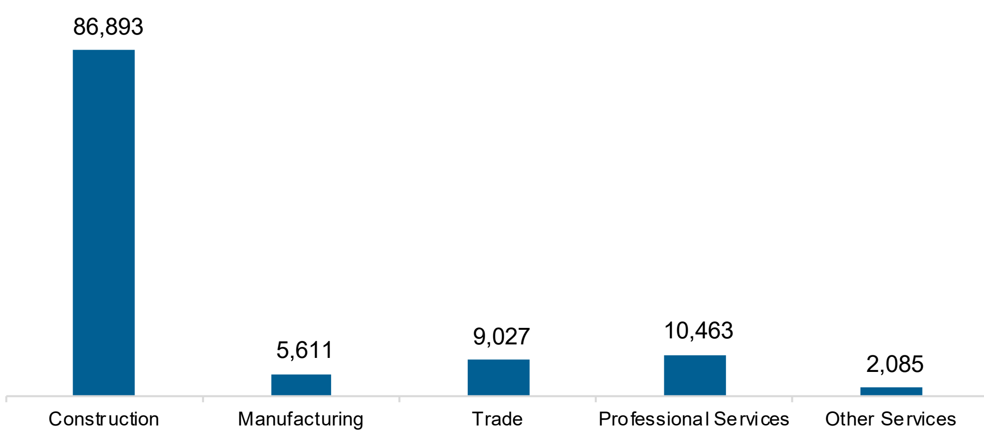
The energy efficiency (EE) sector employed 114,079 workers in Florida, 5.3% of the national EE total. The EE sector added 5,160 jobs and increased 4.7% in the past year.

Figure FL-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

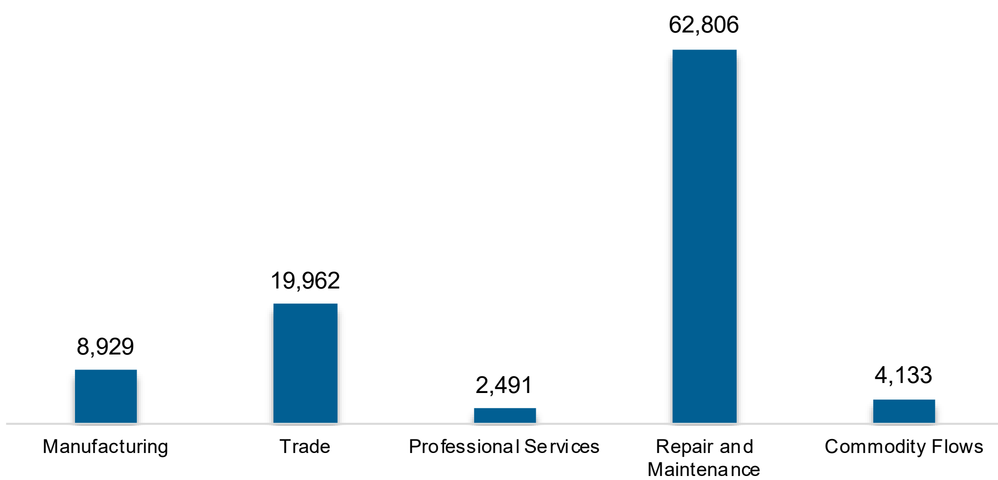
Figure FL-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 98,322 workers in Florida, 3.9% of the national total for the sector. Motor vehicles and component parts added 8,891 jobs and increased 9.9% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure FL-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Florida are more optimistic than their peers across the country about energy sector job growth over the next year.

Table FL-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	3.6	2.2
Electric Power Transmission, Distribution, and Storage	3.1	1.1
Energy Efficiency	3.4	1.7
Fuels	4.0	3.0
Motor Vehicles	4.1	3.2

Hiring Difficulty

Employers in Florida reported 55.6% overall hiring difficulty.

Table FL-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	26.8	28.7	7.1	37.4	55.6

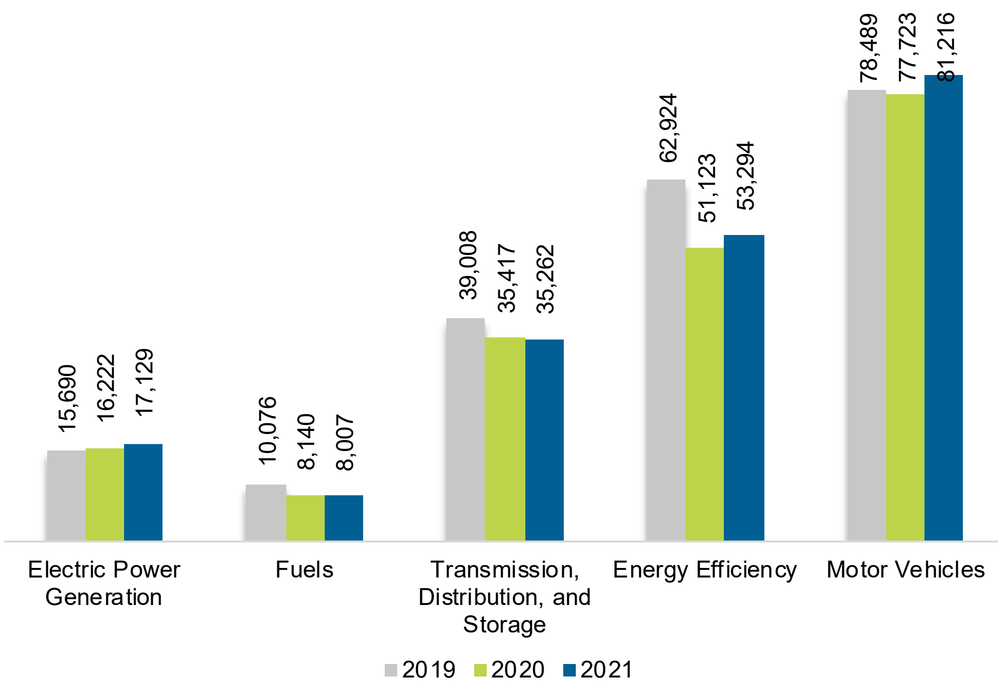
Georgia

ENERGY AND EMPLOYMENT — 2022

Overview

Georgia had 194,908 energy workers statewide in 2021, representing 2.5% of all U.S. energy jobs. Of these energy jobs, 17,129 are in electric power generation; 8,007 in fuels; 35,262 in transmission, distribution, and storage; 53,294 in energy efficiency; and 81,216 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 6,282 jobs, or 3.3%. The energy sector in Georgia represents 4.4% of total state employment.

Figure GA-1.
Employment by Major Energy Technology Application

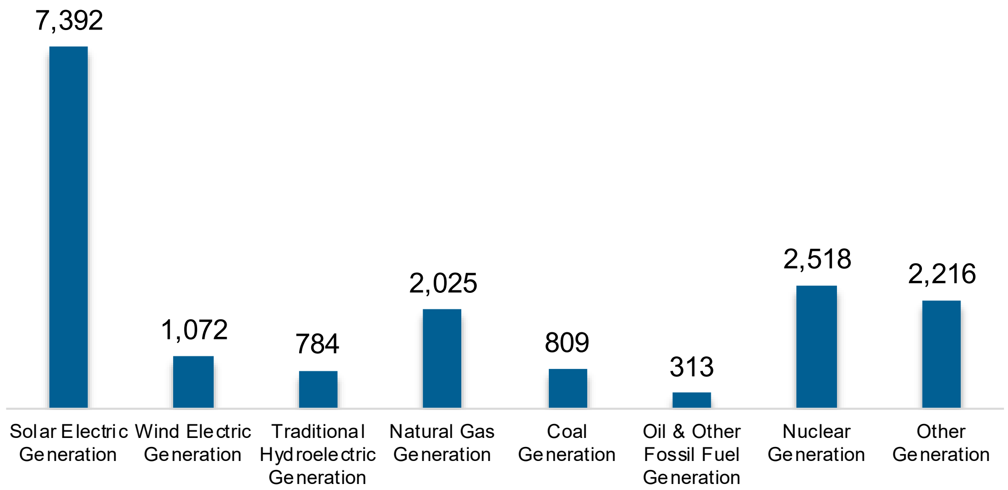


Breakdown by Technology Applications

Electric Power Generation

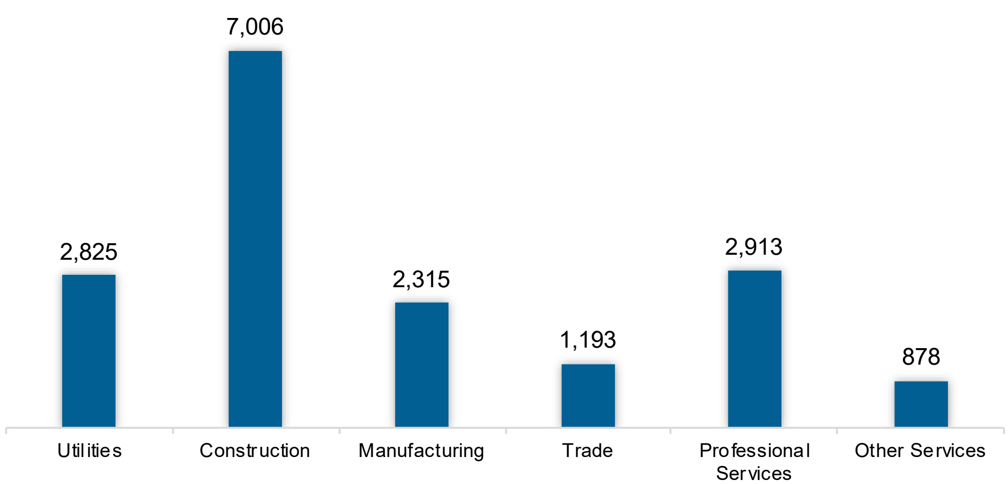
The electric power generation sector employed 17,129 workers in Georgia, 2% of the national electricity total, and added 907 jobs over the past year (5.6%).

Figure GA-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 40.9% of jobs. Professional and business services are next with 17.0%.

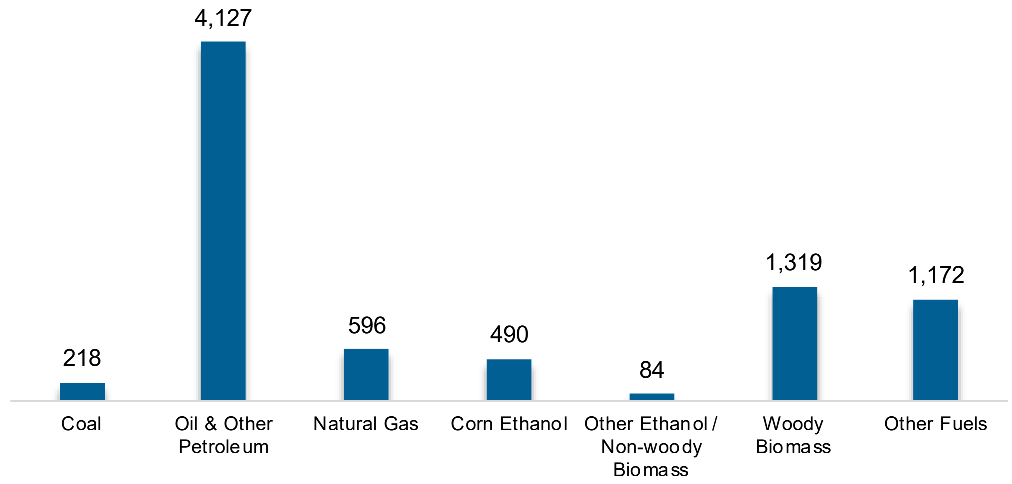
Figure GA-3.
Electric Power Generation Employment by Industry Sector



Fuels

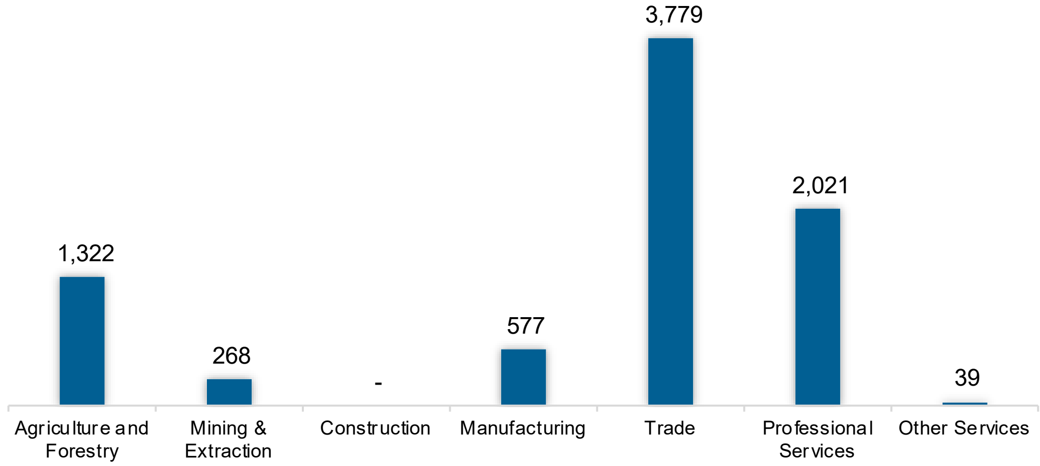
The fuel sector employed 8,007 workers in Georgia, 0.9% of the national total in fuels. The sector lost 133 jobs and decreased 1.6% in the past year.

Figure GA-4.
Fuels Employment by Detailed Technology Application



Wholesale trade jobs represent 47.2% of fuels jobs in Georgia.

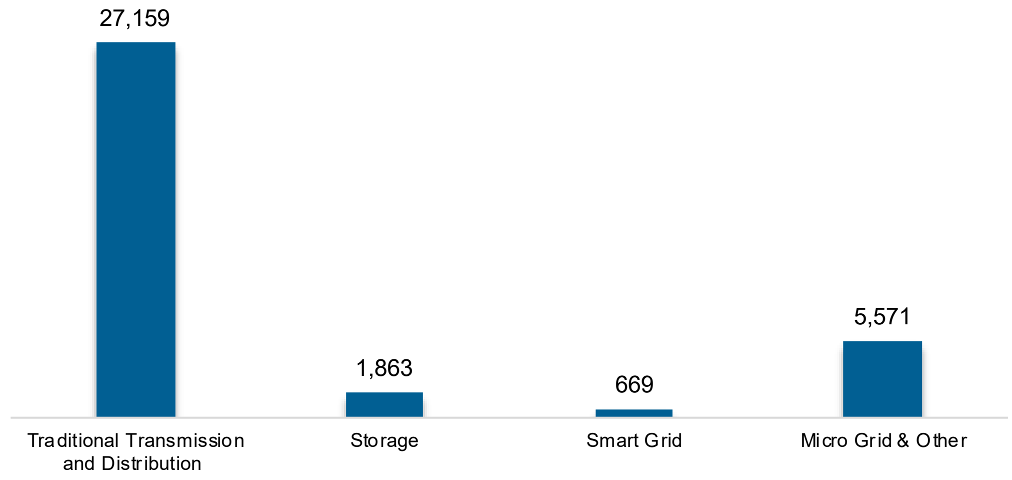
Figure GA-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

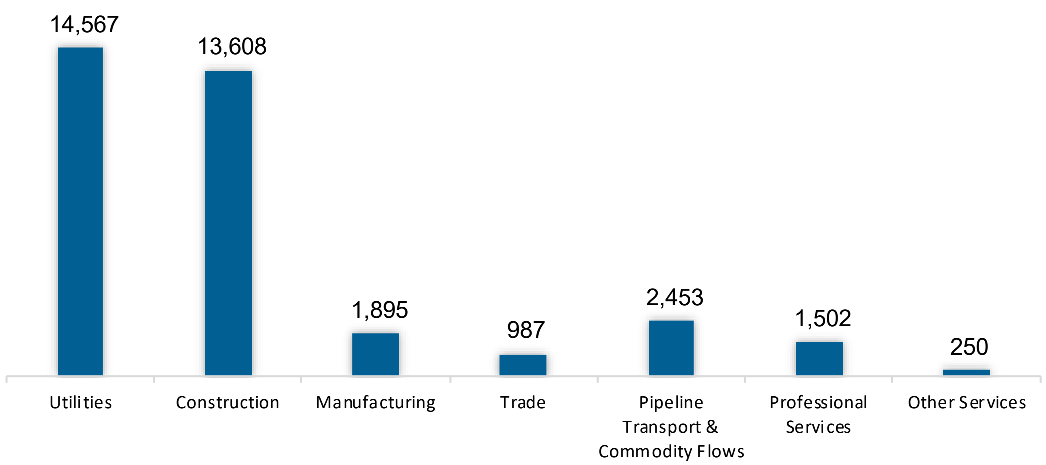
The transmission, distribution, and storage (TDS) sector employed 35,262 workers in Georgia, 0.9% of the national TDS total. The sector lost 155 jobs and decreased 0.4% in the past year.

Figure GA-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Georgia, accounting for 41.3% of the sector's jobs statewide.

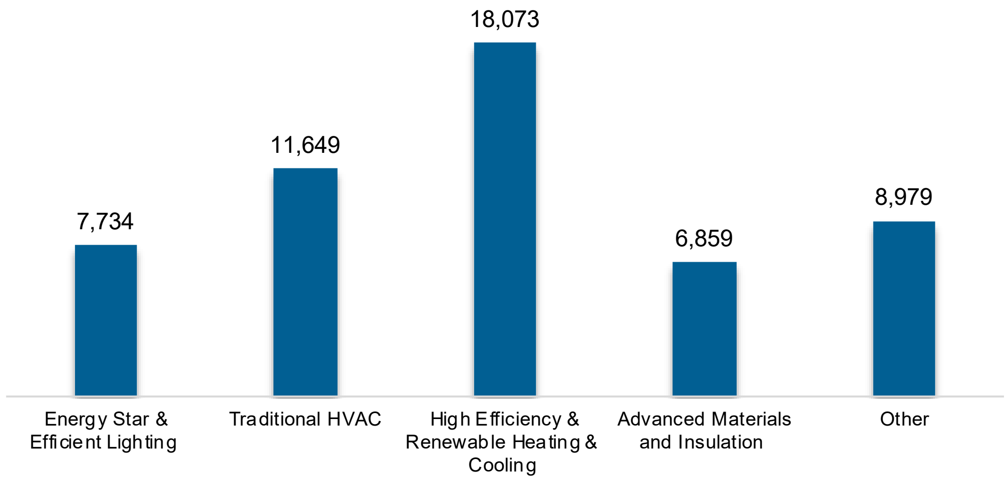
Figure GA-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

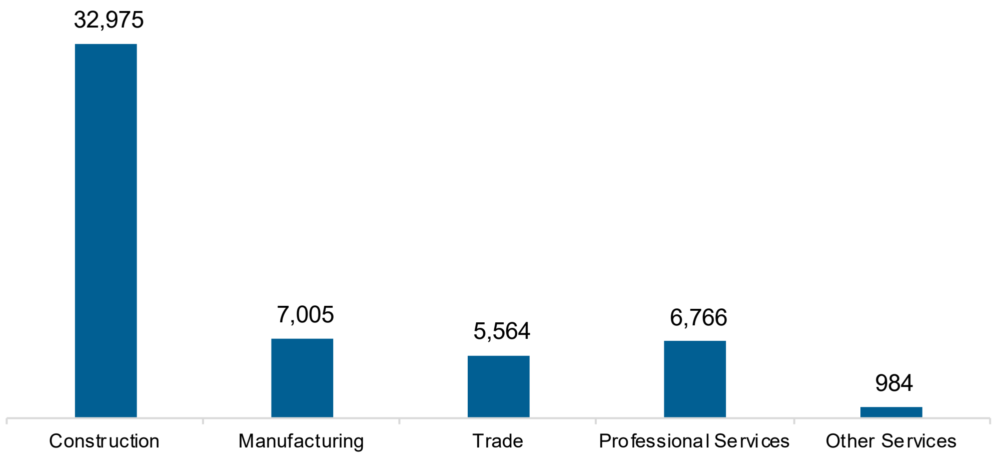
The energy efficiency (EE) sector employed 53,294 workers in Georgia, 2.5% of the national EE total. The EE sector added 2,171 jobs and increased 4.2% in the past year.

Figure GA-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

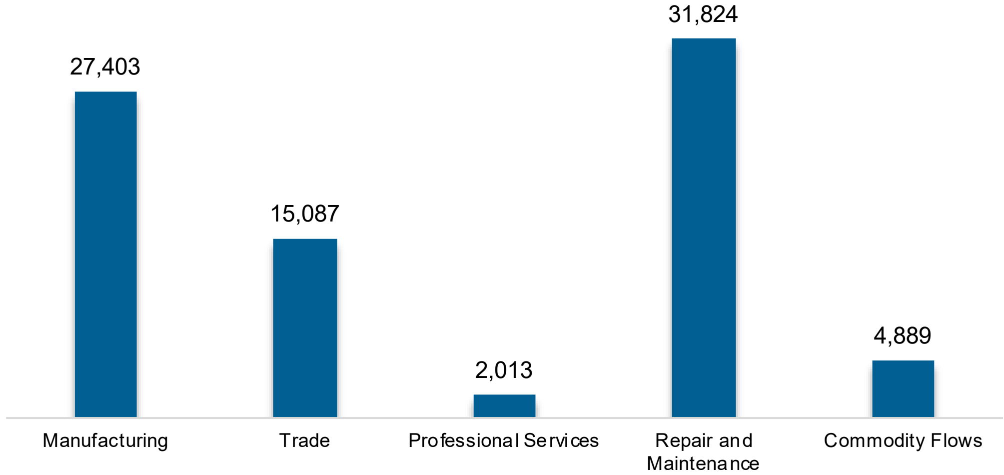
Figure GA-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 81,216 workers in Georgia, 3.2% of the national total for the sector. Motor vehicles and component parts added 3,493 jobs and increased 4.5% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure GA-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Georgia are less optimistic than their peers across the country about energy sector job growth over the next year.

Table GA-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.2	2.2
Electric Power Transmission, Distribution, and Storage	0.7	1.1
Energy Efficiency	1.0	1.7
Fuels	1.6	3.0
Motor Vehicles	1.7	3.2

Hiring Difficulty

Employers in Georgia reported 60.0% overall hiring difficulty.

Table GA-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	28.4	31.6	8.4	31.7	60.0

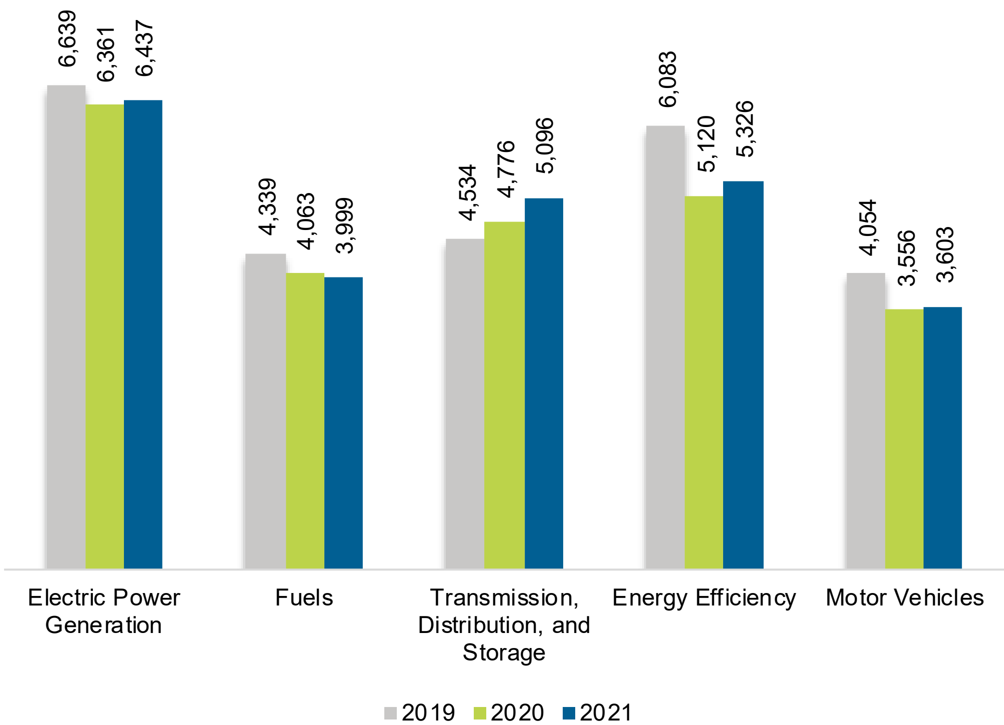
Hawaii

ENERGY AND EMPLOYMENT — 2022

Overview

Hawaii had 24,461 energy workers statewide in 2021, representing 0.3% of all U.S. energy jobs. Of these energy jobs, 6,437 are in electric power generation; 3,999 in fuels; 5,096 in transmission, distribution, and storage; 5,326 in energy efficiency; and 3,603 in motor vehicles. From 2020 to 2021, energy jobs in the state increased 585 jobs, or 2.4%. The energy sector in Hawaii represents 4.2% of total state employment.

Figure HI-1.
Employment by Major Energy Technology Application

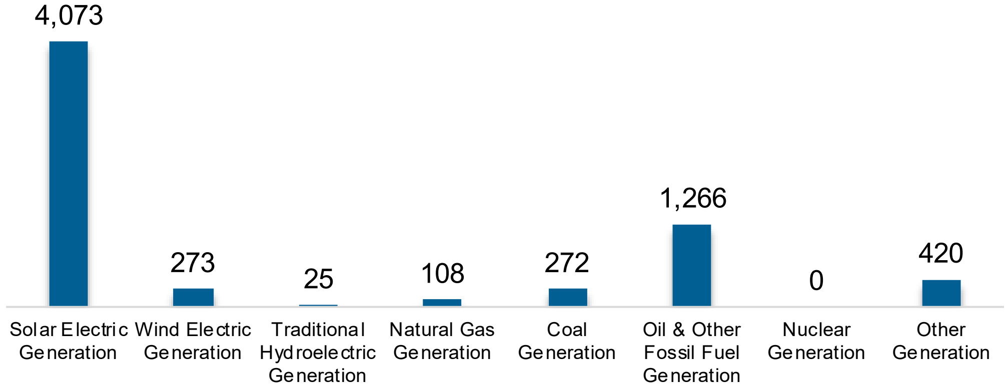


Breakdown by Technology Applications

Electric Power Generation

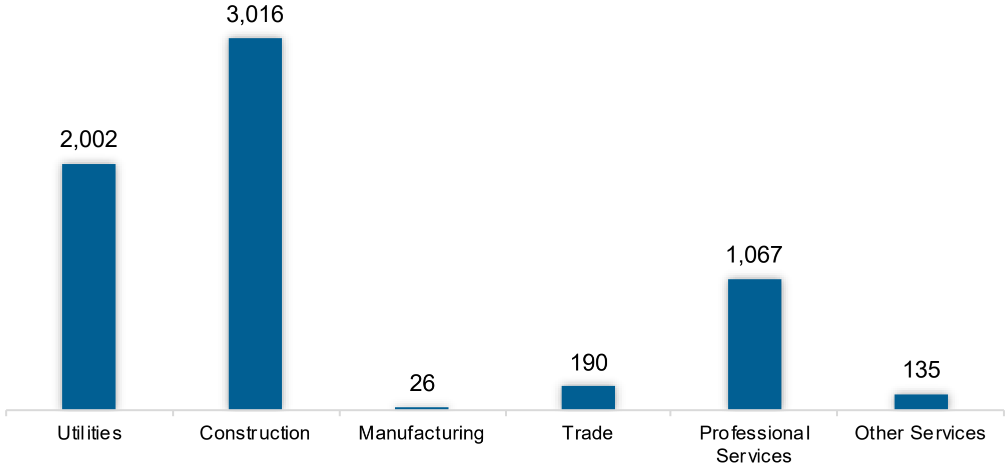
The electric power generation sector employed 6,437 workers in Hawaii, 0.8% of the national electricity total, and added 76 jobs over the past year (1.2%).

Figure HI-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 46.9% of jobs. Utilities is second largest with 31.1%.

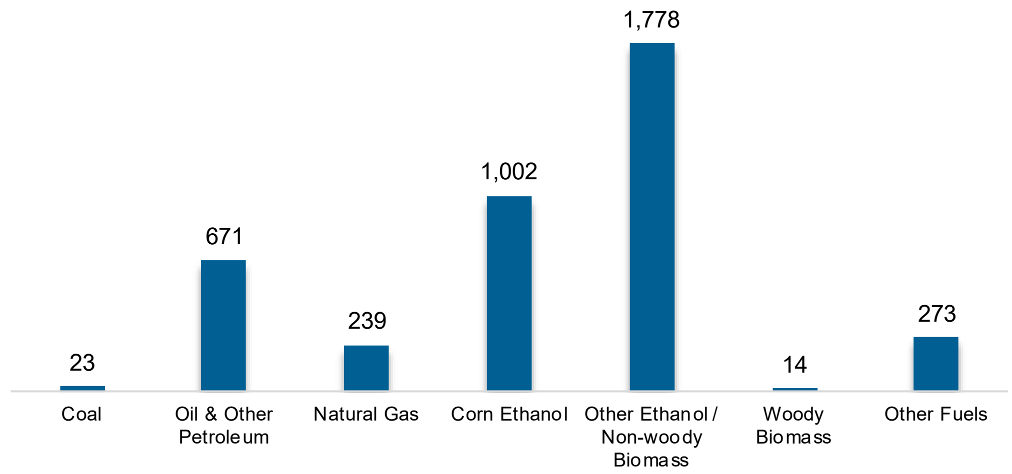
Figure HI-3.
Electric Power Generation Employment by Industry Sector



Fuels

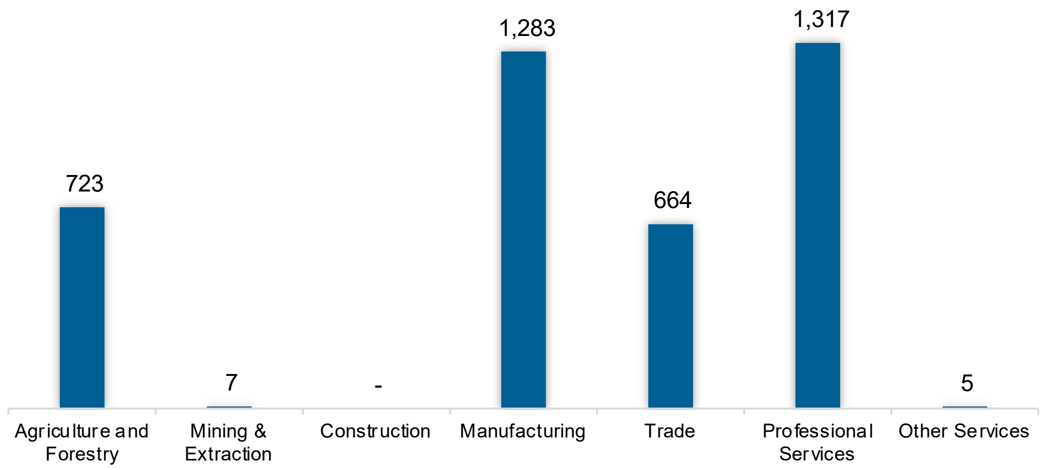
The fuel sector employed 3,999 workers in Hawaii, 0.4% of the national total in fuels. The sector lost 64 jobs and decreased 1.6% in the past year.

Figure HI-4.
Fuels Employment by Detailed Technology Application



Professional and business services jobs represent 32.9% of fuel jobs in Hawaii.

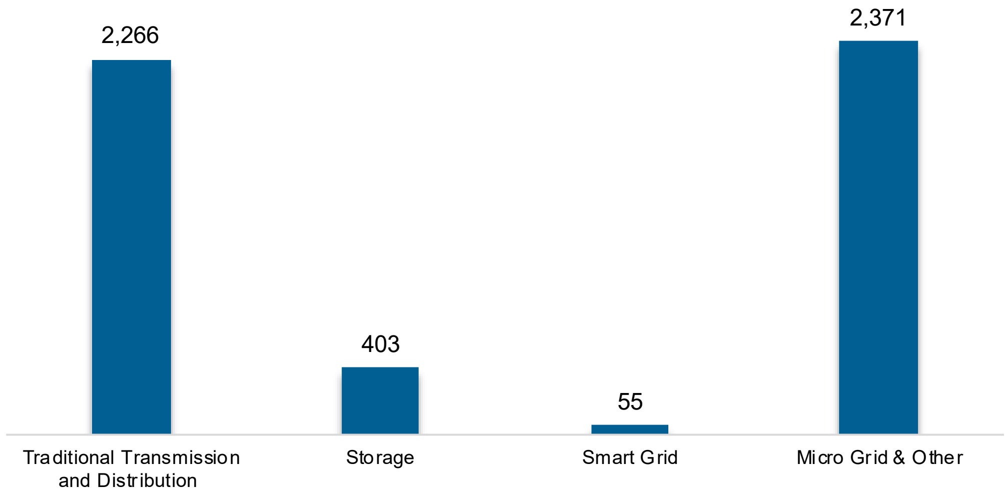
Figure HI-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

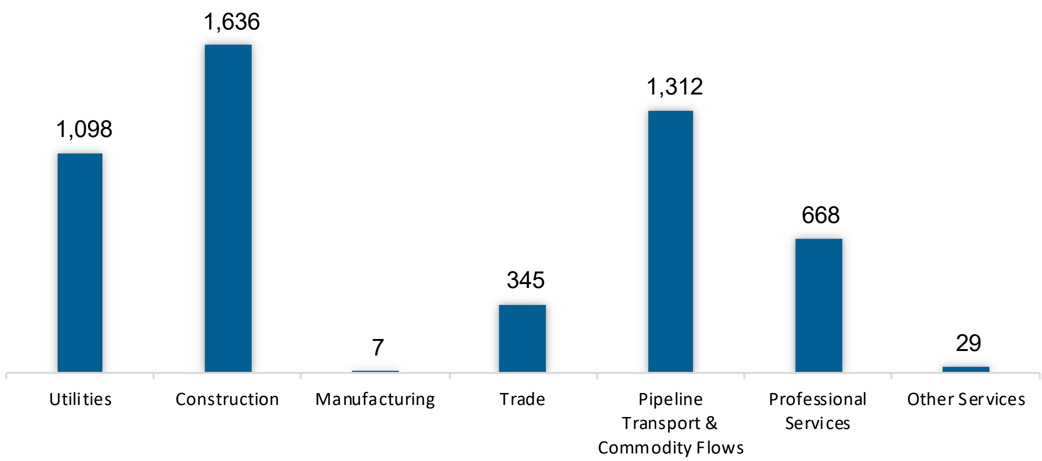
The transmission, distribution, and storage (TDS) sector employed 5,096 workers in Hawaii, 0.4% of the national TDS total. The sector gained 320 jobs and increased 6.7% in the past year.

Figure HI-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in Hawaii, accounting for 32.1% of the sector's jobs statewide.

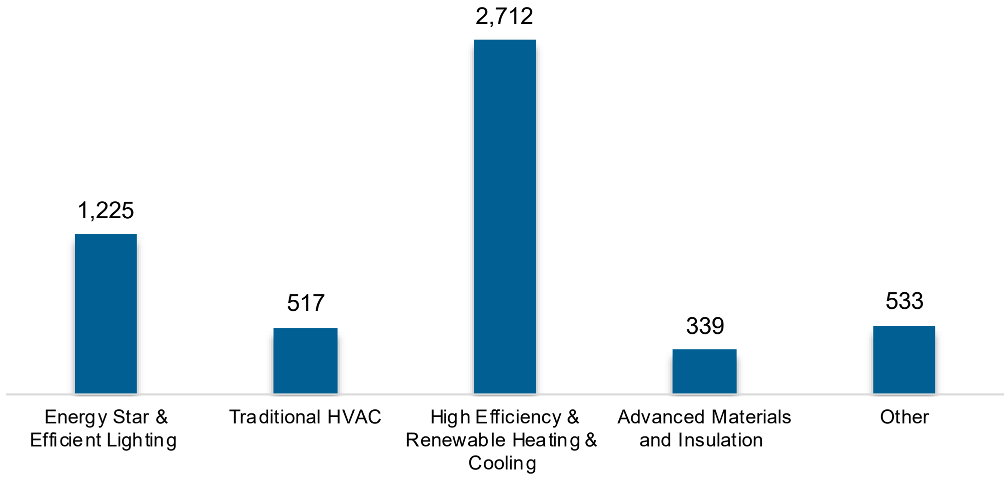
Figure HI-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

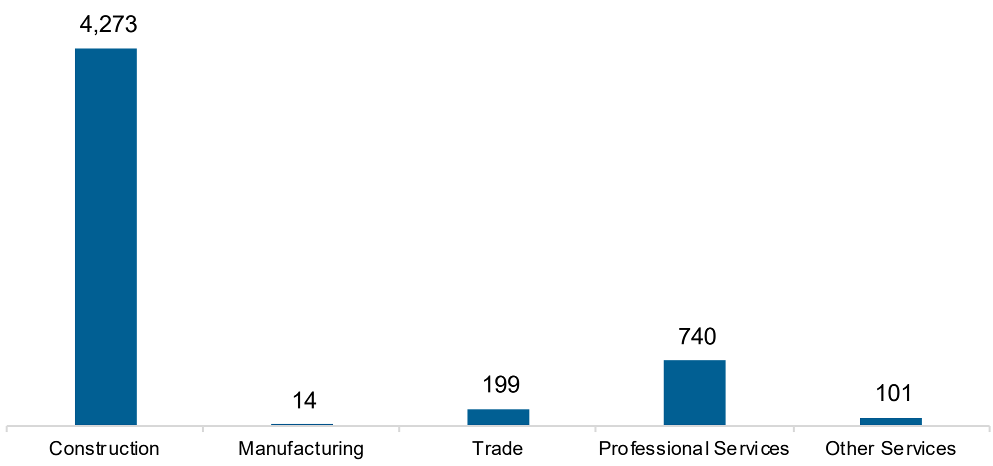
The energy efficiency (EE) sector employed 5,326 workers in Hawaii, 0.2% of the national EE total. The EE sector added 205 jobs and increased 4% in the past year.

Figure HI-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

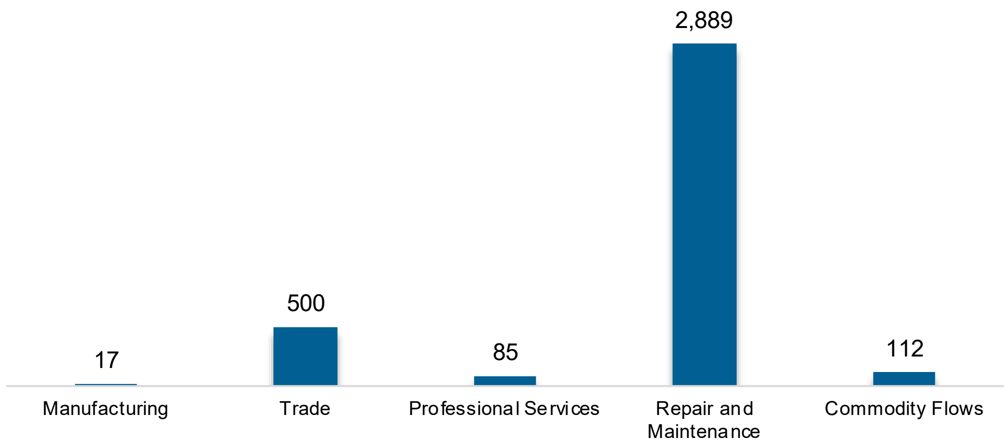
Figure HI-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 3,603 workers in Hawaii, 0.1% of the national total for the sector. Motor vehicles and component parts added 48 jobs and increased 1.3% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure HI-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Hawaii are less optimistic than their peers across the country about energy sector job growth over the next year.

Table HI-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.1	2.2
Electric Power Transmission, Distribution, and Storage	0.6	1.1
Energy Efficiency	0.9	1.7
Fuels	1.5	3.0
Motor Vehicles	1.6	3.2

Hiring Difficulty

Employers in Hawaii reported 63.7% overall hiring difficulty.

Table HI-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	30.3	33.4	5.2	31.1	63.7

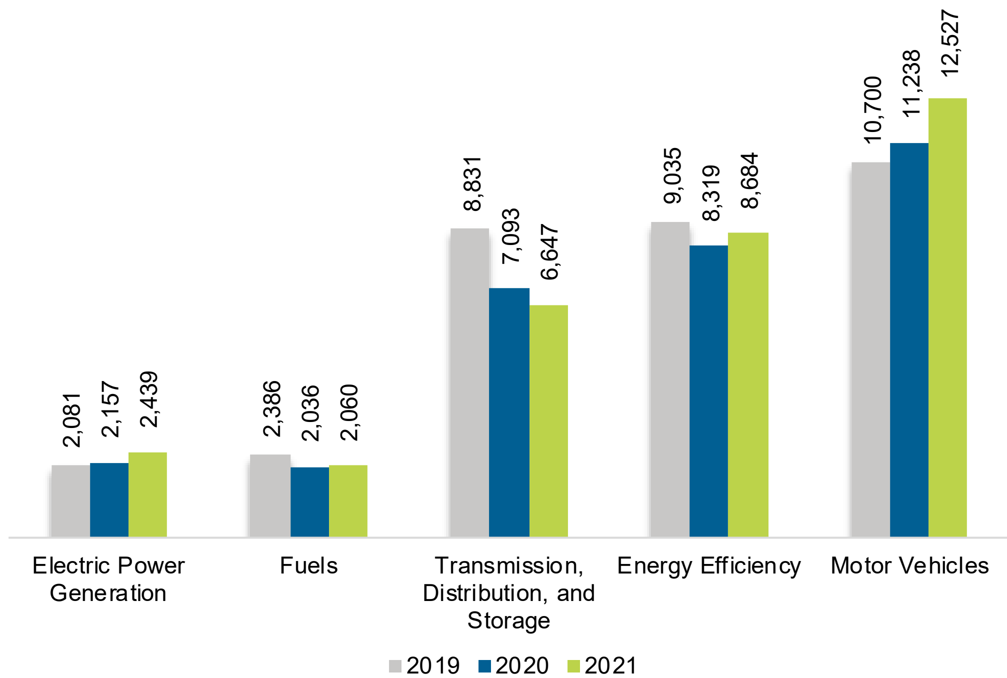
Idaho

ENERGY AND EMPLOYMENT — 2022

Overview

Idaho had 32,356 energy workers statewide in 2021, representing 0.4% of all U.S. energy jobs. Of these energy jobs, 2,439 are in electric power generation; 2,060 in fuels; 6,647 in transmission, distribution, and storage; 8,684 in energy efficiency; and 12,527 in motor vehicles. From 2020 to 2021, energy jobs in the state increased 1,513 jobs, or 4.9%. The energy sector in Idaho represents 4.1% of total state employment.

Figure ID-1.
Employment by Major Energy Technology Application

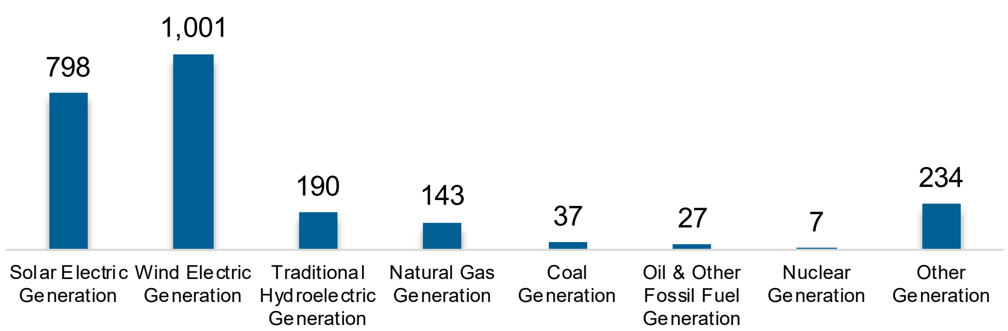


Breakdown by Technology Applications

Electric Power Generation

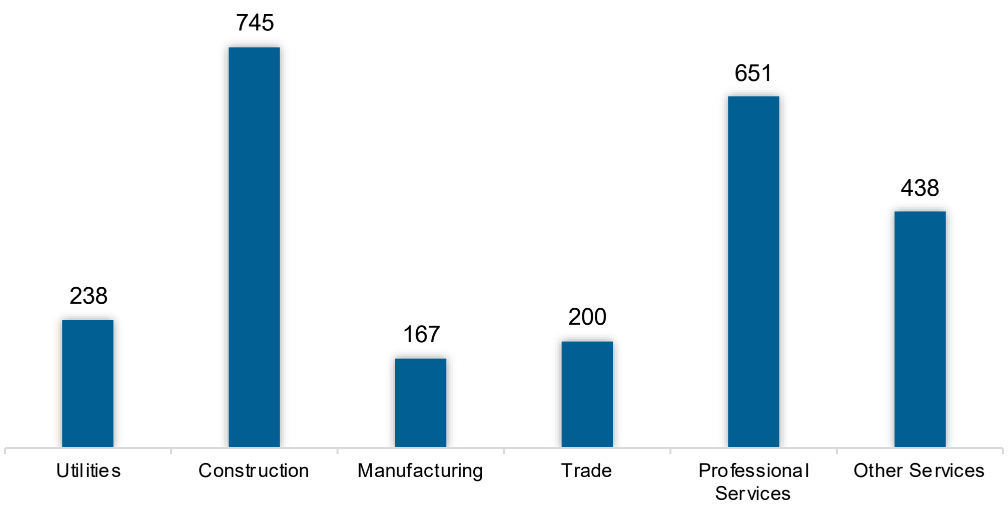
The electric power generation sector employed 2,439 workers in Idaho, 0.3% of the national electricity total, and added 282 jobs over the past year (13.1%).

Figure ID-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 30.5% of jobs. Professional and business services is second largest with 26.7%.

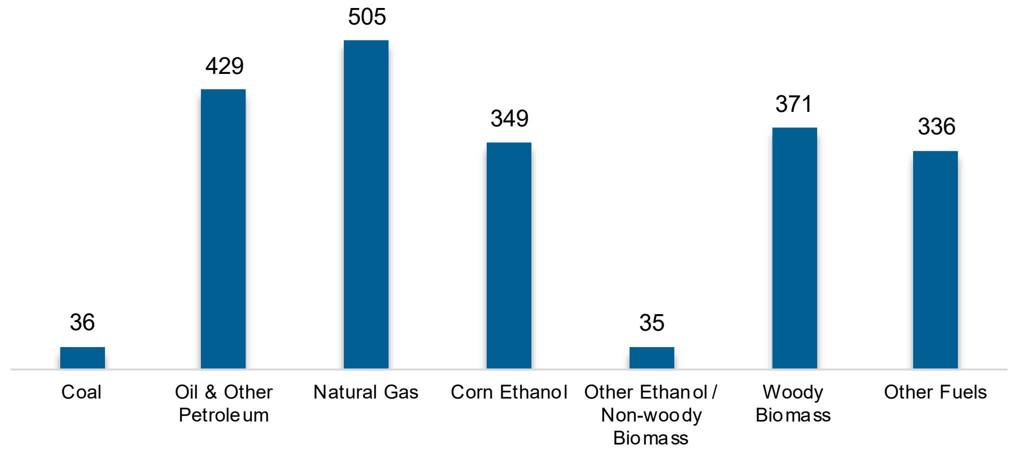
Figure ID-3.
Electric Power Generation Employment by Industry Sector



Fuels

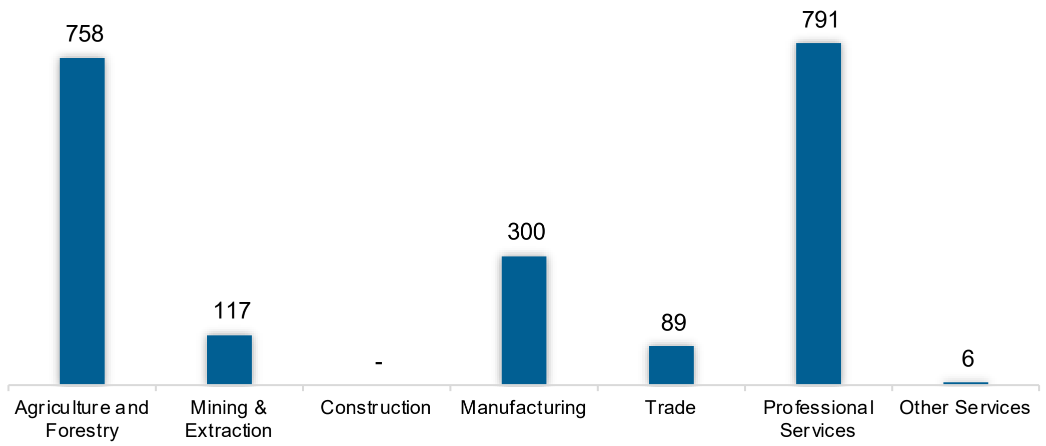
The fuel sector employed 2,060 workers in Idaho, 0.2% of the national total in fuels. The sector gained 24 jobs and increased 1.2% in the past year.

Figure ID-4.
Fuels Employment by Detailed Technology Application



Professional and business services jobs represent 38.4% of fuel jobs in Idaho.

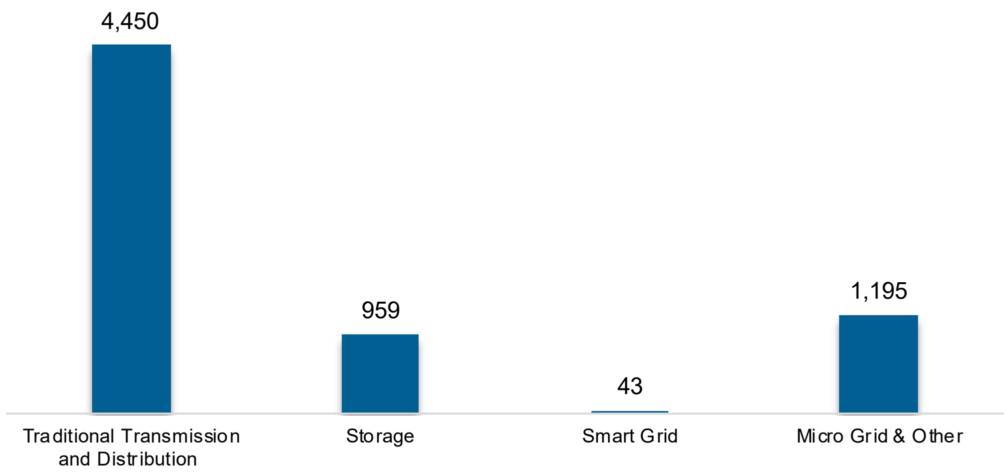
Figure ID-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

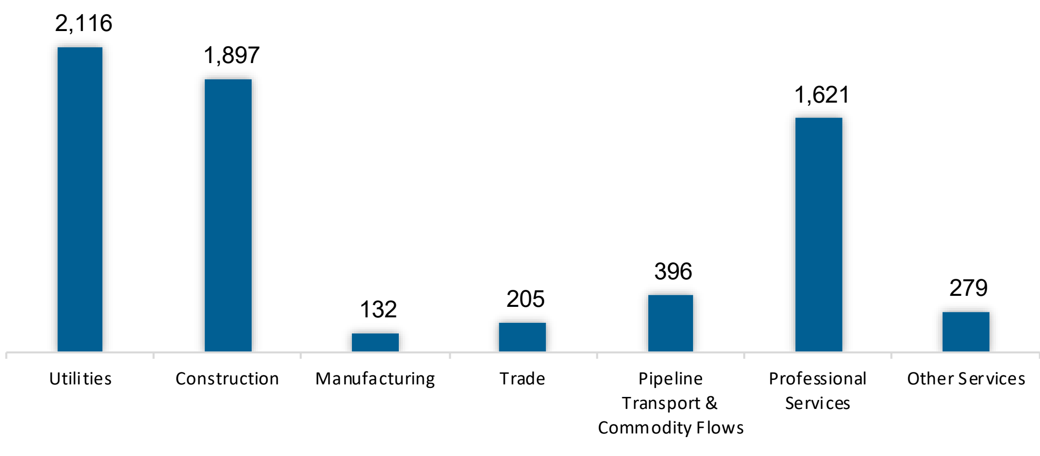
The transmission, distribution, and storage (TDS) sector employed 6,647 workers in Idaho, 0.2% of the national TDS total. The sector lost 447 jobs and decreased 6.3% in the past year.

Figure ID-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Idaho, accounting for 31.8% of the sector's jobs statewide.

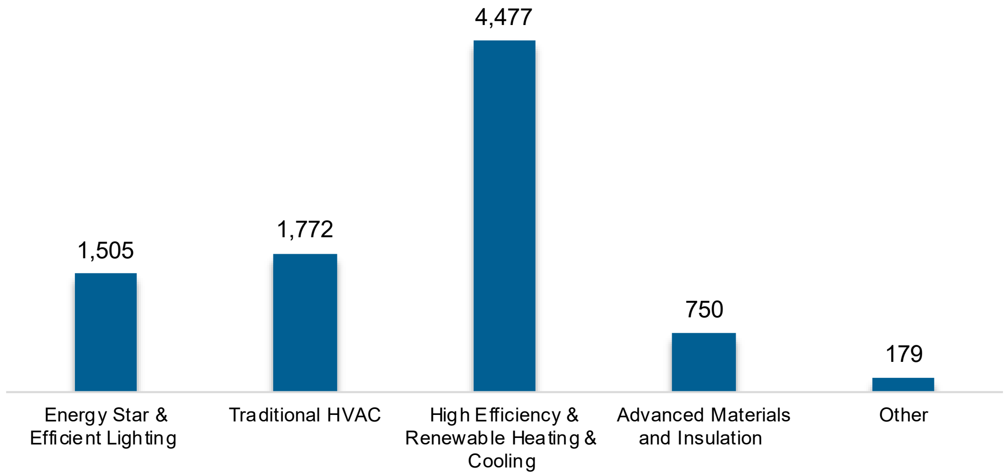
Figure ID-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

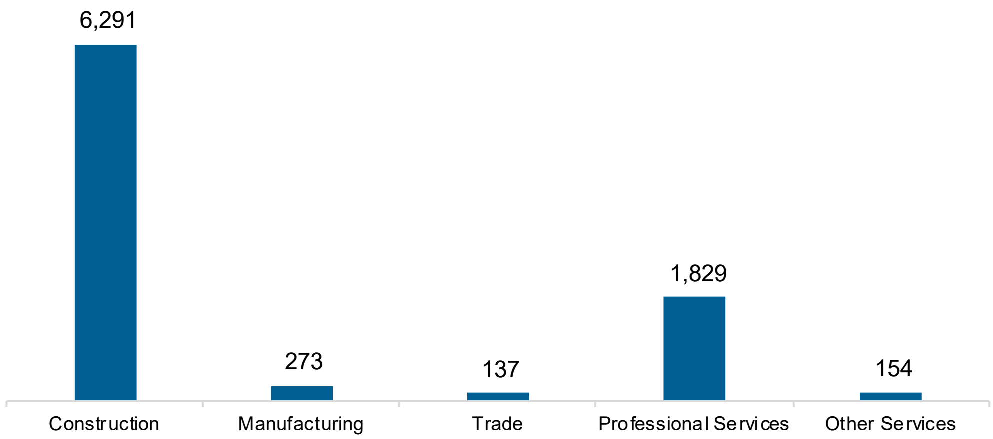
The energy efficiency (EE) sector employed 8,684 workers in Idaho, 0.4% of the national EE total. The EE sector added 365 jobs and increased 4.4% in the past year.

Figure ID-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

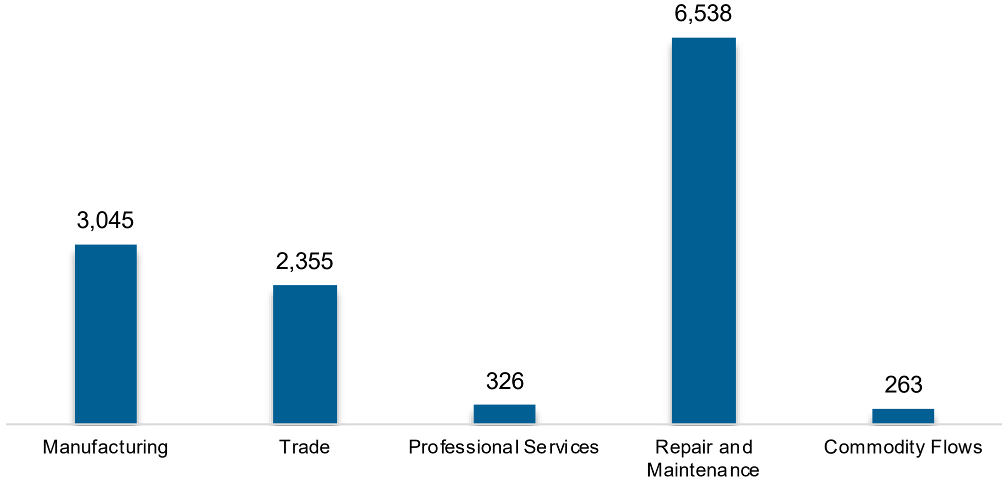
Figure ID-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 12,527 workers in Idaho, 0.5% of the national total for the sector. Motor vehicles and component parts added 1,288 jobs and increased 11.5% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure ID-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Idaho are less optimistic than their peers across the country about energy sector job growth over the next year.

Table ID-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	-0.4	2.2
Electric Power Transmission, Distribution, and Storage	-0.9	1.1
Energy Efficiency	-0.6	1.7
Fuels	0.0	3.0
Motor Vehicles	0.1	3.2

Hiring Difficulty

Employers in Idaho reported 50.9% overall hiring difficulty.

Table ID-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	25.3	25.7	10.8	38.3	50.9

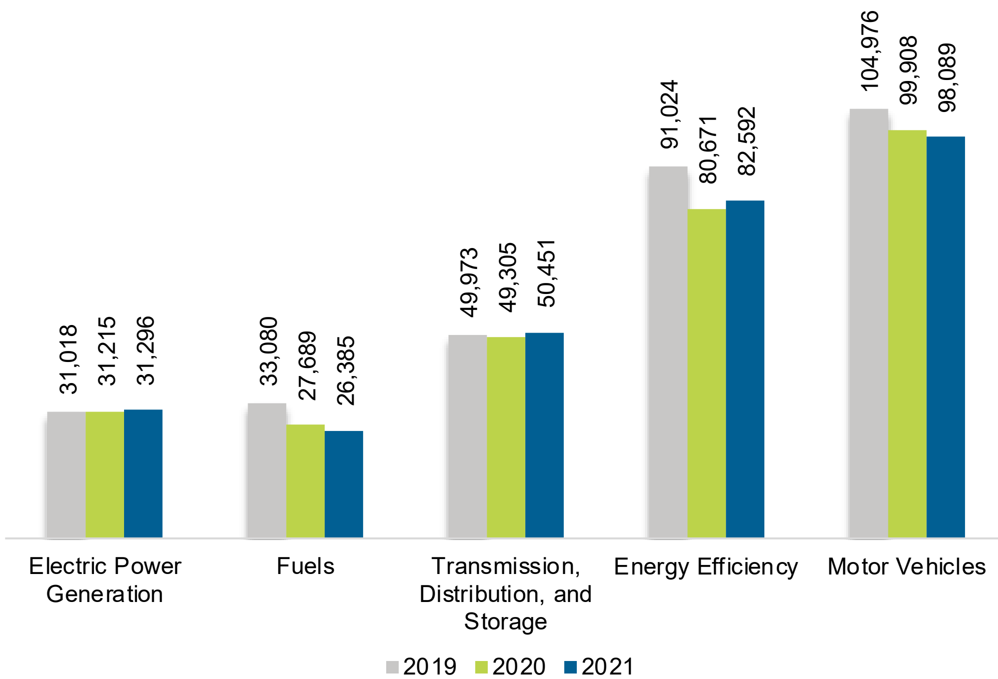
Illinois

ENERGY AND EMPLOYMENT — 2022

Overview

Illinois had 288,814 energy workers statewide in 2021, representing 3.7% of all U.S. energy jobs. Of these energy jobs, 31,296 are in electric power generation; 26,385 in fuels; 50,451 in transmission, distribution, and storage; 82,592 in energy efficiency; and 98,089 in motor vehicles. From 2020 to 2021, energy jobs in the state increased 26 jobs, effectively 0%. The energy sector in Illinois represents 5.1% of total state employment.

Figure IL-1.
Employment by Major Energy Technology Application

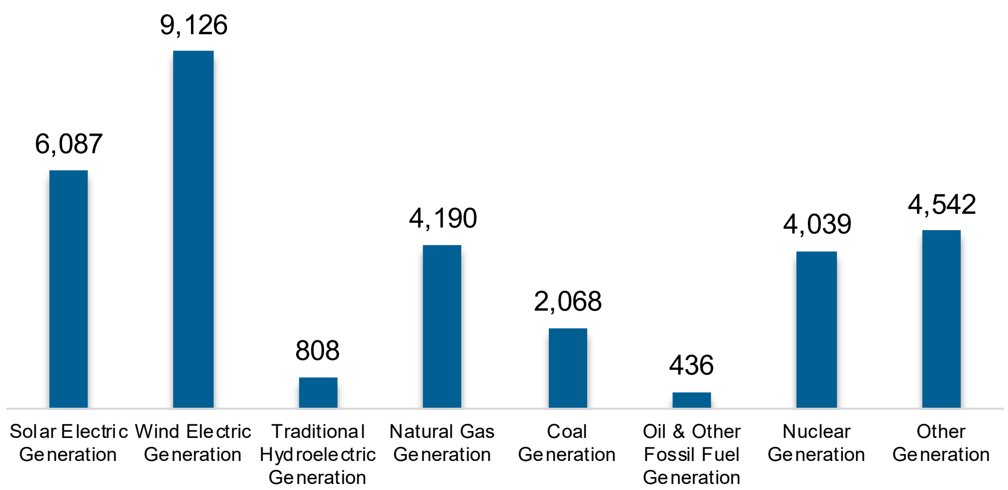


Breakdown by Technology Applications

Electric Power Generation

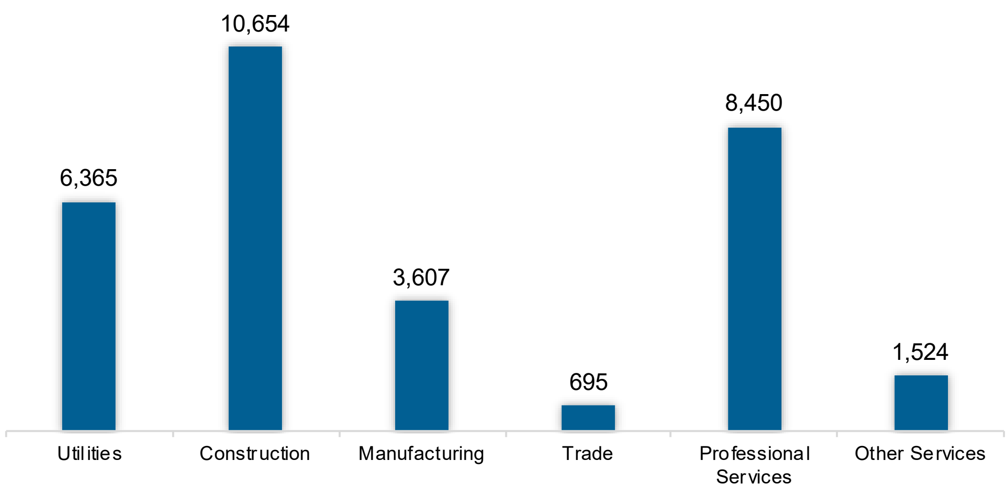
The electric power generation sector employed 31,296 workers in Illinois, 3.6% of the national electricity total, and added 81 jobs over the past year (0.3%).

Figure IL-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 34% of jobs. Professional and business services is second largest with 27%.

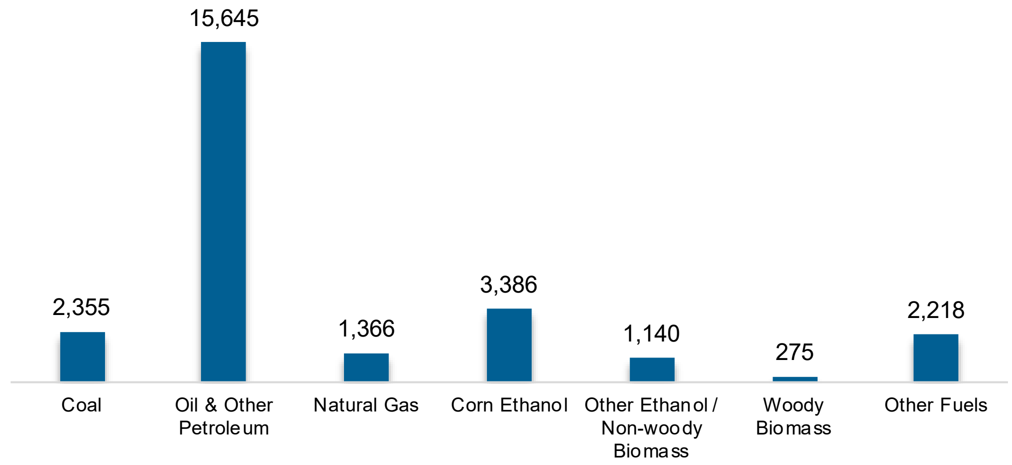
Figure IL-3.
Electric Power Generation Employment by Industry Sector



Fuels

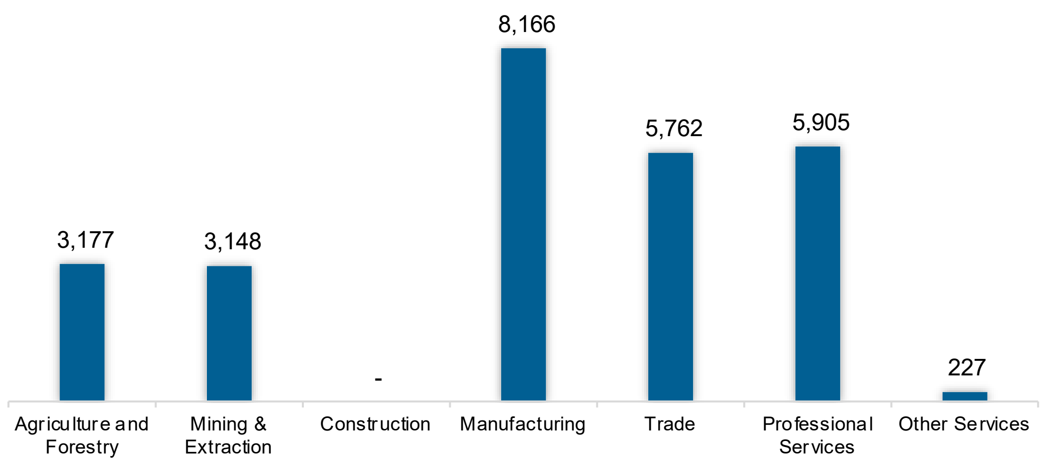
The fuel sector employed 26,385 workers in Illinois, 2.9% of the national total in fuels. The sector lost 1,303 jobs and decreased 4.7% in the past year.

Figure IL-4.
Fuels Employment by Detailed Technology Application



Manufacturing jobs represent 30.9% of fuels jobs in Illinois.

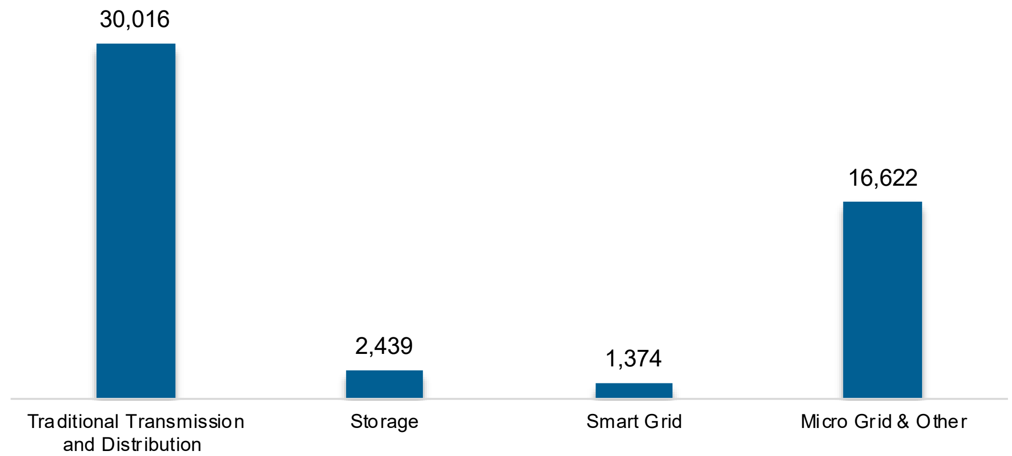
Figure IL-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

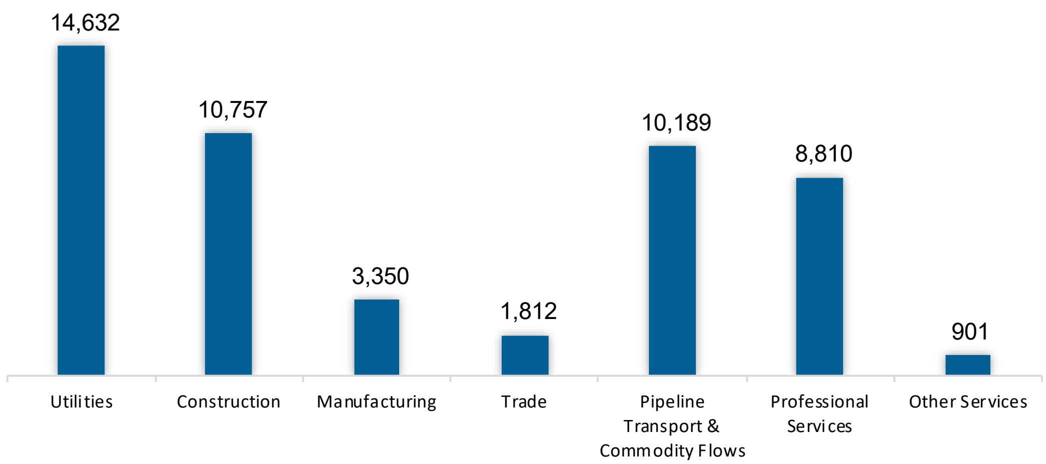
The transmission, distribution, and storage (TDS) sector employed 50,451 workers in Illinois, 2.9% of the national TDS total. The sector gained 1,146 jobs and increased 2.3% in the past year.

Figure IL-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Illinois, accounting for 29% of the sector's jobs statewide.

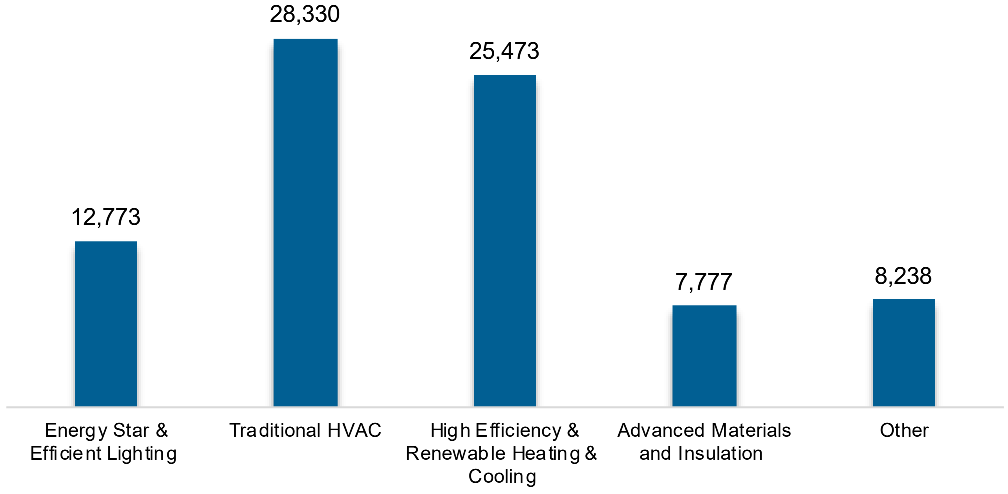
Figure IL-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

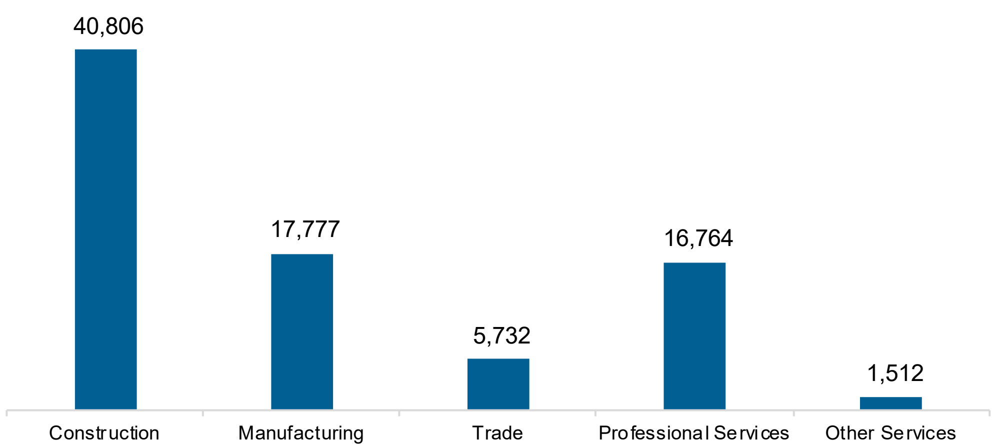
The energy efficiency (EE) sector employed 82,592 workers in Illinois, 3.8% of the national EE total. The EE sector added 1,921 jobs and increased 2.4% in the past year.

Figure IL-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

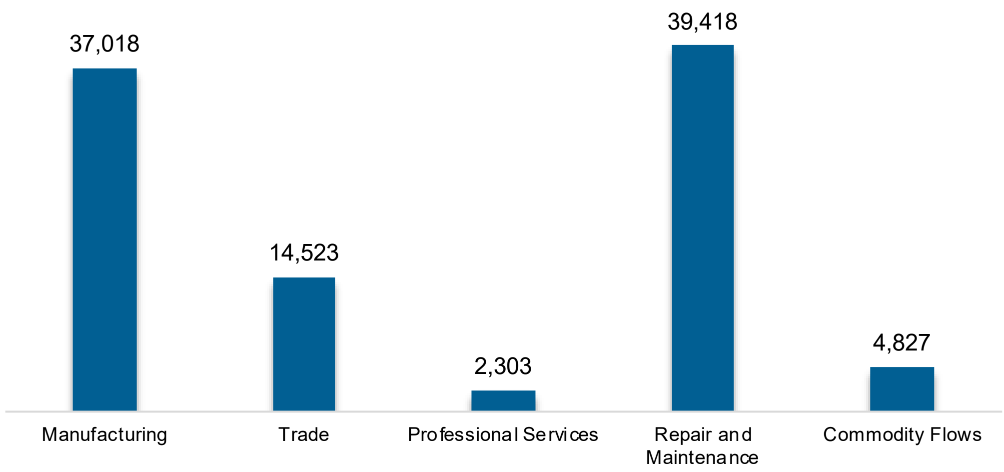
Figure IL-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 98,089 workers in Illinois, 3.8% of the national total for the sector. Motor vehicles and component parts lost 1,819 jobs and decreased 1.8% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure IL-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Illinois are more optimistic than their peers across the country about energy sector job growth over the next year.

Table IL-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	2.5	2.2
Electric Power Transmission, Distribution, and Storage	2.0	1.1
Energy Efficiency	2.3	1.7
Fuels	2.9	3.0
Motor Vehicles	3.0	3.2

Hiring Difficulty

Employers in Illinois reported 51.5% overall hiring difficulty.

Table IL-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	24.1	27.3	8.8	39.7	51.5

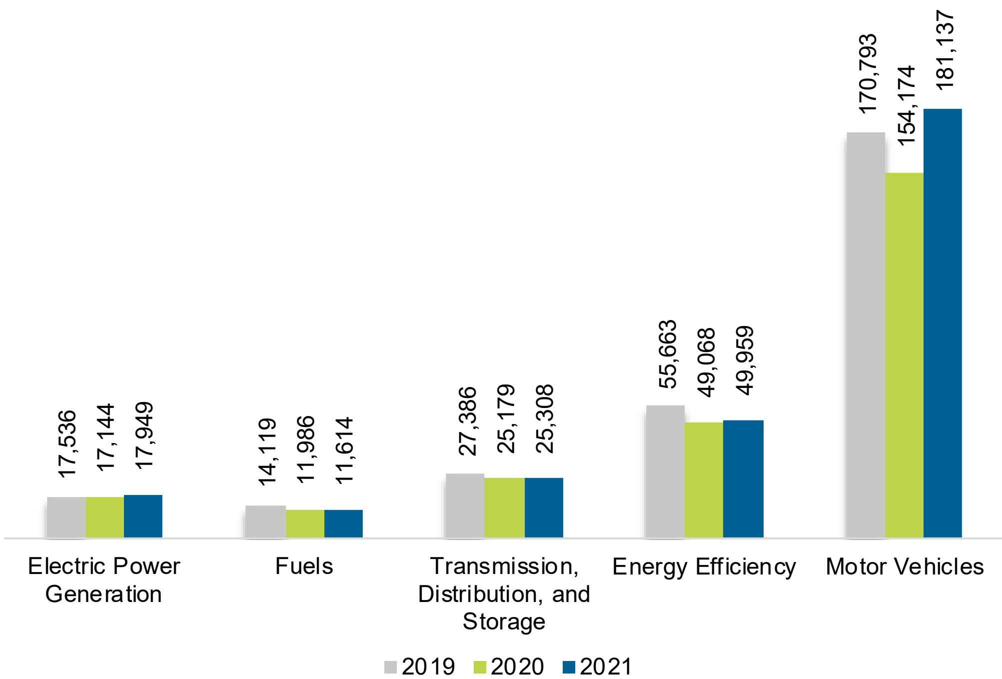
Indiana

ENERGY AND EMPLOYMENT — 2022

Overview

Indiana had 285,967 energy workers statewide in 2021, representing 3.7% of all U.S. energy jobs. Of these energy jobs, 17,949 are in electric power generation; 11,614 in fuels; 25,308 in transmission, distribution, and storage; 49,959 in energy efficiency; and 181,137 in motor vehicles. From 2020 to 2021, energy jobs in the state increased 28,415 jobs, or 11%. The energy sector in Indiana represents 9.5% of total state employment.

Figure IN-1.
Employment by Major Energy Technology Application

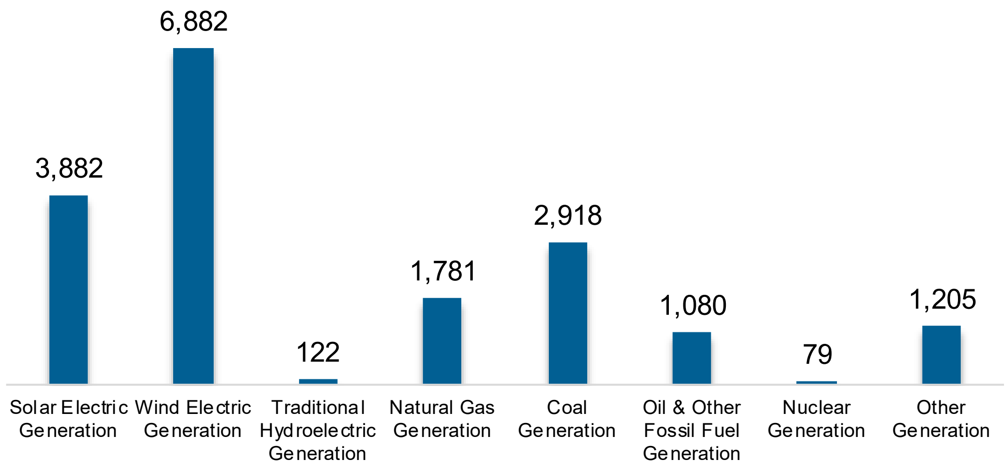


Breakdown by Technology Applications

Electric Power Generation

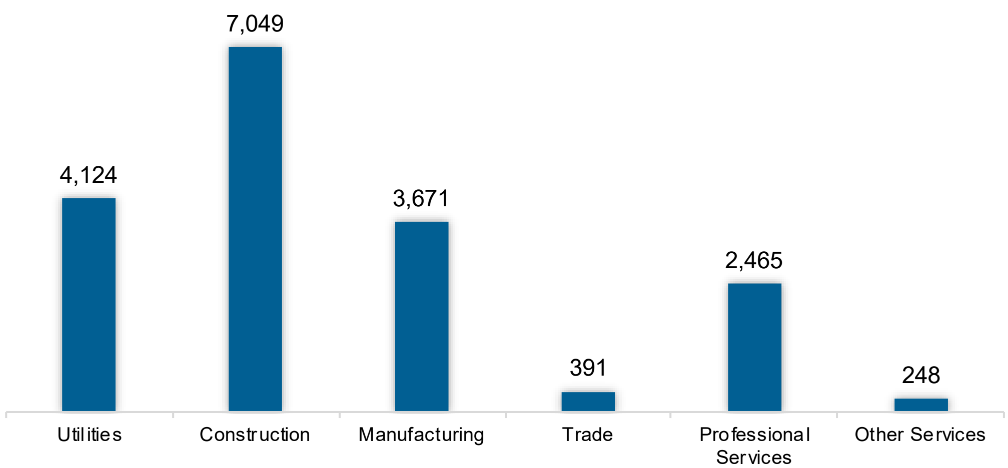
The electric power generation sector employed 17,949 workers in Indiana, 2.1% of the national electricity total, and added 804 jobs over the past year (4.7%).

Figure IN-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 39.3% of jobs. Utilities is second largest with 23%.

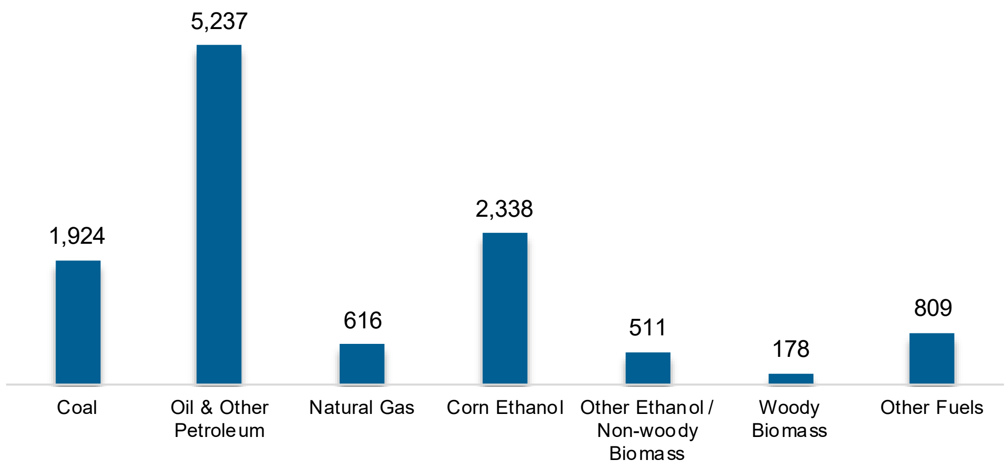
Figure IN-3.
Electric Power Generation Employment by Industry Sector



Fuels

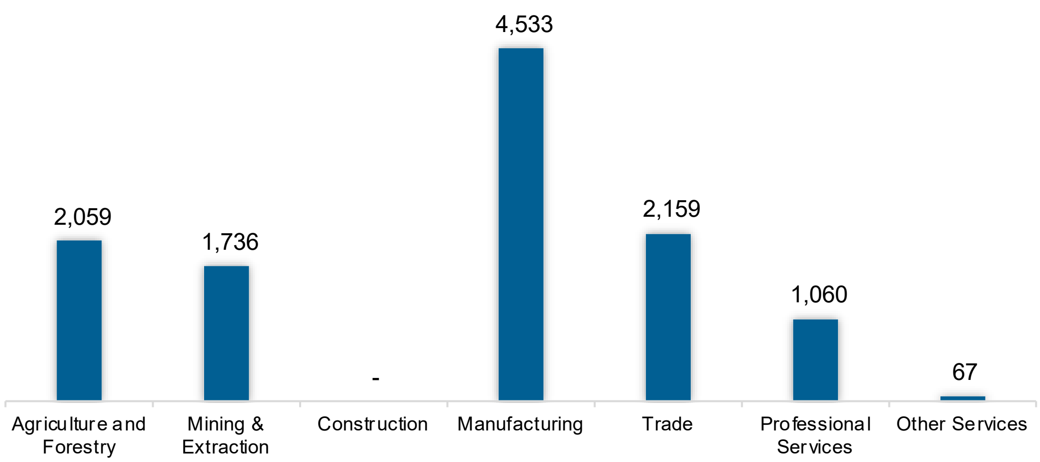
The fuel sector employed 11,614 workers in Indiana, 1.3% of the national total in fuels. The sector lost 372 jobs and decreased 3.1% in the past year.

Figure IN-4.
Fuels Employment by Detailed Technology Application



Manufacturing jobs represent 39.0% of fuel jobs in Indiana.

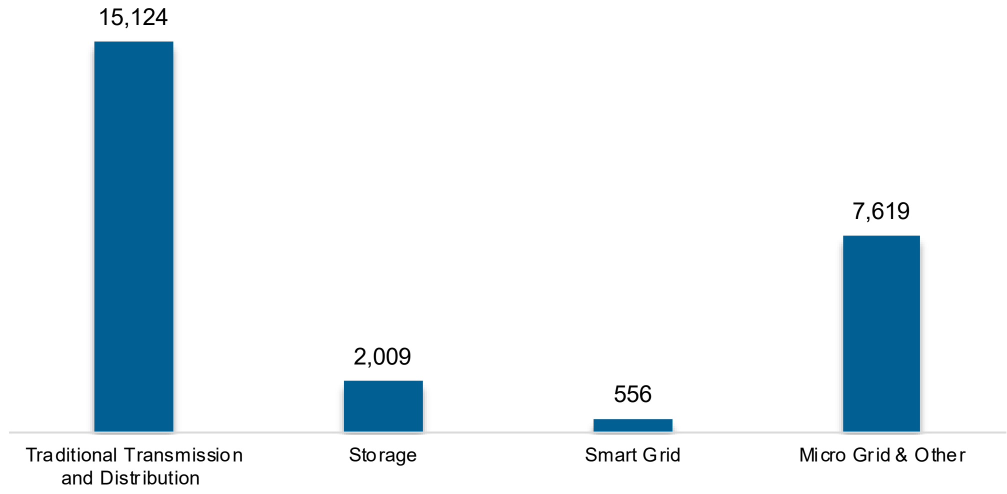
Figure IN-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

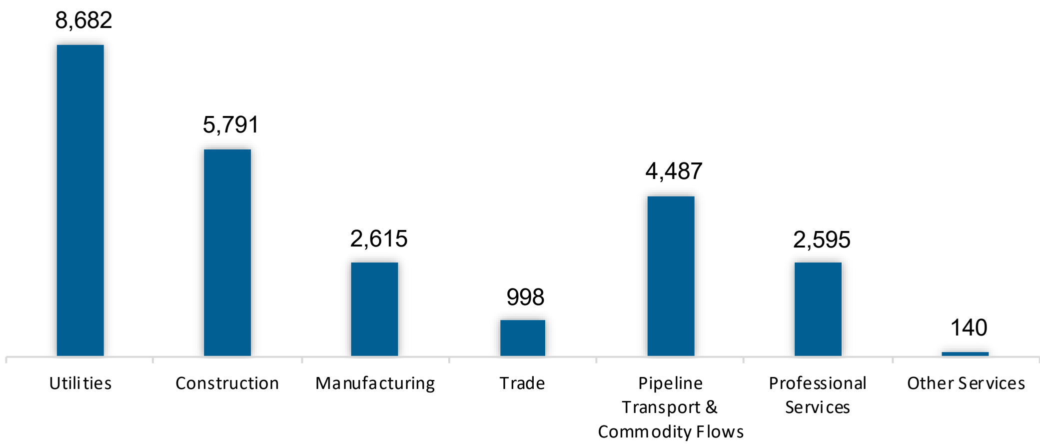
The transmission, distribution, and storage (TDS) sector employed 25,308 workers in Indiana, 1.3% of the national TDS total. The sector gained 129 jobs and increased 0.5% in the past year.

Figure IN-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Indiana, accounting for 34.3% of the sector's jobs statewide.

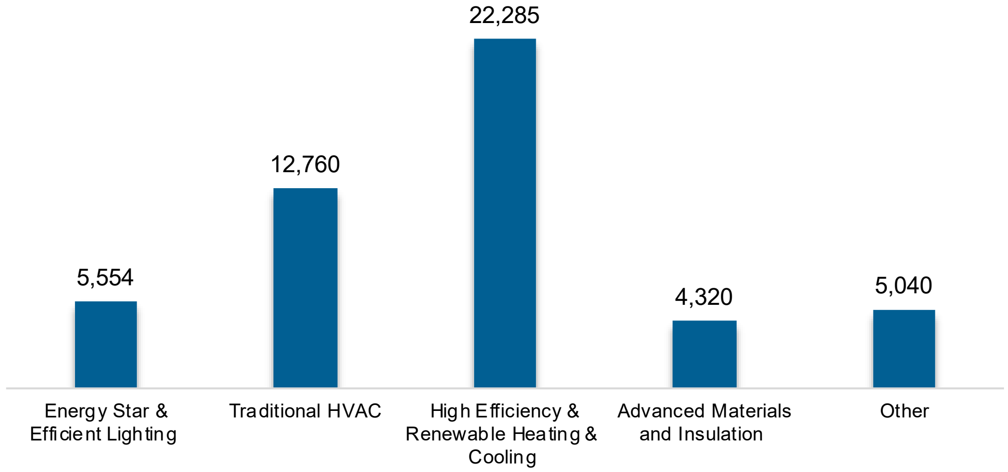
Figure IN-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

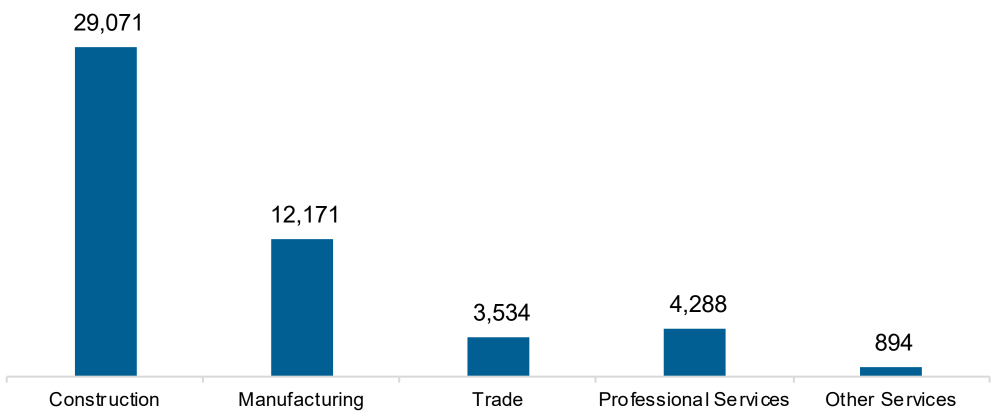
The energy efficiency (EE) sector employed 49,959 workers in Indiana, 2.3% of the national EE total. The EE sector added 891 jobs and increased 1.8% in the past year.

Figure IN-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

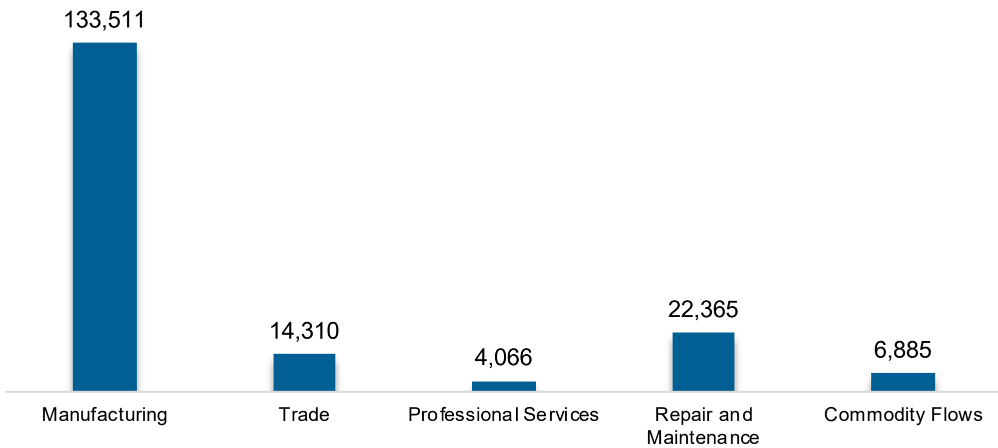
Figure IN-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 181,137 workers in Indiana, 7.1% of the national total for the sector. Motor vehicles and component parts added 26,963 jobs and increased 17.5% in the past year. Manufacturing work represents the largest proportion of motor vehicle jobs.

Figure IN-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Indiana are more optimistic than their peers across the country about energy sector job growth over the next year.

Table IN-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	2.7	2.2
Electric Power Transmission, Distribution, and Storage	2.1	1.1
Energy Efficiency	2.4	1.7
Fuels	3.1	3.0
Motor Vehicles	3.2	3.2

Hiring Difficulty

Employers in Indiana reported 58.9% overall hiring difficulty.

Table IN-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	29.6	29.3	7.5	33.6	58.9

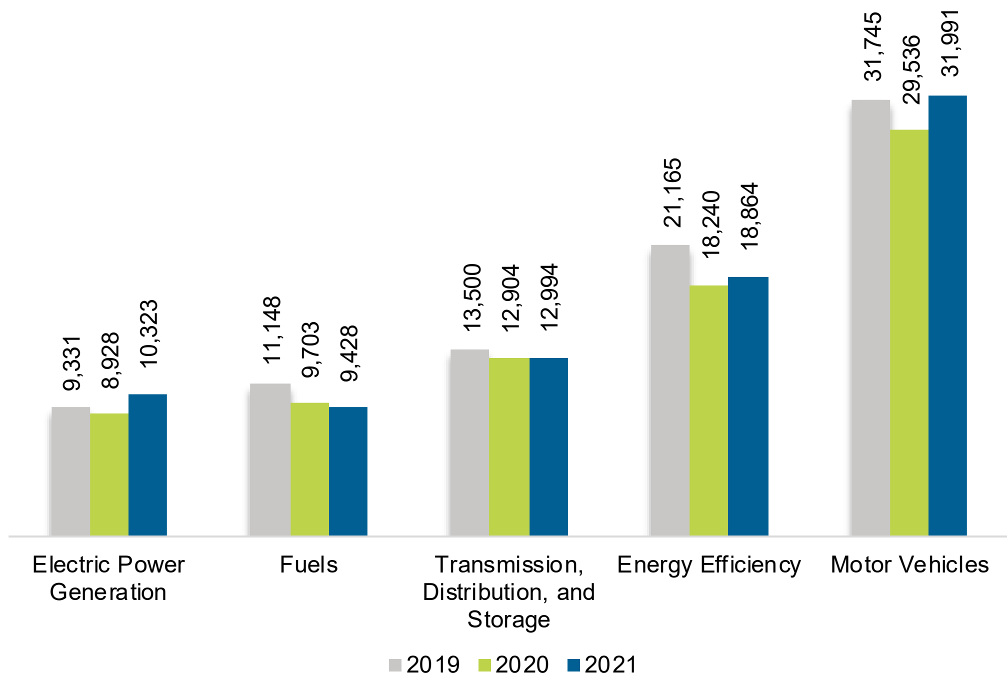
Iowa

ENERGY AND EMPLOYMENT — 2022

Overview

Iowa had 83,599 energy workers statewide in 2021, representing 1.1% of all U.S. energy jobs. Of these energy jobs, 10,323 are in electric power generation; 9,428 in fuels; 12,994 in transmission, distribution, and storage; 18,864 in energy efficiency; and 31,991 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 4,287 jobs, or 5.4%. The energy sector in Iowa represents 5.6% of total state employment

Figure IA-1.
Employment by Major Energy Technology Application

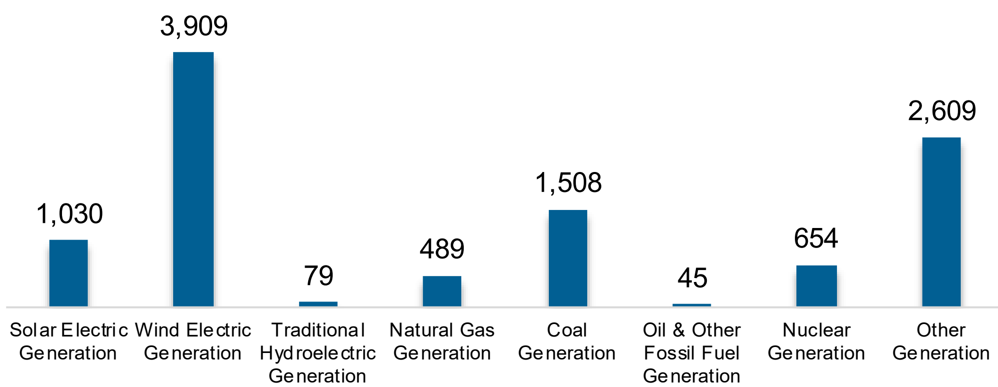


Breakdown by Technology Applications

Electric Power Generation

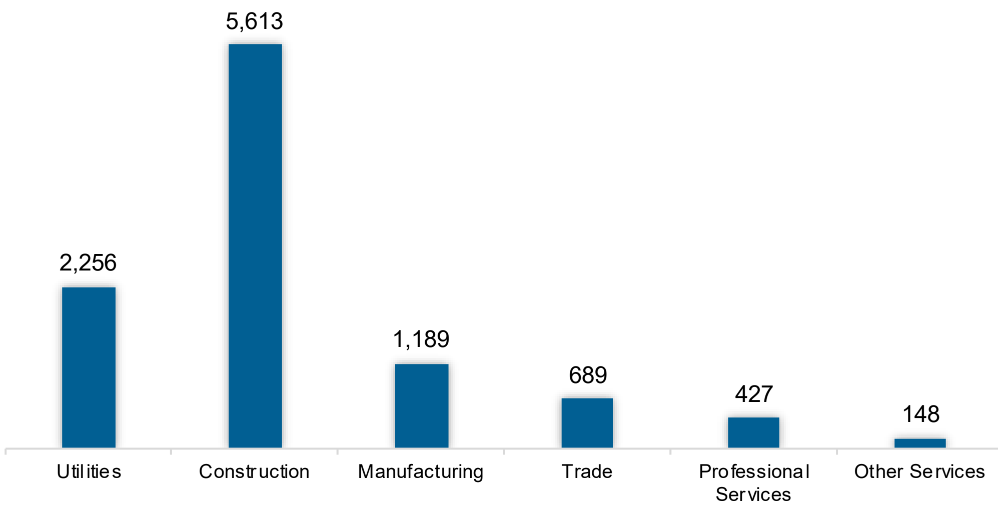
The electric power generation sector employed 10,323 workers in Iowa, 1.2% of the national electricity total, and added 1,394 jobs over the past year (15.6%).

Figure IA-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 54.4% of jobs. Utilities is second largest with 21.9%.

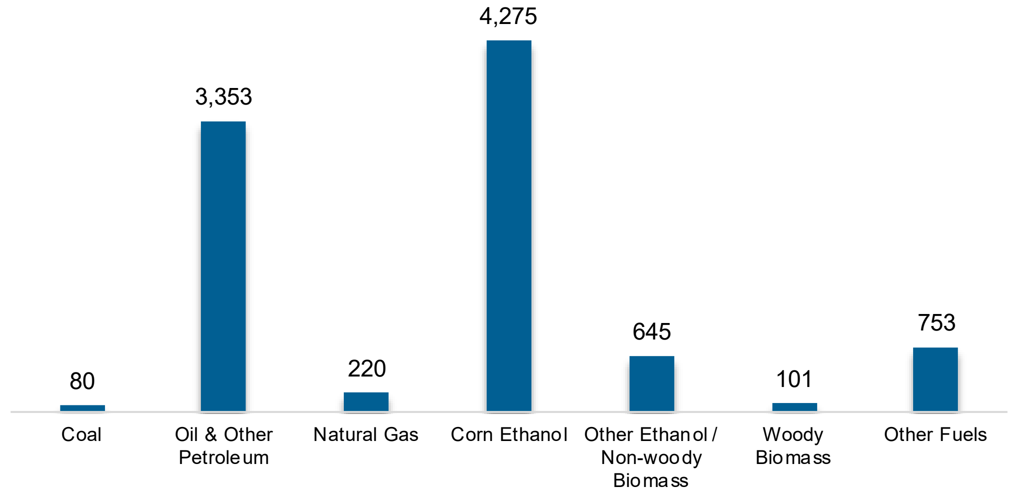
Figure IA-3.
Electric Power Generation Employment by Industry Sector



Fuels

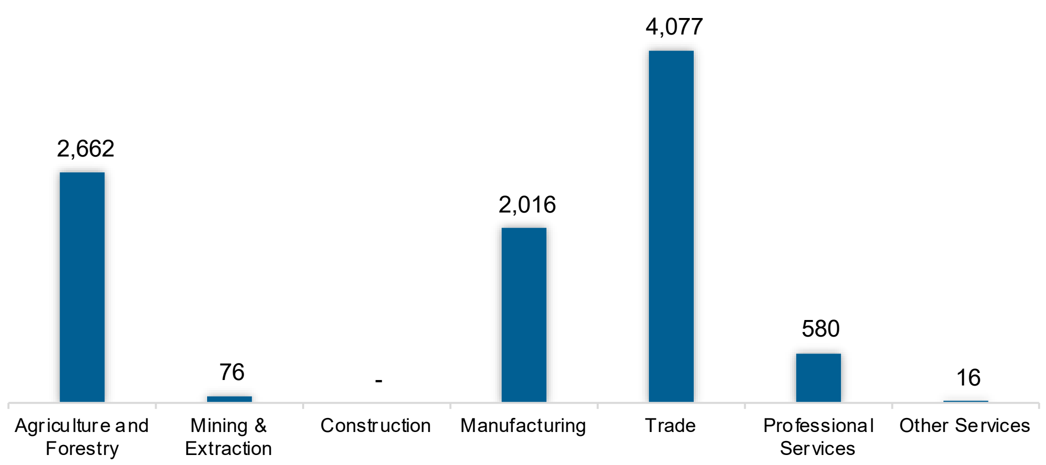
The fuel sector employed 9,428 workers in Iowa, 1% of the national total in fuels. The sector lost 275 jobs and decreased 2.8% in the past year.

Figure IA-4.
Fuels Employment by Detailed Technology Application



Wholesale trade jobs represent 43.2% of fuels jobs in Iowa.

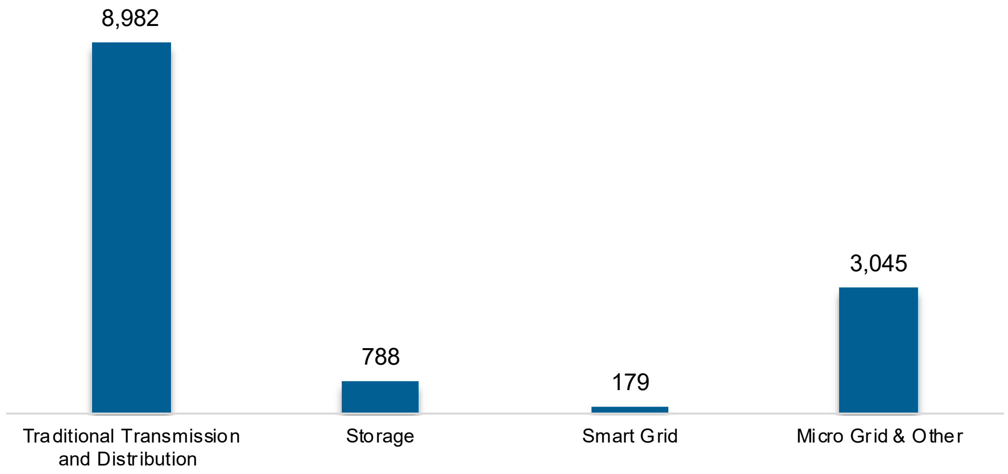
Figure IA-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

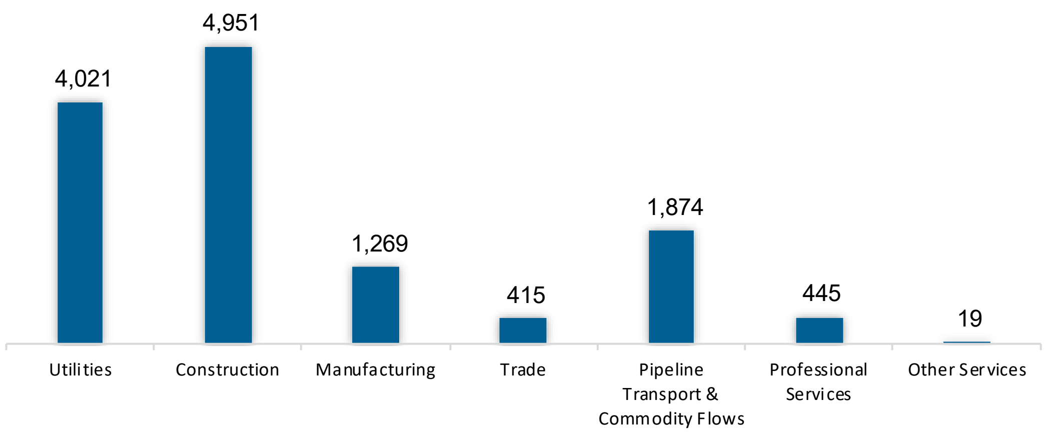
The transmission, distribution, and storage (TDS) sector employed 12,994 workers in Iowa, 1% of the national TDS total. The sector gained 90 jobs and increased 0.7% in the past year.

Figure IA-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in Iowa, accounting for 38.1% of the sector's jobs statewide.

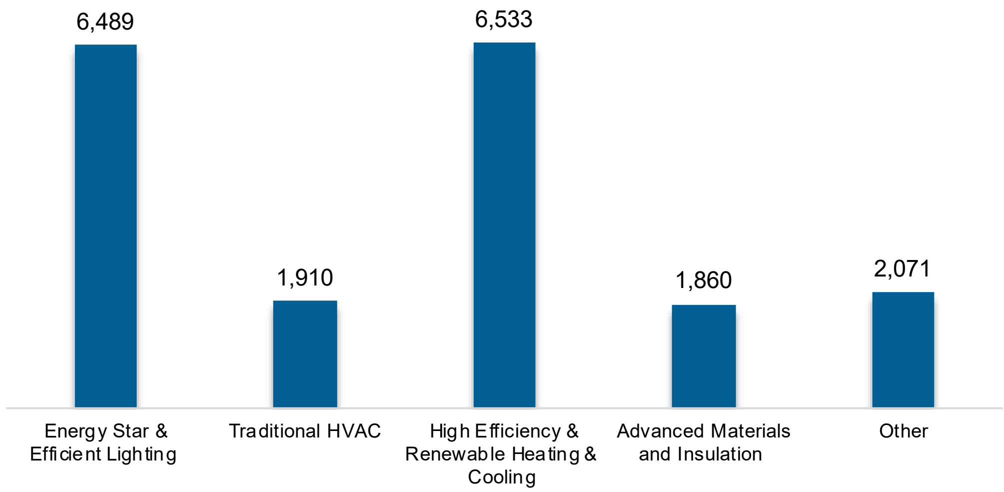
Figure IA-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

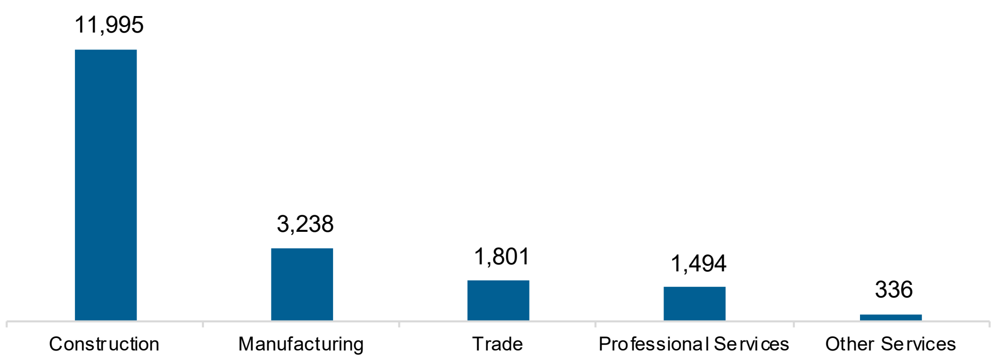
The energy efficiency (EE) sector employed 18,864 workers in Iowa, 0.9% of the national EE total. The EE sector added 624 jobs and increased 3.4% in the past year.

Figure IA-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

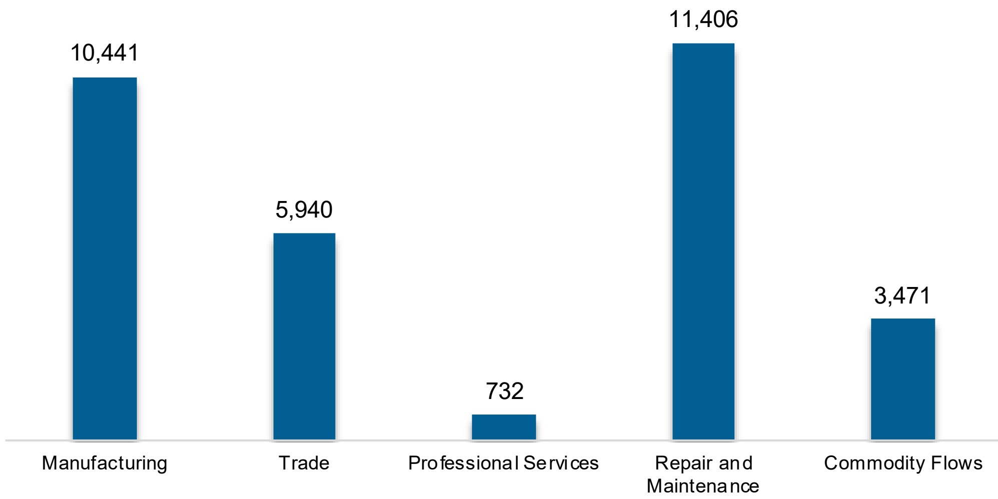
Figure IA-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 31,991 workers in Iowa, 1.3% of the national total for the sector. Motor vehicles and component parts added 2,454 jobs and increased 8.3% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure IA-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Iowa are less optimistic than their peers across the country about energy sector job growth over the next year.

Table IA-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.2	2.2
Electric Power Transmission, Distribution, and Storage	0.7	1.1
Energy Efficiency	1.0	1.7
Fuels	1.6	3.0
Motor Vehicles	1.7	3.2

Hiring Difficulty

Employers in Iowa reported 52.0% overall hiring difficulty.

Table IA-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	23.6	28.4	10.2	37.7	52.0

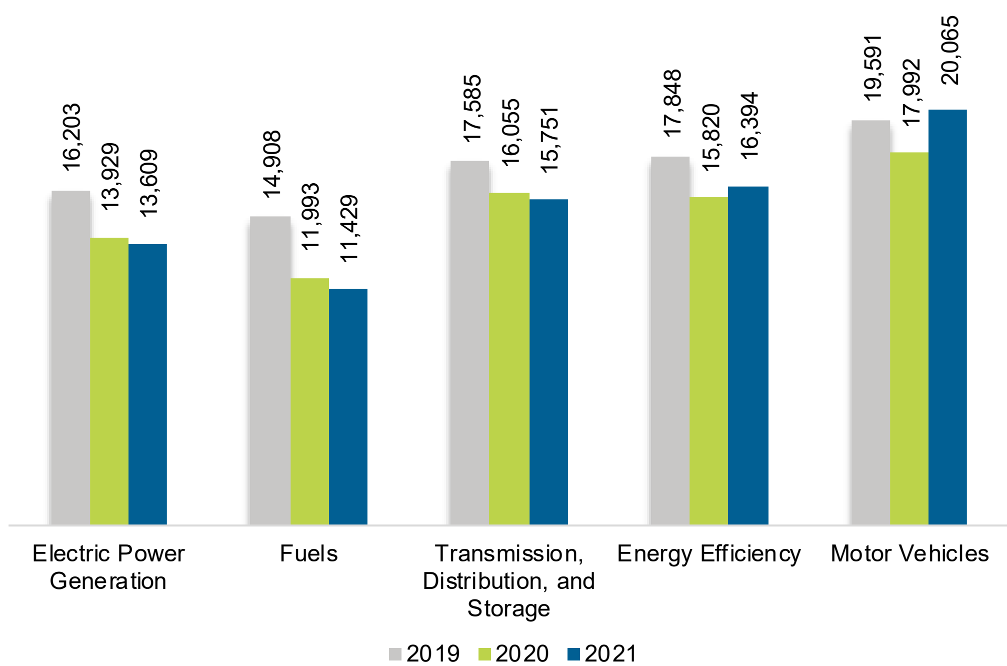
Kansas

ENERGY AND EMPLOYMENT — 2022

Overview

Kansas had 77,247 energy workers statewide in 2021, representing 1% of all U.S. energy jobs. Of these energy jobs, 13,609 are in electric power generation; 11,429 in fuels; 15,751 in transmission, distribution, and storage; 16,394 in energy efficiency; and 20,065 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 1,459 jobs, or 1.9%. The energy sector in Kansas represents 5.7% of total state employment.

Figure KS-1.
Employment by Major Energy Technology Application

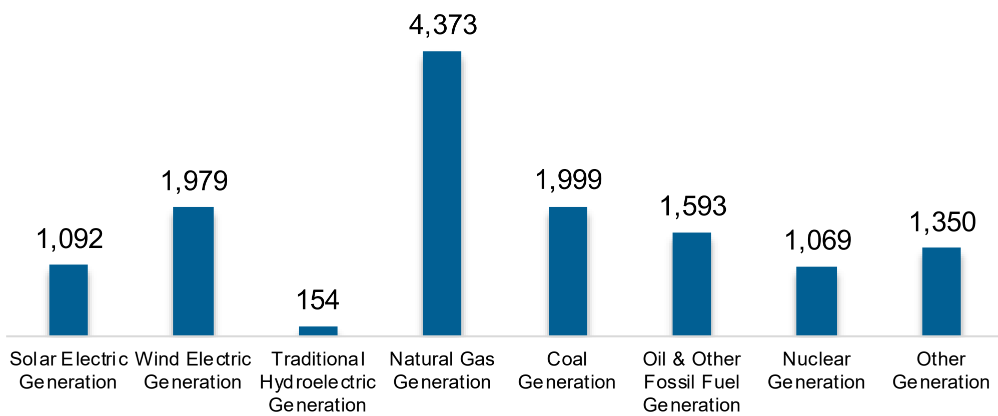


Breakdown by Technology Applications

Electric Power Generation

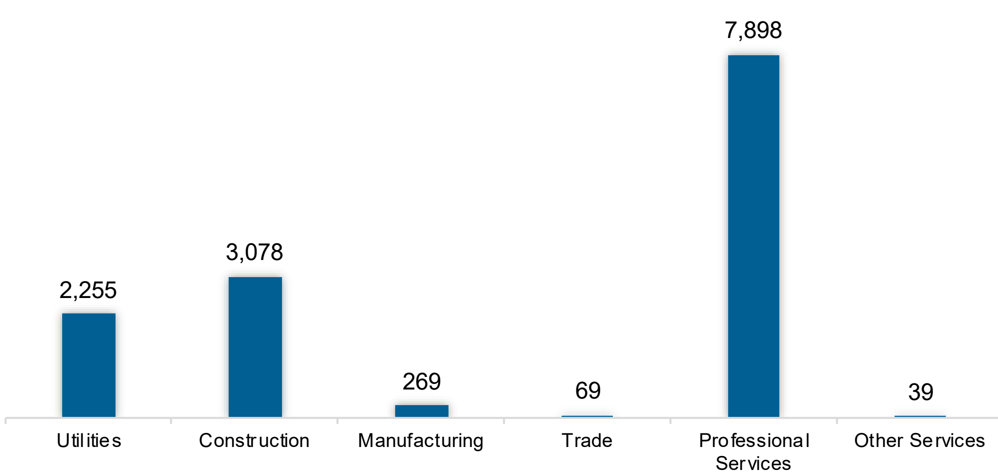
The electric power generation sector employed 13,609 workers in Kansas, 1.6% of the national electricity total, and lost 320 jobs over the past year (-2.3%).

Figure KS-2.
Electric Power Generation Employment by Detailed Technology Application



Professional and business services work represents the largest industry sector in the electric power generation sector, with 58% of jobs. Construction is second largest with 22.6%.

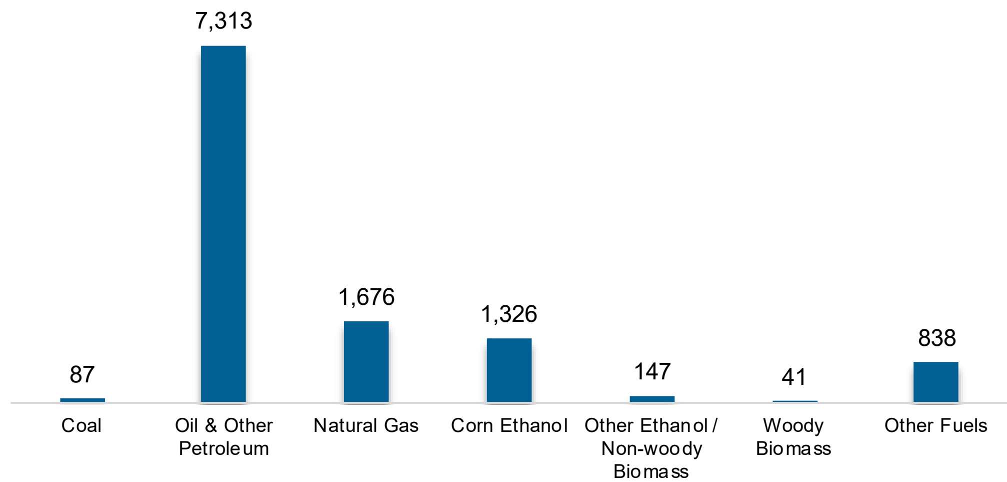
Figure KS-3.
Electric Power Generation Employment by Industry Sector



Fuels

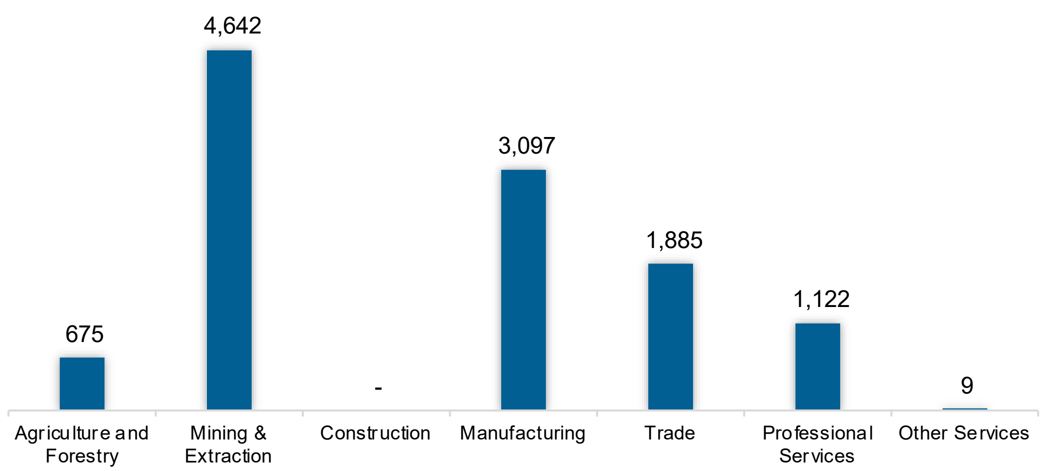
The fuel sector employed 11,429 workers in Kansas, 1.3% of the national total in fuels. The sector lost 564 jobs and decreased 4.7% in the past year.

Figure KS-4.
Fuels Employment by Detailed Technology Application



Mining and extraction jobs represent 40.6% of fuel jobs in Kansas.

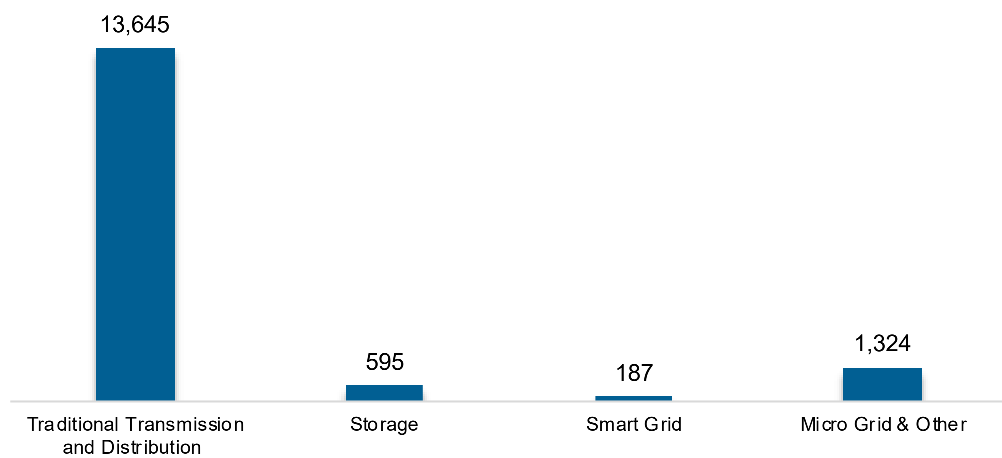
Figure KS-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

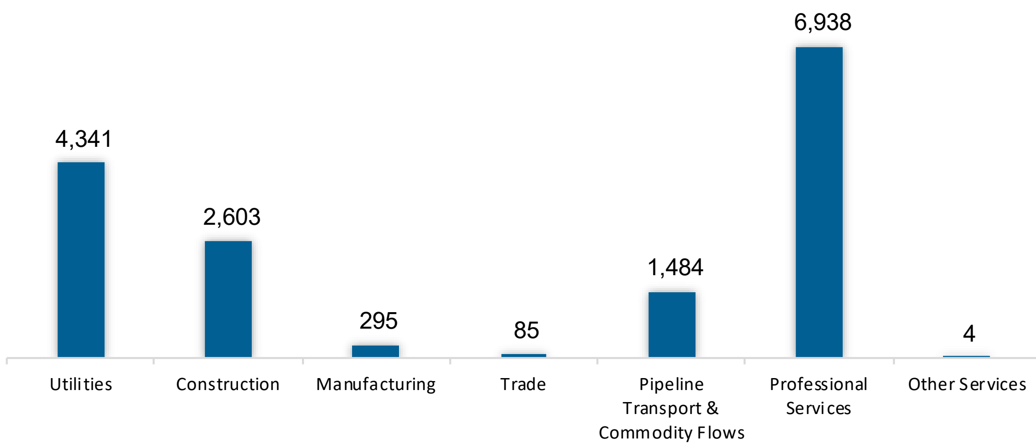
The transmission, distribution, and storage (TDS) sector employed 15,751 workers in Kansas, 1.3% of the national TDS total. The sector lost 305 jobs and decreased 1.9% in the past year.

Figure KS-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Professional and business services work represents the greatest proportion of TDS jobs in Kansas, accounting for 44% of the sector's jobs statewide.

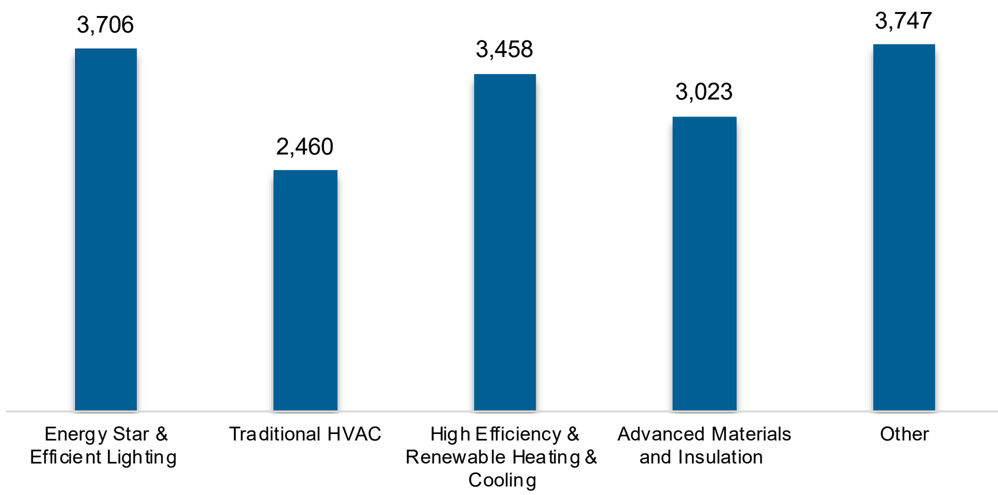
Figure KS-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

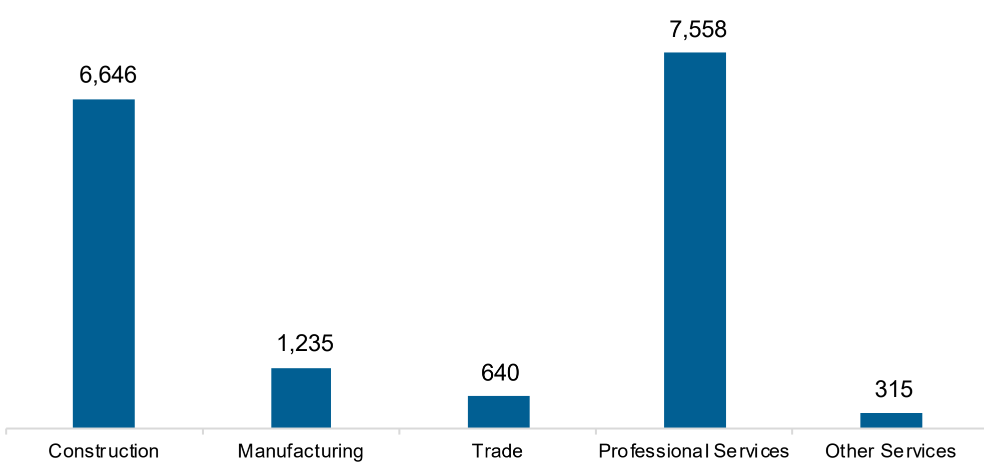
The energy efficiency (EE) sector employed 16,394 workers in Kansas, 0.8% of the national EE total. The EE sector added 574 jobs and increased 3.6% in the past year.

Figure KS-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the professional and business services industry.

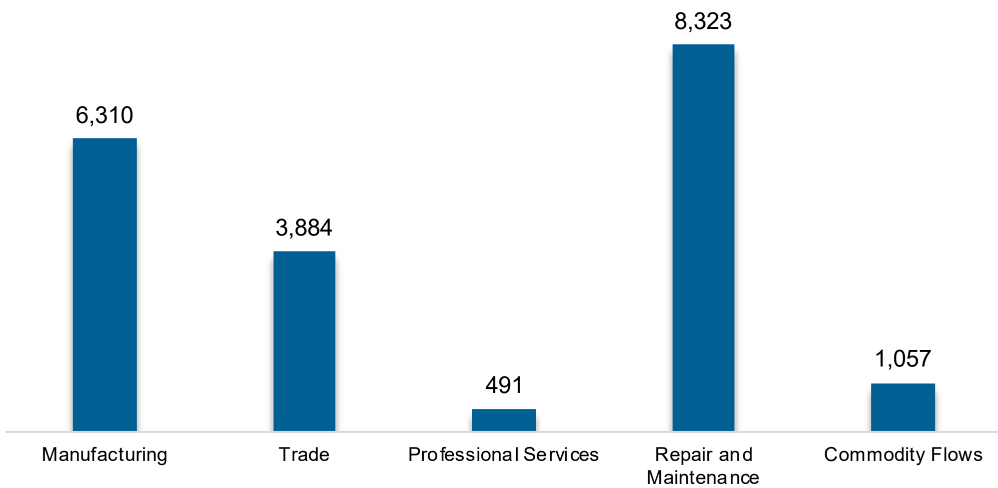
Figure KS-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 20,065 workers in Kansas, 0.8% of the national total for the sector. Motor vehicles and component parts added 2,073 jobs and increased 11.5% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure KS-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Kansas are more optimistic than their peers across the country about energy sector job growth over the next year.

Table KS-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	2.5	2.2
Electric Power Transmission, Distribution, and Storage	2.0	1.1
Energy Efficiency	2.3	1.7
Fuels	2.9	3.0
Motor Vehicles	3.0	3.2

Hiring Difficulty

Employers in Kansas reported 51.6% overall hiring difficulty.

Table KS-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	25.3	26.3	9.4	39.0	51.6

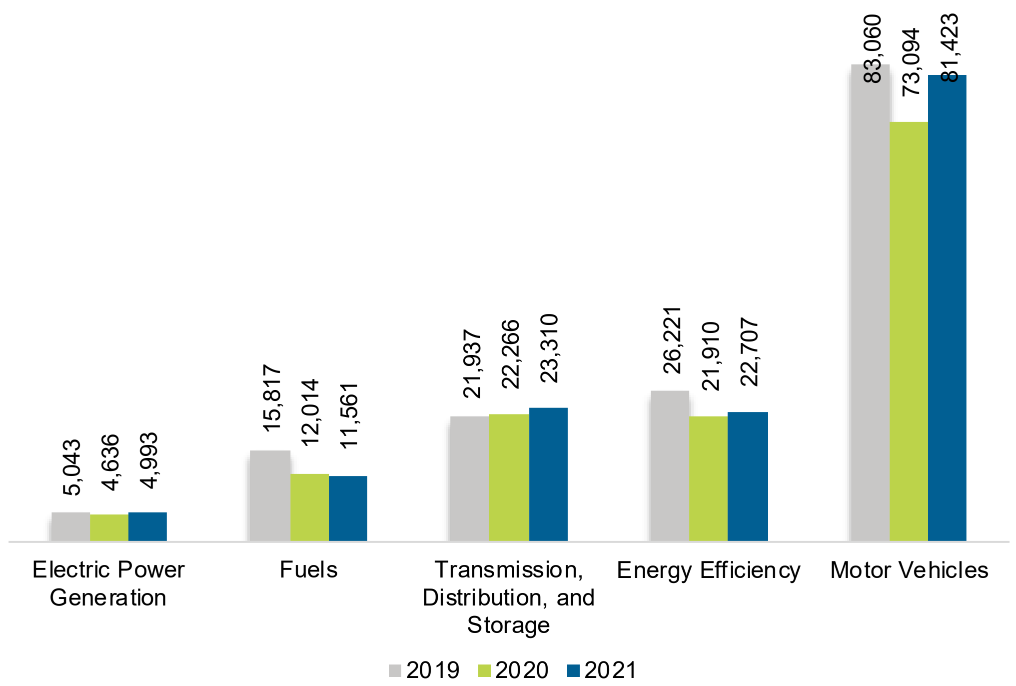
Kentucky

ENERGY AND EMPLOYMENT — 2022

Overview

Kentucky had 143,994 energy workers statewide in 2021, representing 1.8% of all U.S. energy jobs. Of these energy jobs, 4,993 are in electric power generation; 11,561 in fuels; 23,310 in transmission, distribution, and storage; 22,707 in energy efficiency; and 81,423 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 10,074 jobs, or 7.5%. The energy sector in Kentucky represents 7.8% of total state employment.

Figure KY-1.
Employment by Major Energy Technology Application

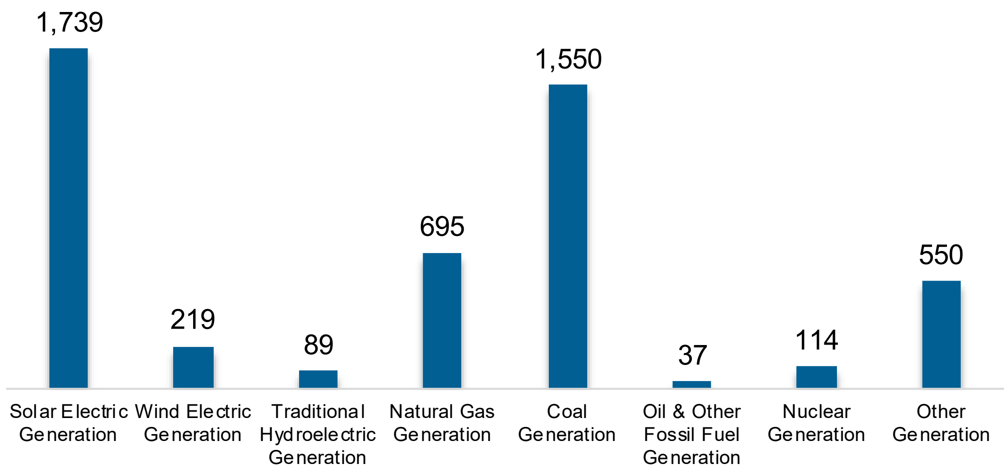


Breakdown by Technology Applications

Electric Power Generation

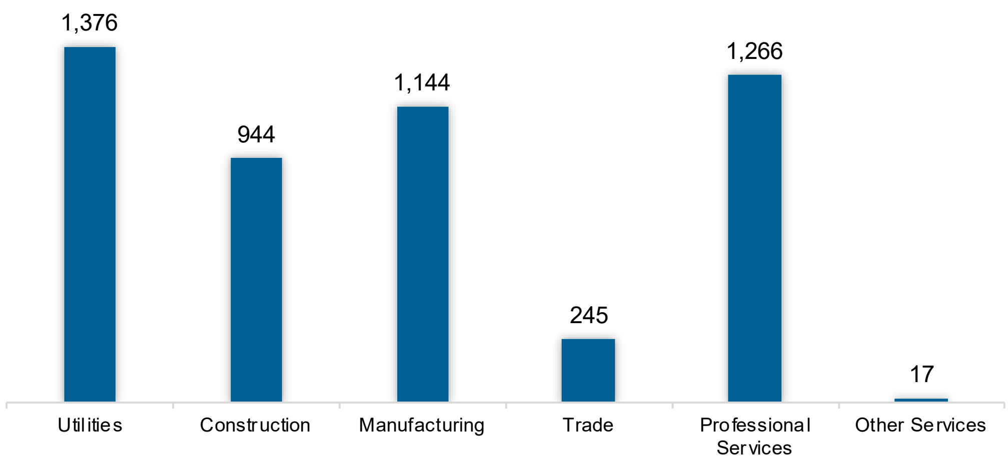
The electric power generation sector employed 4,993 workers in Kentucky, 0.6% of the national electricity total, and added 357 jobs over the past year (7.7%).

Figure KY-2.
Electric Power Generation Employment by Detailed Technology Application



Utilities work represents the largest industry sector in the electric power generation sector, with 27.6% of jobs. Professional and business services is second largest with 25.4%.

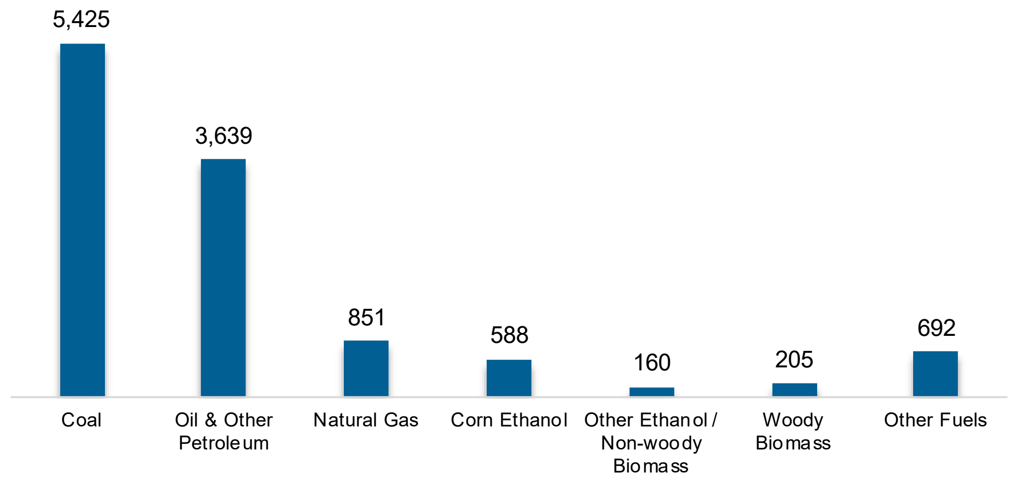
Figure KY-3.
Electric Power Generation Employment by Industry Sector



Fuels

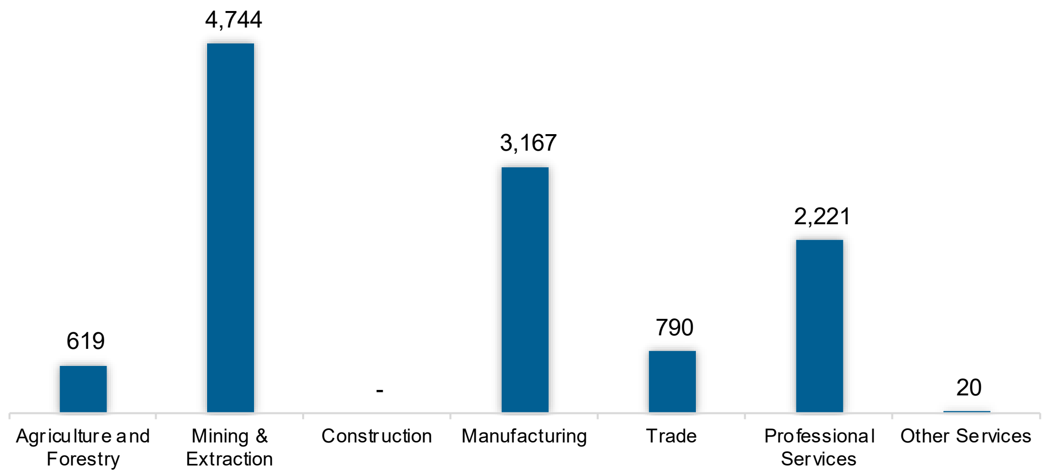
The fuel sector employed 11,561 workers in Kentucky, 1.3% of the national total in fuels. The sector lost 453 jobs and decreased 3.8% in the past year.

Figure KY-4.
Fuels Employment by Detailed Technology Application



Mining and extraction jobs represent 41% of fuel jobs in Kentucky.

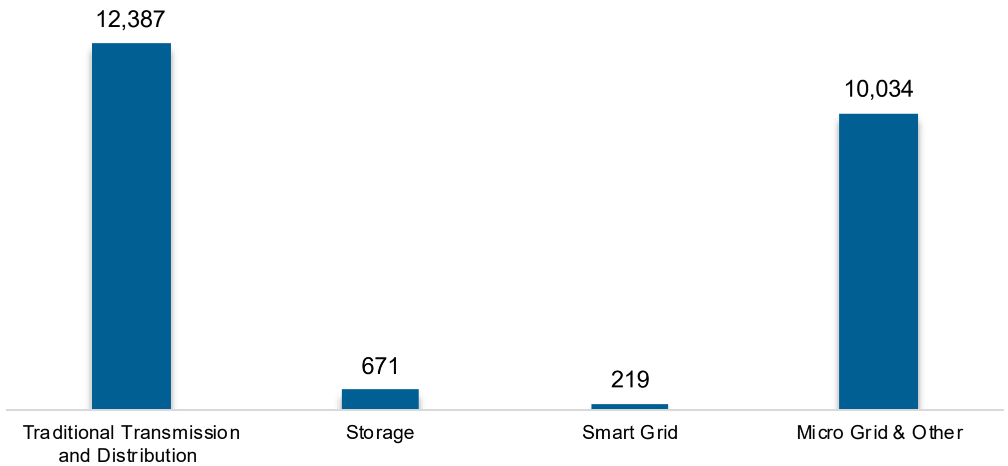
Figure KY-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

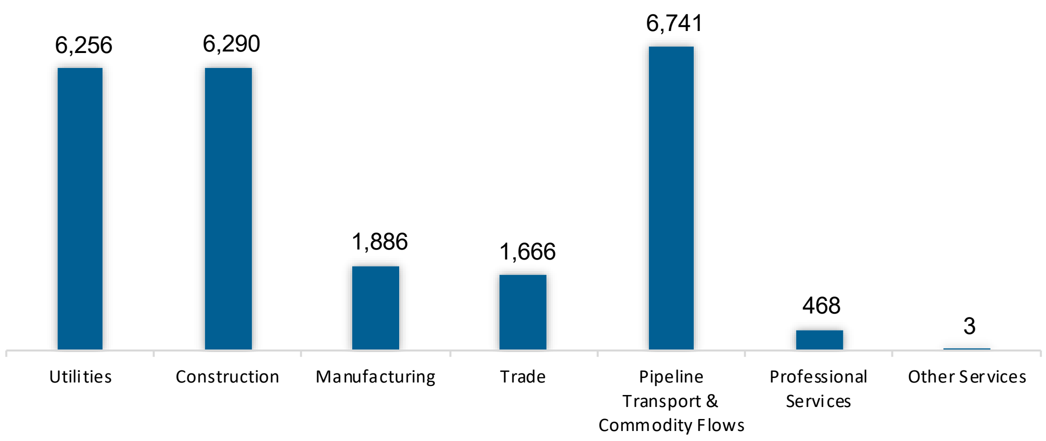
The transmission, distribution, and storage (TDS) sector employed 23,310 workers in Kentucky, 1.3% of the national TDS total. The sector gained 1,045 jobs and increased 4.7% in the past year.

Figure KY-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Pipeline transport and commodity flows work represents the greatest proportion of TDS jobs in Kentucky, accounting for 28.9% of the sector's jobs statewide.

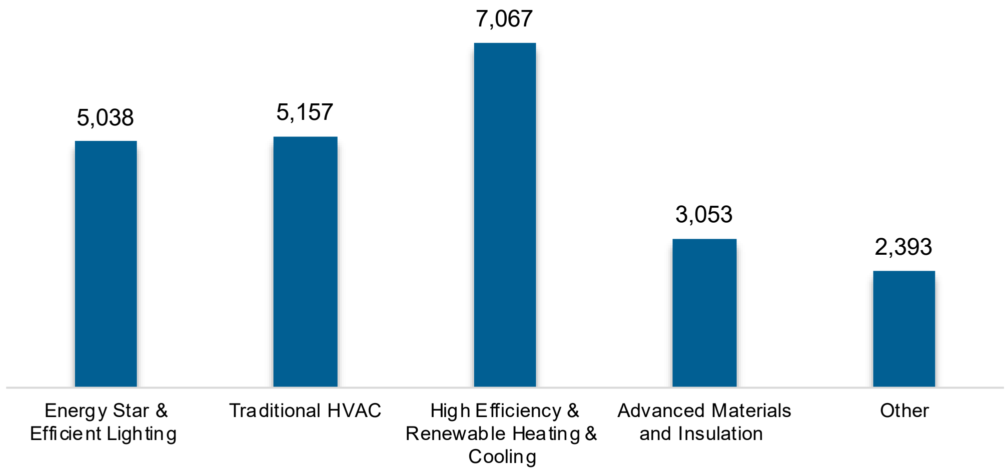
Figure KY-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

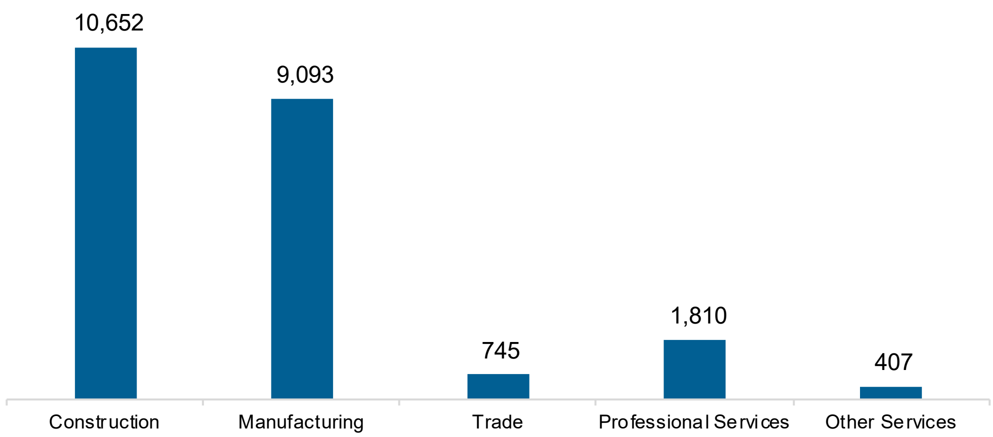
The energy efficiency (EE) sector employed 22,707 workers in Kentucky, 1% of the national EE total. The EE sector added 797 jobs and increased 3.6% in the past year.

Figure KY-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

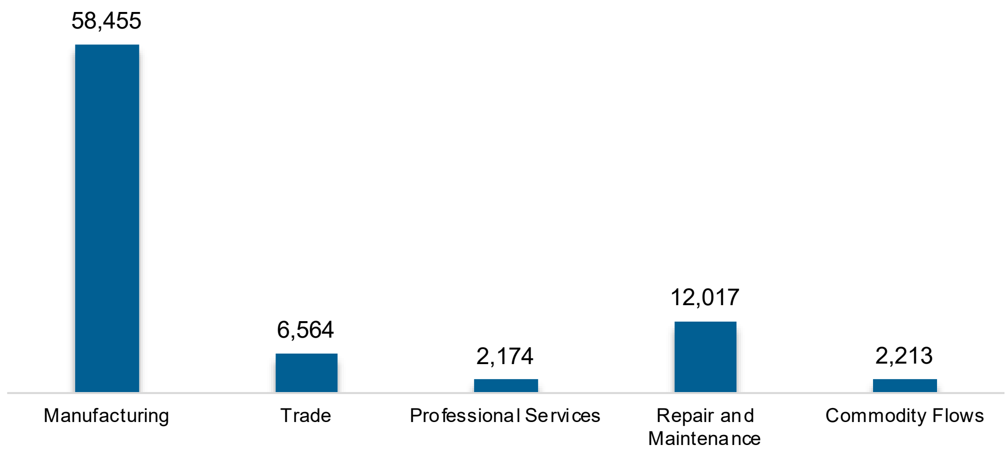
Figure KY-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 81,423 workers in Kentucky, 3.2% of the national total for the sector. Motor vehicles and component parts added 8,329 jobs and increased 11.4% in the past year. Manufacturing work represents the largest proportion of motor vehicle jobs.

Figure KY-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Kentucky are less optimistic than their peers across the country about energy sector job growth over the next year.

Table KY-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	0.6	2.2
Electric Power Transmission, Distribution, and Storage	0.0	1.1
Energy Efficiency	0.3	1.7
Fuels	1.0	3.0
Motor Vehicles	1.1	3.2

Hiring Difficulty

Employers in Kentucky reported 57.9% overall hiring difficulty.

Table KY-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	21.1	36.8	9.4	32.7	57.9

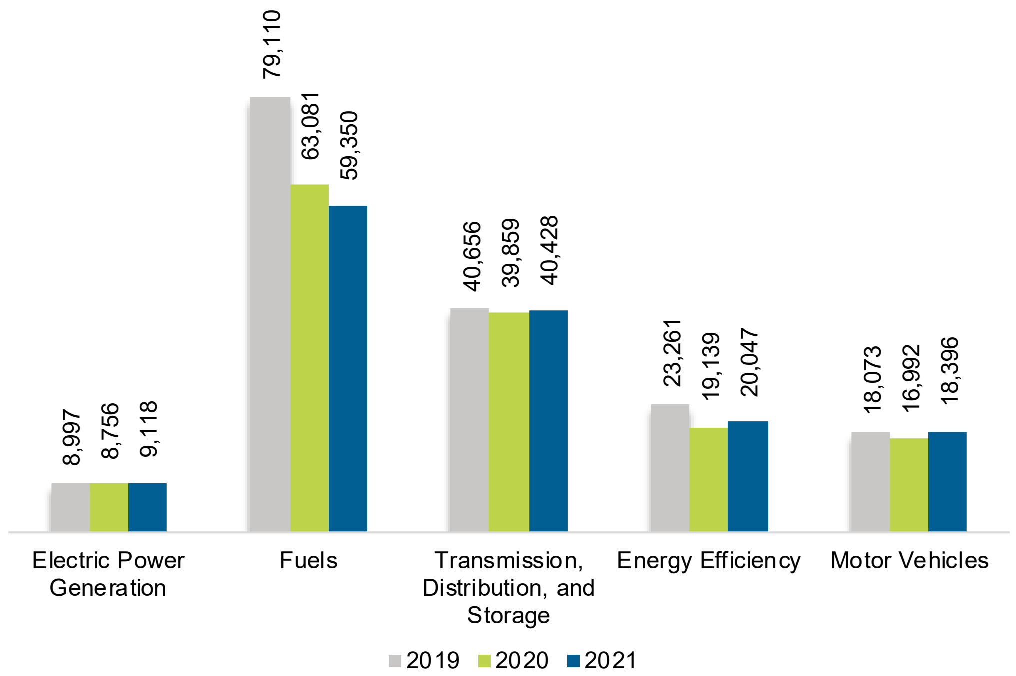
Louisiana

ENERGY AND EMPLOYMENT — 2022

Overview

Louisiana had 147,338 energy workers statewide in 2021, representing 1.9% of all U.S. energy jobs. Of these energy jobs, 9,118 are in electric power generation; 59,350 in fuels; 40,428 in transmission, distribution, and storage; 20,047 in energy efficiency; and 18,396 in motor vehicles. From 2020 to 2021, energy jobs in the state decreased by 490 jobs, or 0.3%. The energy sector in Louisiana represents 8.1% of total state employment

Figure LA-1.
Employment by Major Energy Technology Application

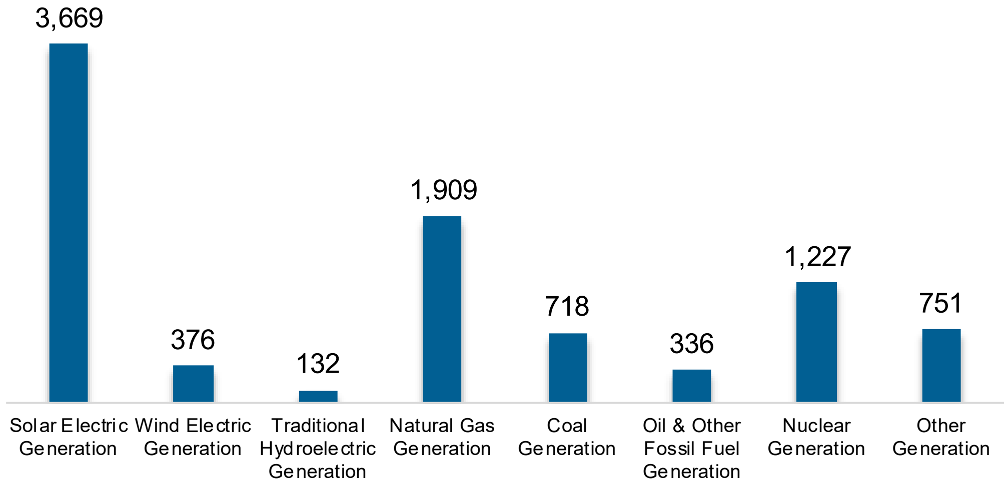


Breakdown by Technology Applications

Electric Power Generation

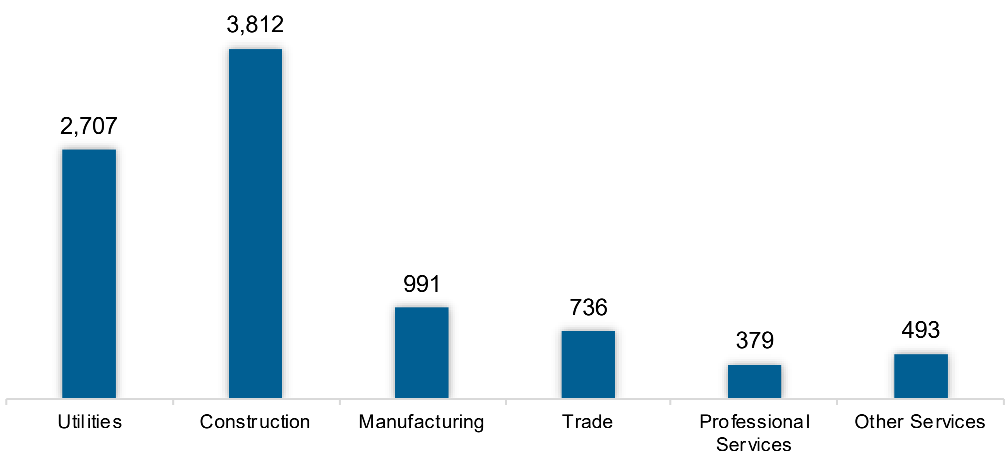
The electric power generation sector employed 9,118 workers in Louisiana, 1.1% of the national electricity total, and added 361 jobs over the past year (4.1%).

Figure LA-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 41.8% of jobs. Utilities is second largest with 29.7%.

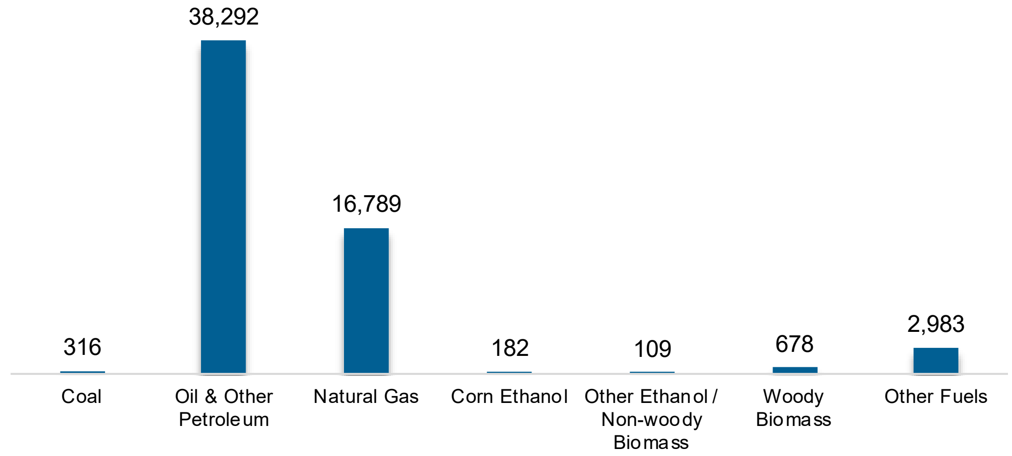
Figure LA-3.
Electric Power Generation Employment by Industry Sector



Fuels

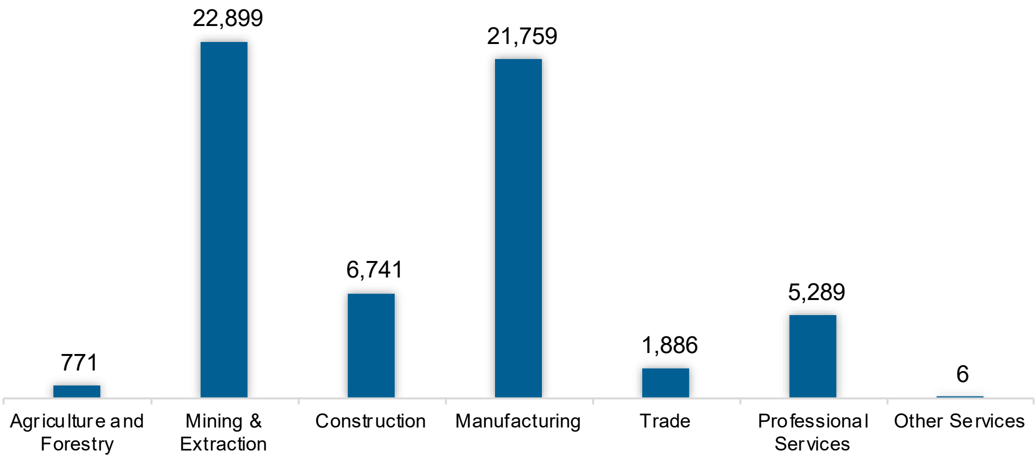
The fuel sector employed 59,350 workers in Louisiana, 6.5% of the national total in fuels. The sector lost 3,731 jobs and decreased 5.9% in the past year.

Figure LA-4.
Fuels Employment by Detailed Technology Application



Mining and extraction jobs represent 38.6% of fuel jobs in Louisiana.

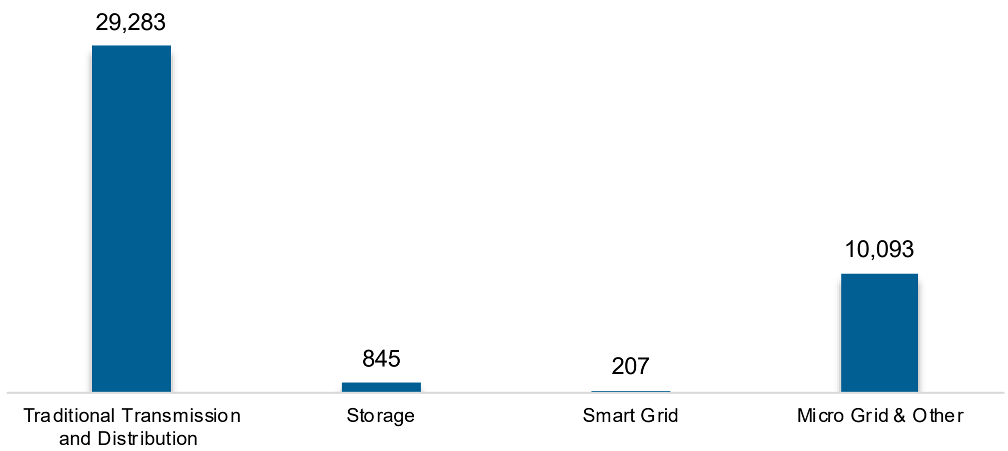
Figure LA-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

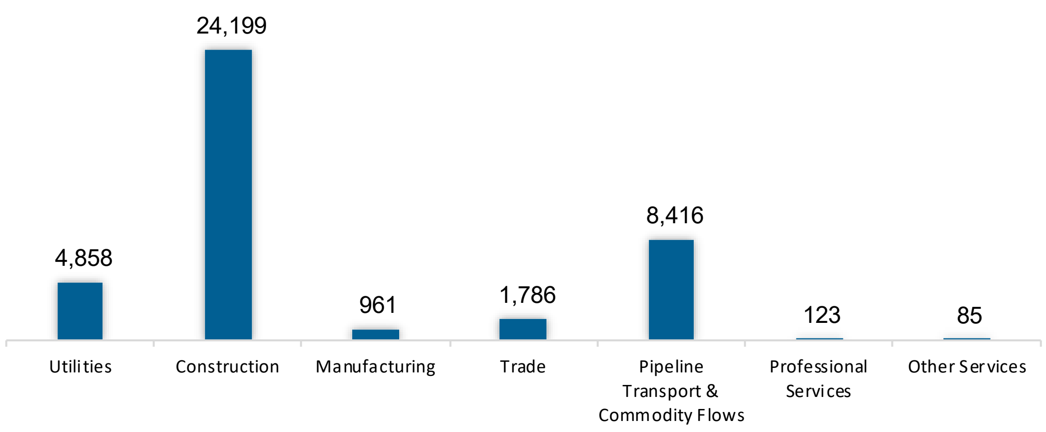
The transmission, distribution, and storage (TDS) sector employed 40,428 workers in Louisiana, 6.5% of the national TDS total. The sector gained 569 jobs and increased 1.4% in the past year.

Figure LA-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in Louisiana, accounting for 59.9% of the sector's jobs statewide.

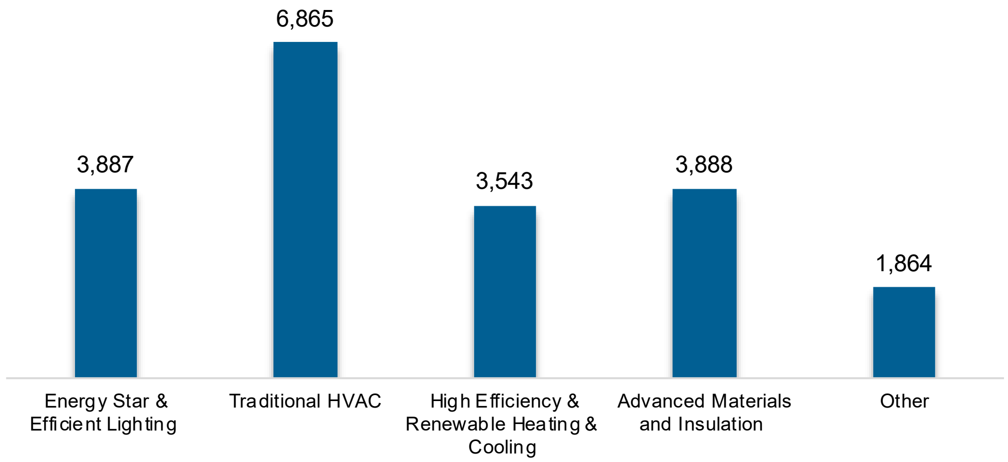
Figure LA-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

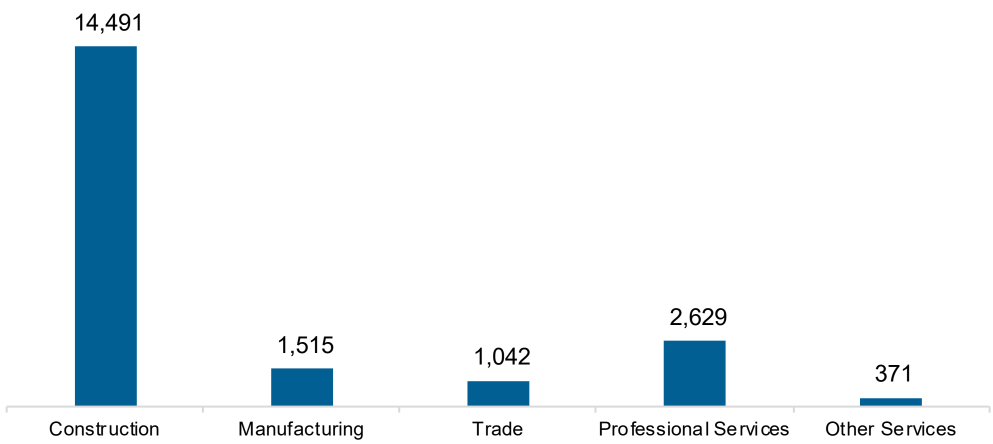
The energy efficiency (EE) sector employed 20,047 workers in Louisiana, 0.9% of the national EE total. The EE sector added 908 jobs and increased 4.7% in the past year.

Figure LA-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

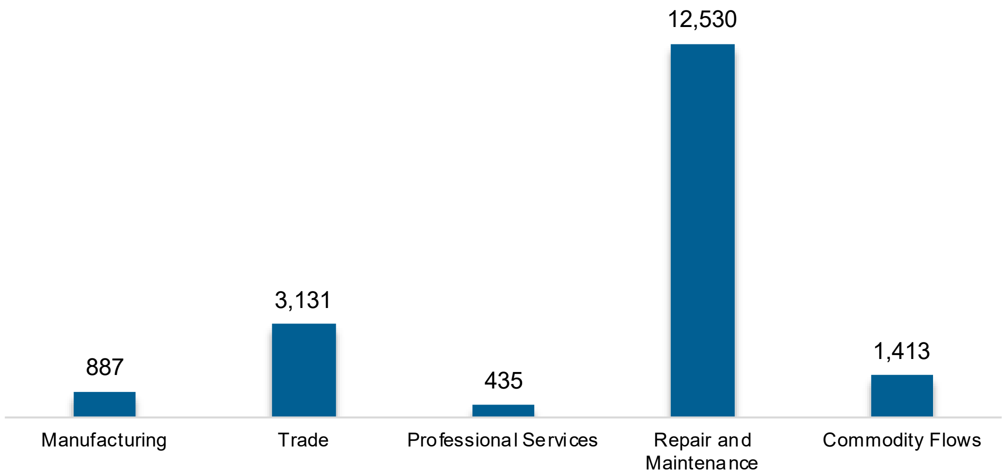
Figure LA-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 18,396 workers in Louisiana, 0.7% of the national total for the sector. Motor vehicles and component parts added 1,403 jobs and increased 8.3% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure LA-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Louisiana are less optimistic than their peers across the country about energy sector job growth over the next year.

Table LA-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.2	2.2
Electric Power Transmission, Distribution, and Storage	0.7	1.1
Energy Efficiency	1.0	1.7
Fuels	1.6	3.0
Motor Vehicles	1.7	3.2

Hiring Difficulty

Employers in Louisiana reported 55.6% overall hiring difficulty.

Table LA-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	28.0	27.5	7.1	37.4	55.6

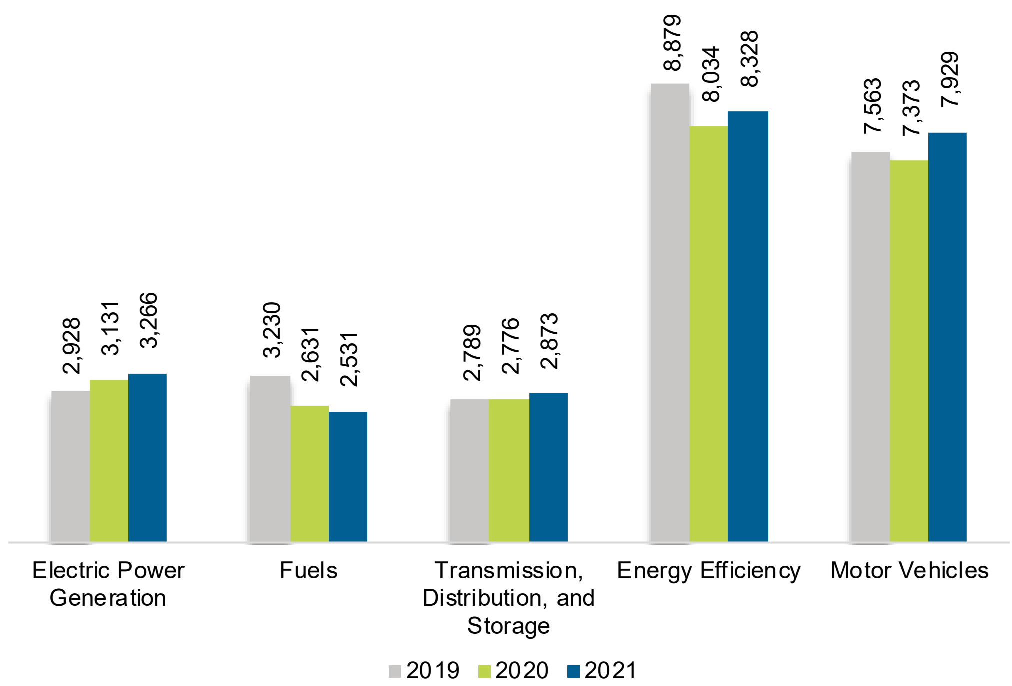
Maine

ENERGY AND EMPLOYMENT — 2022

Overview

Maine had 24,927 energy workers statewide in 2021, representing 0.3% of all U.S. energy jobs. Of these energy jobs, 3,266 are in electric power generation; 2,531 in fuels; 2,873 in transmission, distribution, and storage; 8,328 in energy efficiency; and 7,929 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 983 jobs, or 4.1%. The energy sector in Maine represents 4.1% of total state employment

Figure ME-1.
Employment by Major Energy Technology Application

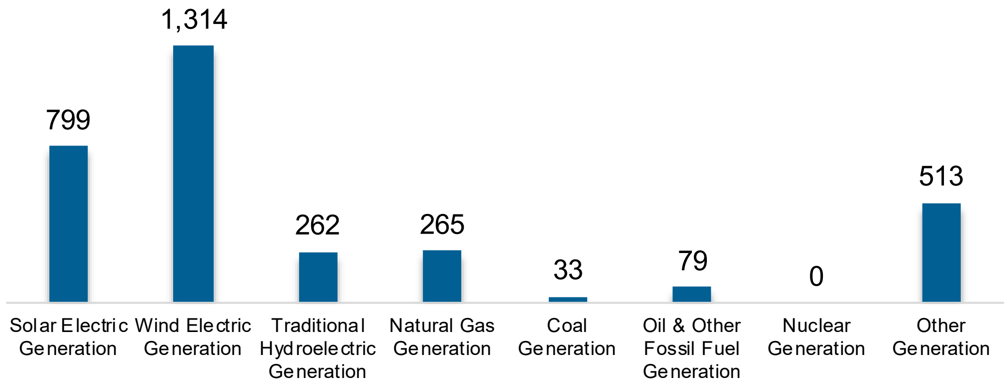


Breakdown by Technology Applications

Electric Power Generation

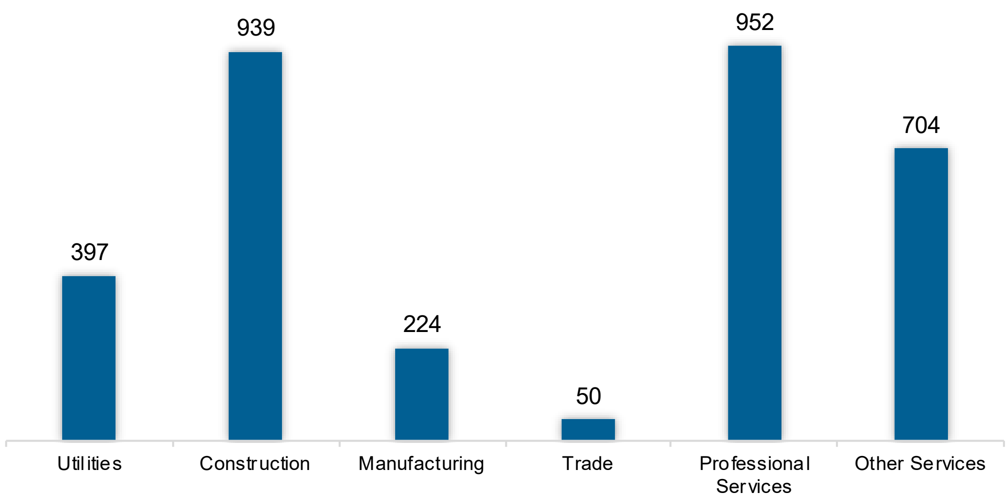
The electric power generation sector employed 3,266 workers in Maine, 0.4% of the national electricity total, and added 135 jobs over the past year (4.3%).

Figure ME-2.
Electric Power Generation Employment by Detailed Technology Application



Professional and business services work represents the largest industry sector in the electric power generation sector, with 29.2% of jobs. Construction is second largest with 28.7%.

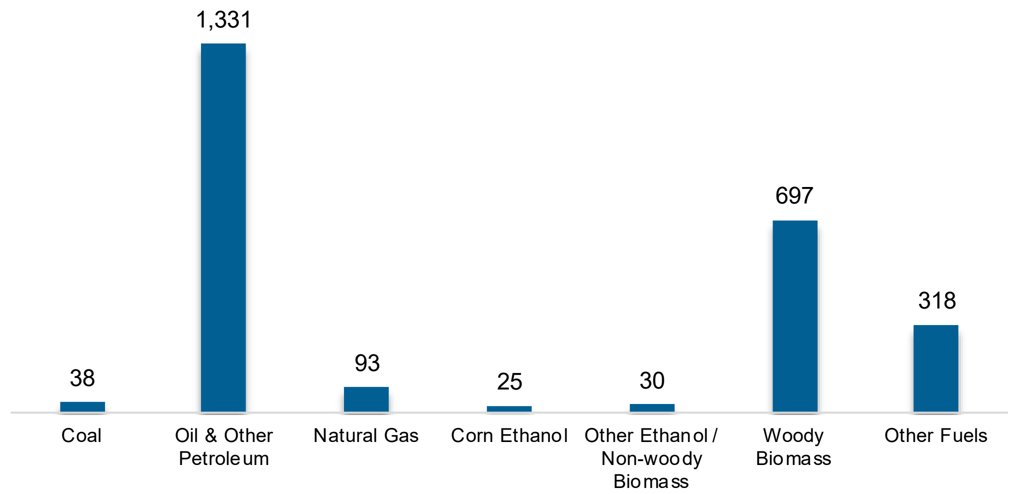
Figure ME-3.
Electric Power Generation Employment by Industry Sector



Fuels

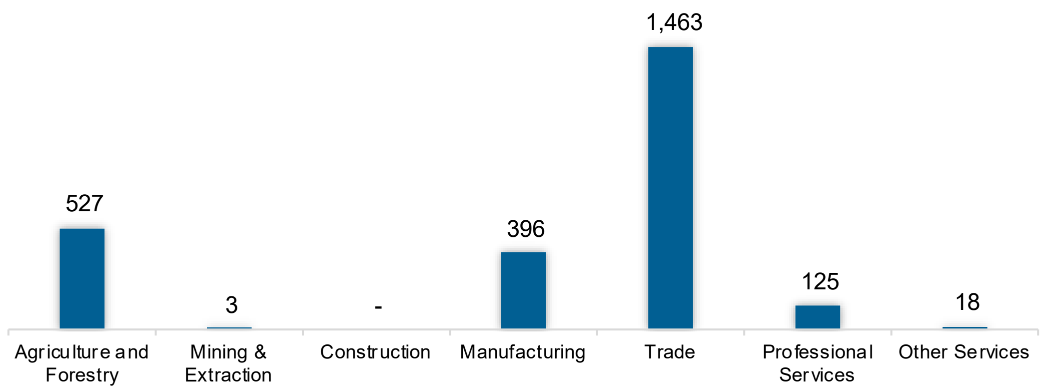
The fuel sector employed 2,531 workers in Maine, 0.3% of the national total in fuels. The sector lost 100 jobs and decreased 3.8% in the past year

Figure ME-4.
Fuels Employment by Detailed Technology Application



Wholesale trade jobs represent 57.8% of fuel jobs in Maine.

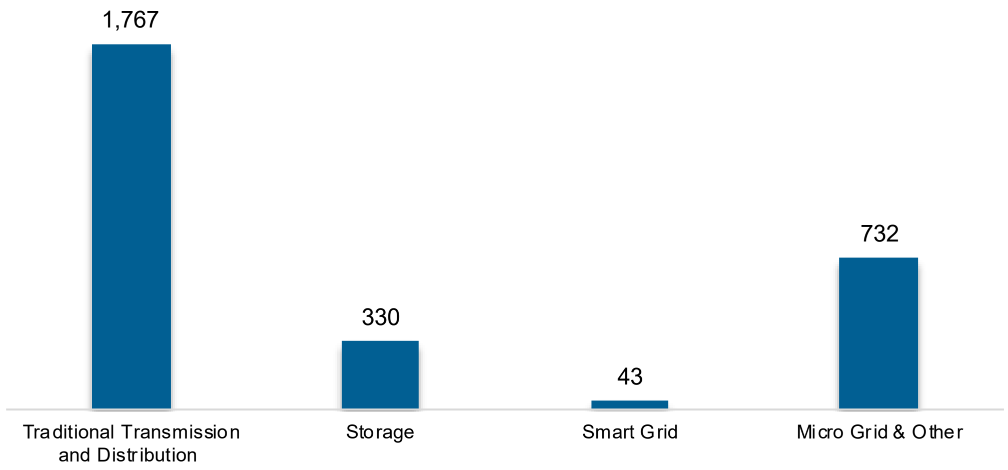
Figure ME-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

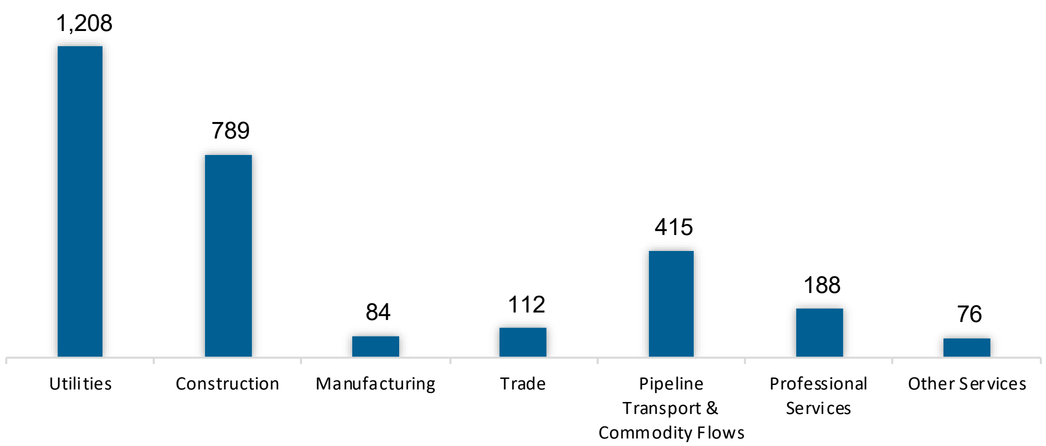
The transmission, distribution, and storage (TDS) sector employed 2,873 workers in Maine, 0.3% of the national TDS total. The sector gained 97 jobs and increased 3.5% in the past year.

Figure ME-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Maine, accounting for 42.1% of the sector's jobs statewide.

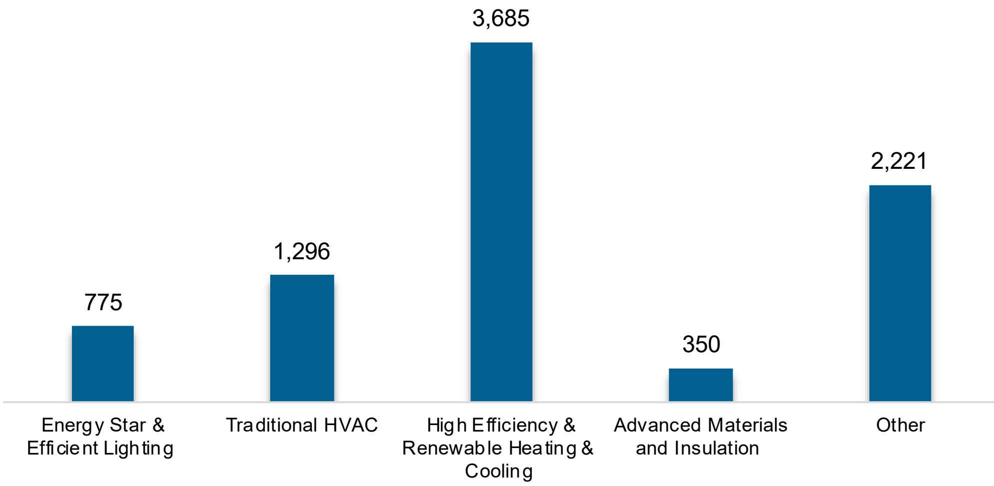
Figure ME-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

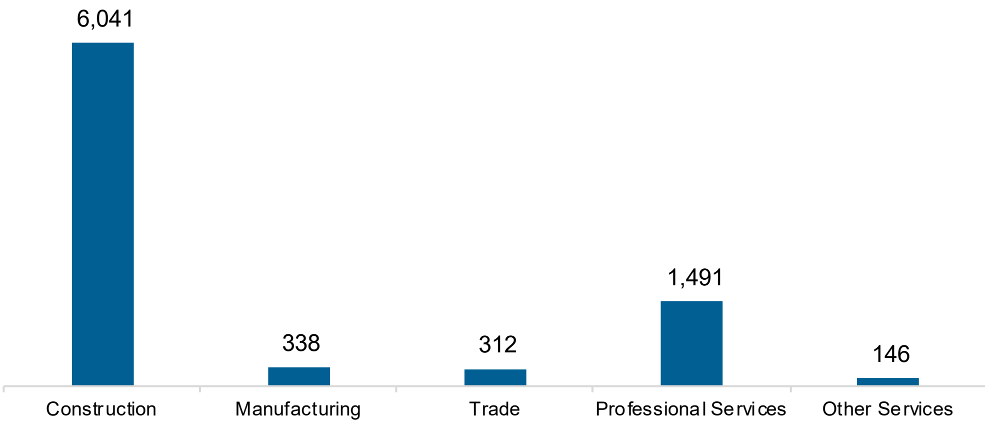
The energy efficiency (EE) sector employed 8,328 workers in Maine, 0.4% of the national EE total. The EE sector added 295 jobs and increased 3.7% in the past year.

Figure ME-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

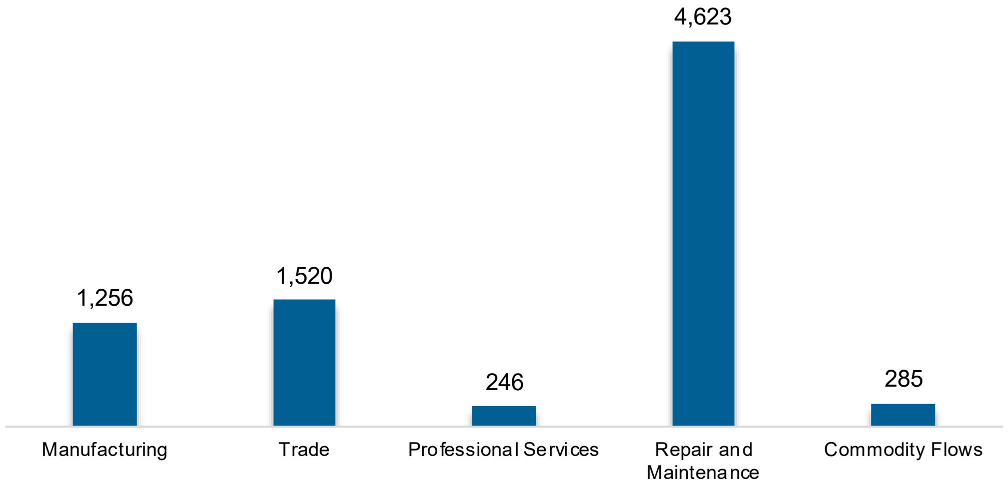
Figure ME-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 7,929 workers in Maine, 0.3% of the national total for the sector. Motor vehicles and component parts added 556 jobs and increased 7.5% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure ME-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Maine are less optimistic than their peers across the country about energy sector job growth over the next year.

Table ME-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.4	2.2
Electric Power Transmission, Distribution, and Storage	0.9	1.1
Energy Efficiency	1.2	1.7
Fuels	1.8	3.0
Motor Vehicles	1.9	3.2

Hiring Difficulty

Employers in Maine reported 57.0% overall hiring difficulty.

Table ME-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	30.3	26.8	5.2	37.7	57.0

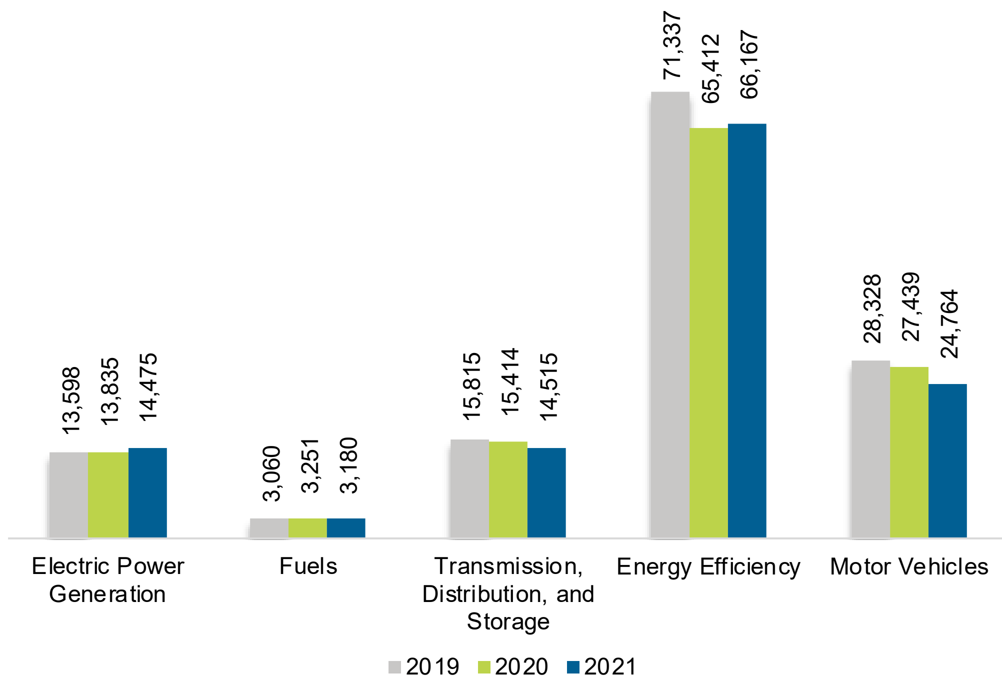
Maryland

ENERGY AND EMPLOYMENT — 2022

Overview

Maryland had 123,101 energy workers statewide in 2021, representing 1.6% of all U.S. energy jobs. Of these energy jobs, 14,475 are in electric power generation; 3,180 in fuels; 14,515 in transmission, distribution, and storage; 66,167 in energy efficiency; and 24,764 in motor vehicles. From 2020 to 2021, energy jobs in the state decreased by 2,250 jobs, or 1.8%. The energy sector in Maryland represents 4.8% of total state employment

Figure MD-1.
Employment by Major Energy Technology Application

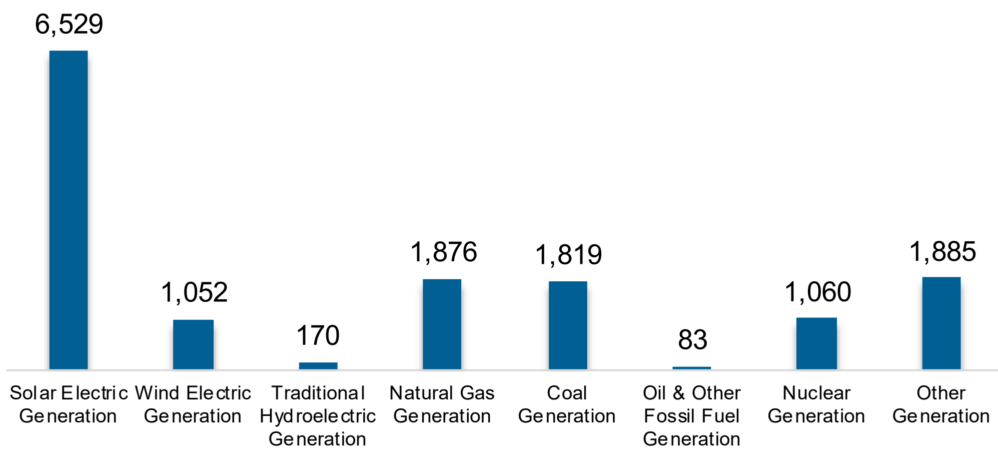


Breakdown by Technology Applications

Electric Power Generation

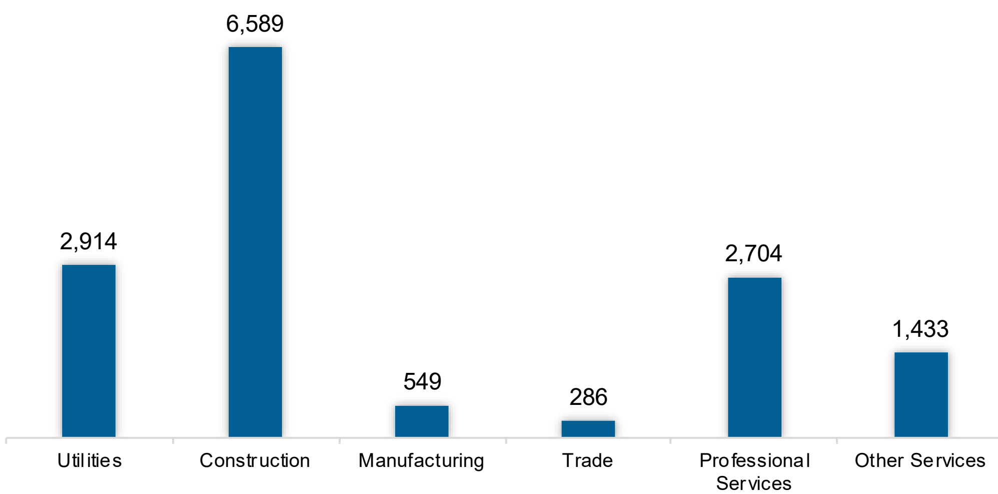
The electric power generation sector employed 14,475 workers in Maryland, 1.7% of the national electricity total, and added 640 jobs over the past year (4.6%).

Figure MD-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 45.5% of jobs. Utilities is second largest with 20.1%.

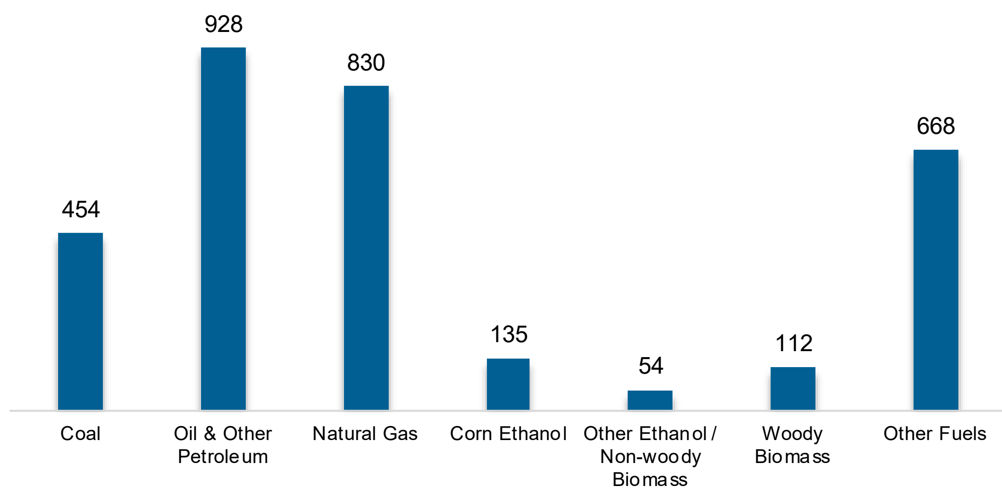
Figure MD-3.
Electric Power Generation Employment by Industry Sector



Fuels

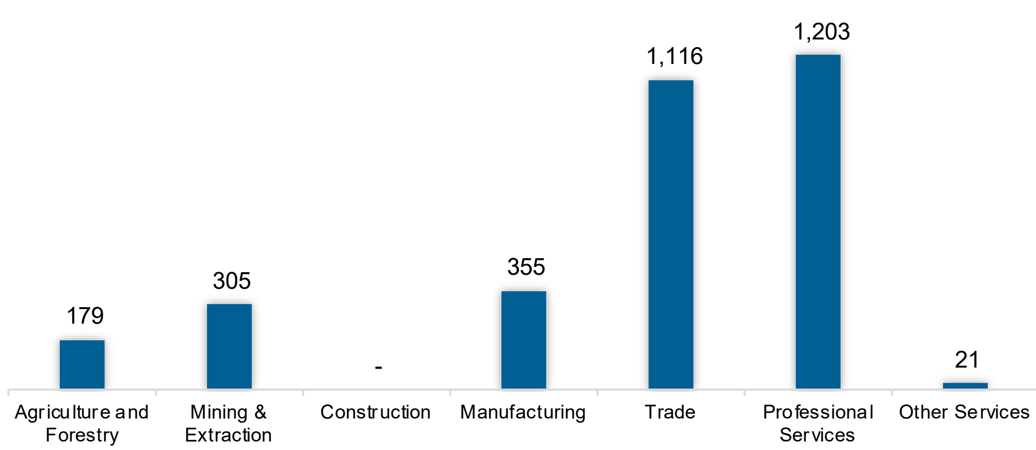
The fuel sector employed 3,180 workers in Maryland, 0.4% of the national total in fuels. The sector lost 72 jobs and decreased 2.2% in the past year.

Figure MD-4.
Fuels Employment by Detailed Technology Application



Professional and business services jobs represent 37.8% of fuel jobs in Maryland.

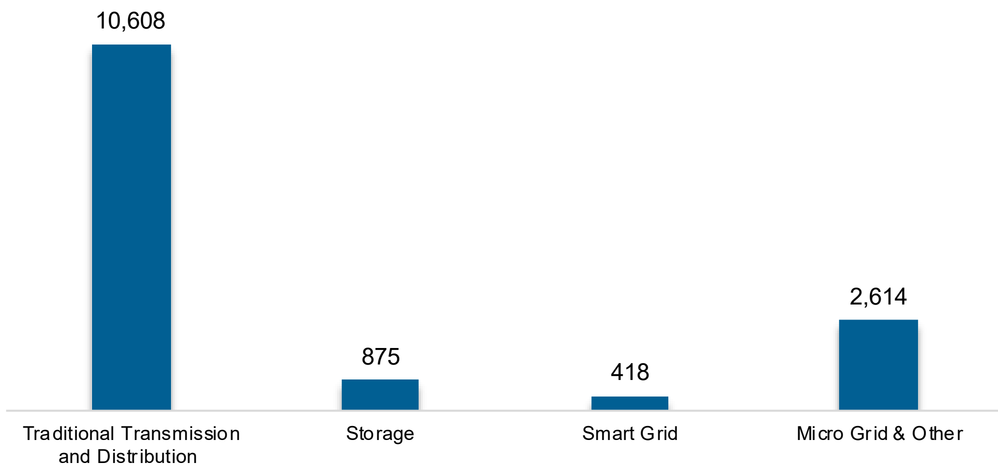
Figure MD-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

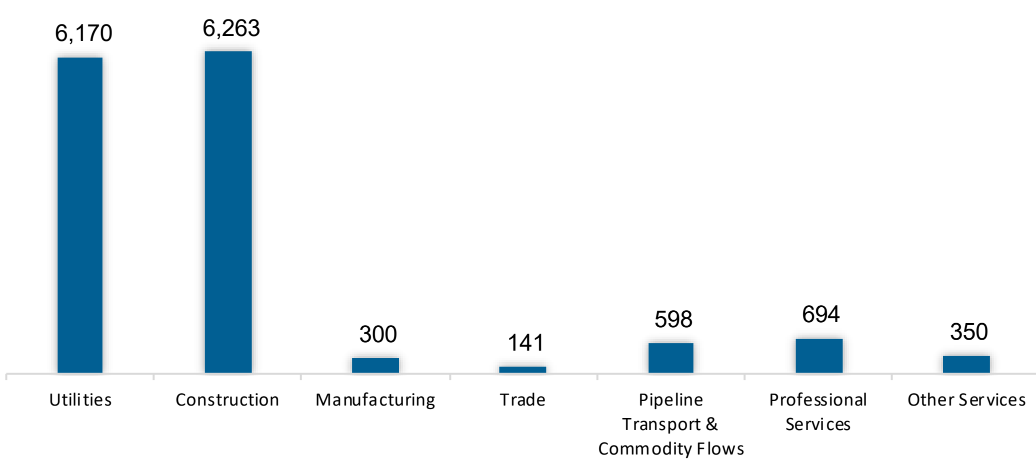
The transmission, distribution, and storage (TDS) sector employed 14,515 workers in Maryland, 0.4% of the national TDS total. The sector lost 898 jobs and decreased 5.8% in the past year.

Figure MD-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in Maryland, accounting for 43.1% of the sector's jobs statewide.

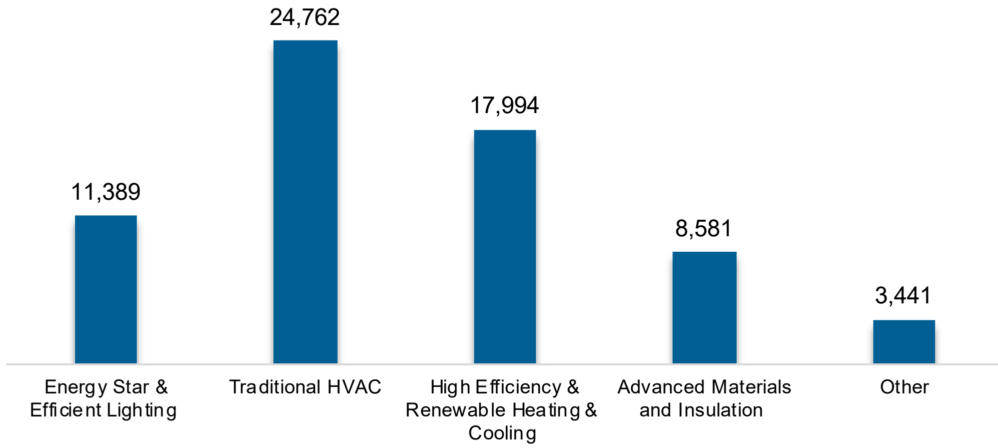
Figure MD-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

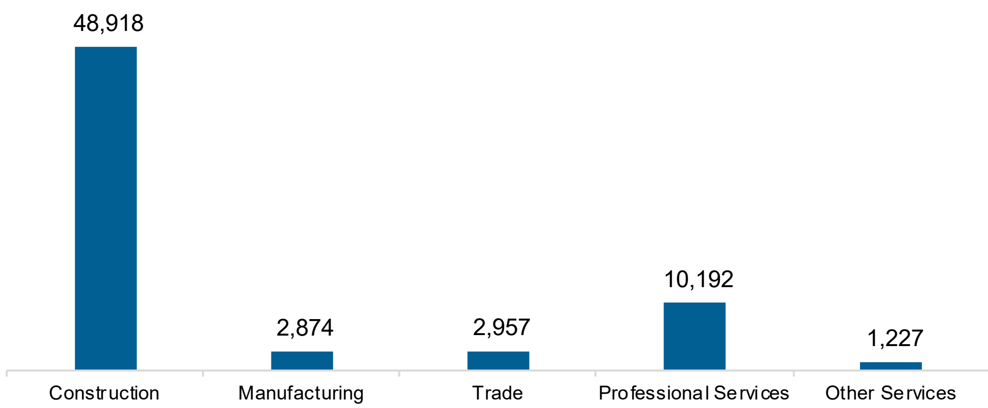
The energy efficiency (EE) sector employed 66,167 workers in Maryland, 3.1% of the national EE total. The EE sector added 755 jobs and increased 1.2% in the past year.

Figure MD-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

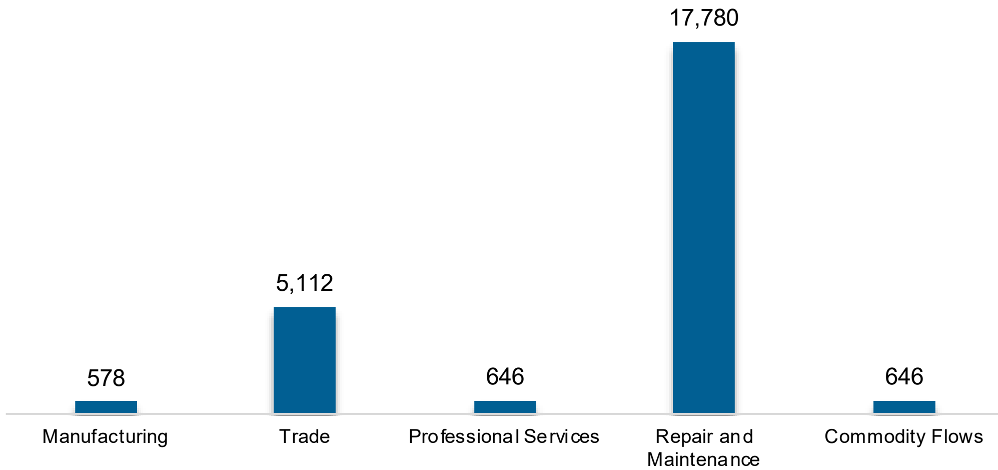
Figure MD-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 24,764 workers in Maryland, 1% of the national total for the sector. Motor vehicles and component parts lost 2,676 jobs and decreased 9.8% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure MD-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Maryland are less optimistic than their peers across the country about energy sector job growth over the next year.

Table MD-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	2.8	2.2
Electric Power Transmission, Distribution, and Storage	2.2	1.1
Energy Efficiency	2.5	1.7
Fuels	3.2	3.0
Motor Vehicles	3.3	3.2

Hiring Difficulty

Employers in Maryland reported 51.7% overall hiring difficulty.

Table MD-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	26.3	25.4	9.2	39.1	51.7

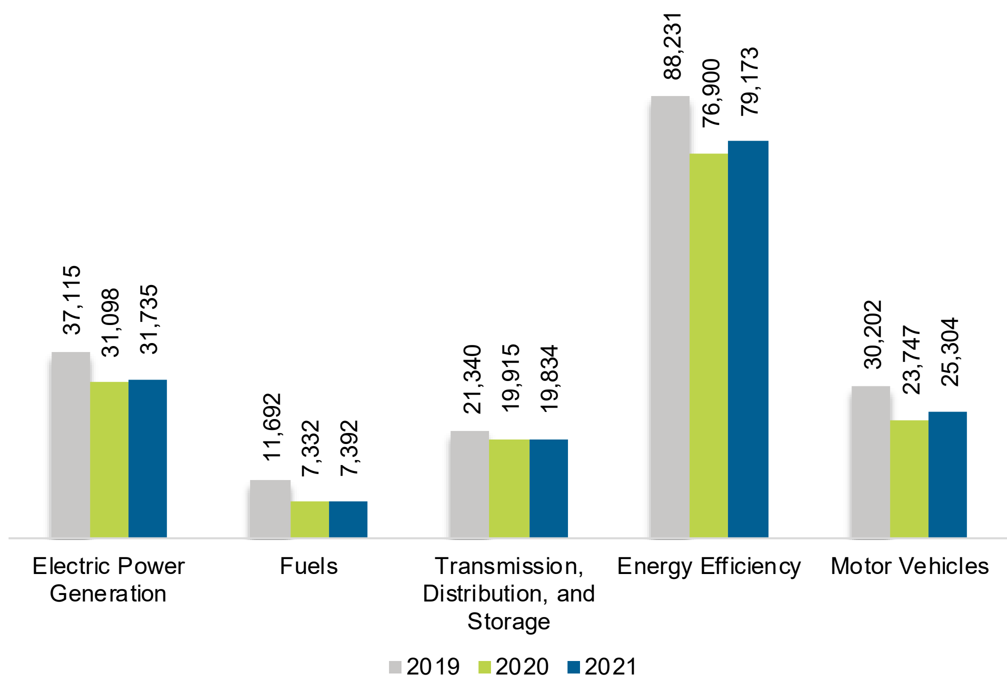
Massachusetts

ENERGY AND EMPLOYMENT — 2022

Overview

Massachusetts had 163,437 energy workers statewide in 2021, representing 2.1% of all U.S. energy jobs. Of these energy jobs, 31,735 are in electric power generation; 7,392 in fuels; 19,834 in transmission, distribution, and storage; 79,173 in energy efficiency; and 25,304 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 4,446 jobs, or 2.8%. The energy sector in Massachusetts represents 4.7% of total state employment.

Figure MA-1.
Employment by Major Energy Technology Application

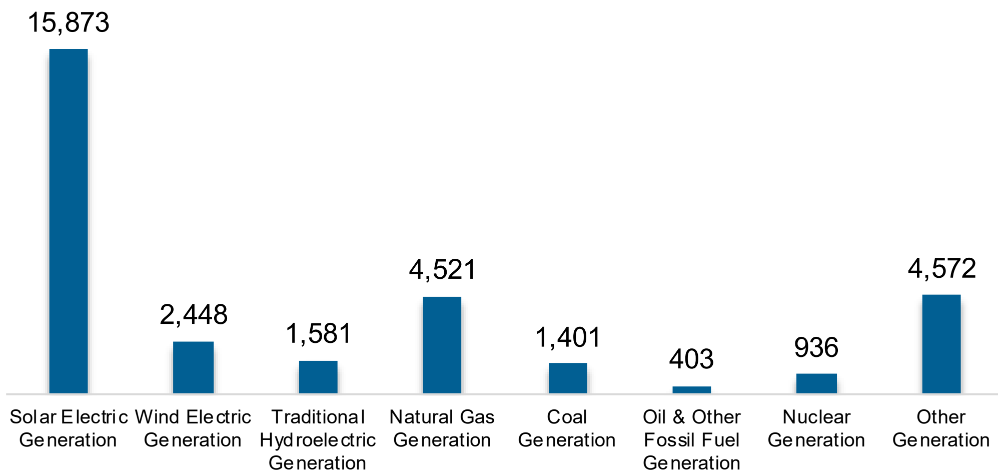


Breakdown by Technology Applications

Electric Power Generation

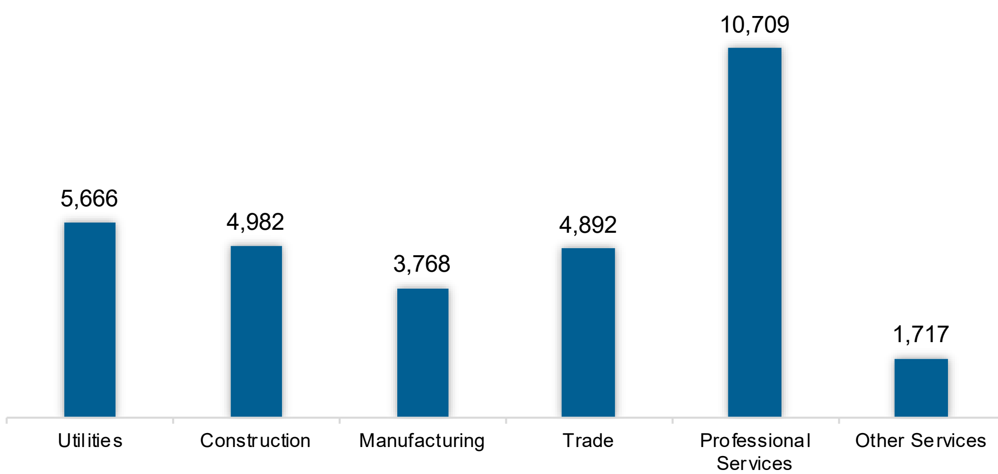
The electric power generation sector employed 31,735 workers in Massachusetts, 3.7% of the national electricity total, and added 637 jobs over the past year (2%).

Figure MA-2.
Electric Power Generation Employment by Detailed Technology Application



Professional and business services work represents the largest industry sector in the electric power generation sector, with 33.7% of jobs. Utilities is second largest with 17.9%.

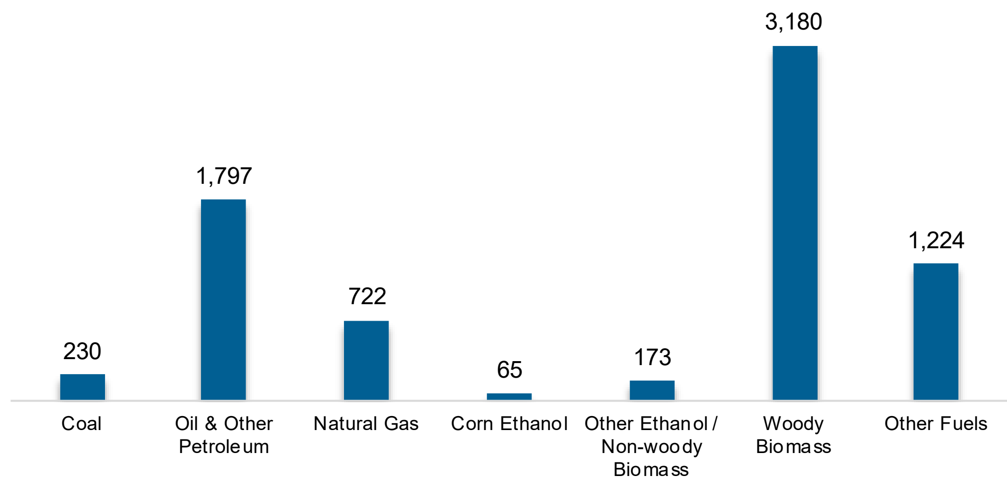
Figure MA-3.
Electric Power Generation Employment by Industry Sector



Fuels

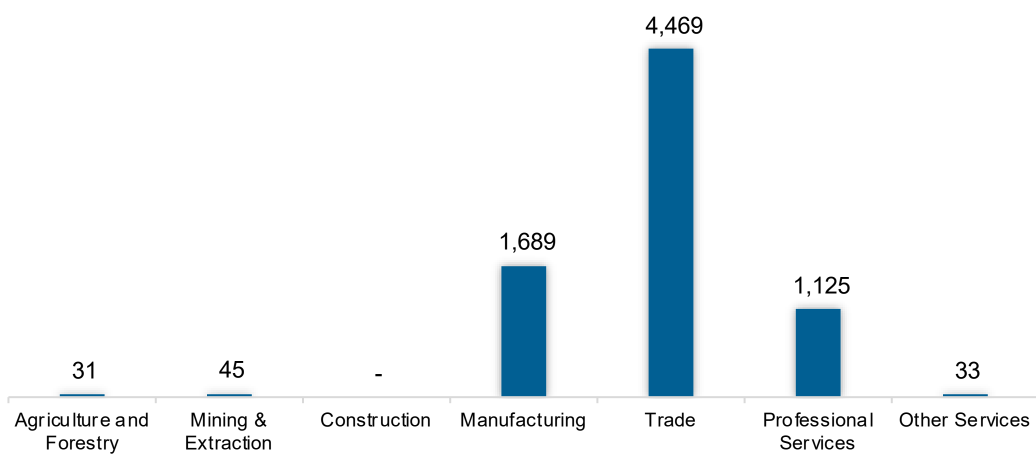
The fuel sector employed 7,392 workers in Massachusetts, 0.8% of the national total in fuels. The sector gained 60 jobs and increased 0.8% in the past year.

Figure MA-4.
Fuels Employment by Detailed Technology Application



Wholesale trade jobs represent 60.5% of fuels jobs in Massachusetts.

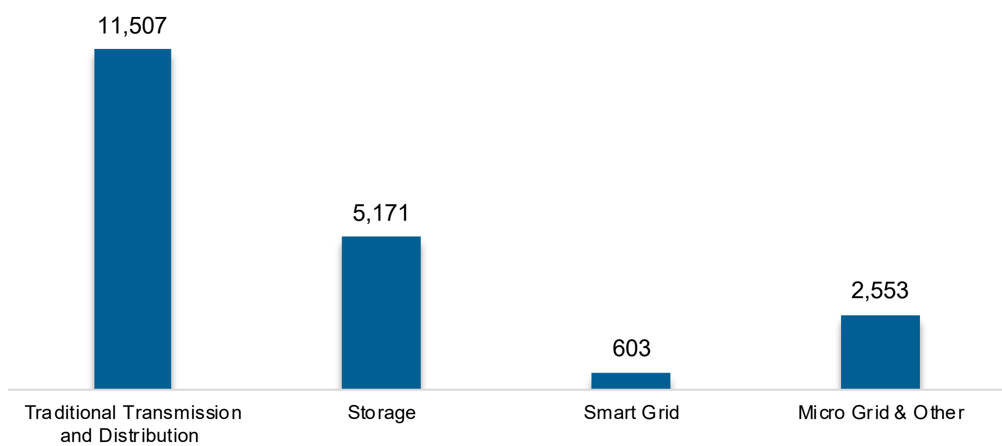
Figure MA-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

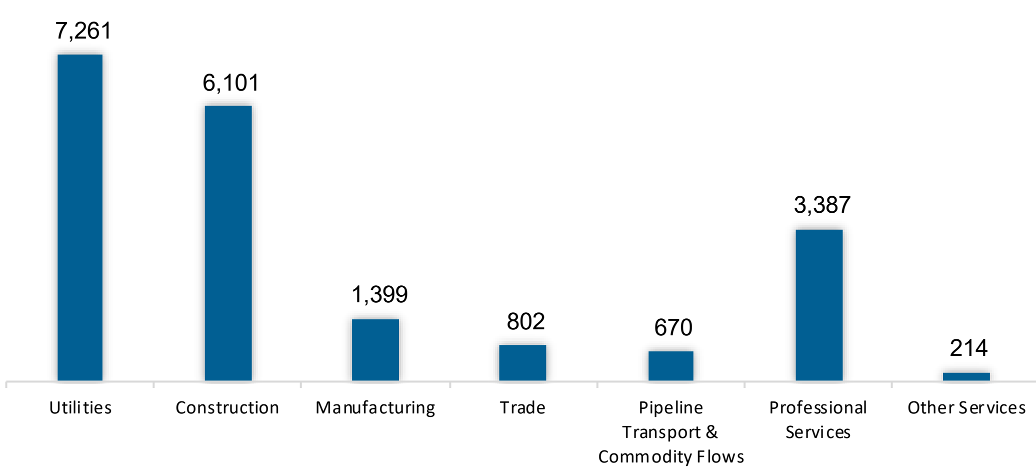
The transmission, distribution, and storage (TDS) sector employed 19,834 workers in Massachusetts, 0.8% of the national TDS total. The sector lost 81 jobs and decreased 0.4% in the past year.

Figure MA-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Massachusetts, accounting for 36.6% of the sector's jobs statewide.

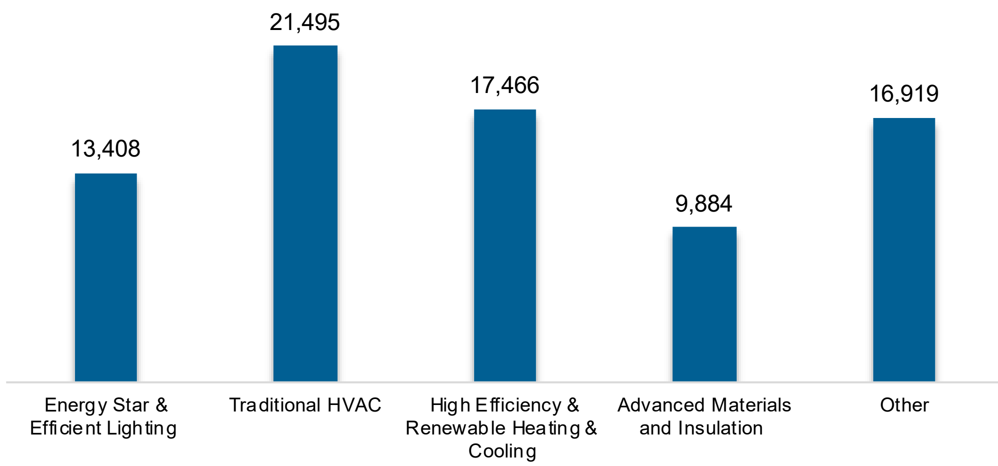
Figure MA-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

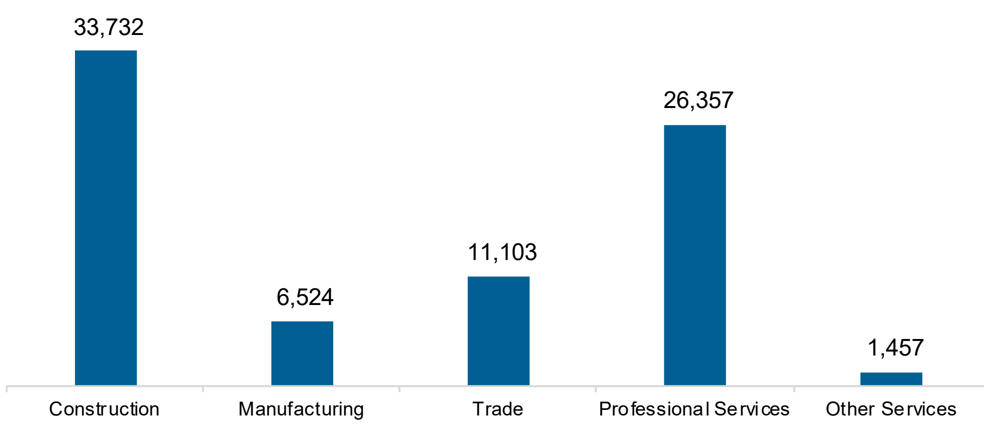
The energy efficiency (EE) sector employed 79,173 workers in Massachusetts, 3.7% of the national EE total. The EE sector added 2,273 jobs and increased 3% in the past year.

Figure MA-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

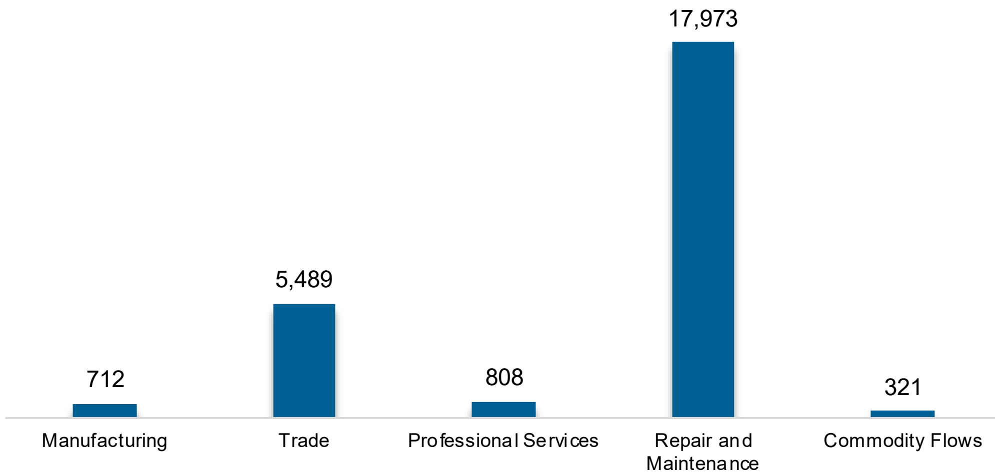
Figure MA-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 25,304 workers in Massachusetts, 1% of the national total for the sector. Motor vehicles and component parts added 1,557 jobs and increased 6.6% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure MA-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Massachusetts are less optimistic than their peers across the country about energy sector job growth over the next year.

Table MA-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.3	2.2
Electric Power Transmission, Distribution, and Storage	0.7	1.1
Energy Efficiency	1.0	1.7
Fuels	1.7	3.0
Motor Vehicles	1.8	3.2

Hiring Difficulty

Employers in Massachusetts reported 55.2% overall hiring difficulty.

Table MA-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	26.7	28.5	7.4	37.4	55.2

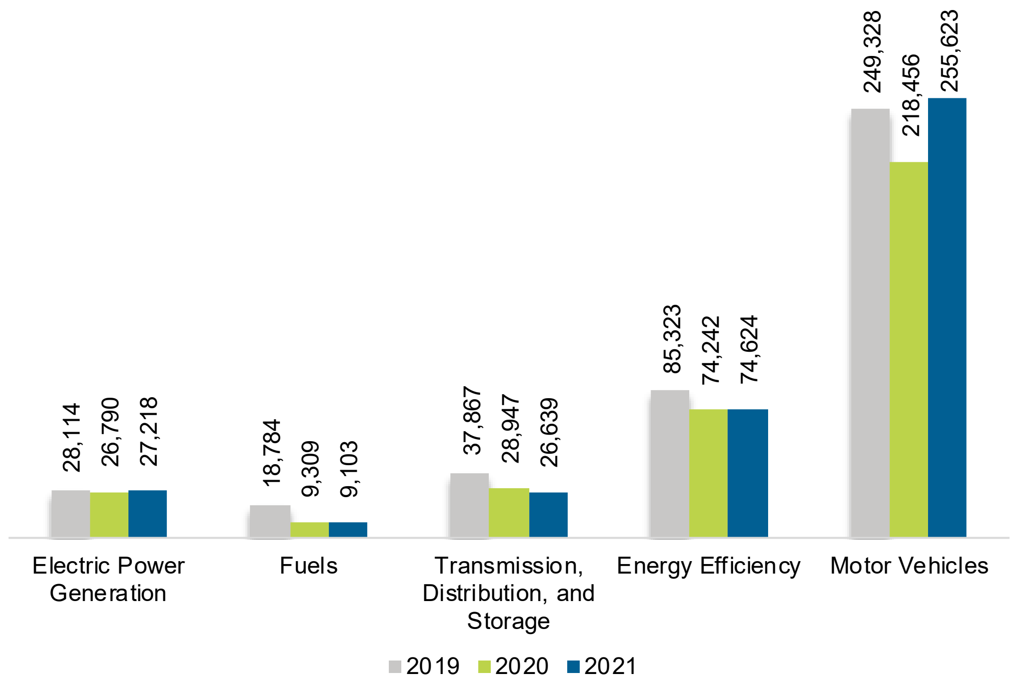
Michigan

ENERGY AND EMPLOYMENT — 2022

Overview

Michigan had 393,207 energy workers statewide in 2021, representing 5% of all U.S. energy jobs. Of these energy jobs, 27,218 are in electric power generation; 9,103 in fuels; 26,639 in transmission, distribution, and storage; 74,624 in energy efficiency; and 255,623 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 35,463 jobs, or 9.9%. The energy sector in Michigan represents 9.5% of total state employment

Figure MI-1.
Employment by Major Energy Technology Application

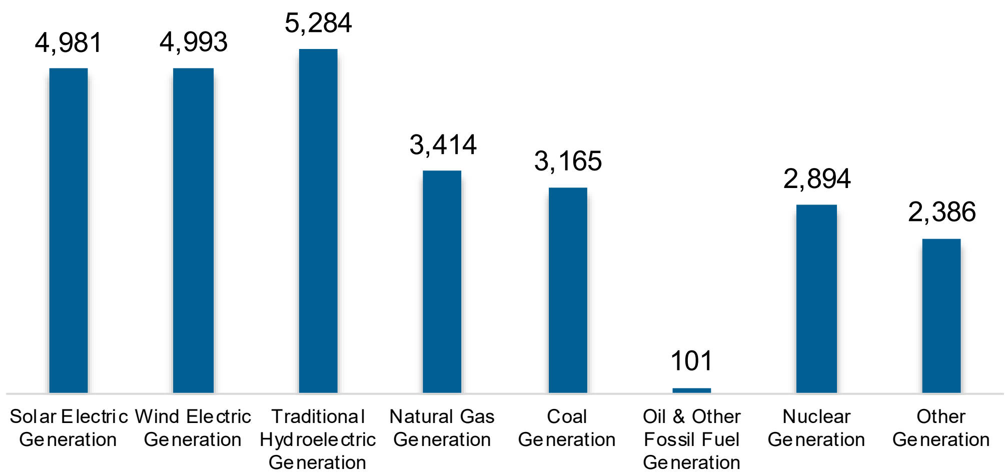


Breakdown by Technology Applications

Electric Power Generation

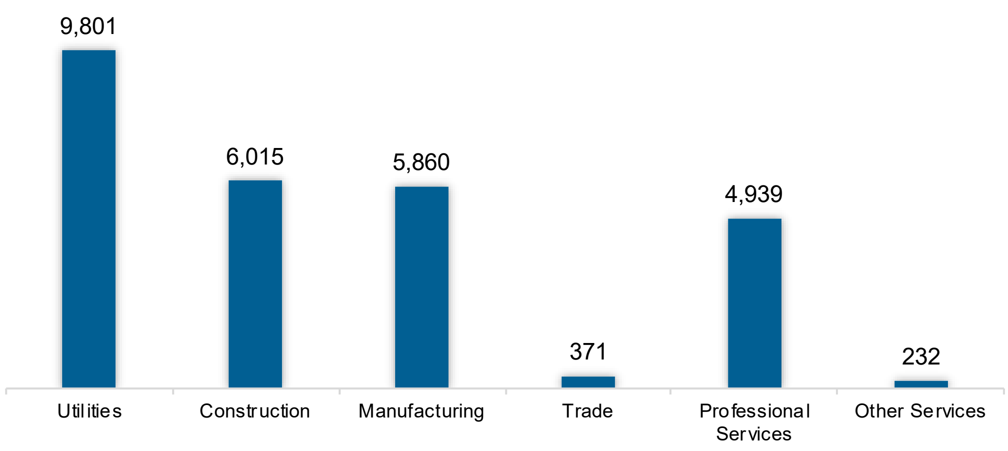
The electric power generation sector employed 27,218 workers in Michigan, 3.2% of the national electricity total, and added 428 jobs over the past year (1.6%).

Figure MI-2.
Electric Power Generation Employment by Detailed Technology Application



Utilities work represents the largest industry sector in the electric power generation sector, with 36% of jobs. Construction is second largest with 22.1%.

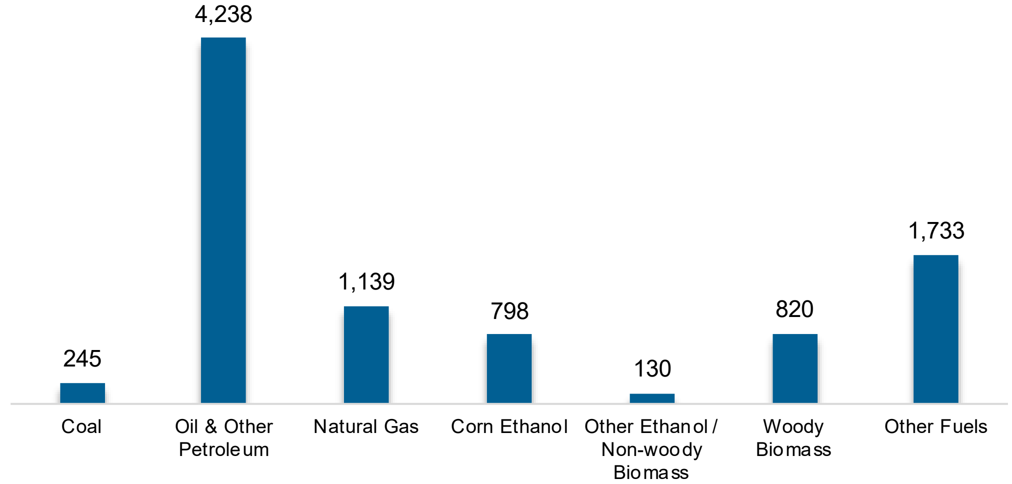
Figure MI-3.
Electric Power Generation Employment by Industry Sector



Fuels

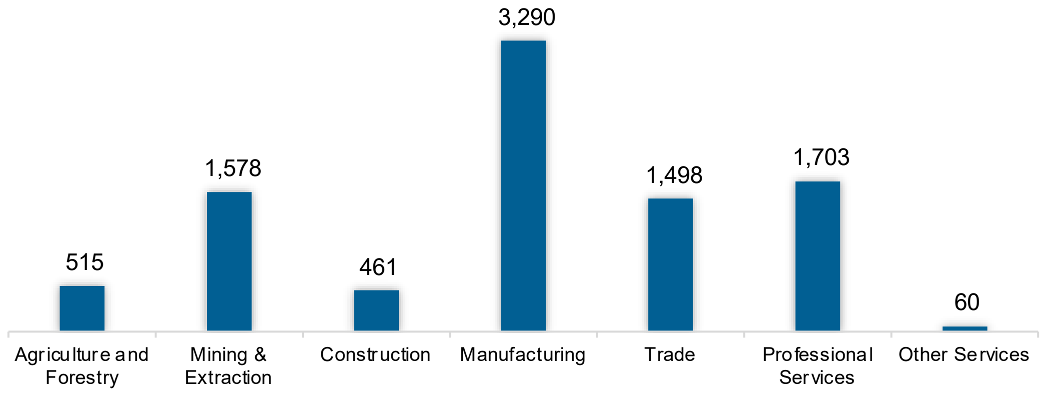
The fuel sector employed 9,103 workers in Michigan, 1% of the national total in fuels. The sector lost 206 jobs and decreased 2.2% in the past year.

Figure MI-4.
Fuels Employment by Detailed Technology Application



Manufacturing jobs represent 36.1% of fuel jobs in Michigan.

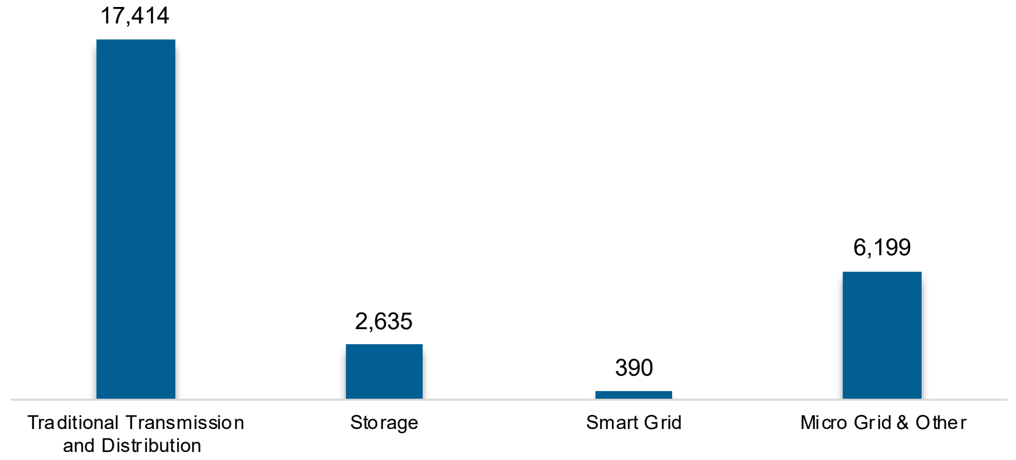
Figure MI-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

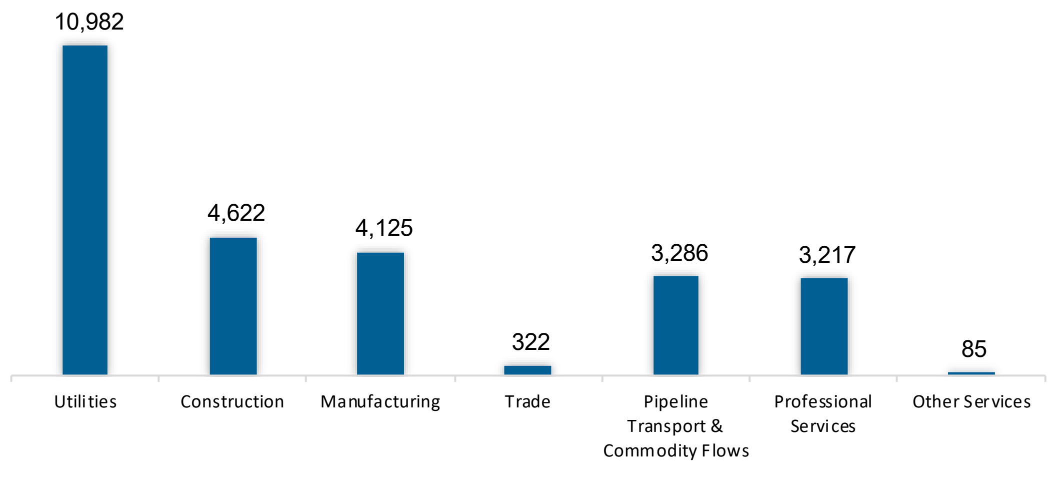
The transmission, distribution, and storage (TDS) sector employed 26,639 workers in Michigan, 1% of the national TDS total. The sector lost 2,308 jobs and decreased 8% in the past year.

Figure MI-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Michigan, accounting for 41.2% of the sector's jobs statewide.

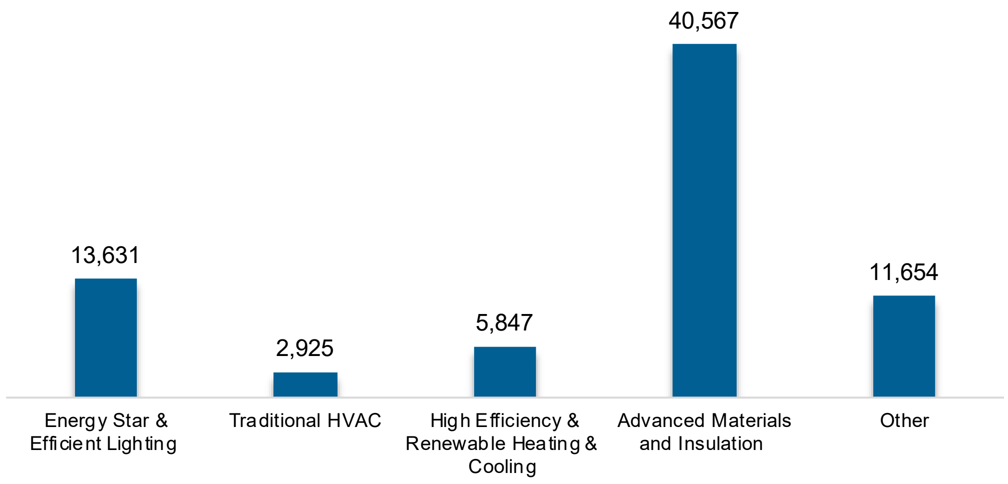
Figure MI-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

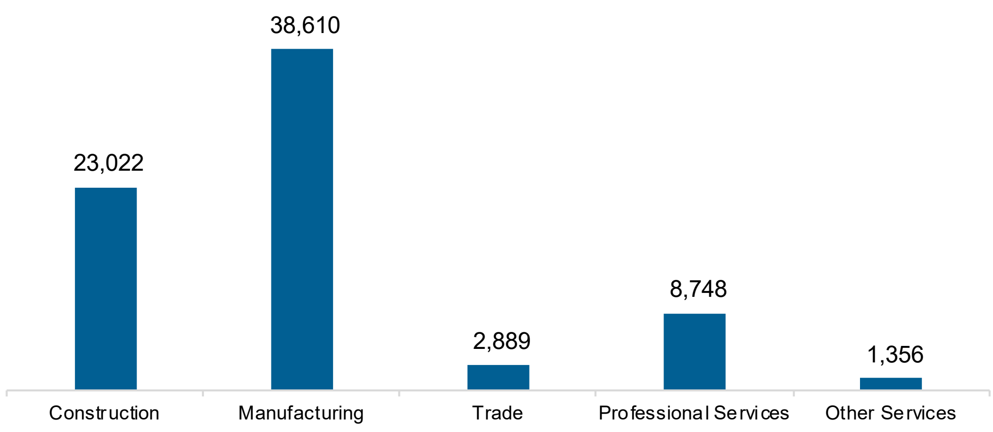
The energy efficiency (EE) sector employed 74,624 workers in Michigan, 3.4% of the national EE total. The EE sector added 382 jobs and increased 0.5% in the past year.

Figure MI-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the manufacturing industry.

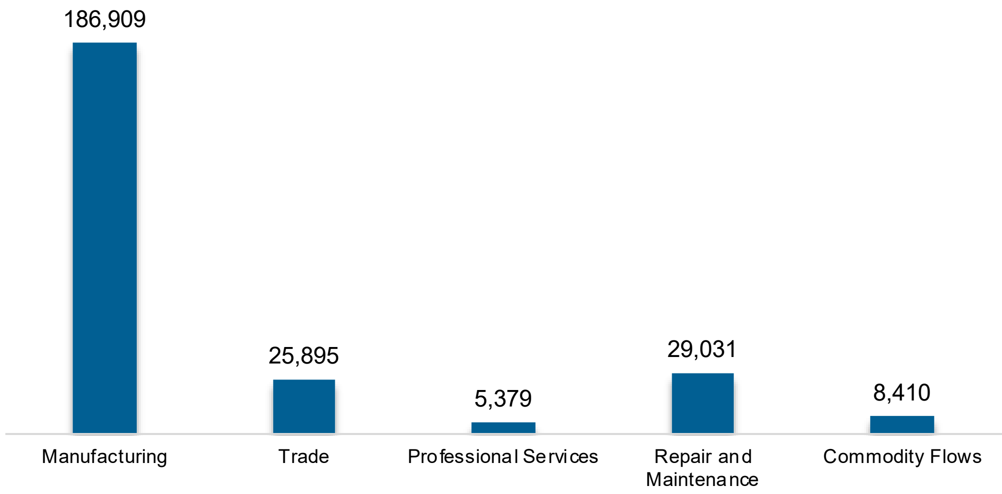
Figure MI-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 255,623 workers in Michigan, 10% of the national total for the sector. Motor vehicles and component parts added 37,168 jobs and increased 17% in the past year. Manufacturing work represents the largest proportion of motor vehicle jobs.

Figure MI-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Michigan are less optimistic than their peers across the country about energy sector job growth over the next year.

Table MI-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	0.3	2.2
Electric Power Transmission, Distribution, and Storage	-0.2	1.1
Energy Efficiency	0.1	1.7
Fuels	0.7	3.0
Motor Vehicles	0.8	3.2

Hiring Difficulty

Employers in Michigan reported 54.3% overall hiring difficulty.

Table MI-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	29.6	24.7	5.2	40.5	54.3

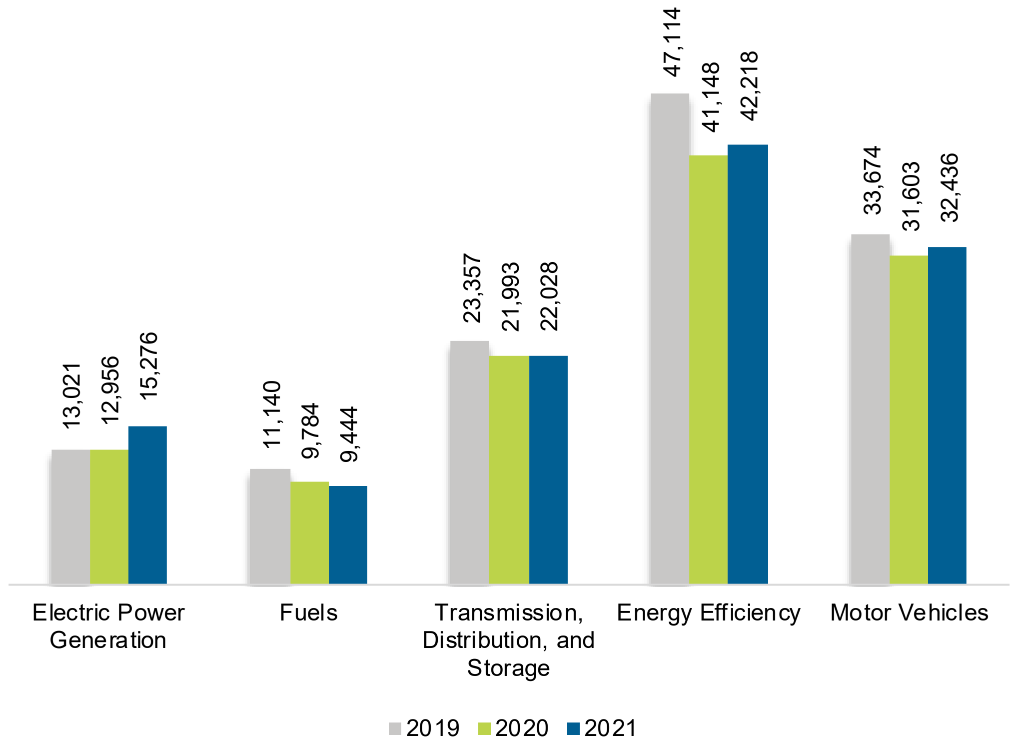
Minnesota

ENERGY AND EMPLOYMENT — 2022

Overview

Minnesota had 121,402 energy workers statewide in 2021, representing 1.6% of all U.S. energy jobs. Of these energy jobs, 15,276 are in electric power generation; 9,444 in fuels; 22,028 in transmission, distribution, and storage; 42,218 in energy efficiency; and 32,436 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 3,918 jobs, or 3.3%. The energy sector in Minnesota represents 4.4% of total state employment

Figure MN-1.
Employment by Major Energy Technology Application

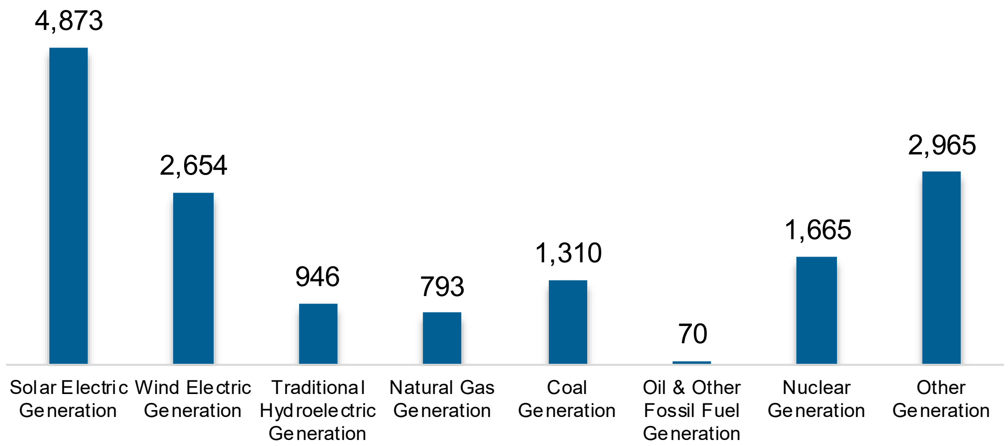


Breakdown by Technology Applications

Electric Power Generation

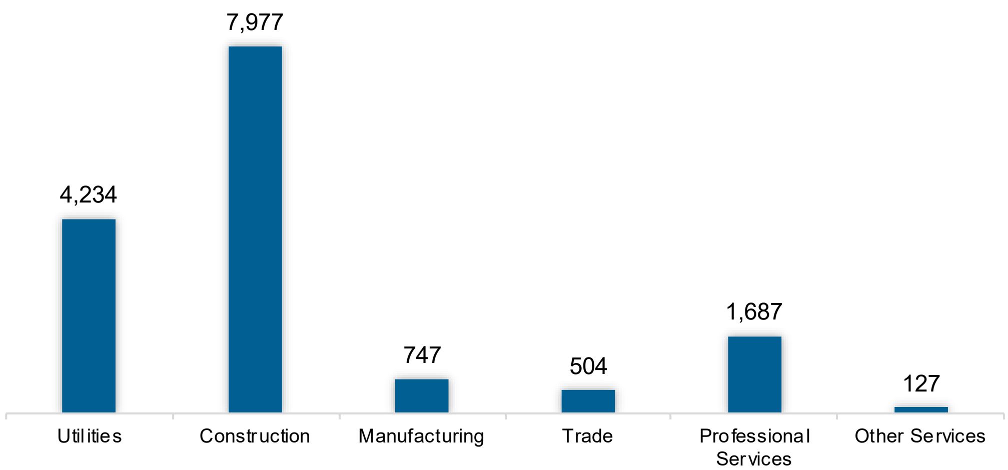
The electric power generation sector employed 15,276 workers in Minnesota, 1.8% of the national electricity total, and added 2,320 jobs over the past year (17.9%).

Figure MN-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 52.2% of jobs. Utilities is second largest with 27.7%.

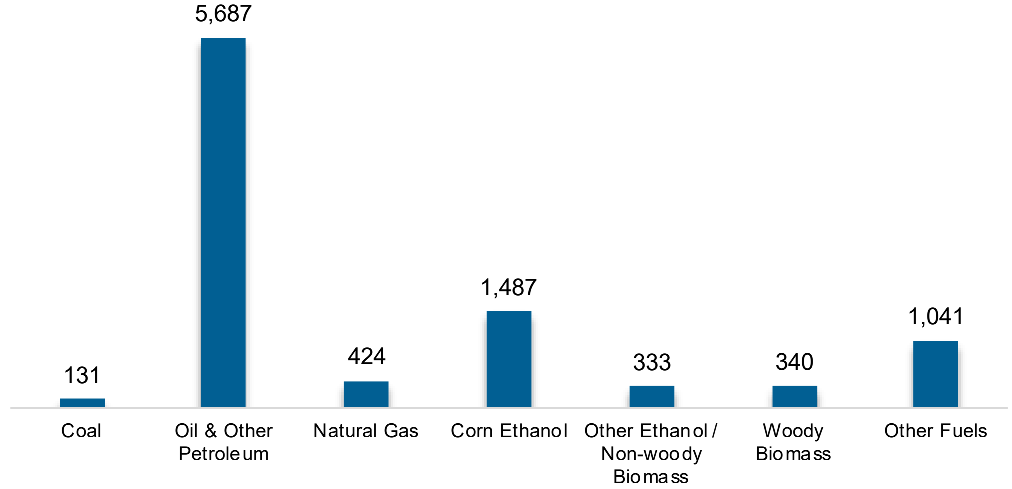
Figure MN-3.
Electric Power Generation Employment by Industry Sector



Fuels

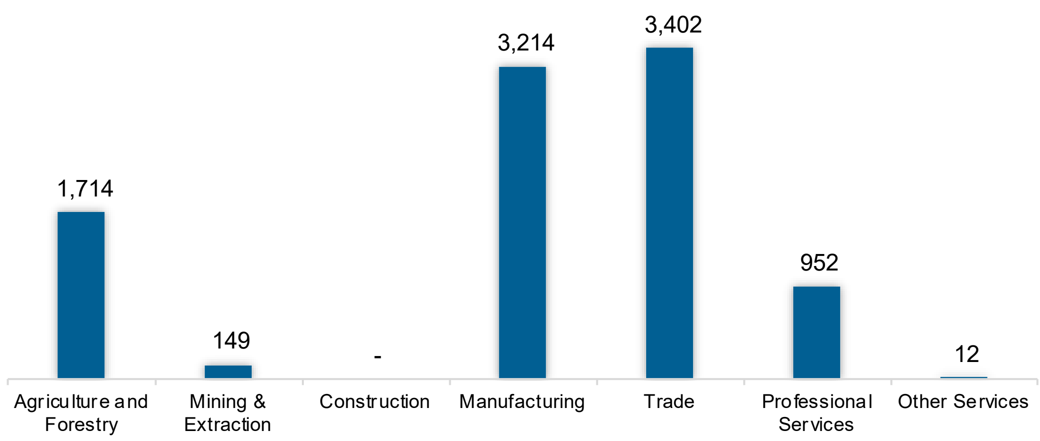
The fuel sector employed 9,444 workers in Minnesota, 1% of the national total in fuels. The sector lost 340 jobs and decreased 3.5% in the past year.

Figure MN-4.
Fuels Employment by Detailed Technology Application



Wholesale trade jobs represent 36% of fuel jobs in Minnesota.

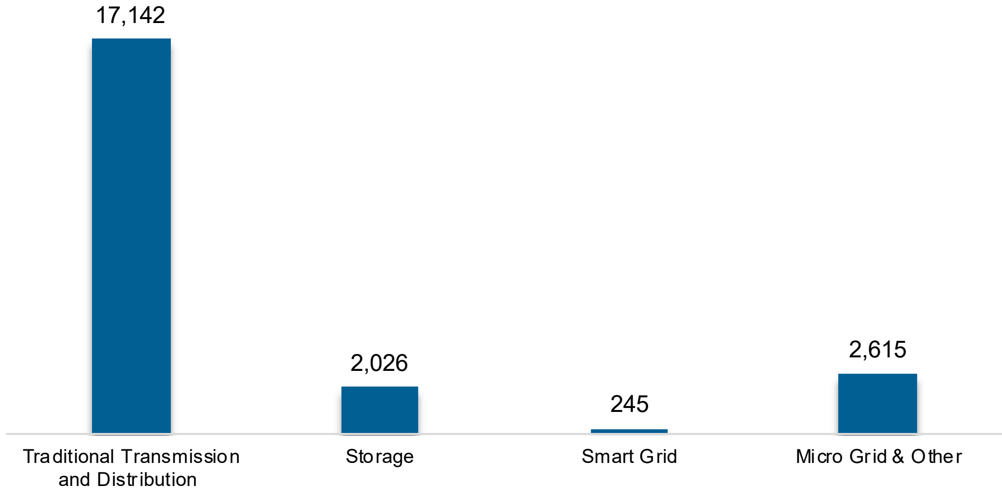
Figure MN-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

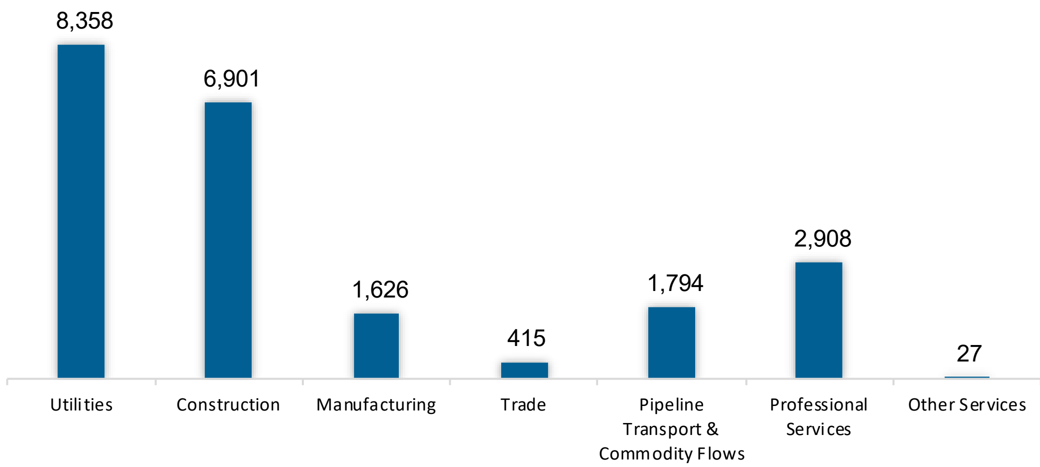
The transmission, distribution, and storage (TDS) sector employed 22,028 workers in Minnesota, 1% of the national TDS total. The sector gained 35 jobs and increased 0.2% in the past year.

Figure MN-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Minnesota, accounting for 37.9% of the sector's jobs statewide.

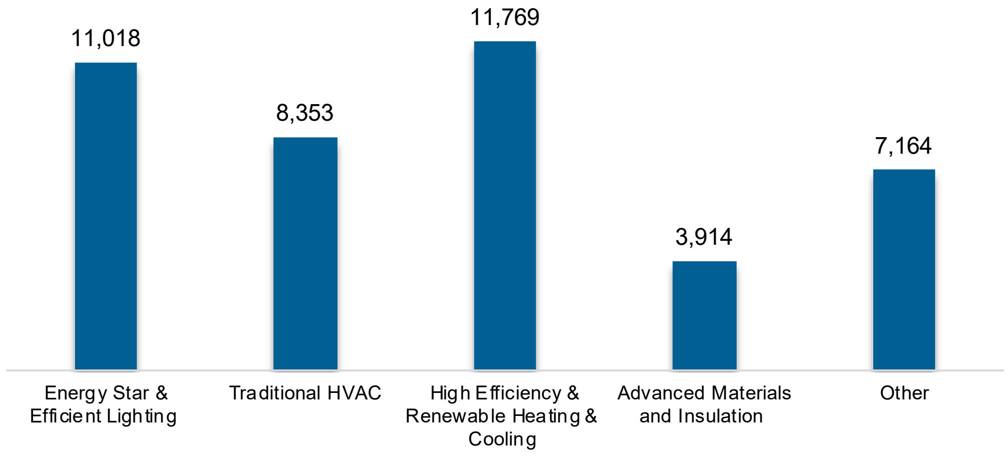
Figure MN-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

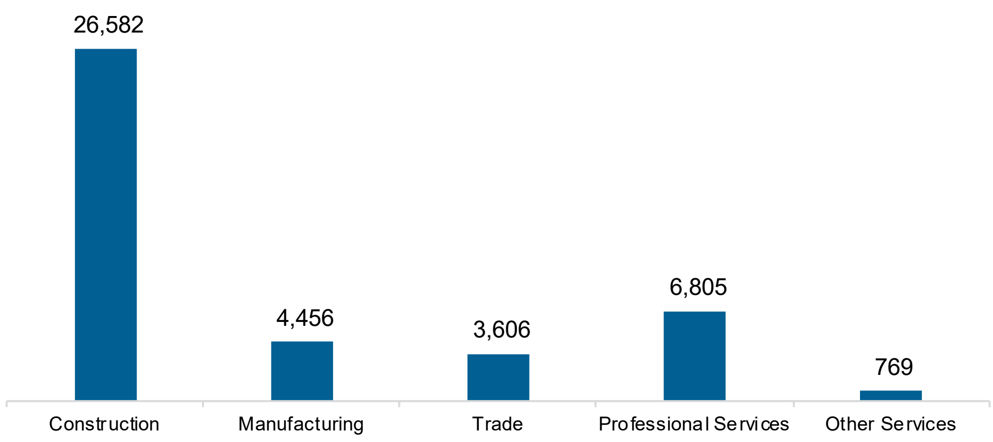
The energy efficiency (EE) sector employed 42,218 workers in Minnesota, 2% of the national EE total. The EE sector added 1,070 jobs and increased 2.6% in the past year.

Figure MN-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

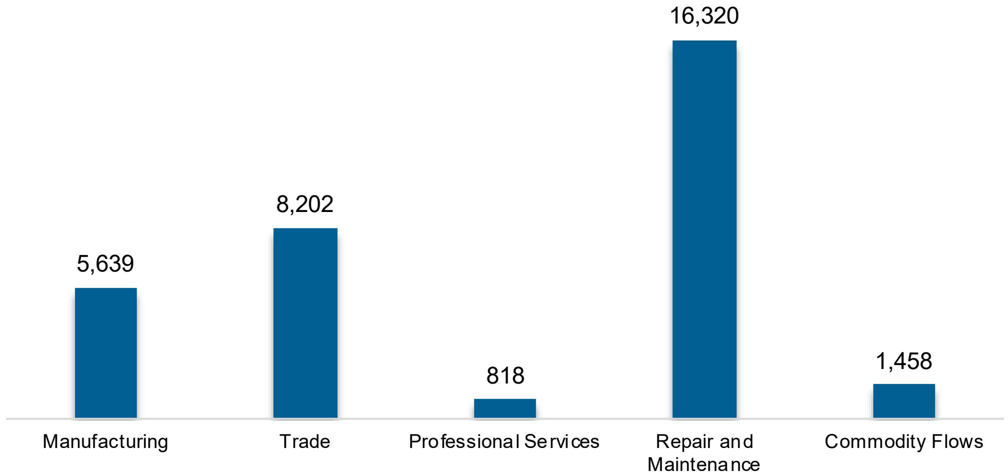
Figure MN-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 32,436 workers in Minnesota, 1.3% of the national total for the sector. Motor vehicles and component parts added 833 jobs and increased 2.6% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure MN-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Minnesota are less optimistic than their peers across the country about energy sector job growth over the next year.

Table MN-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	0.0	2.2
Electric Power Transmission, Distribution, and Storage	-0.6	1.1
Energy Efficiency	-0.3	1.7
Fuels	0.4	3.0
Motor Vehicles	0.5	3.2

Hiring Difficulty

Employers in Minnesota reported 57.0% overall hiring difficulty.

Table MN-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	24.7	32.3	11.9	31.1	57.0

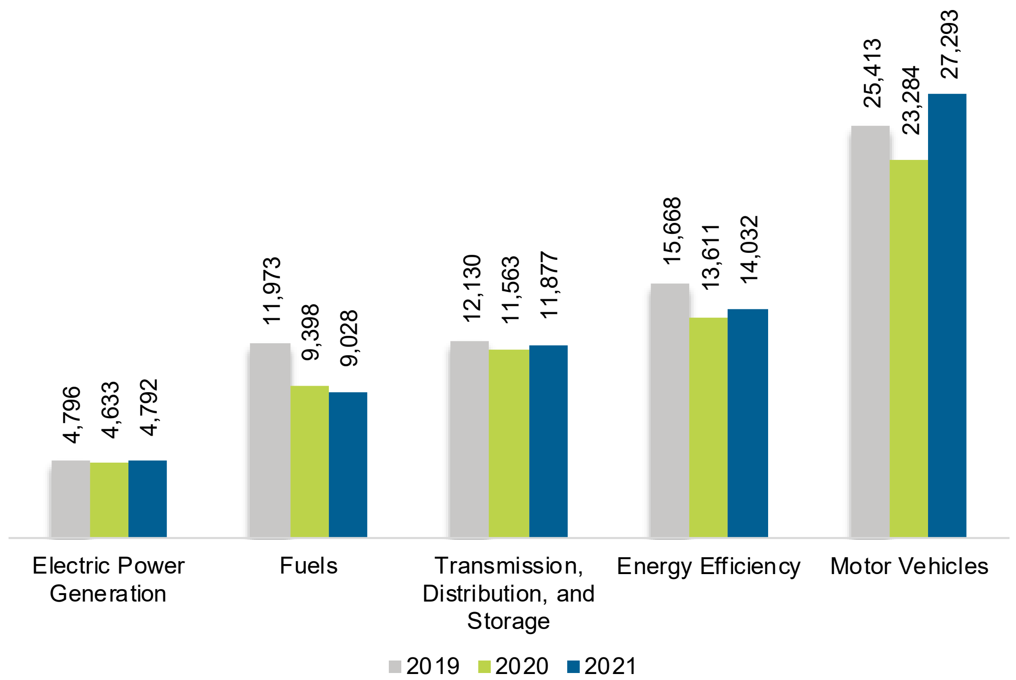
Mississippi

ENERGY AND EMPLOYMENT — 2022

Overview

Mississippi had 67,022 energy workers statewide in 2021, representing 0.9% of all U.S. energy jobs. Of these energy jobs, 4,792 are in electric power generation; 9,028 in fuels; 11,877 in transmission, distribution, and storage; 14,032 in energy efficiency; and 27,293 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 4,533 jobs, or 7.3%. The energy sector in Mississippi represents 6% of total state employment

Figure MS-1.
Employment by Major Energy Technology Application

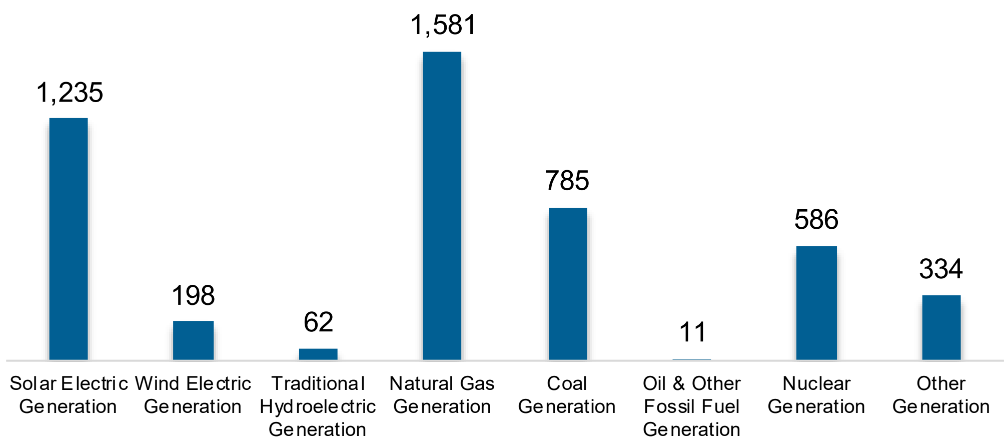


Breakdown by Technology Applications

Electric Power Generation

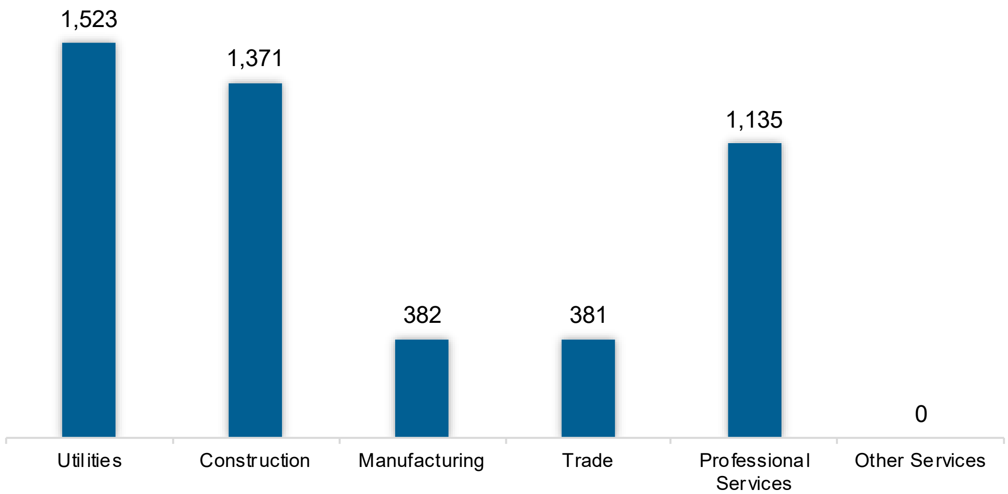
The electric power generation sector employed 4,792 workers in Mississippi, 0.6% of the national electricity total, and added 159 jobs over the past year (3.4%).

Figure MS-2.
Electric Power Generation Employment by Detailed Technology Application



Utilities work represents the largest industry sector in the electric power generation sector, with 31.8% of jobs. Construction is second largest with 28.6%.

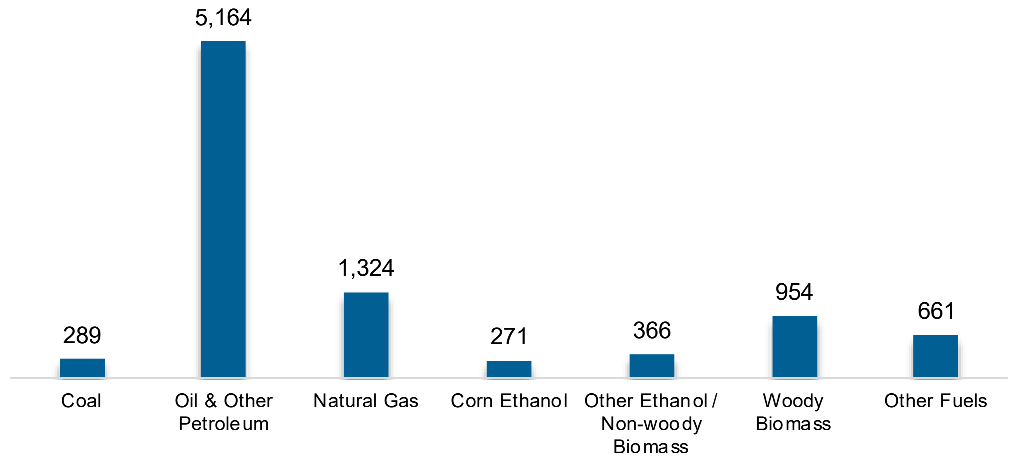
Figure MS-3.
Electric Power Generation Employment by Industry Sector



Fuels

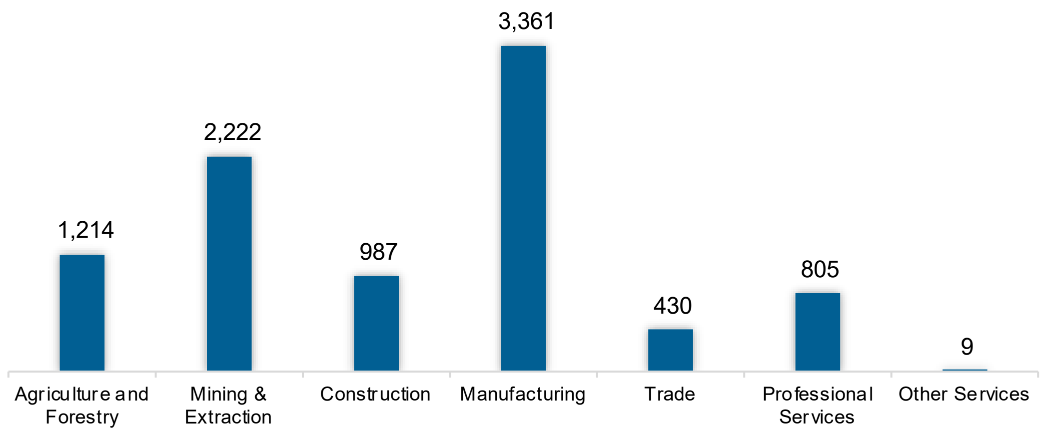
The fuel sector employed 9,028 workers in Mississippi, 1% of the national total in fuels. The sector lost 370 jobs and decreased 3.9% in the past year.

Figure MS-4.
Fuels Employment by Detailed Technology Application



Manufacturing jobs represent 37.2% of fuel jobs in Mississippi.

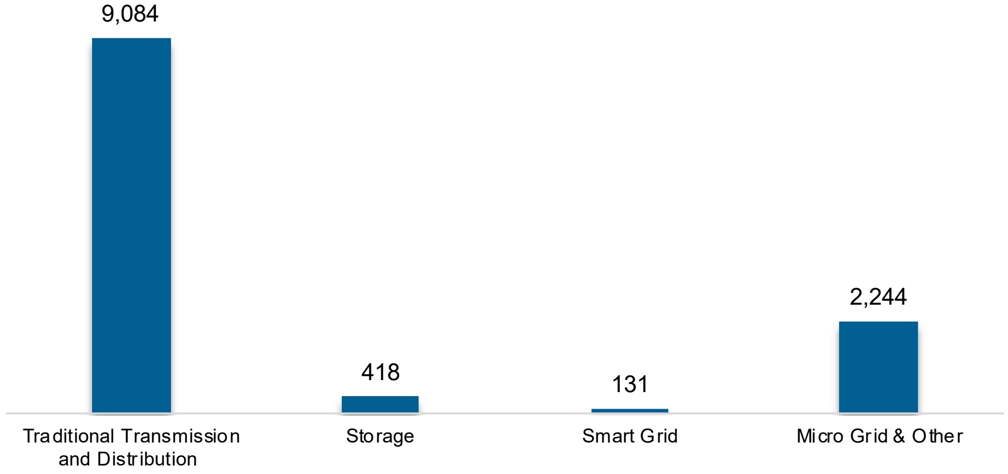
Figure MS-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

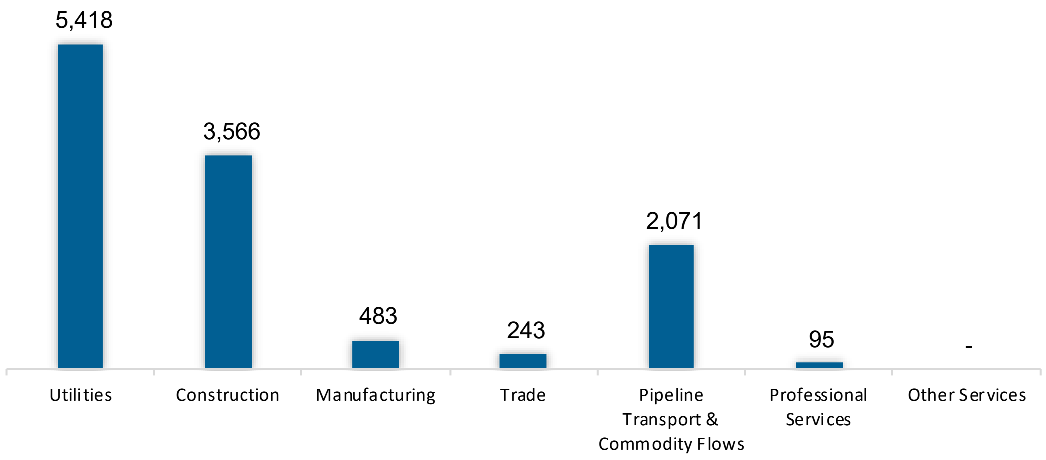
The transmission, distribution, and storage (TDS) sector employed 11,877 workers in Mississippi, 1% of the national TDS total. The sector gained 314 jobs and increased 2.7% in the past year.

Figure MS-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Mississippi, accounting for 45.6% of the sector's jobs statewide.

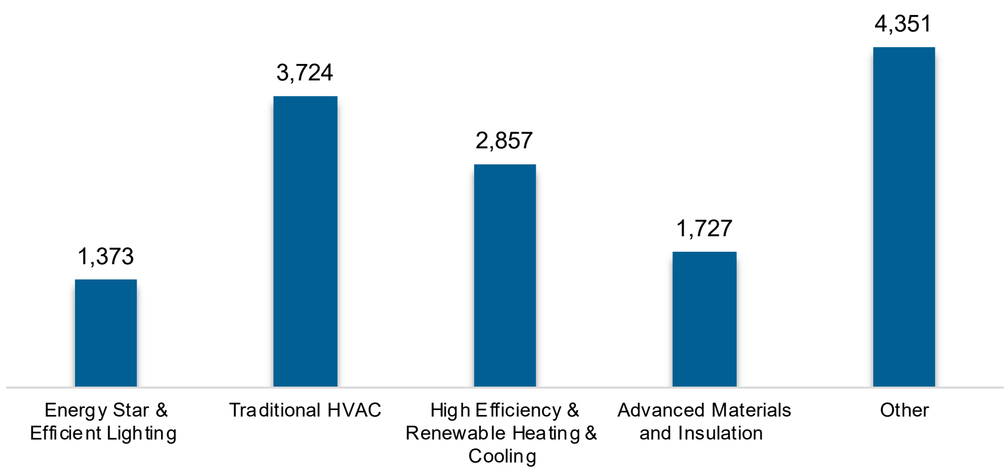
Figure MS-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

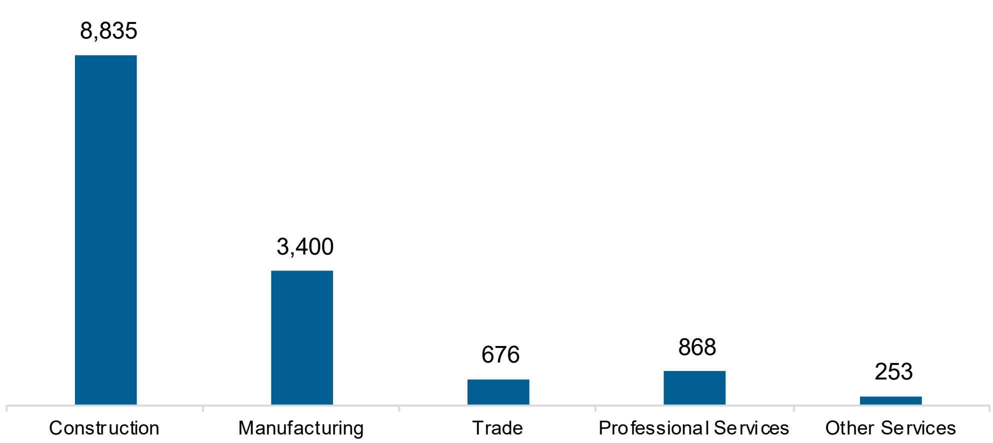
The energy efficiency (EE) sector employed 14,032 workers in Mississippi, 0.6% of the national EE total. The EE sector added 421 jobs and increased 3.1% in the past year.

Figure MS-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

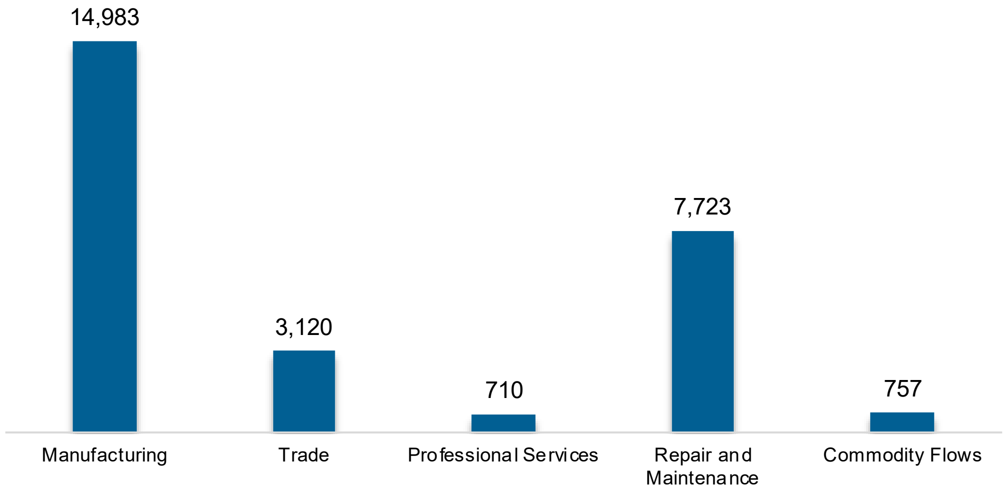
Figure MS-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 27,293 workers in Mississippi, 1.1% of the national total for the sector. Motor vehicles and component parts added 4,009 jobs and increased 17.2% in the past year. Manufacturing work represents the largest proportion of motor vehicle jobs.

Figure MS-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Mississippi are less optimistic than their peers across the country about energy sector job growth over the next year.

Table MS-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.1	2.2
Electric Power Transmission, Distribution, and Storage	0.6	1.1
Energy Efficiency	0.9	1.7
Fuels	1.5	3.0
Motor Vehicles	1.6	3.2

Hiring Difficulty

Employers in Mississippi reported 57.0% overall hiring difficulty.

Table MS-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	23.6	33.4	5.2	37.7	57.0

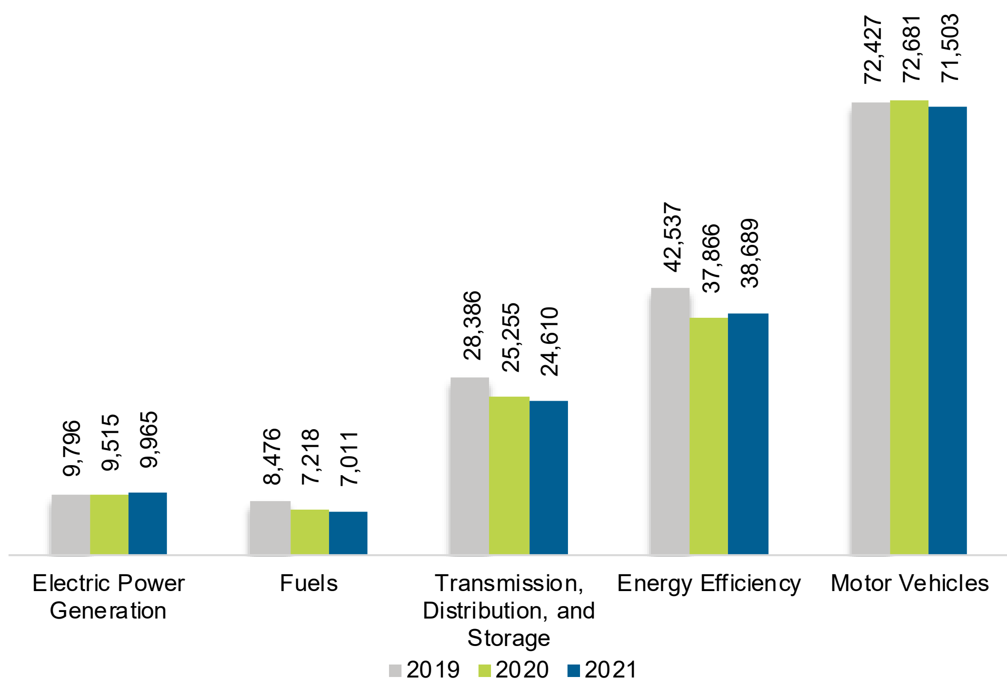
Missouri

ENERGY AND EMPLOYMENT — 2022

Overview

Missouri had 151,777 energy workers statewide in 2021, representing 1.9% of all U.S. energy jobs. Of these energy jobs, 9,965 are in electric power generation; 7,011 in fuels; 24,610 in transmission, distribution, and storage; 38,689 in energy efficiency; and 71,503 in motor vehicles. From 2020 to 2021, energy jobs in the state decreased by 758 jobs, or 0.5%. The energy sector in Missouri represents 5.5% of total state employment

Figure MO-1.
Employment by Major Energy Technology Application

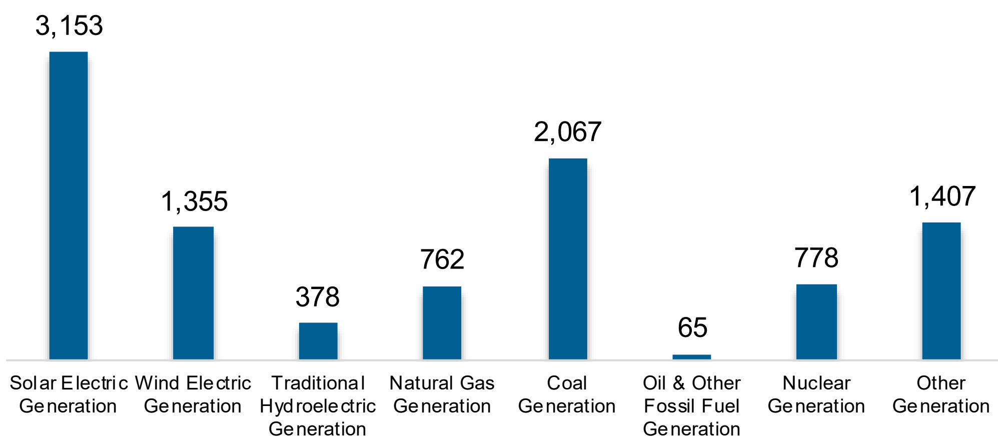


Breakdown by Technology Applications

Electric Power Generation

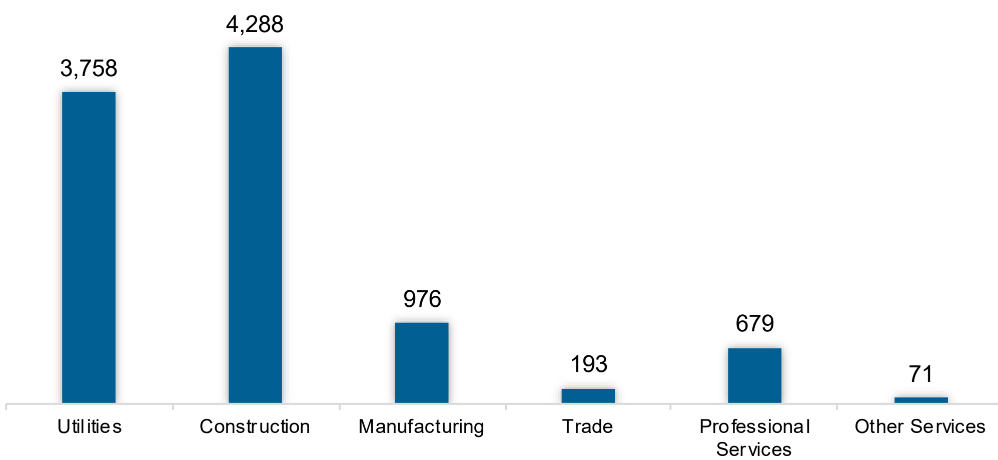
The electric power generation sector employed 9,965 workers in Missouri, 1.2% of the national electricity total, and added 449 jobs over the past year (4.7%).

Figure MO-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 43% of jobs. Utilities is second largest with 37.7%.

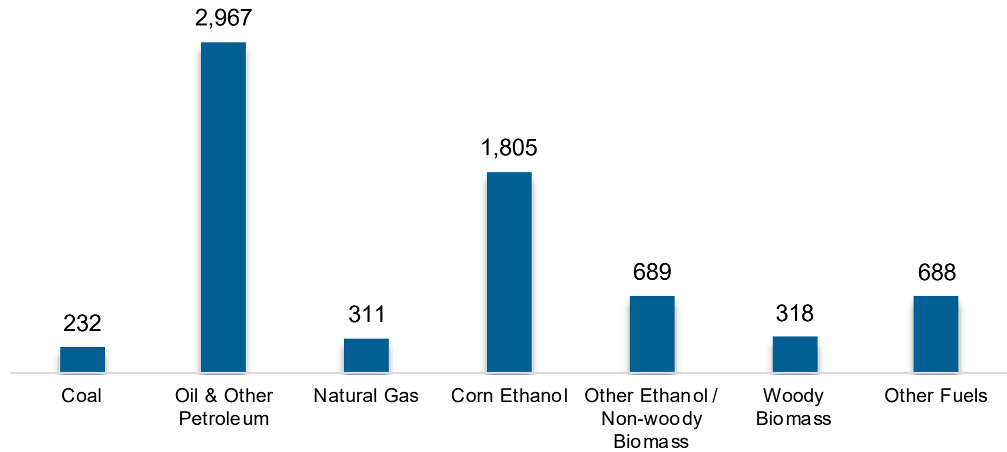
Figure MO-3.
Electric Power Generation Employment by Industry Sector



Fuels

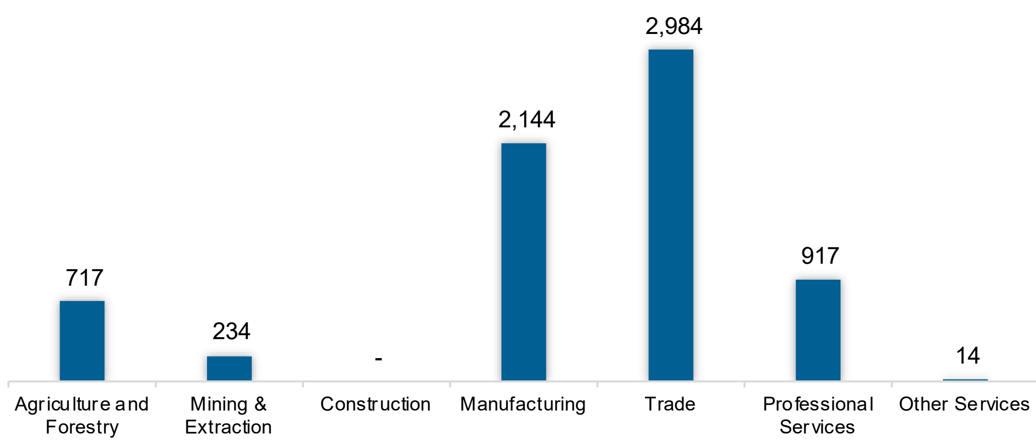
The fuel sector employed 7,011 workers in Missouri, 0.8% of the national total in fuels. The sector lost 207 jobs and decreased 2.9% in the past year.

Figure MO-4.
Fuels Employment by Detailed Technology Application



Wholesale trade jobs represent 42.6% of fuel jobs in Missouri.

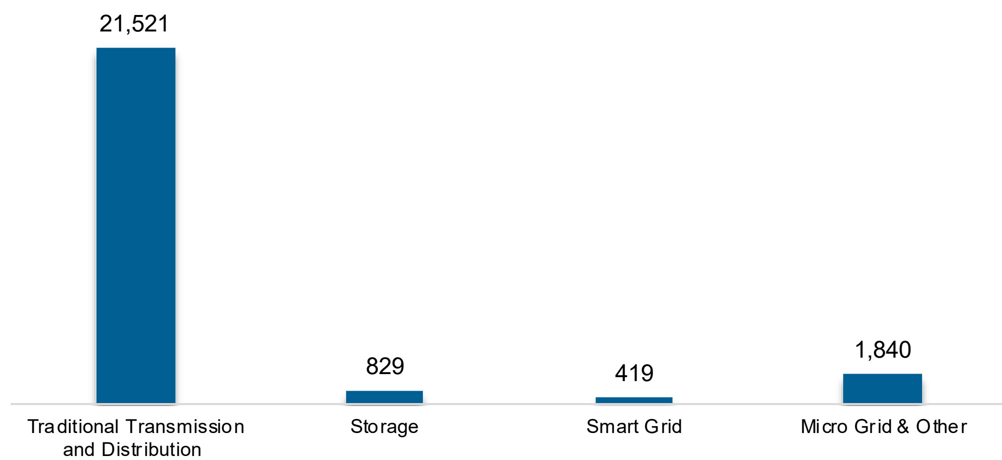
Figure MO-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

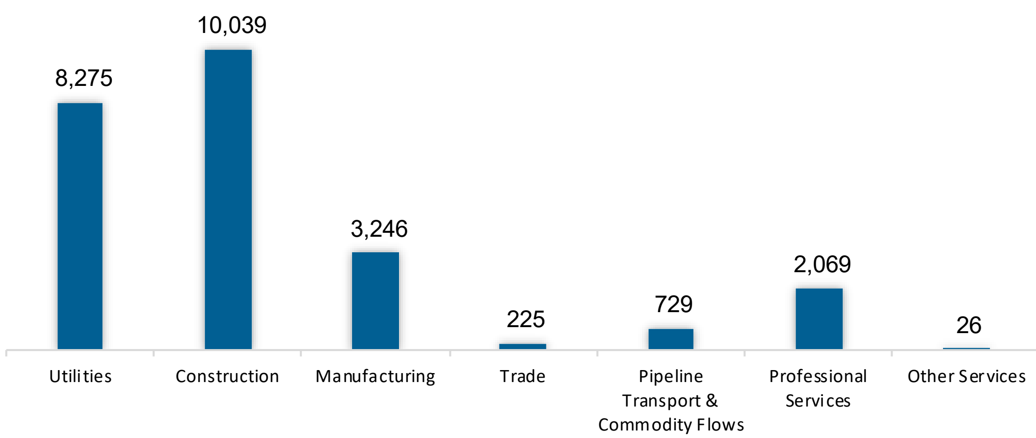
The transmission, distribution, and storage (TDS) sector employed 24,610 workers in Missouri, 0.8% of the national TDS total. The sector lost 645 jobs and decreased 2.6% in the past year.

Figure MO-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in Missouri, accounting for 40.8% of the sector's jobs statewide.

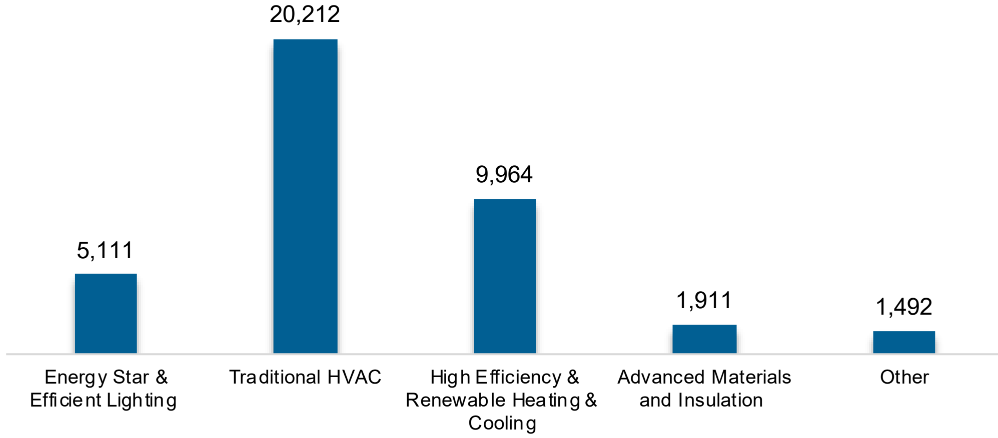
Figure MO-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

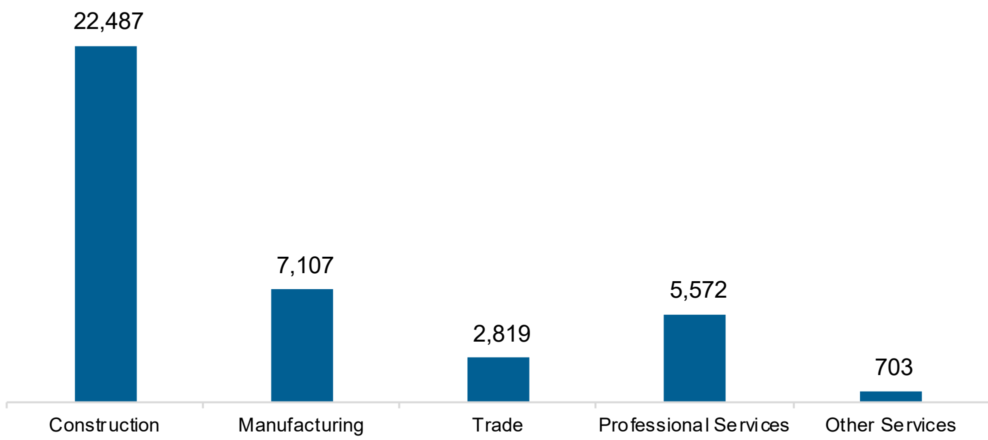
The energy efficiency (EE) sector employed 38,689 workers in Missouri, 1.8% of the national EE total. The EE sector added 823 jobs and increased 2.2% in the past year.

Figure MO-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

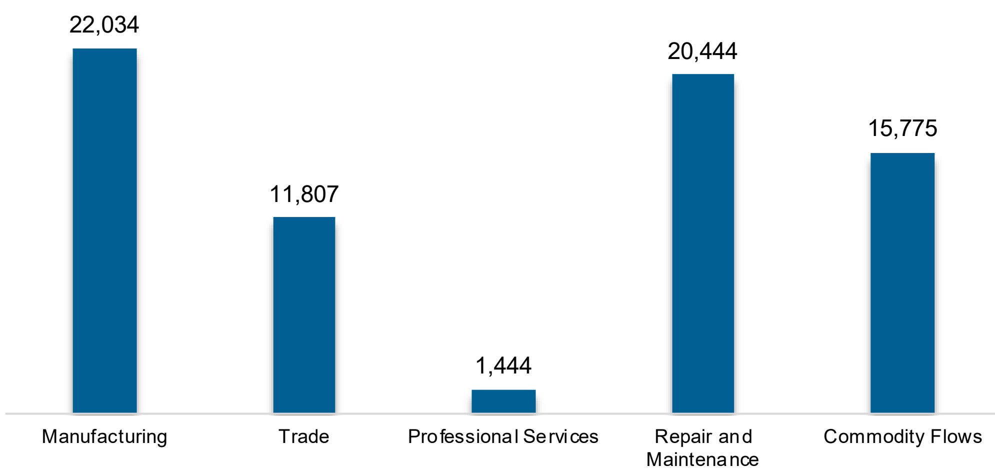
Figure MO-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 71,503 workers in Missouri, 2.8% of the national total for the sector. Motor vehicles and component parts lost 1,178 jobs and decreased 1.6% in the past year. Manufacturing work represents the largest proportion of motor vehicle jobs.

Figure MO-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Missouri are similarly optimistic than their peers across the country about energy sector job growth over the next year.

Table MO-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	2.4	2.2
Electric Power Transmission, Distribution, and Storage	1.8	1.1
Energy Efficiency	2.1	1.7
Fuels	2.8	3.0
Motor Vehicles	2.9	3.2

Hiring Difficulty

Employers in Missouri reported 57.0% overall hiring difficulty.

Table MO-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	23.6	33.4	9.7	33.3	57.0

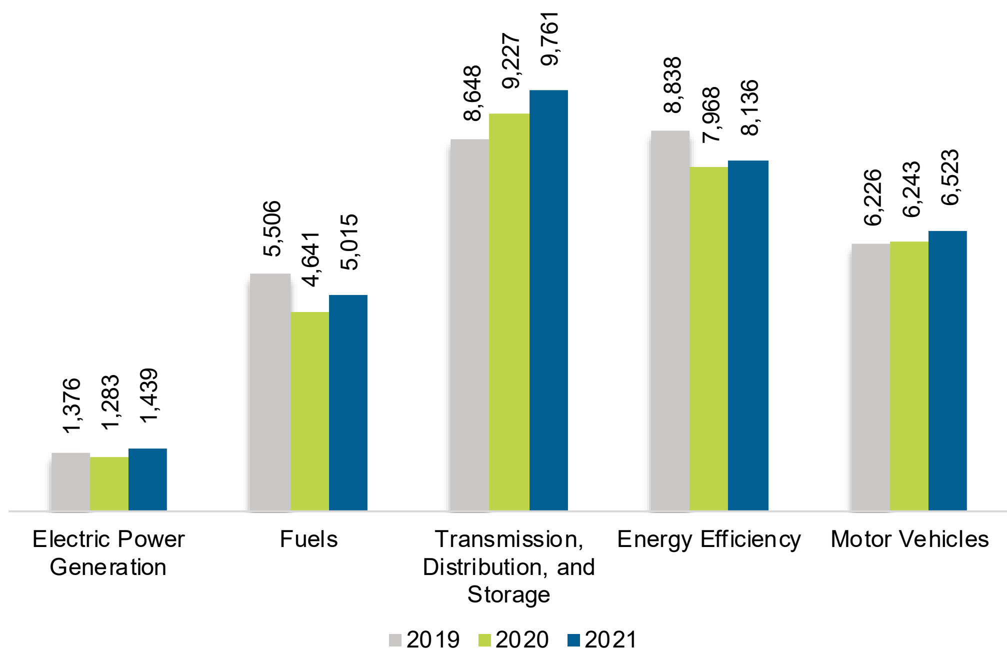
Montana

ENERGY AND EMPLOYMENT — 2022

Overview

Montana had 30,875 energy workers statewide in 2021, representing 0.4% of all U.S. energy jobs. Of these energy jobs, 1,439 are in electric power generation; 5,015 in fuels; 9,761 in transmission, distribution, and storage; 8,136 in energy efficiency; and 6,523 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 1,513 jobs, or 5.2%. The energy sector in Montana represents 6.5% of total state employment

Figure MT-1.
Employment by Major Energy Technology Application

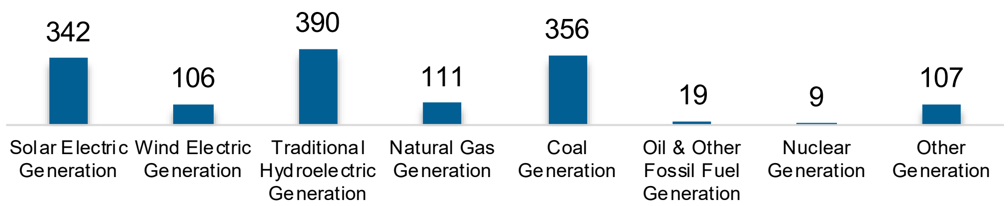


Breakdown by Technology Applications

Electric Power Generation

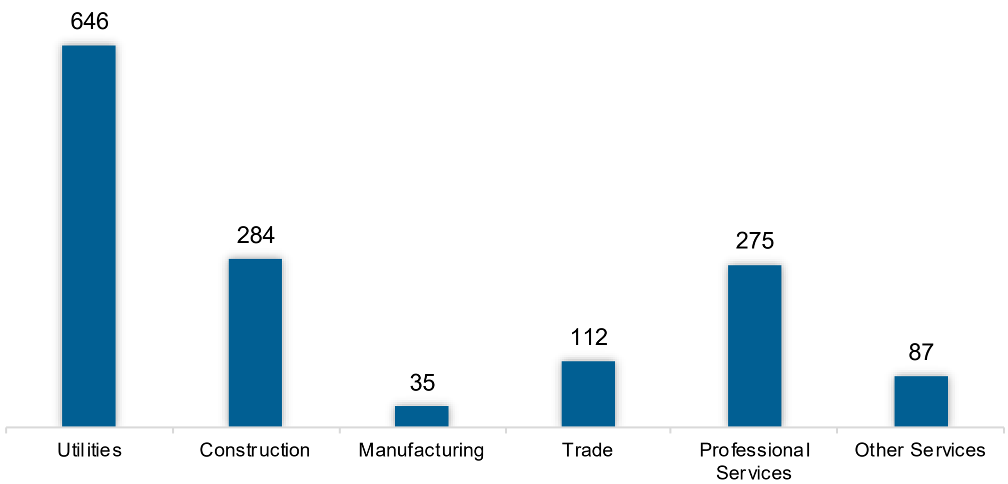
The electric power generation sector employed 1,439 workers in Montana, 0.2% of the national electricity total, and added 156 jobs over the past year (12.2%).

Figure MT-2.
Electric Power Generation Employment by Detailed Technology Application



Utilities work represents the largest industry sector in the electric power generation sector, with 44.8% of jobs. Construction is second largest with 19.7%.

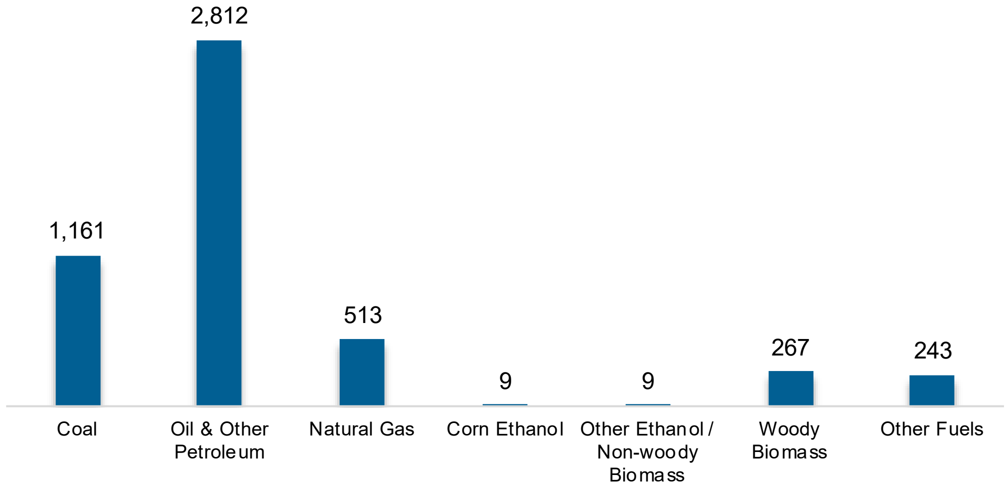
Figure MT-3.
Electric Power Generation Employment by Industry Sector



Fuels

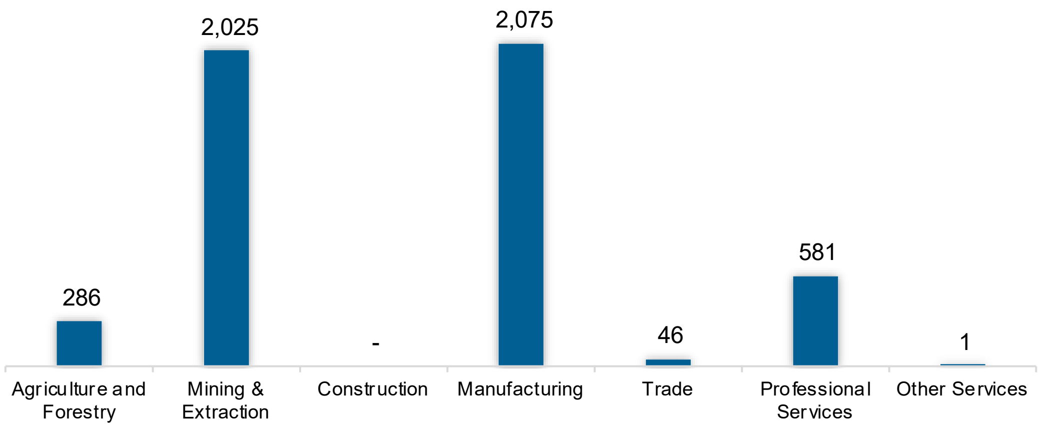
The fuel sector employed 5,015 workers in Montana, 0.6% of the national total in fuels. The sector gained 374 jobs and increased 8.1% in the past year.

Figure MT-4.
Fuels Employment by Detailed Technology Application



Manufacturing jobs represent 41.4% of fuel jobs in Montana.

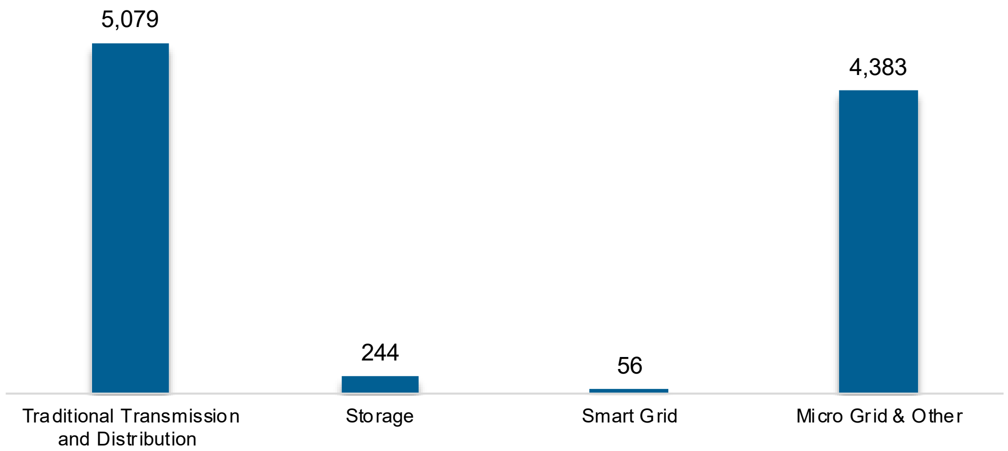
Figure MT-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

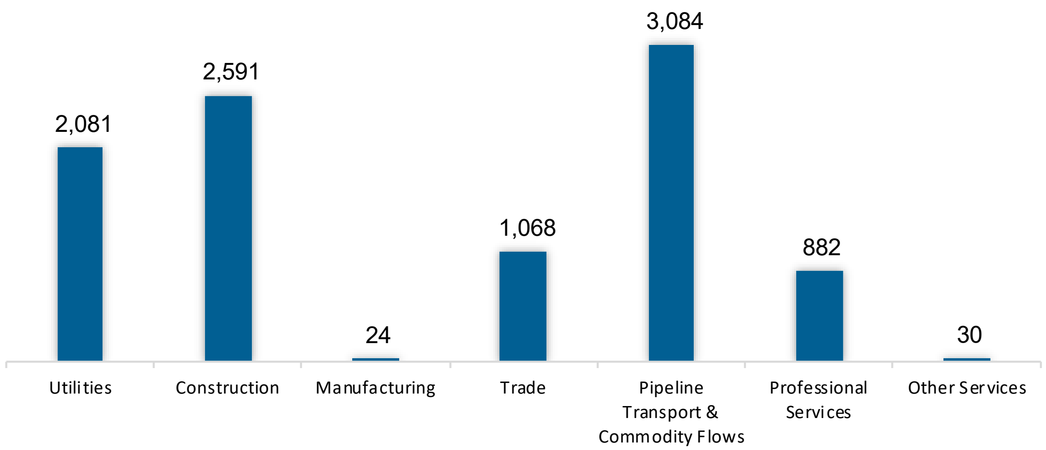
The transmission, distribution, and storage (TDS) sector employed 9,761 workers in Montana, 0.6% of the national TDS total. The sector gained 534 jobs and increased 5.8% in the past year.

Figure MT-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Pipeline transport and commodity flows work represents the greatest proportion of TDS jobs in Montana, accounting for 31.6% of the sector's jobs statewide.

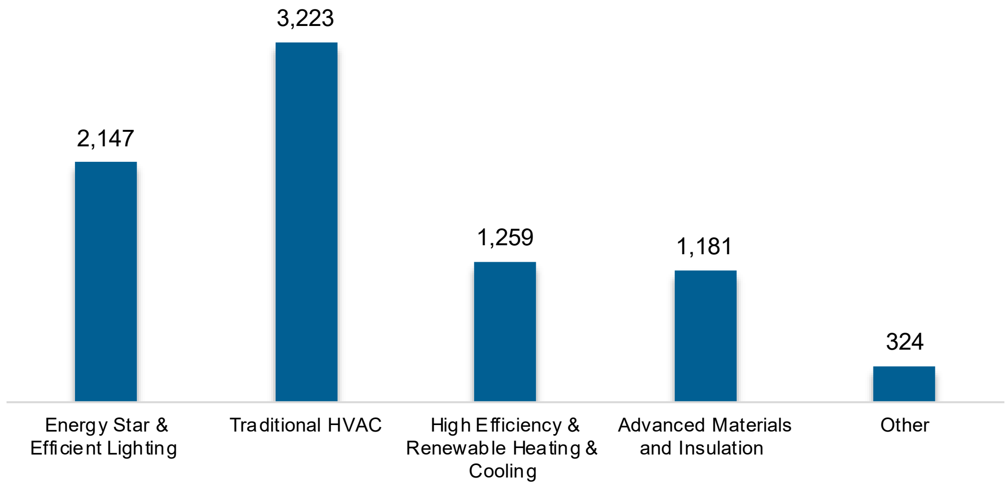
Figure MT-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

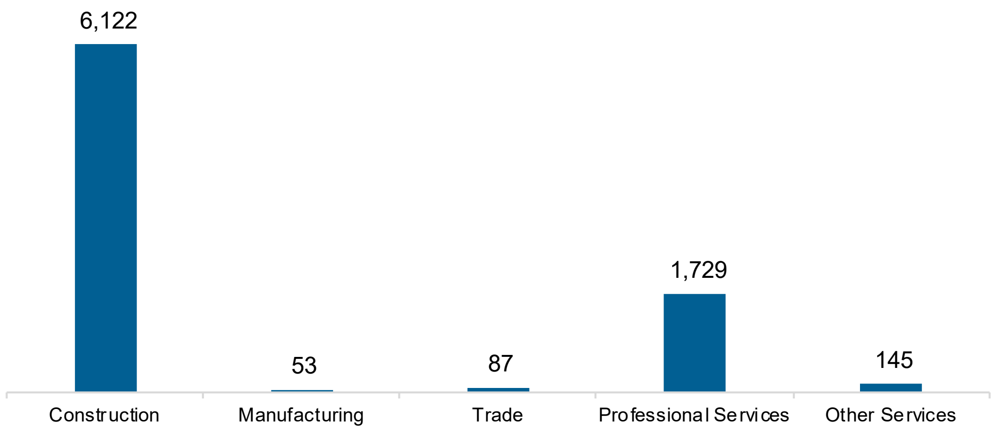
The energy efficiency (EE) sector employed 8,136 workers in Montana, 0.4% of the national EE total. The EE sector added 168 jobs and increased 2.1% in the past year.

Figure MT-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

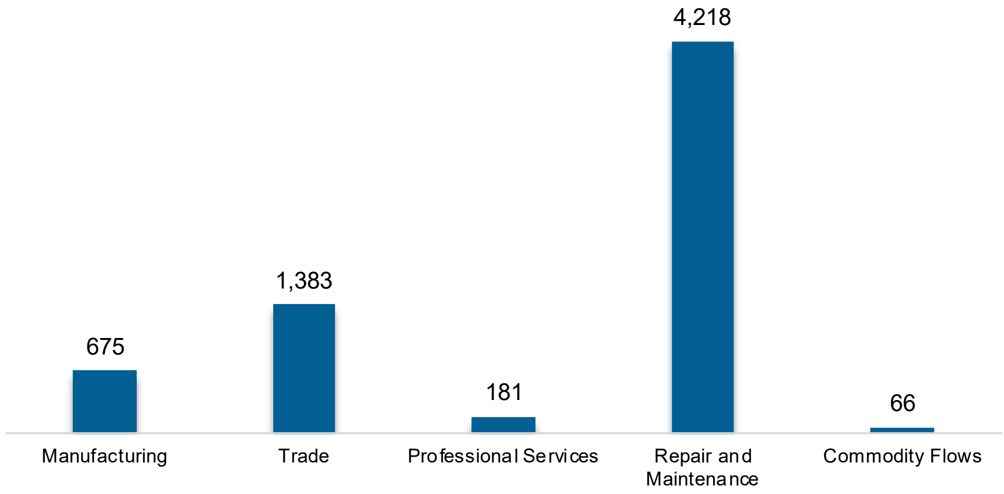
Figure MT-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 6,523 workers in Montana, 0.3% of the national total for the sector. Motor vehicles and component parts added 280 jobs and increased 4.5% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure MT-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Montana are less optimistic than their peers across the country about energy sector job growth over the next year.

Table MT-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	0.6	2.2
Electric Power Transmission, Distribution, and Storage	0.1	1.1
Energy Efficiency	0.4	1.7
Fuels	1.0	3.0
Motor Vehicles	1.1	3.2

Hiring Difficulty

Employers in Montana reported 48.1% overall hiring difficulty.

Table MT-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	22.5	25.7	8.0	43.8	48.1

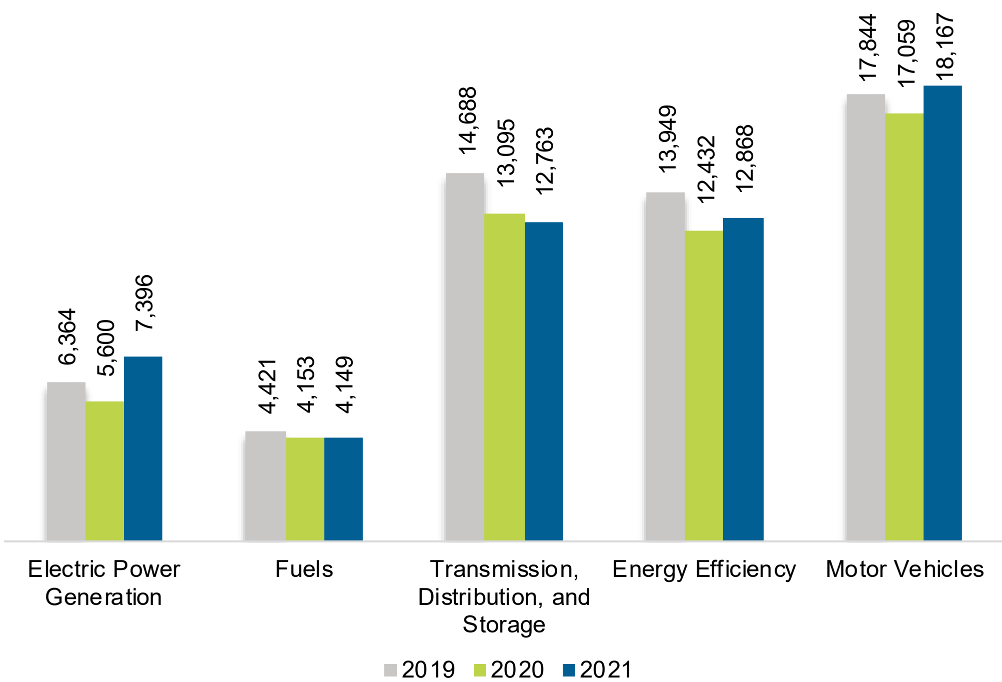
Nebraska

ENERGY AND EMPLOYMENT — 2022

Overview

Nebraska had 55,344 energy workers statewide in 2021, representing 0.7% of all U.S. energy jobs. Of these energy jobs, 7,396 are in electric power generation; 4,149 in fuels; 12,763 in transmission, distribution, and storage; 12,868 in energy efficiency; and 18,167 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 3,005 jobs, or 5.7%. The energy sector in Nebraska represents 5.7% of total state employment

Figure NE-1.
Employment by Major Energy Technology Application

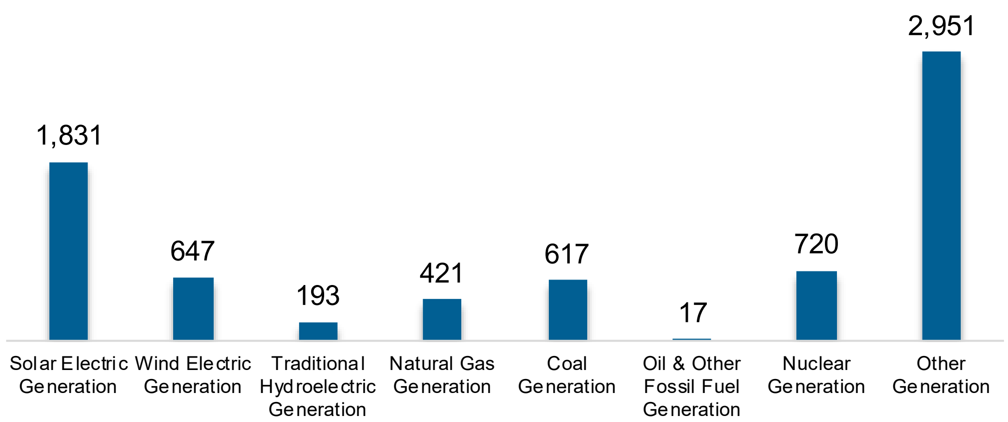


Breakdown by Technology Applications

Electric Power Generation

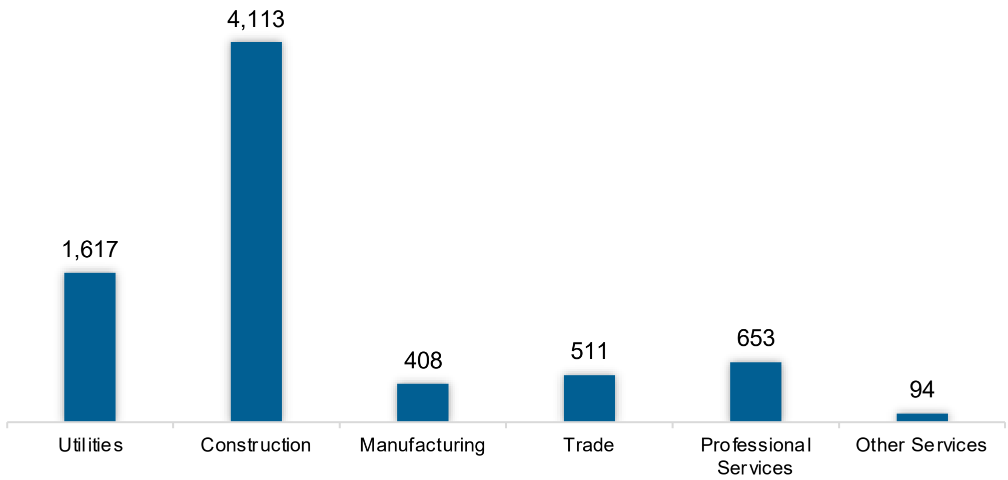
The electric power generation sector employed 7,396 workers in Nebraska, 0.9% of the national electricity total, and added 1,796 jobs over the past year (32.1%).

Figure NE-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 55.6% of jobs. Utilities is second largest with 21.9%.

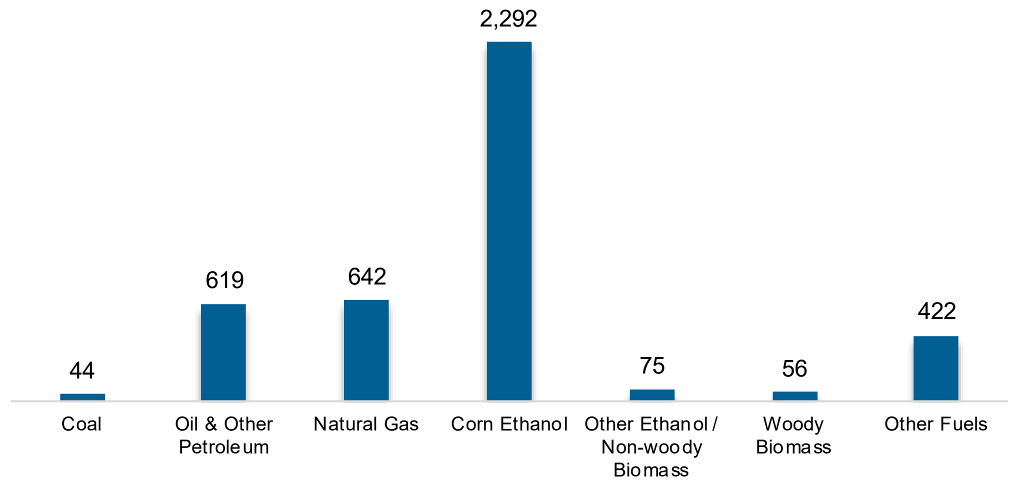
Figure NE-3.
Electric Power Generation Employment by Industry Sector



Fuels

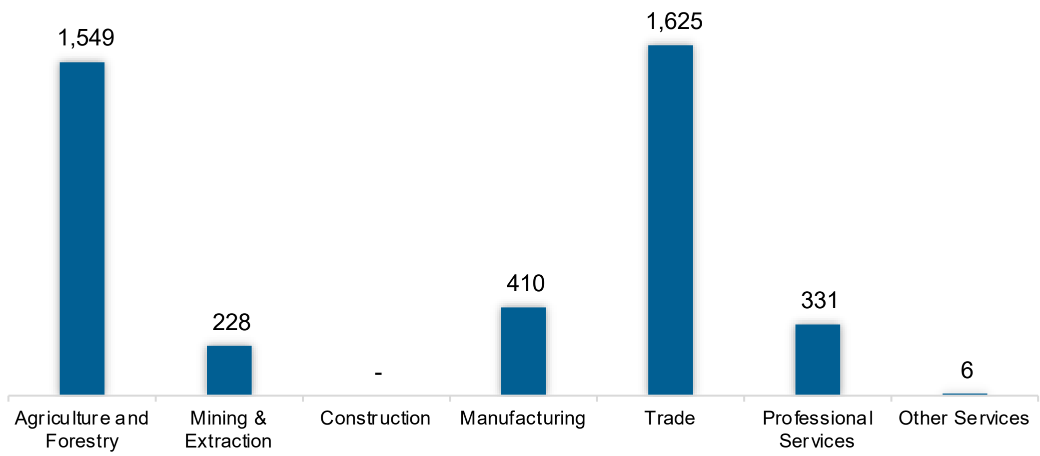
The fuel sector employed 4,149 workers in Nebraska, 0.5% of the national total in fuels. The sector lost 4 jobs and decreased 0.1% in the past year.

Figure NE-4.
Fuels Employment by Detailed Technology Application



Wholesale trade jobs represent 39.2% of fuel jobs in Nebraska.

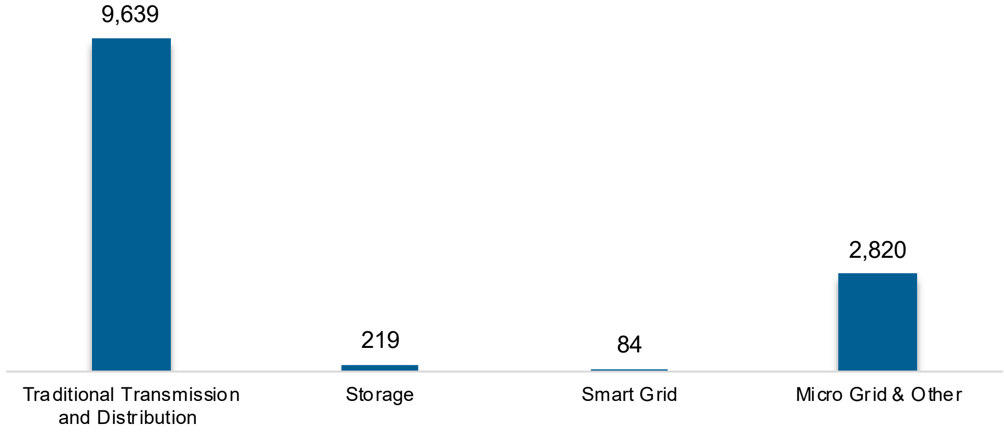
Figure NE-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

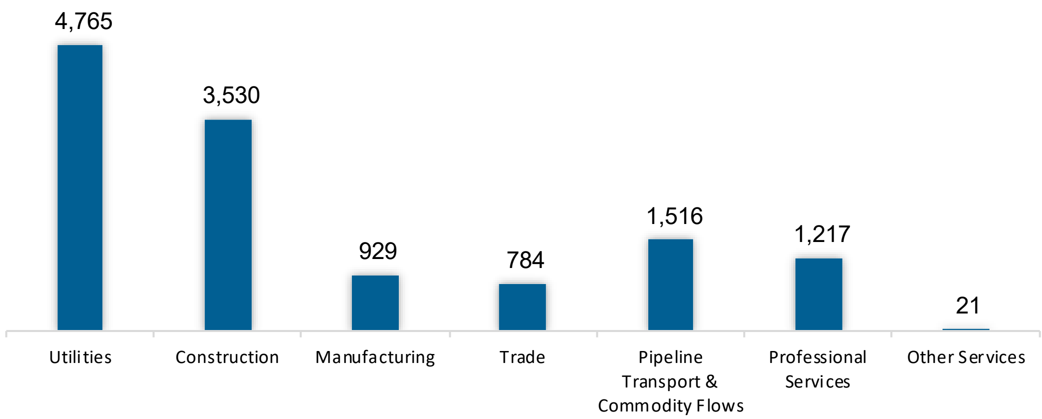
The transmission, distribution, and storage (TDS) sector employed 12,763 workers in Nebraska, 0.5% of the national TDS total. The sector lost 332 jobs and decreased 2.5% in the past year.

Figure NE-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Nebraska, accounting for 37.3% of the sector's jobs statewide.

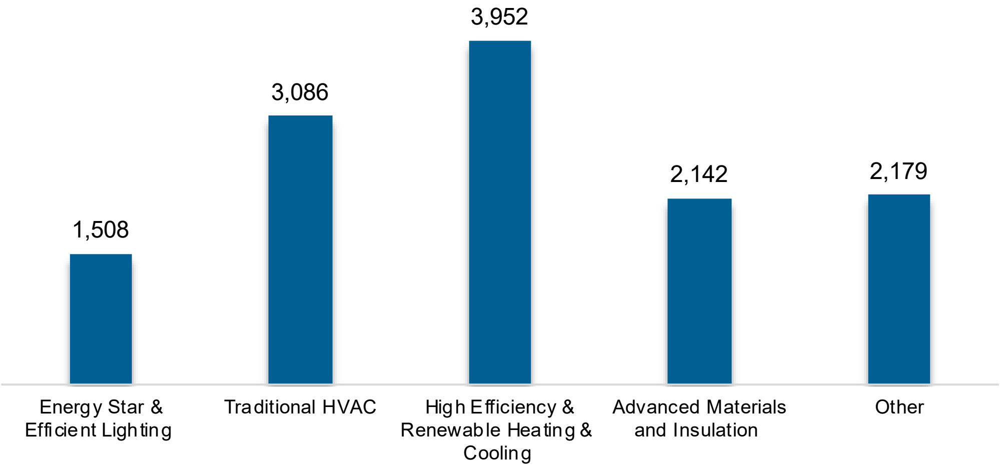
Figure NE-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

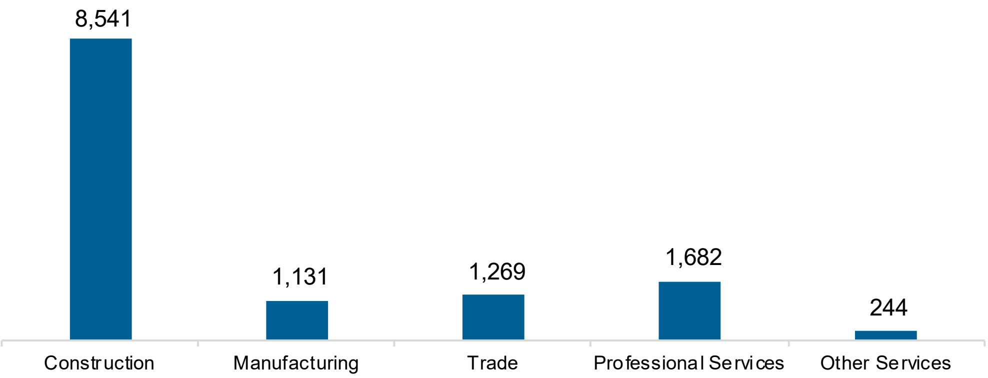
The energy efficiency (EE) sector employed 12,868 workers in Nebraska, 0.6% of the national EE total. The EE sector added 436 jobs and increased 3.5% in the past year.

Figure NE-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

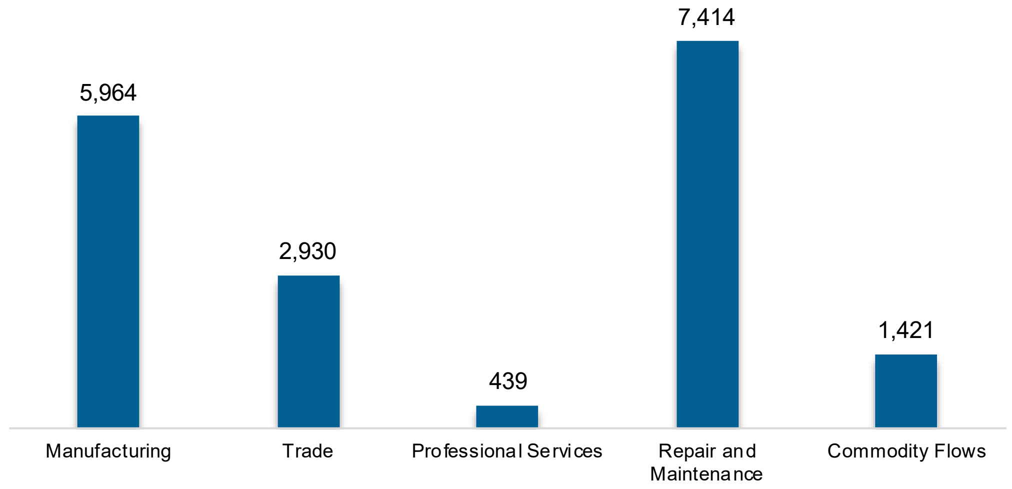
Figure NE-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 18,167 workers in Nebraska, 0.7% of the national total for the sector. Motor vehicles and component parts added 1,108 jobs and increased 6.5% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure NE-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Nebraska are less optimistic than their peers across the country about energy sector job growth over the next year.

Table NE-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.2	2.2
Electric Power Transmission, Distribution, and Storage	0.7	1.1
Energy Efficiency	1.0	1.7
Fuels	1.6	3.0
Motor Vehicles	1.7	3.2

Hiring Difficulty

Employers in Nebraska reported 52.4% overall hiring difficulty.

Table NE-2
Hiring Difficulty

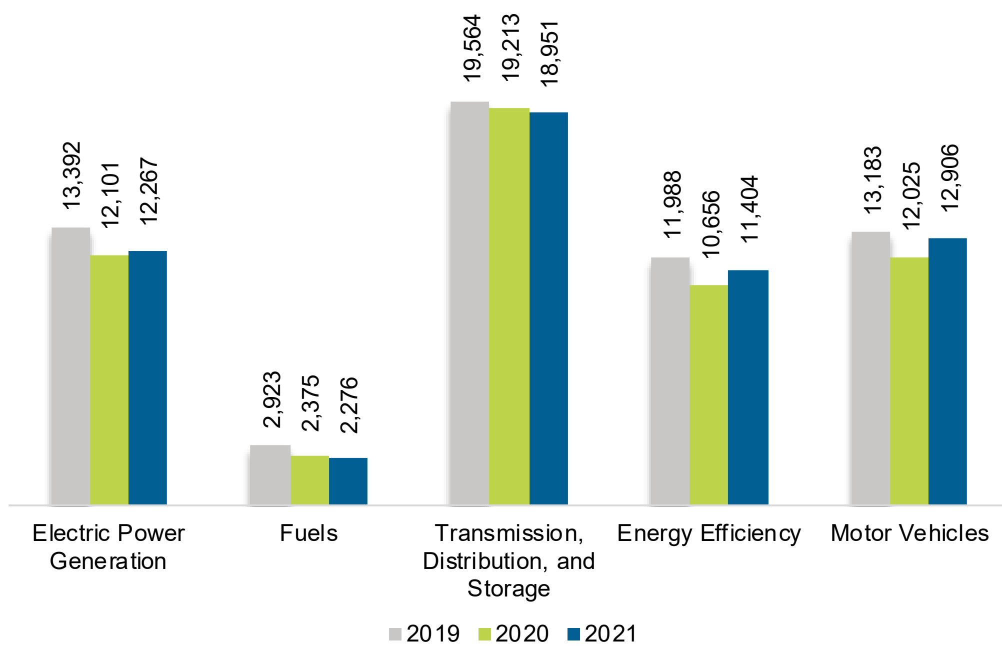
Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	19.5	32.9	7.8	39.8	52.4

Nevada
ENERGY AND EMPLOYMENT — 2022

Overview

Nevada had 57,804 energy workers statewide in 2021, representing 0.7% of all U.S. energy jobs. Of these energy jobs, 12,267 are in electric power generation; 2,276 in fuels; 18,951 in transmission, distribution, and storage; 11,404 in energy efficiency; and 12,906 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 1,435 jobs, or 2.5%. The energy sector in Nevada represents 4.3% of total state employment.

Figure NV-1.
Employment by Major Energy Technology Application

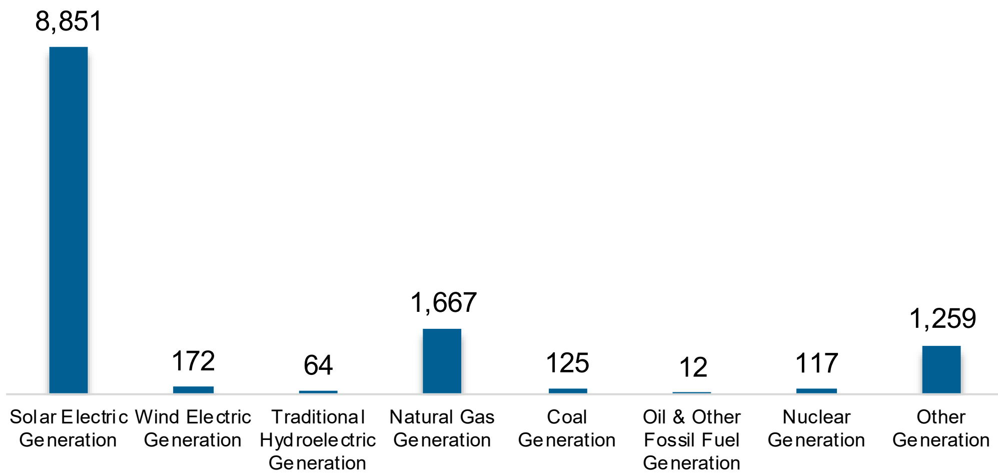


Breakdown by Technology Applications

Electric Power Generation

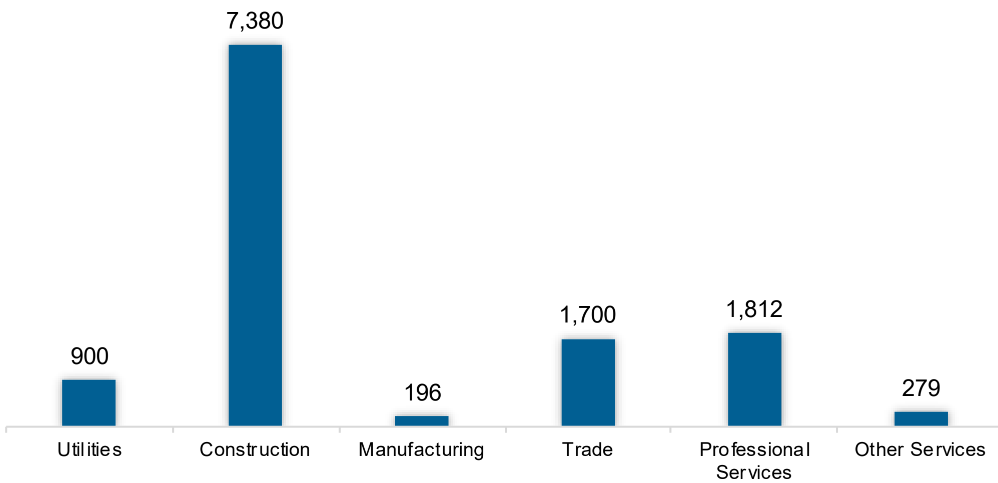
The electric power generation sector employed 12,267 workers in Nevada, 1.4% of the national electricity total, and added 166 jobs over the past year (1.4%).

Figure NV-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 60.2% of jobs. Professional and business services is second largest with 14.8 %.

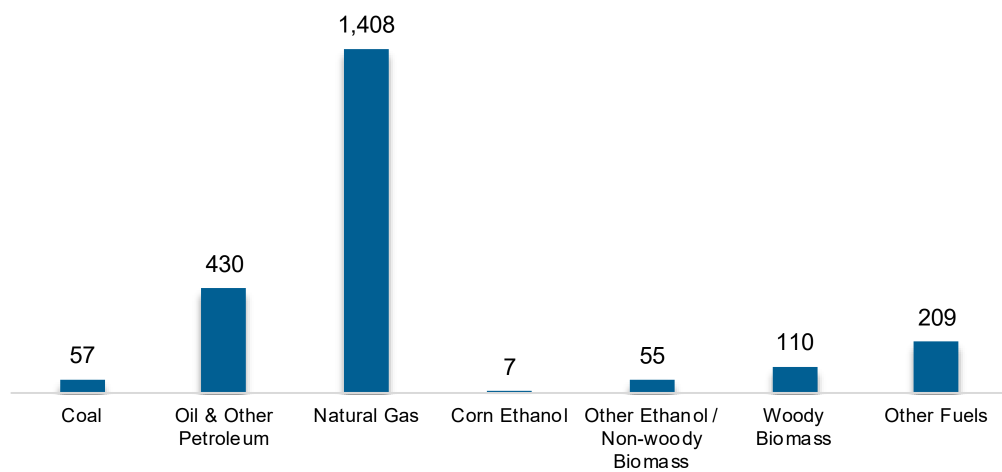
Figure NV-3.
Electric Power Generation Employment by Industry Sector



Fuels

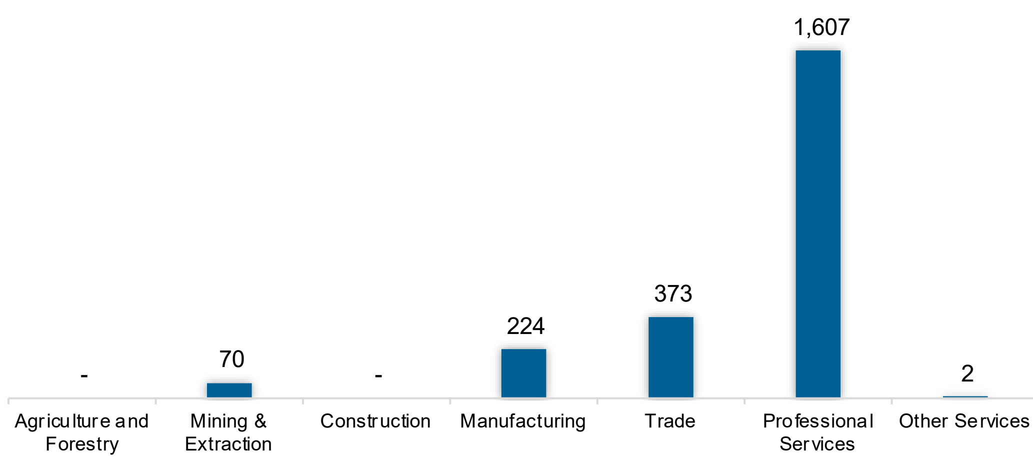
The fuel sector employed 2,276 workers in Nevada, 0.3% of the national total in fuels. The sector lost 99 jobs and decreased 4.2% in the past year.

Figure NV-4.
Fuels Employment by Detailed Technology Application



Professional and business services jobs represent 70.6% of fuel jobs in Nevada.

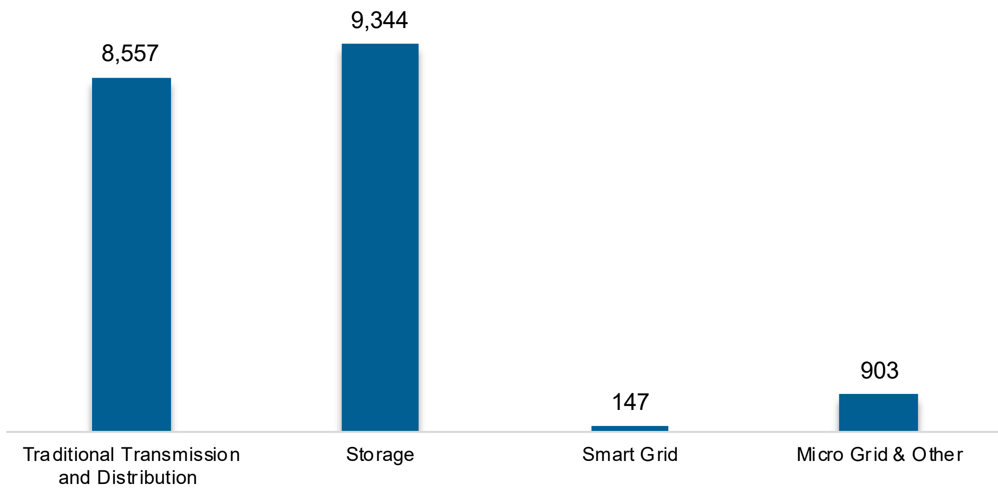
Figure NV-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

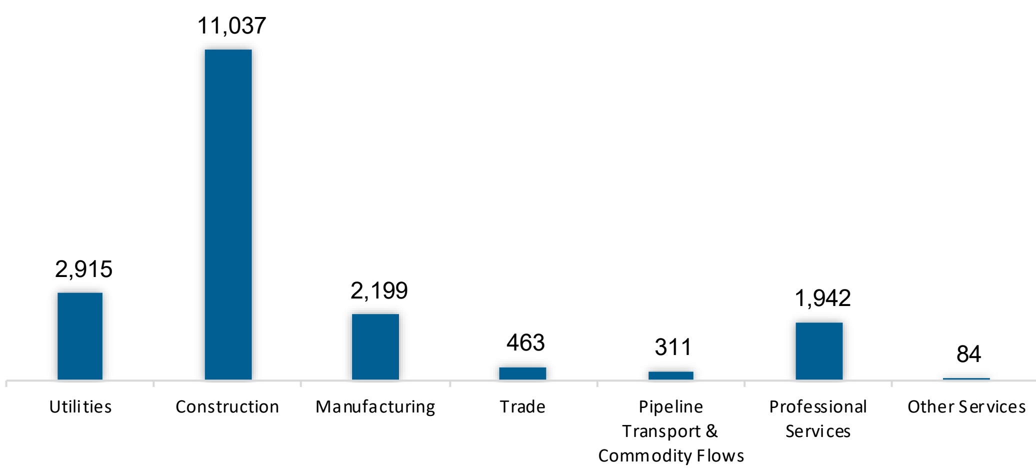
The transmission, distribution, and storage (TDS) sector employed 18,951 workers in Nevada, 0.3% of the national TDS total. The sector lost 262 jobs and decreased 1.4% in the past year.

Figure NV-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in Nevada, accounting for 58.2% of the sector's jobs statewide.

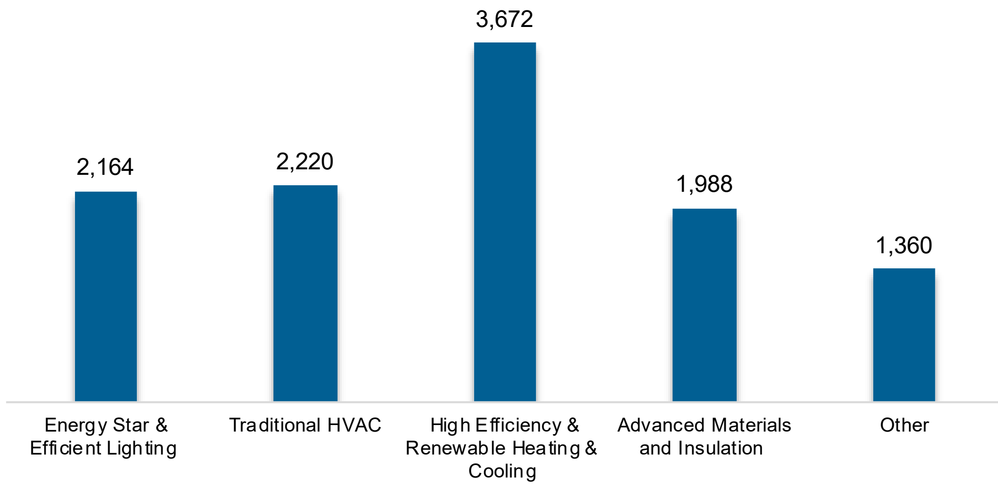
Figure NV-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

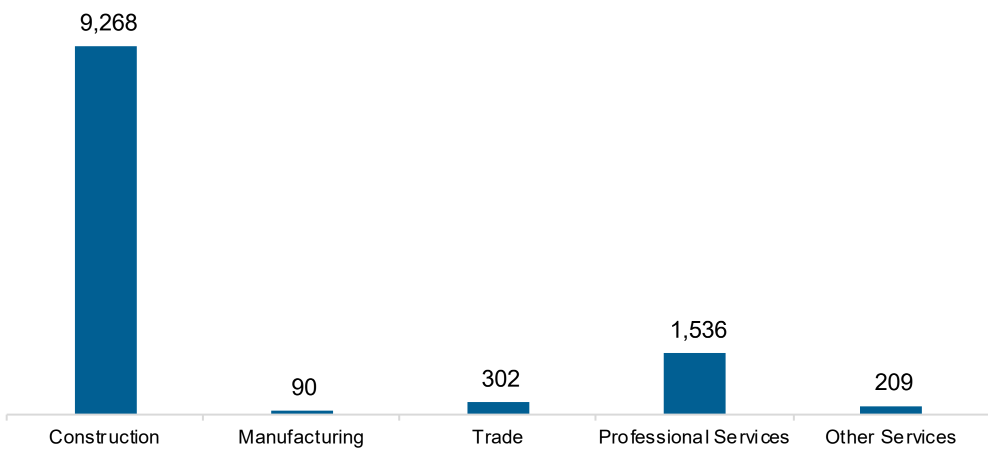
The energy efficiency (EE) sector employed 11,404 workers in Nevada, 0.5% of the national EE total. The EE sector added 749 jobs and increased 7% in the past year.

Figure NV-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

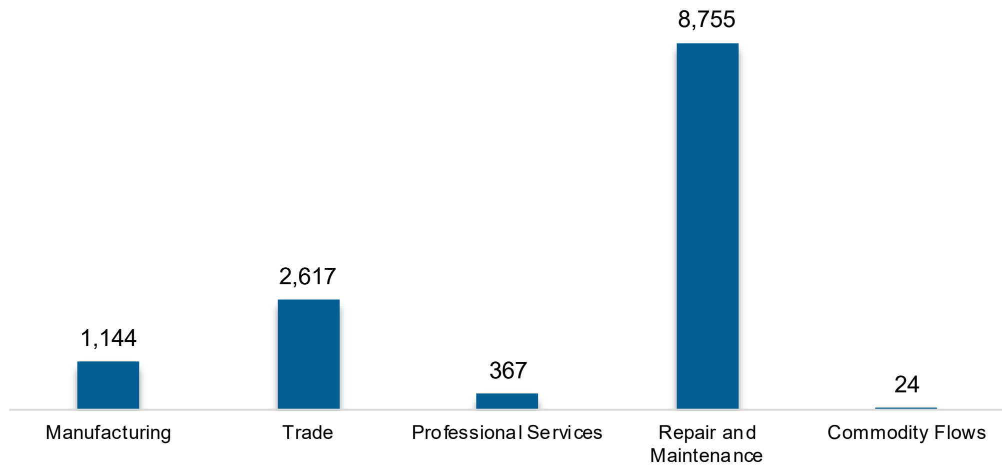
Figure NV-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 12,906 workers in Nevada, 0.5% of the national total for the sector. Motor vehicles and component parts added 882 jobs and increased 7.3% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure NV-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Nevada are less optimistic than their peers across the country about energy sector job growth over the next year.

Table NV-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.1	2.2
Electric Power Transmission, Distribution, and Storage	0.6	1.1
Energy Efficiency	0.9	1.7
Fuels	1.5	3.0
Motor Vehicles	1.6	3.2

Hiring Difficulty

Employers in Nevada reported 57.9% overall hiring difficulty.

Table NV-2
Hiring Difficulty

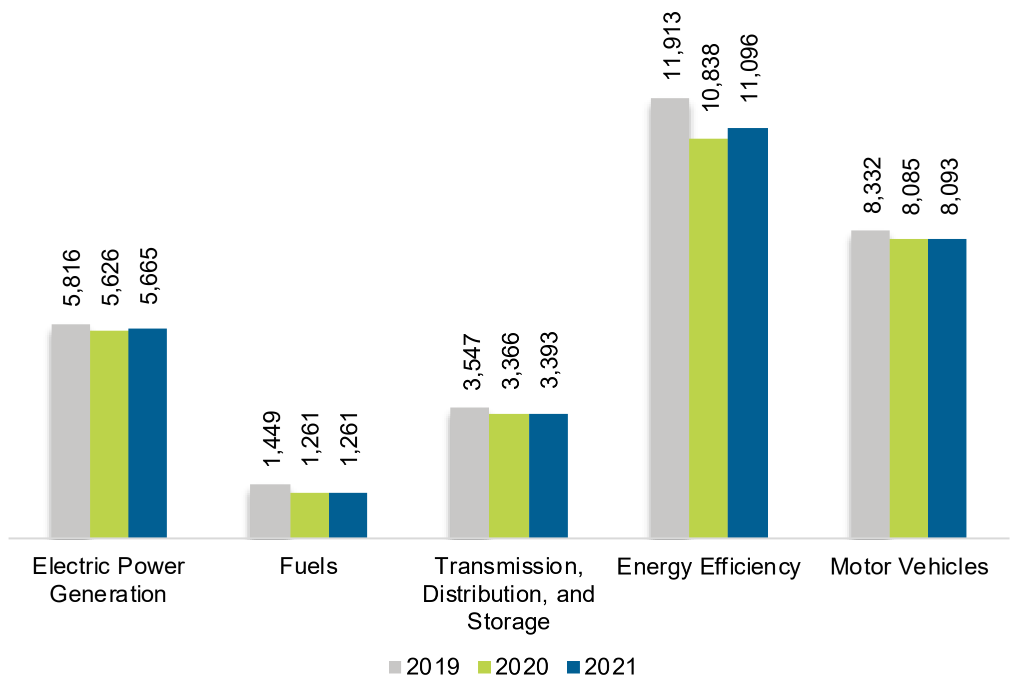
Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	29.4	28.4	9.4	32.7	57.9

New Hampshire
ENERGY AND EMPLOYMENT — 2022

Overview

New Hampshire had 29,508 energy workers statewide in 2021, representing 0.4% of all U.S. energy jobs. Of these energy jobs, 5,665 are in electric power generation; 1,261 in fuels; 3,393 in transmission, distribution, and storage; 11,096 in energy efficiency; and 8,093 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 332 jobs, or 1.1%. The energy sector in New Hampshire represents 4.5% of total state employment

Figure NH-1.
Employment by Major Energy Technology Application

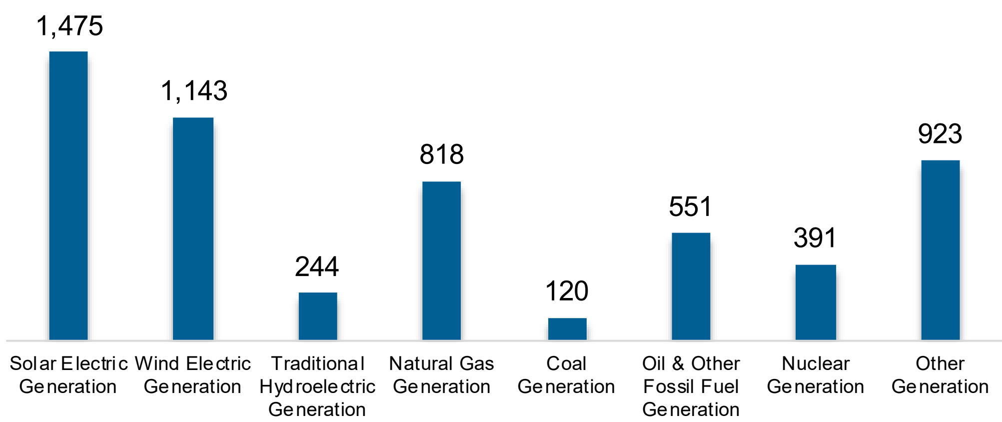


Breakdown by Technology Applications

Electric Power Generation

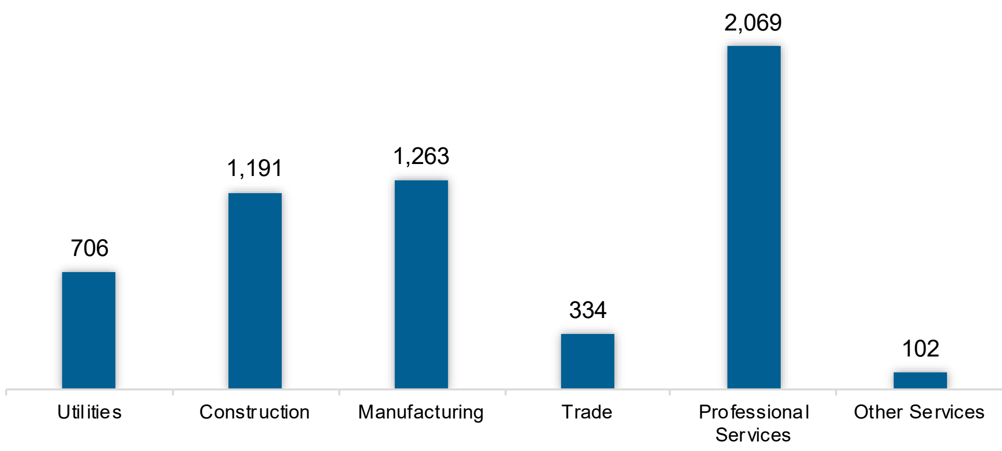
The electric power generation sector employed 5,665 workers in New Hampshire, 0.7% of the national electricity total, and added 39 jobs over the past year (0.7%).

Figure NH-2.
Electric Power Generation Employment by Detailed Technology Application



Professional and business services work represents the largest industry sector in the electric power generation sector, with 36.5% of jobs. Manufacturing is second largest with 22.3%.

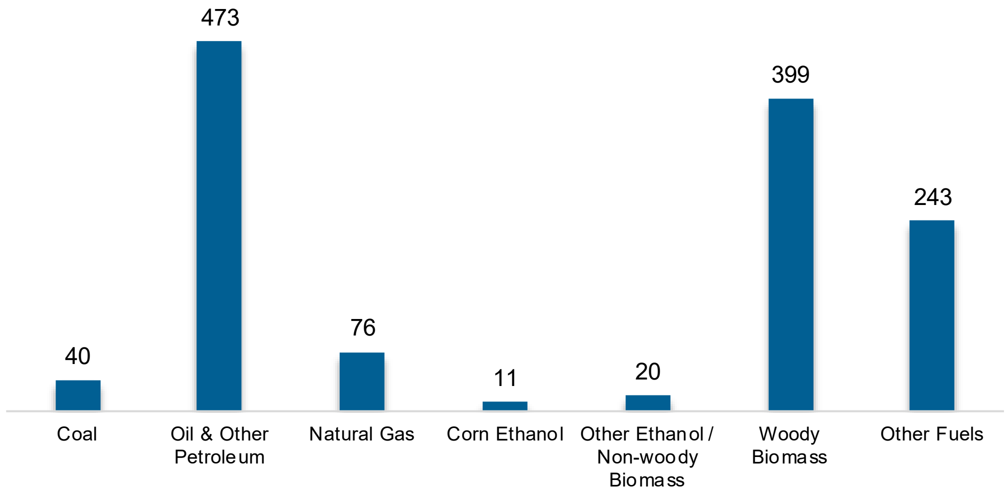
Figure NH-3.
Electric Power Generation Employment by Industry Sector



Fuels

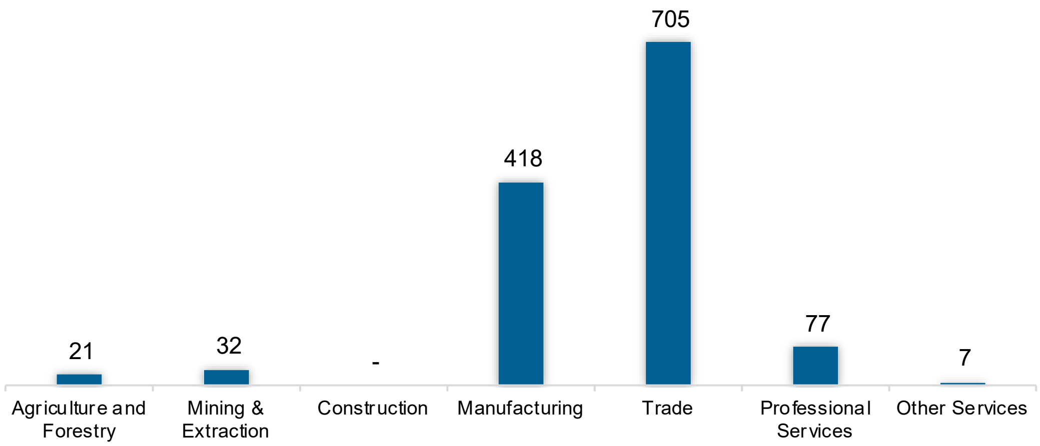
The fuel sector employed 1,261 workers in New Hampshire, 0.1% of the national total in fuels. The sector gained no jobs in the past year.

Figure NH-4.
Fuels Employment by Detailed Technology Application



Wholesale trade jobs represent 55.9% of fuel jobs in New Hampshire.

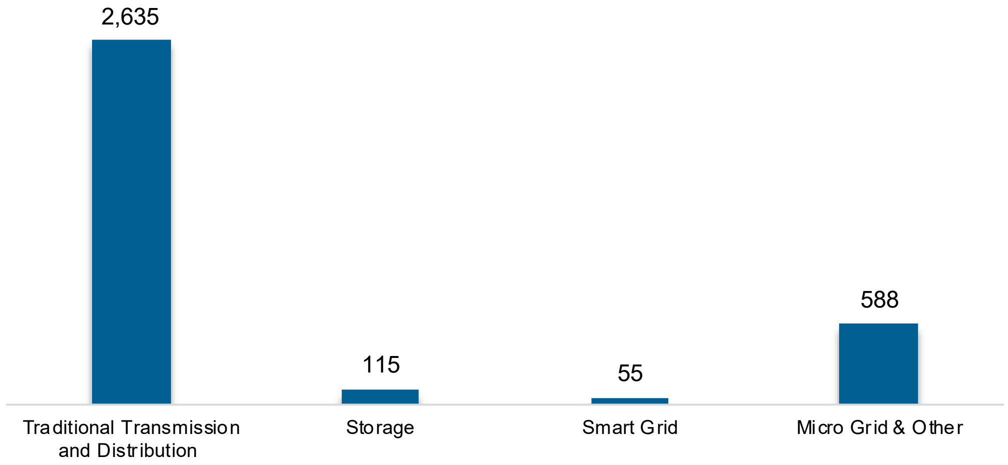
Figure NH-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

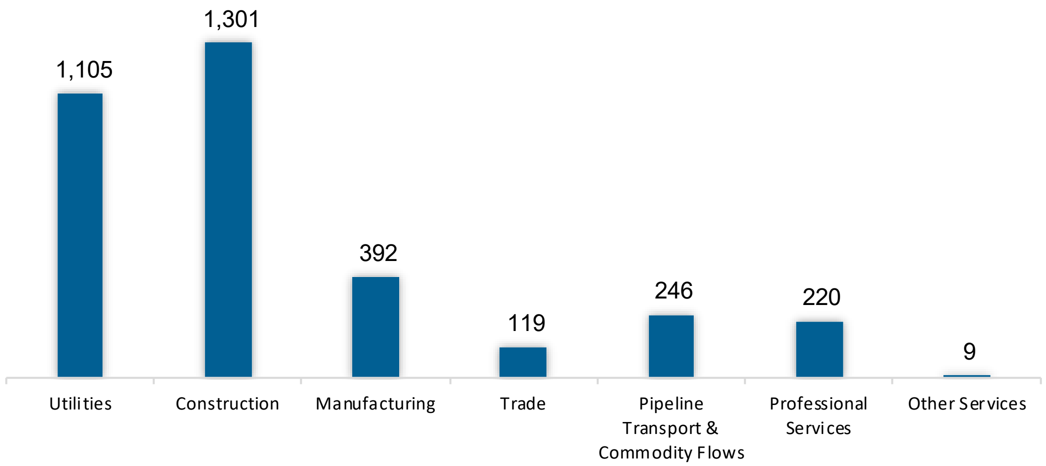
The transmission, distribution, and storage (TDS) sector employed 3,393 workers in New Hampshire, 0.1% of the national TDS total. The sector gained 27 jobs and increased 0.8% in the past year.

Figure NH-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in New Hampshire, accounting for 38.3% of the sector's jobs statewide.

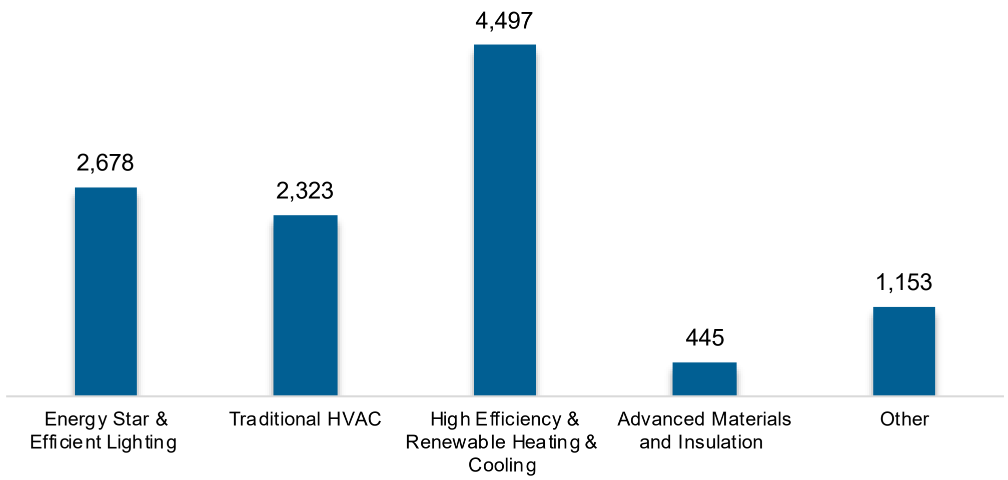
Figure NH-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

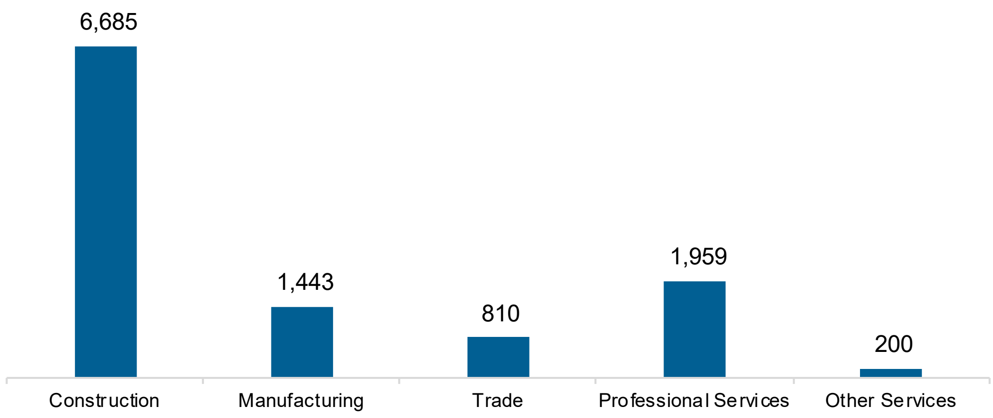
The energy efficiency (EE) sector employed 11,096 workers in New Hampshire, 0.5% of the national EE total. The EE sector added 258 jobs and increased 2.4% in the past year.

Figure NH-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

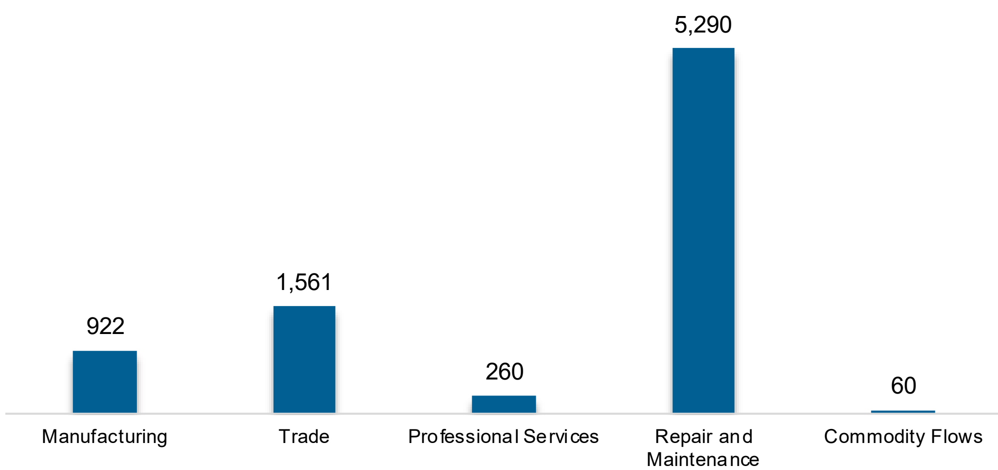
Figure NH-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 8,093 workers in New Hampshire, 0.3% of the national total for the sector. Motor vehicles and component parts added eight jobs and increased 0.1% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure NH-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in New Hampshire are less optimistic than their peers across the country about energy sector job growth over the next year.

Table NH-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.4	2.2
Electric Power Transmission, Distribution, and Storage	0.9	1.1
Energy Efficiency	1.2	1.7
Fuels	1.8	3.0
Motor Vehicles	1.9	3.2

Hiring Difficulty

Employers in New Hampshire reported 64.3% overall hiring difficulty.

Table NH-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	35.1	29.2	5.2	30.5	64.3

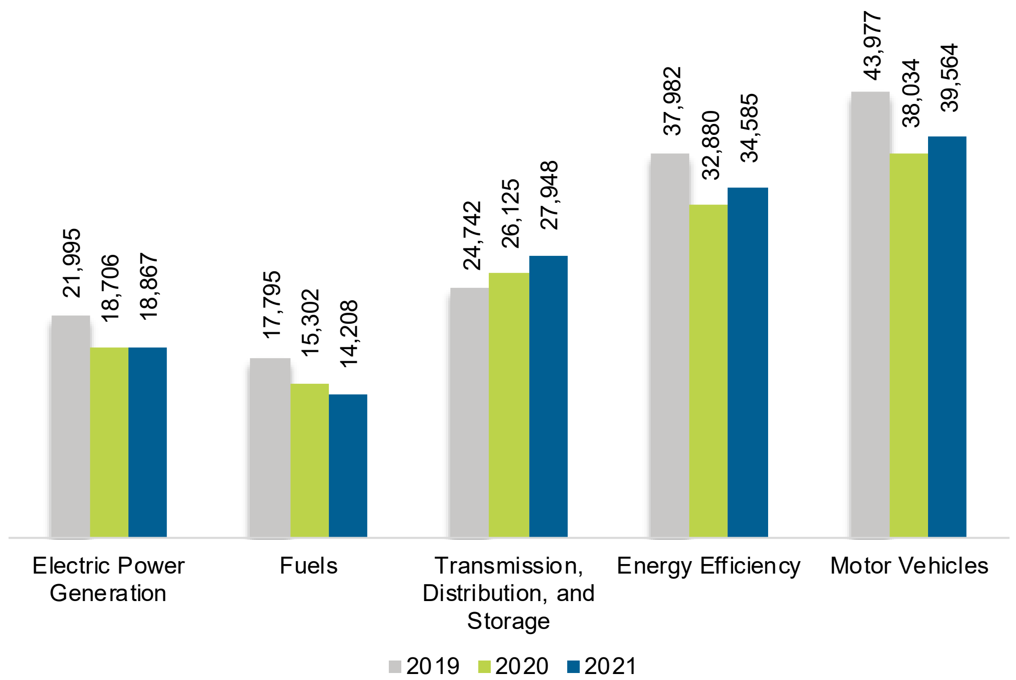
New Jersey

ENERGY AND EMPLOYMENT — 2022

Overview

New Jersey had 135,172 energy workers statewide in 2021, representing 1.7% of all U.S. energy jobs. Of these energy jobs, 18,867 are in electric power generation; 14,208 in fuels; 27,948 in transmission, distribution, and storage; 34,585 in energy efficiency; and 39,564 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 4,125 jobs, or 3.1%. The energy sector in New Jersey represents 3.4% of total state employment.

Figure NJ-1.
Employment by Major Energy Technology Application

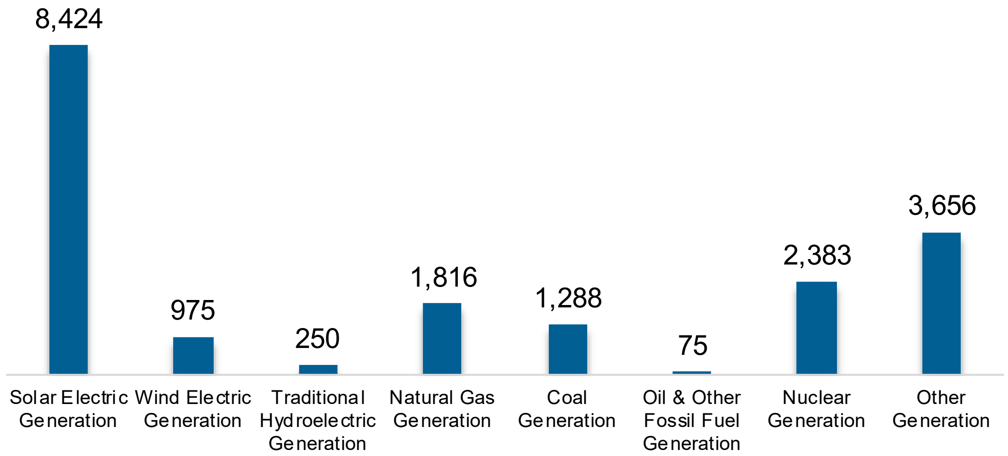


Breakdown by Technology Applications

Electric Power Generation

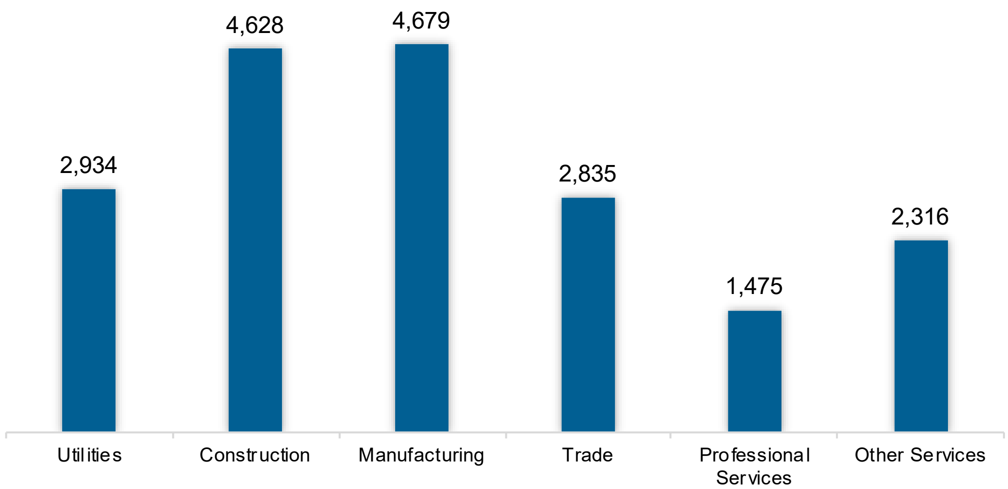
The electric power generation sector employed 18,867 workers in New Jersey, 2.2% of the national electricity total, and added 161 jobs over the past year (0.9%).

Figure NJ-2.
Electric Power Generation Employment by Detailed Technology Application



Manufacturing work represents the largest industry sector in the electric power generation sector, with 24.8% of jobs. Construction is second largest with 24.5%.

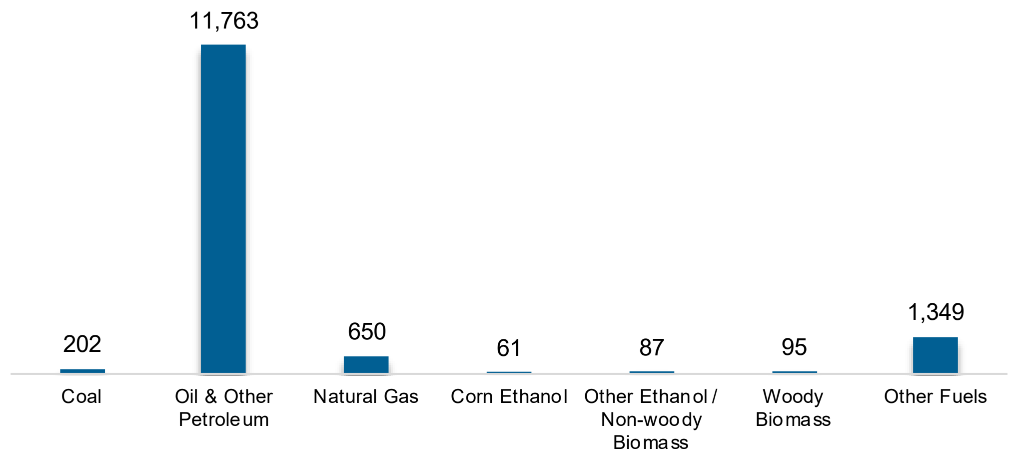
Figure NJ-3.
Electric Power Generation Employment by Industry Sector



Fuels

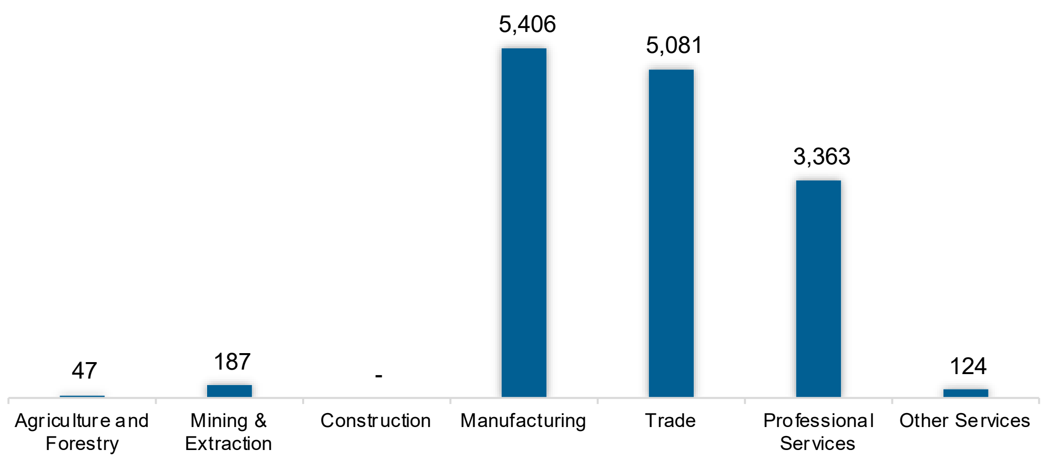
The fuel sector employed 14,208 workers in New Jersey, 1.6% of the national total in fuels. The sector lost 1,095 jobs and decreased 7.2% in the past year.

Figure NJ-4.
Fuels Employment by Detailed Technology Application



Manufacturing jobs represent 38.1% of fuel jobs in New Jersey.

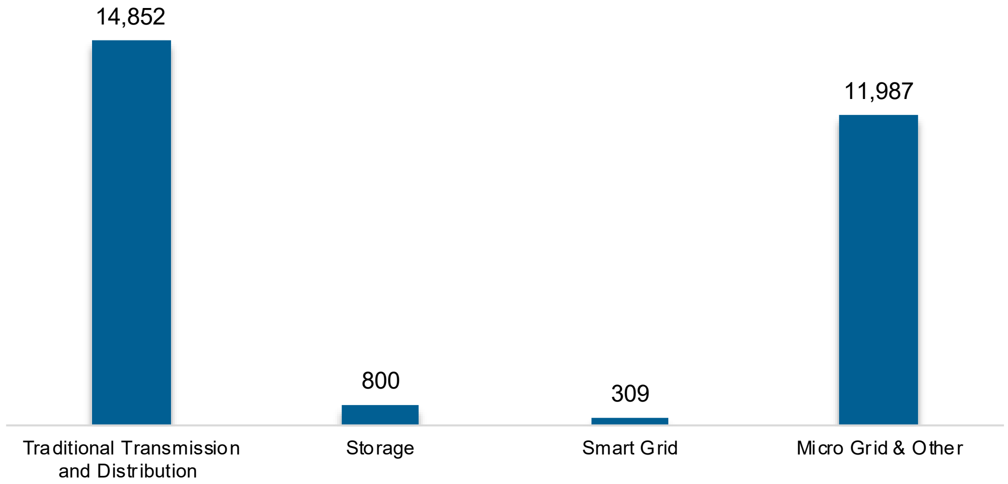
Figure NJ-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

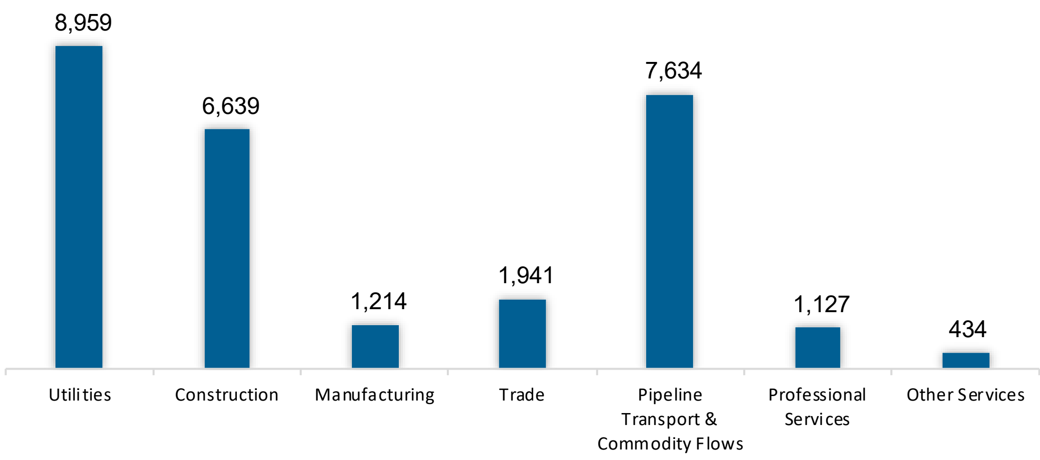
The transmission, distribution, and storage (TDS) sector employed 27,948 workers in New Jersey, 1.6% of the national TDS total. The sector gained 1,823 jobs and increased 7% in the past year.

Figure NJ-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in New Jersey, accounting for 32.1% of the sector's jobs statewide.

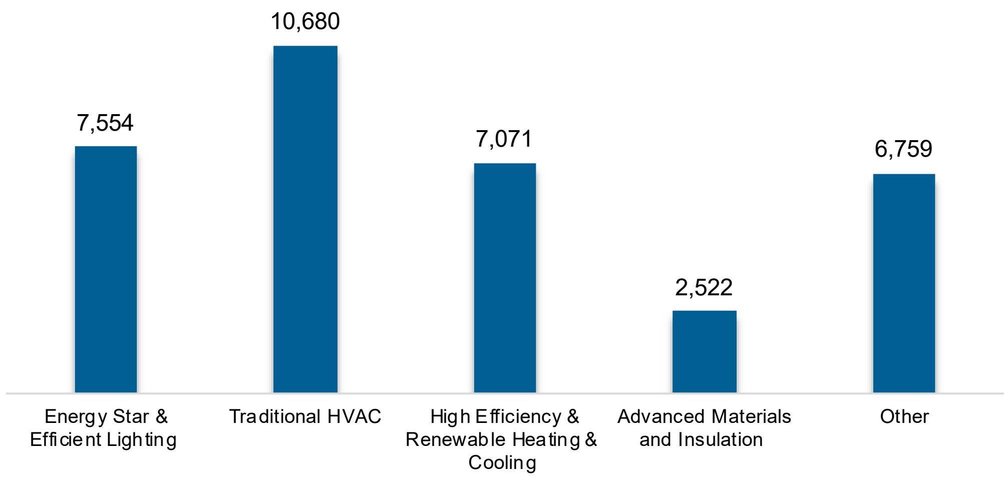
Figure NJ-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

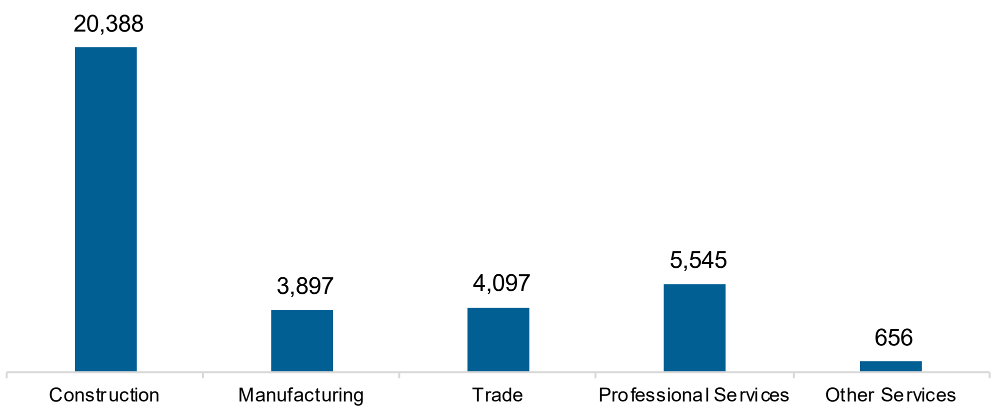
The energy efficiency (EE) sector employed 34,585 workers in New Jersey, 1.6% of the national EE total. The EE sector added 1,705 jobs and increased 5.2% in the past year.

Figure NJ-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

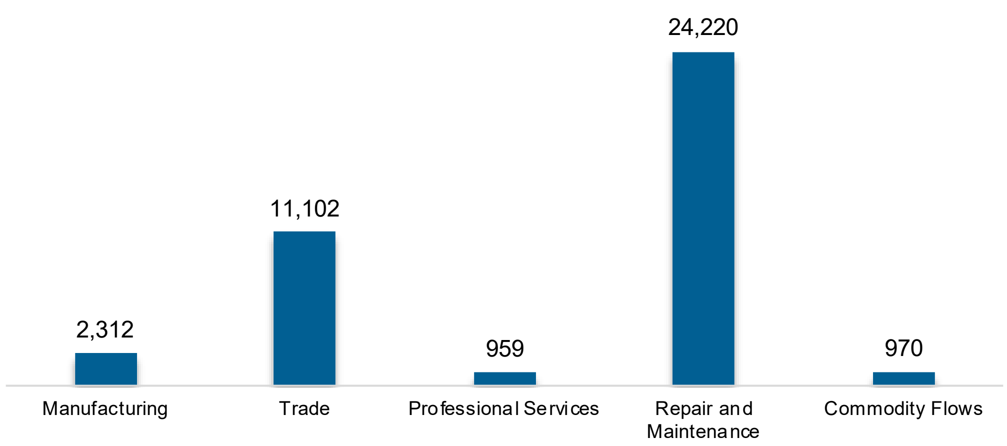
Figure NJ-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 39,564 workers in New Jersey, 1.5% of the national total for the sector. Motor vehicles and component parts added 1,530 jobs and increased 4% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure NJ-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in New Jersey are more optimistic than their peers across the country about energy sector job growth over the next year.

Table NJ-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	2.8	2.2
Electric Power Transmission, Distribution, and Storage	2.3	1.1
Energy Efficiency	2.6	1.7
Fuels	3.2	3.0
Motor Vehicles	3.3	3.2

Hiring Difficulty

Employers in New Jersey reported 57.3% overall hiring difficulty.

Table NJ-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	24.2	33.1	5.2	37.4	57.3

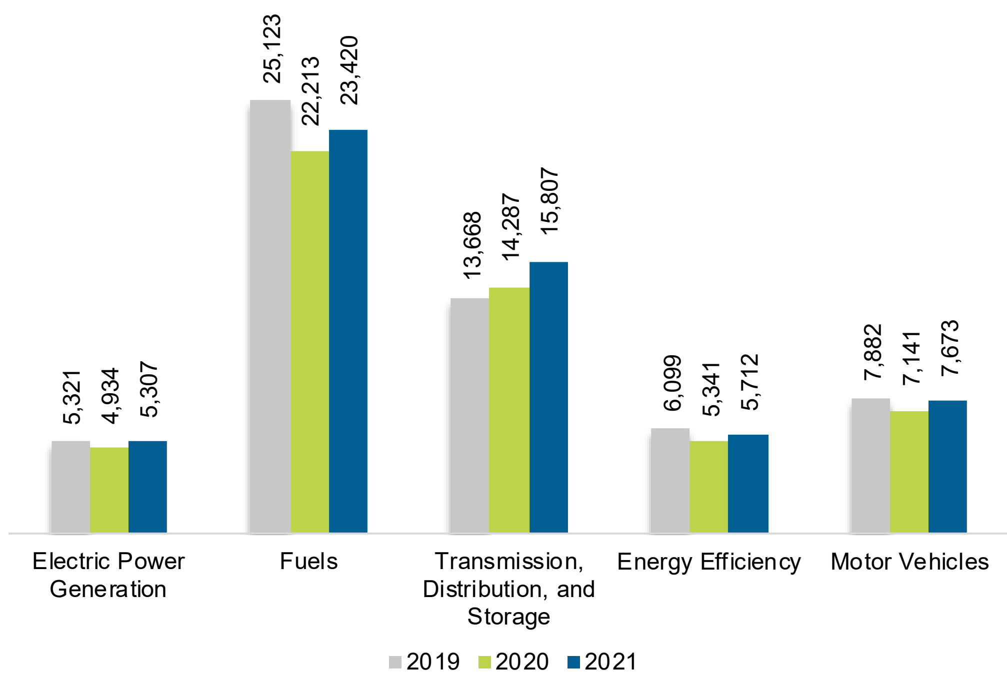
New Mexico

ENERGY AND EMPLOYMENT — 2022

Overview

New Mexico had 57,920 energy workers statewide in 2021, representing 0.7% of all U.S. energy jobs. Of these energy jobs, 5,307 are in electric power generation; 23,420 in fuels; 15,807 in transmission, distribution, and storage; 5,712 in energy efficiency; and 7,673 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 4,003 jobs, or 7.4%. The energy sector in New Mexico represents 7.3% of total state employment.

Figure NM-1.
Employment by Major Energy Technology Application

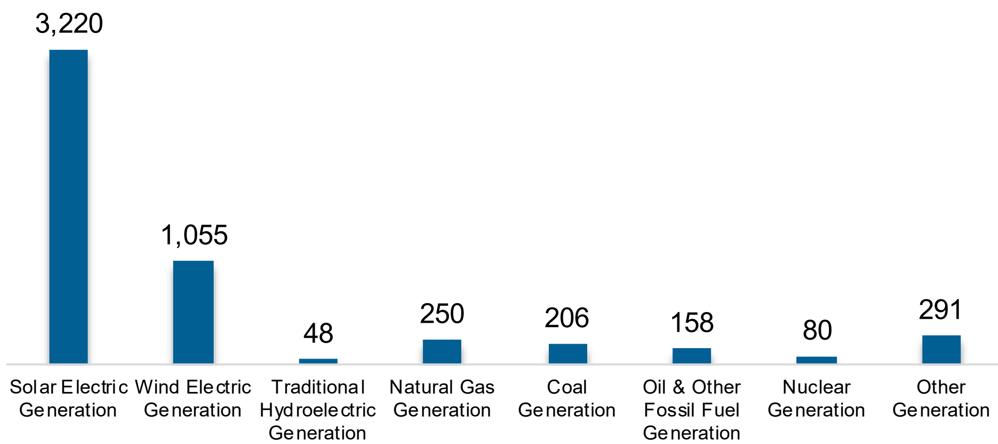


Breakdown by Technology Applications

Electric Power Generation

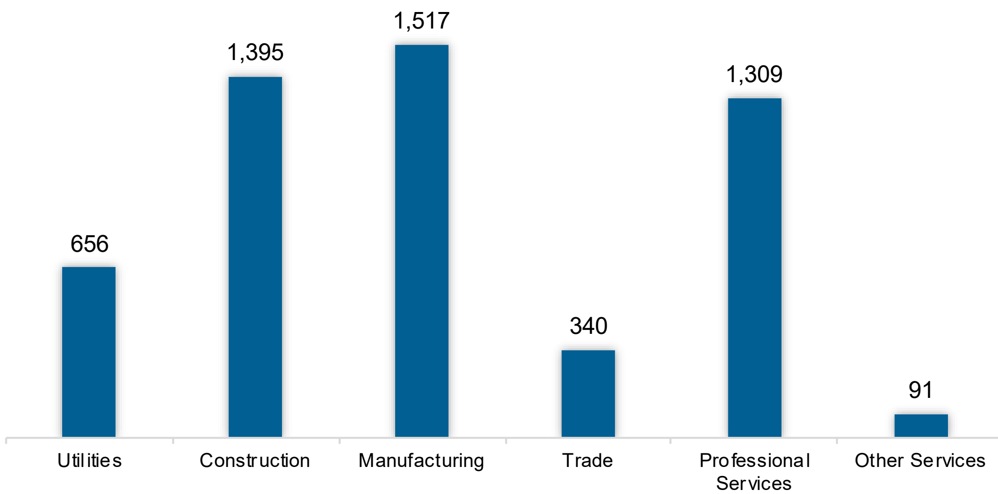
The electric power generation sector employed 5,307 workers in New Mexico, 0.6% of the national electricity total, and added 373 jobs over the past year (7.6%).

Figure NM-2.
Electric Power Generation Employment by Detailed Technology Application



Manufacturing work represents the largest industry sector in the electric power generation sector, with 28.6% of jobs. Construction is second largest with 26.3%.

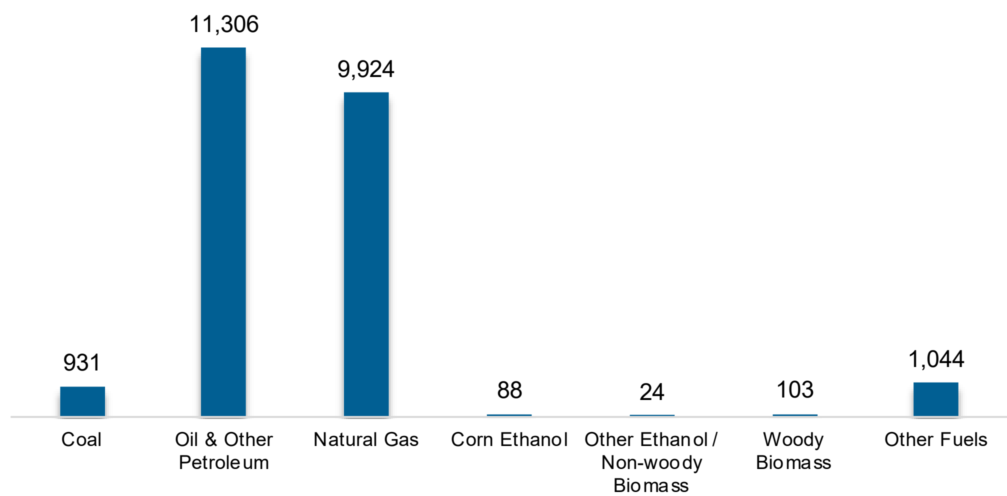
Figure NM-3.
Electric Power Generation Employment by Industry Sector



Fuels

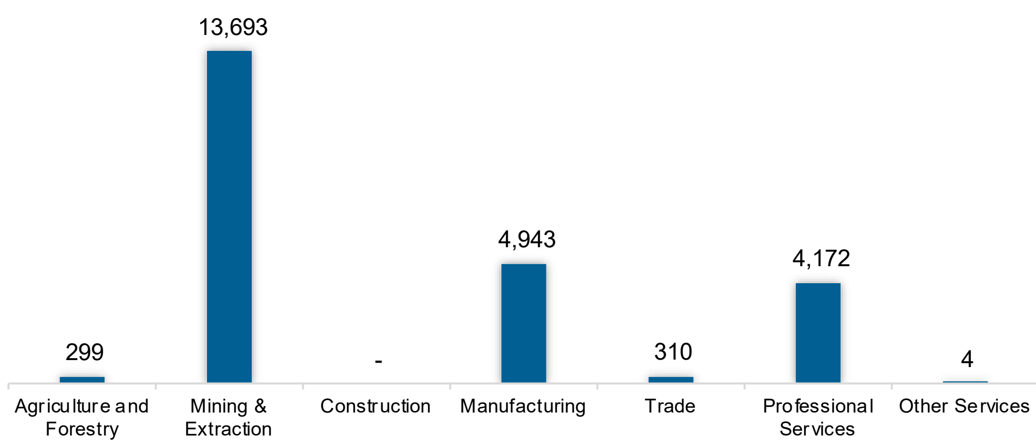
The fuel sector employed 23,420 workers in New Mexico, 2.6% of the national total in fuels. The sector gained 1,208 jobs and increased 5.4% in the past year.

Figure NM-4.
Fuels Employment by Detailed Technology Application



Mining and extraction jobs represent 58.5% of fuel jobs in New Mexico.

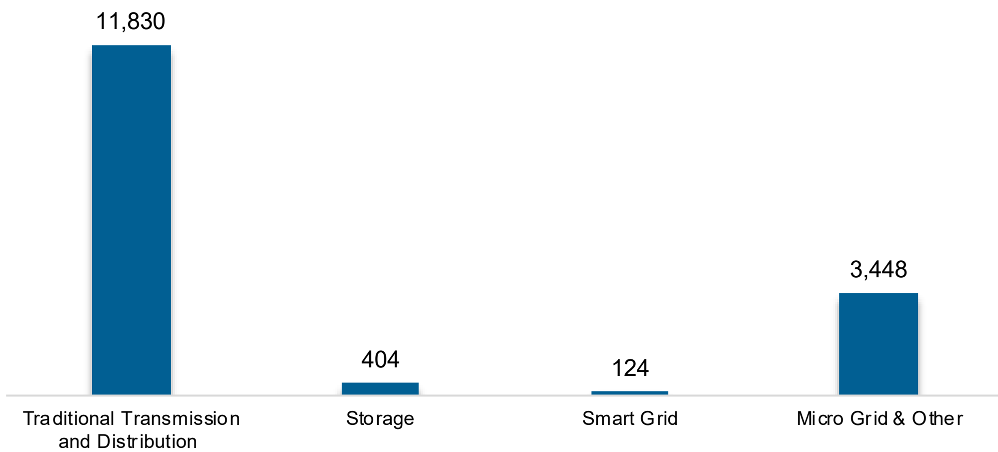
Figure NM-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

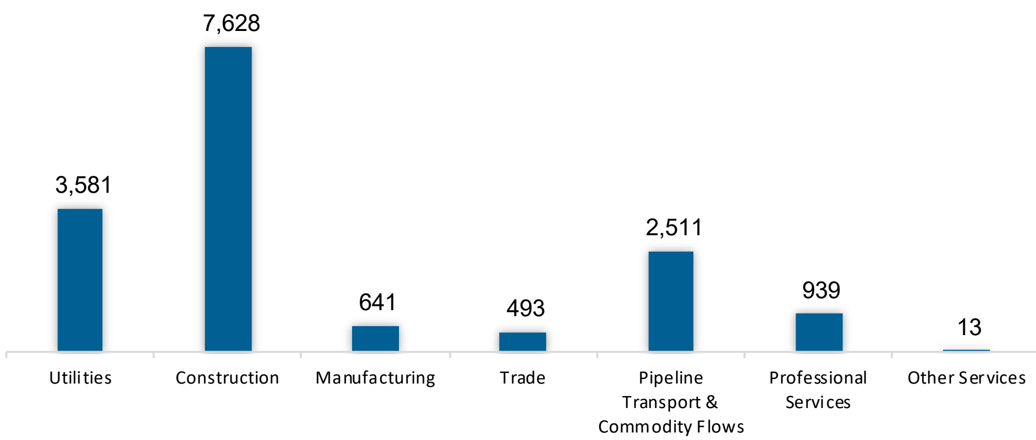
The transmission, distribution, and storage (TDS) sector employed 15,807 workers in New Mexico, 2.6% of the national TDS total. The sector gained 1,519 jobs and increased 10.6% in the past year.

Figure NM-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in New Mexico, accounting for 48.3% of the sector's jobs statewide.

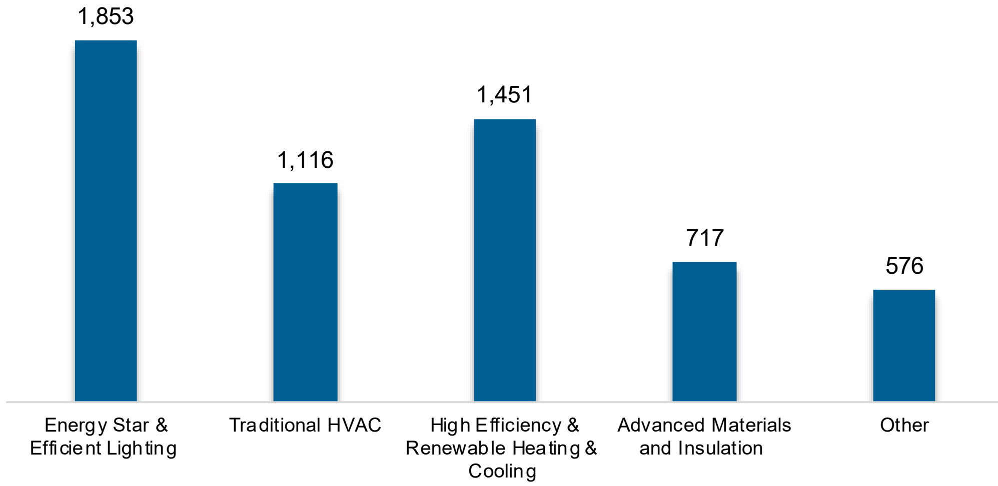
Figure NM-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

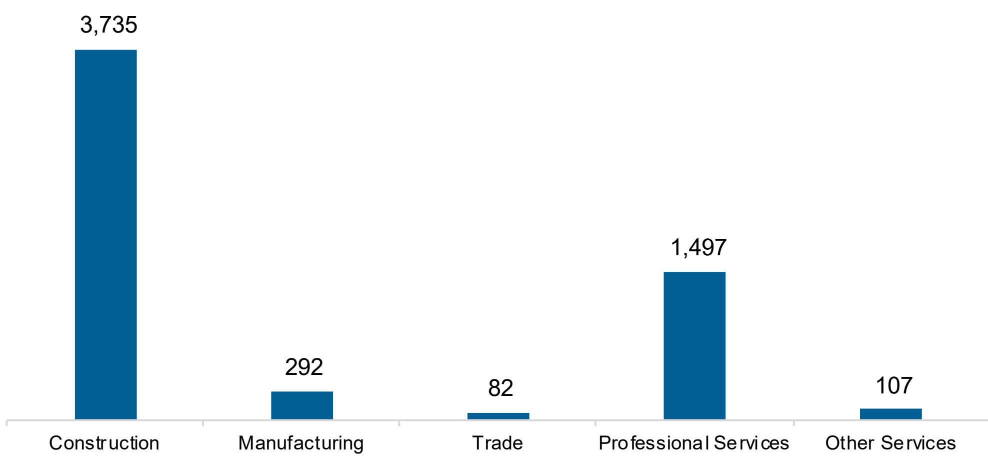
The energy efficiency (EE) sector employed 5,712 workers in New Mexico, 0.3% of the national EE total. The EE sector added 372 jobs and increased 7% in the past year.

Figure NM-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

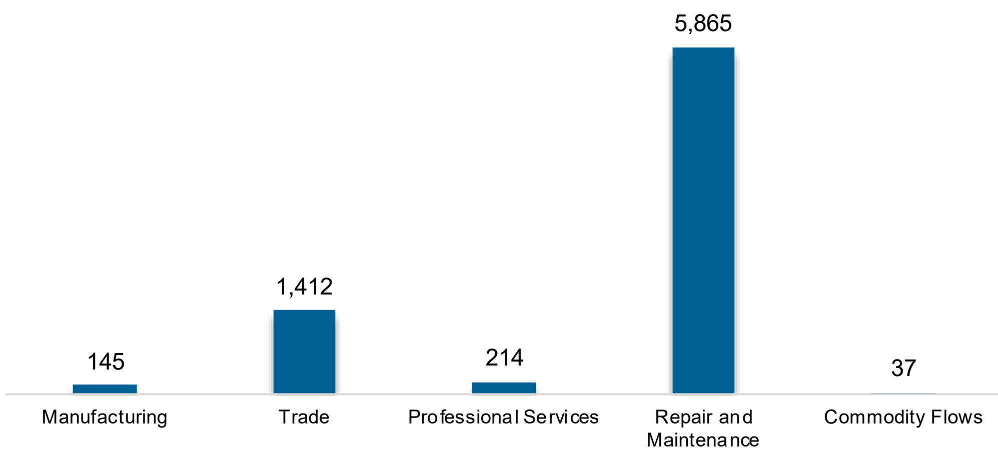
Figure NM-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 7,673 workers in New Mexico, 0.3% of the national total for the sector. Motor vehicles and component parts added 532 jobs and increased 7.4% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure NM-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in New Mexico are less optimistic than their peers across the country about energy sector job growth over the next year.

Table NM-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	0.6	2.2
Electric Power Transmission, Distribution, and Storage	0.0	1.1
Energy Efficiency	0.3	1.7
Fuels	1.0	3.0
Motor Vehicles	1.1	3.2

Hiring Difficulty

Employers in New Mexico reported 67.6% overall hiring difficulty.

Table NM-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	39.2	28.4	5.2	27.2	67.6

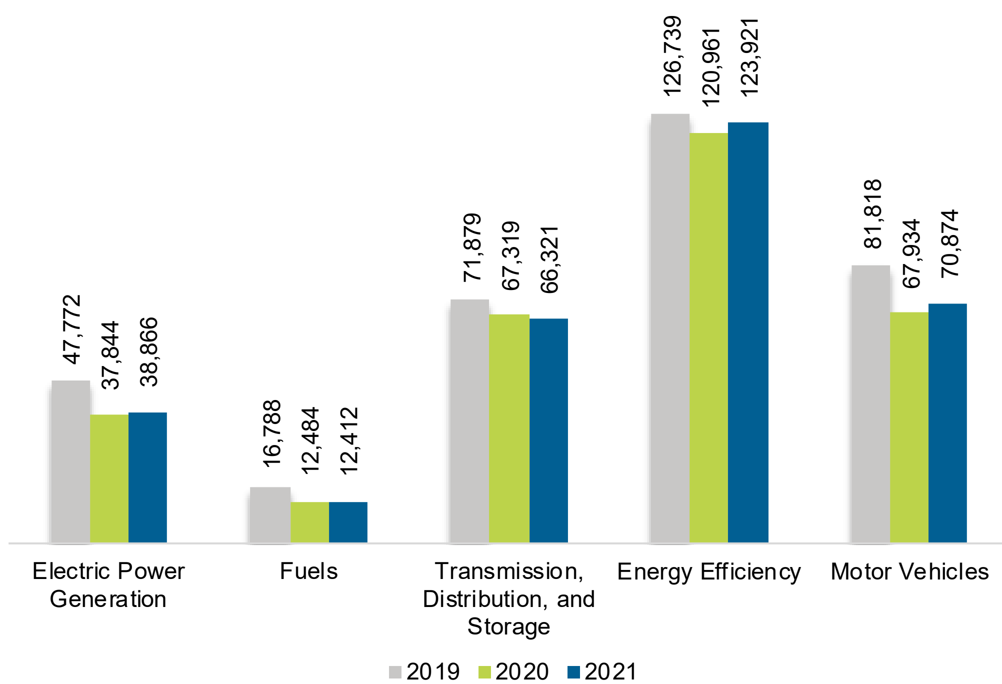
New York

ENERGY AND EMPLOYMENT — 2022

Overview

New York had 312,394 energy workers statewide in 2021, representing 4% of all U.S. energy jobs. Of these energy jobs, 38,866 are in electric power generation; 12,412 in fuels; 66,321 in transmission, distribution, and storage; 123,921 in energy efficiency; and 70,874 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 5,852 jobs, or 1.9%. The energy sector in New York represents 3.5% of total state employment.

Figure NY-1.
Employment by Major Energy Technology Application

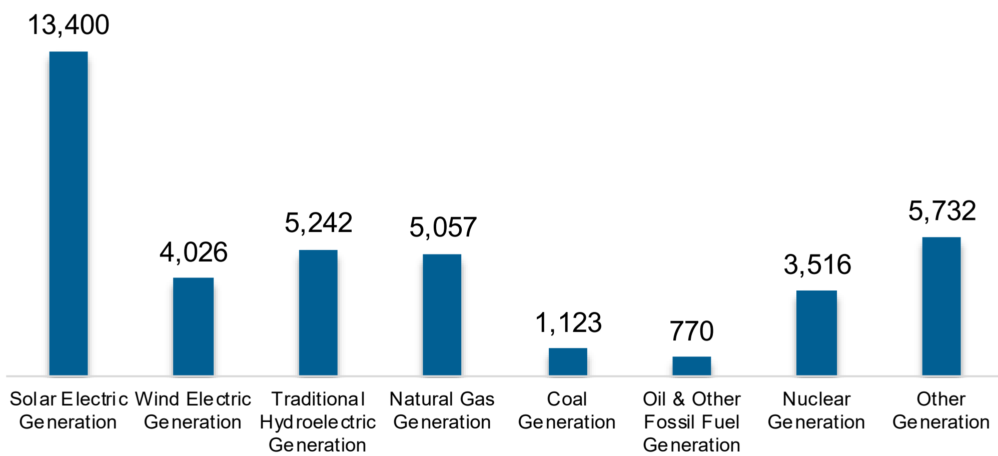


Breakdown by Technology Applications

Electric Power Generation

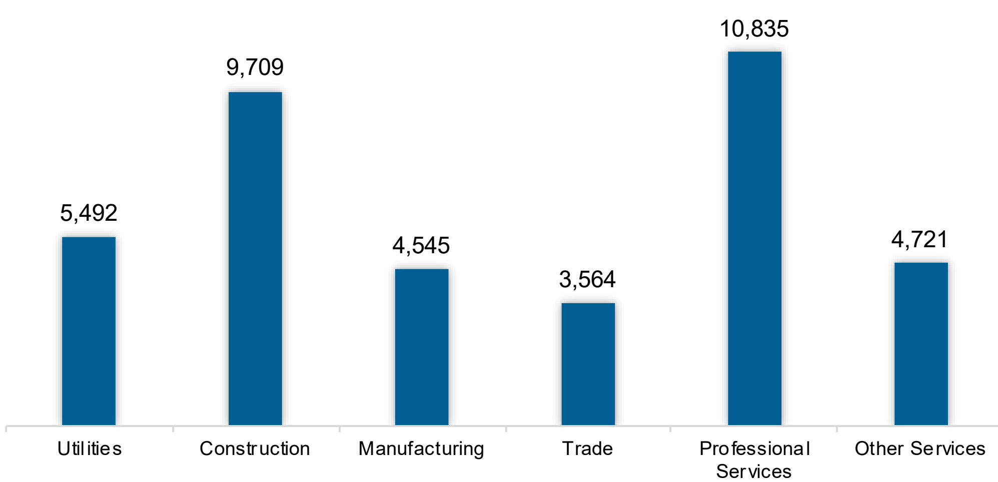
The electric power generation sector employed 38,866 workers in New York, 4.5% of the national electricity total, and added 1,022 jobs over the past year (2.7%).

Figure NY-2.
Electric Power Generation Employment by Detailed Technology Application



Professional and business services work represents the largest industry sector in the electric power generation sector, with 27.9% of jobs. Construction is second largest with 25%.

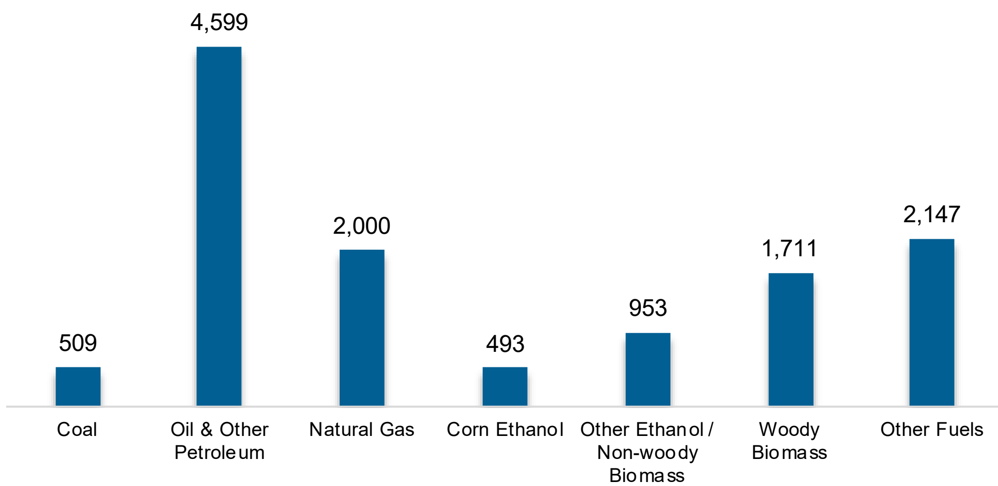
Figure NY-3.
Electric Power Generation Employment by Industry Sector



Fuels

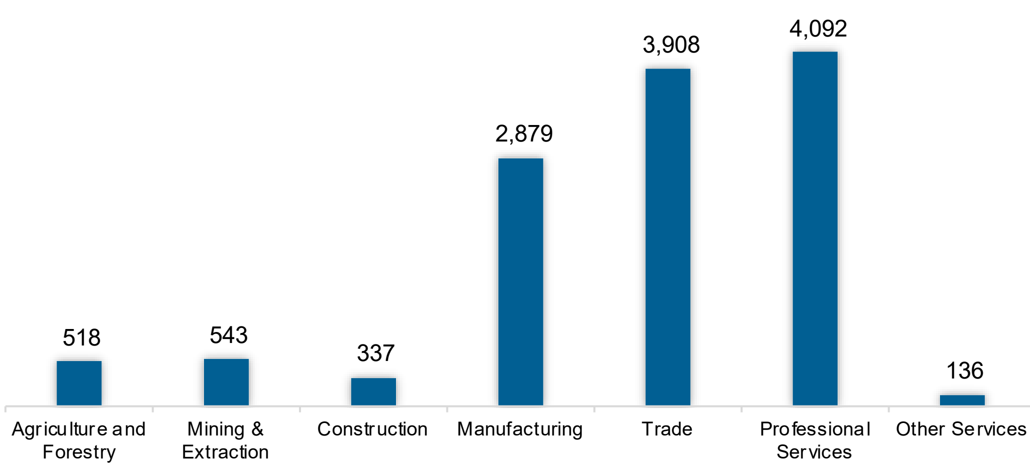
The fuel sector employed 12,412 workers in New York, 1.4% of the national total in fuels. The sector lost 72 jobs and decreased 0.6% in the past year.

Figure NY-4.
Fuels Employment by Detailed Technology Application



Professional and business services jobs represent 33.0% of fuel jobs in New York.

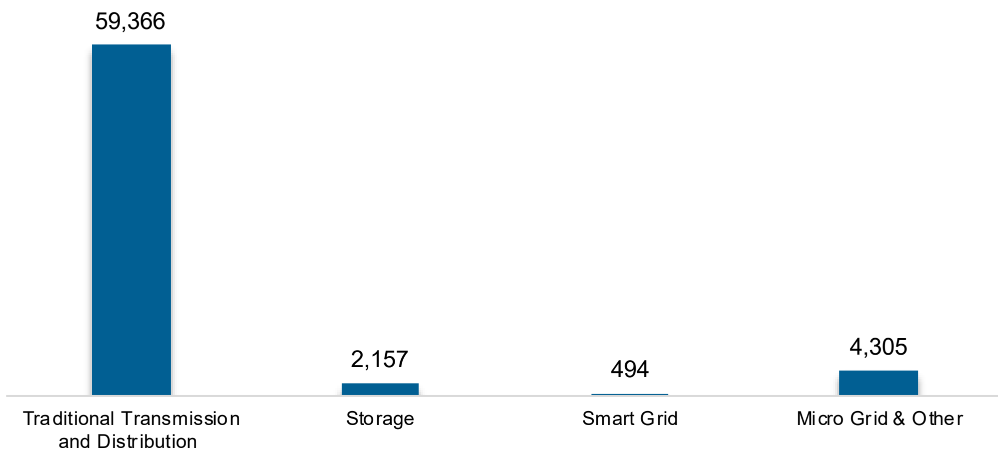
Figure NY-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

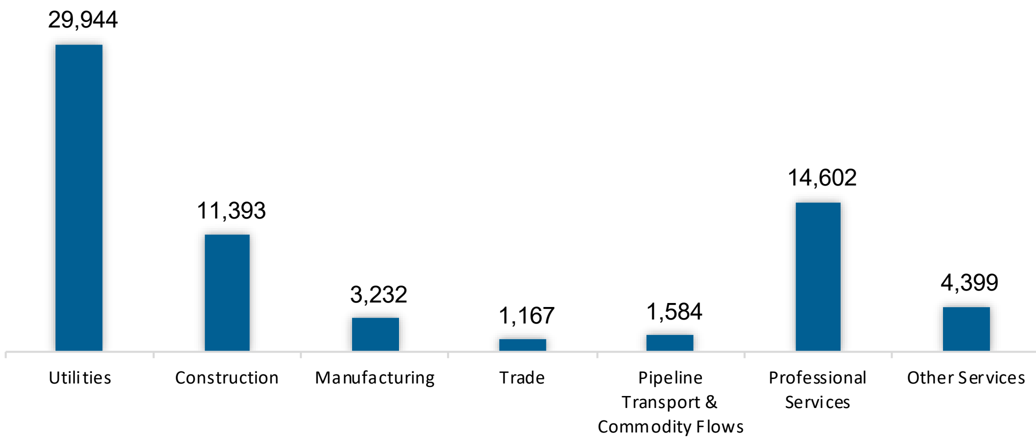
Transmission, Distribution, and Storage employs 66,321 workers in New York, 4.9% of the national total, down 1.5% or 998 jobs since the 2021 report.

Figure NY-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in New York, accounting for 45.2% of the sector's jobs statewide.

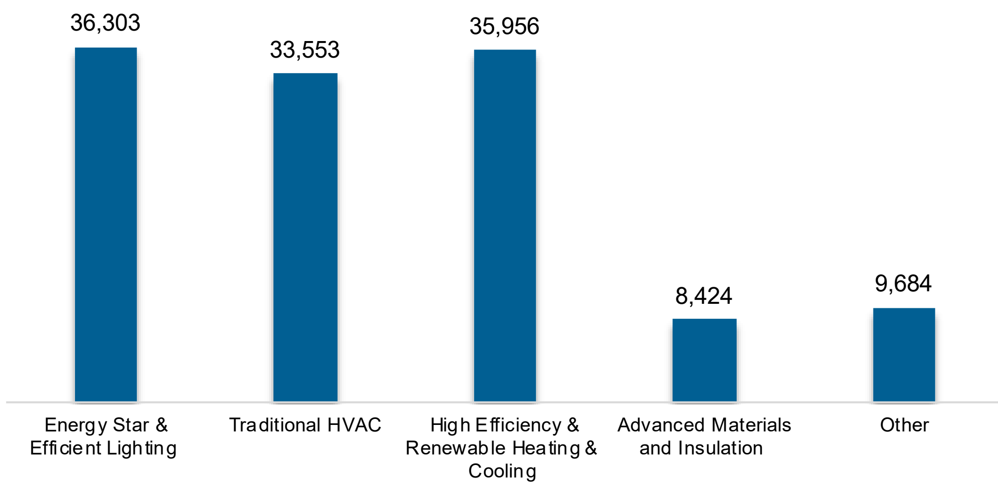
Figure NY-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

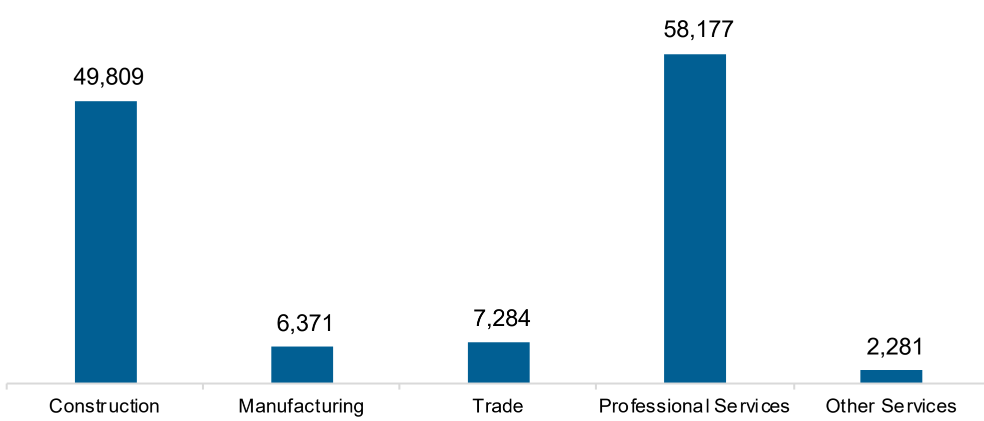
The energy efficiency (EE) sector employed 123,921 workers in New York, 5.7% of the national EE total. The EE sector added 2,960 jobs and increased 2.4% in the past year.

Figure NY-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the professional and business services industry.

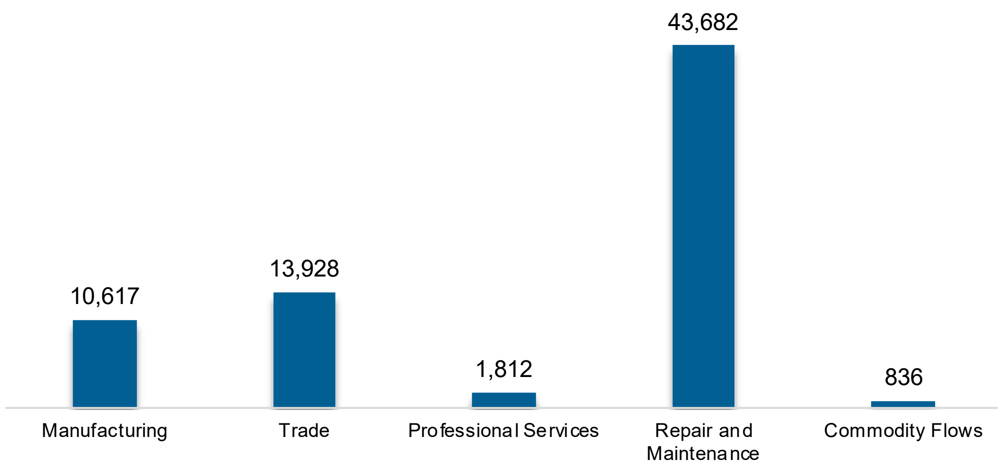
Figure NY-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 70,874 workers in New York, 2.8% of the national total for the sector. Motor vehicles and component parts added 2,941 jobs and increased 4.3% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure NY-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in New York are less optimistic than their peers across the country about energy sector job growth over the next year.

Table NY-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.5	2.2
Electric Power Transmission, Distribution, and Storage	0.9	1.1
Energy Efficiency	1.2	1.7
Fuels	1.9	3.0
Motor Vehicles	2.0	3.2

Hiring Difficulty

Employers in New York reported 52.7% overall hiring difficulty.

Table NY-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	23.2	29.5	7.8	39.5	52.7

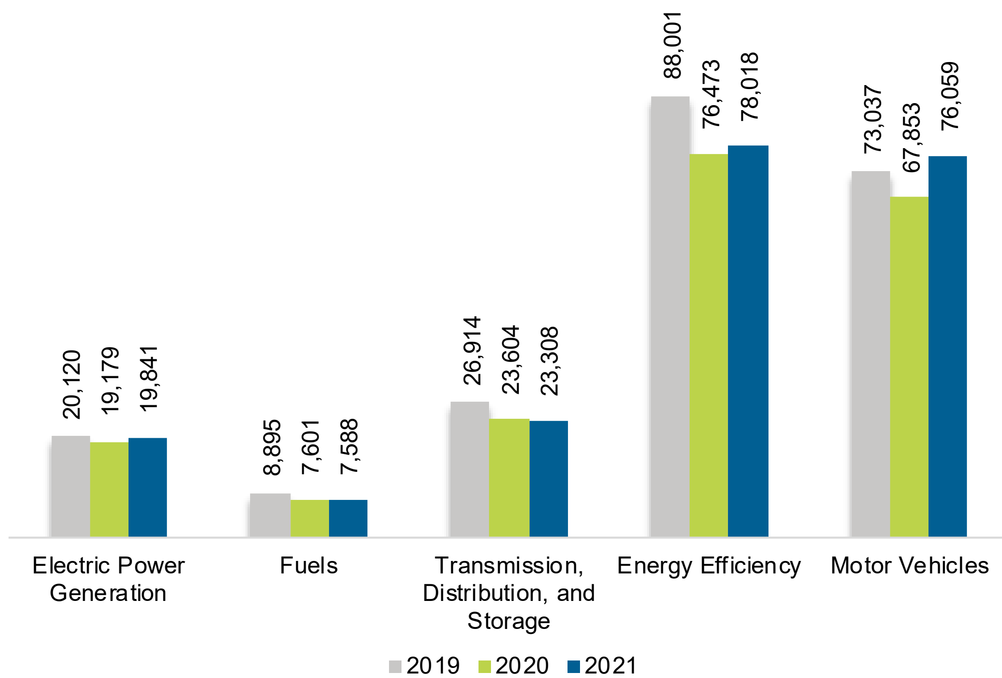
North Carolina

ENERGY AND EMPLOYMENT — 2022

Overview

North Carolina had 204,813 energy workers statewide in 2021, representing 2.6% of all U.S. energy jobs. Of these energy jobs, 19,841 are in electric power generation; 7,588 in fuels; 23,308 in transmission, distribution, and storage; 78,018 in energy efficiency; and 76,059 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 10,104 jobs, or 5.2%. The energy sector in North Carolina represents 4.5% of total state employment.

Figure NC-1.
Employment by Major Energy Technology Application

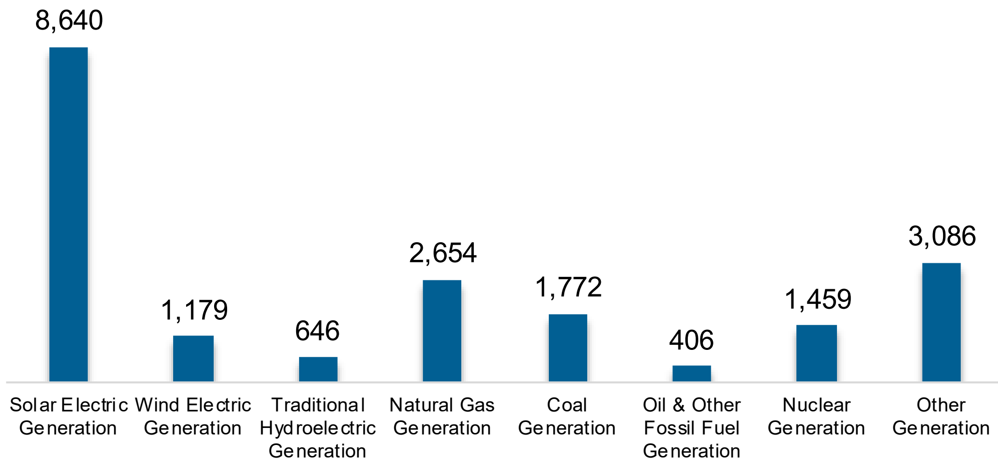


Breakdown by Technology Applications

Electric Power Generation

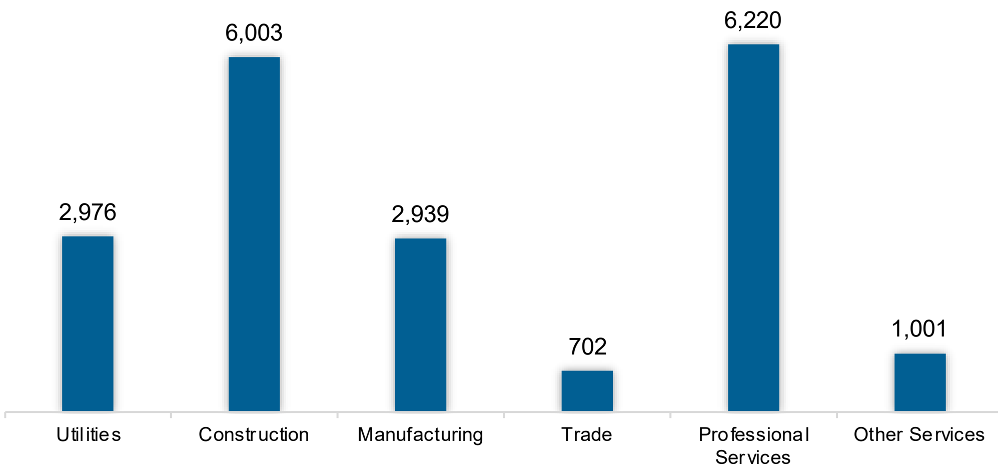
The electric power generation sector employed 19,841 workers in North Carolina, 2.3% of the national electricity total, and added 662 jobs over the past year (3.5%).

Figure NC-2.
Electric Power Generation Employment by Detailed Technology Application



Professional and business services work represents the largest industry sector in the electric power generation sector, with 31.3% of jobs. Construction is second largest with 30.3%.

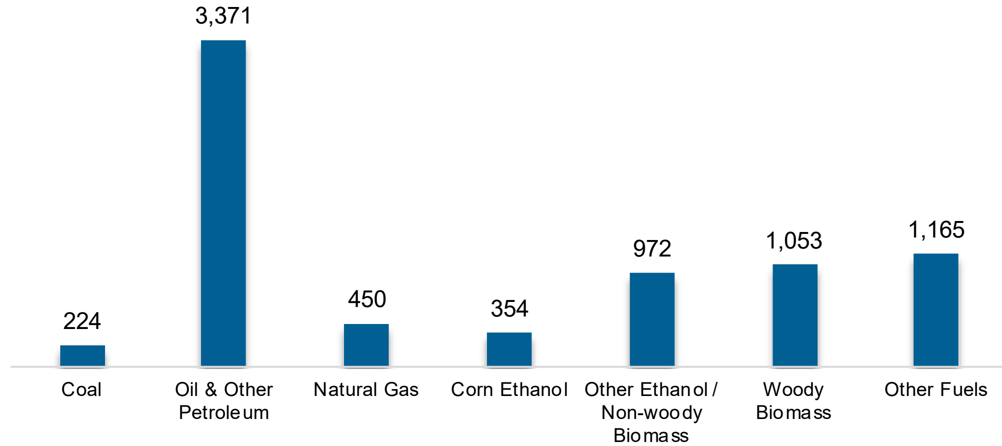
Figure NC-3.
Electric Power Generation Employment by Industry Sector



Fuels

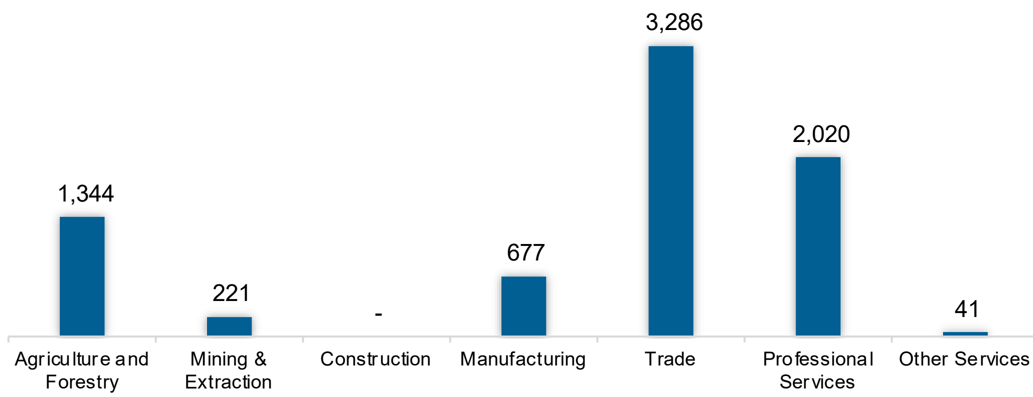
The fuel sector employed 7,588 workers in North Carolina, 0.8% of the national total in fuels. The sector lost 13 jobs and decreased 0.2% in the past year.

Figure NC-4.
Fuels Employment by Detailed Technology Application



Wholesale trade jobs represent 43.3% of fuel jobs in North Carolina.

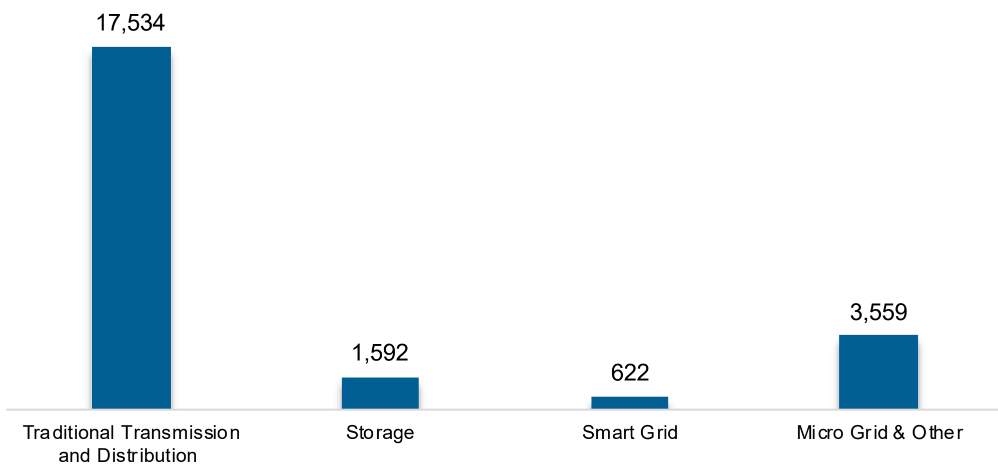
Figure NC-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

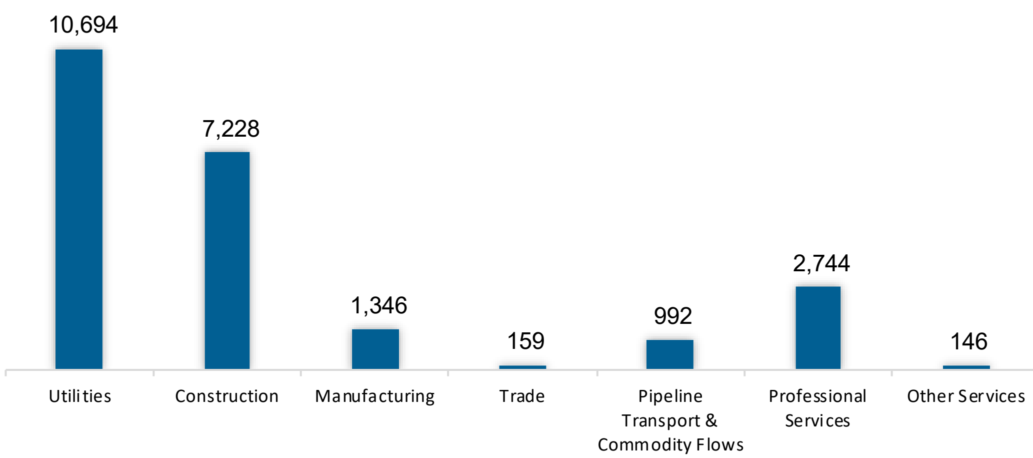
The transmission, distribution, and storage (TDS) sector employed 23,308 workers in North Carolina, 0.8% of the national TDS total. The sector lost 297 jobs and decreased 1.3% in the past year.

Figure NC-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in North Carolina, accounting for 45.9% of the sector's jobs statewide.

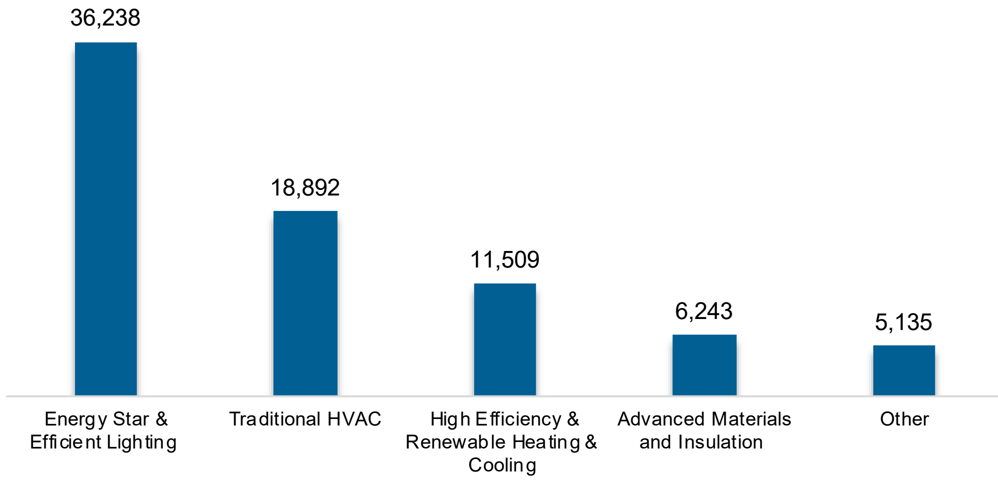
Figure NC-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

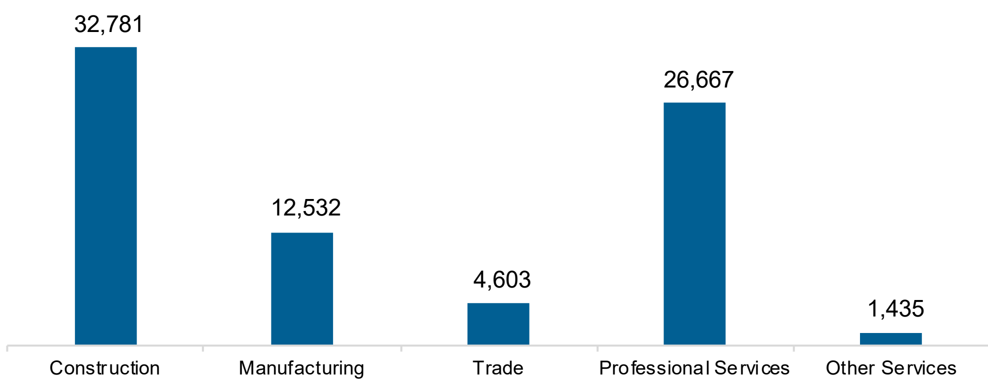
The energy efficiency (EE) sector employed 78,018 workers in North Carolina, 3.6% of the national EE total. The EE sector added 1,545 jobs and increased 2% in the past year.

Figure NC-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

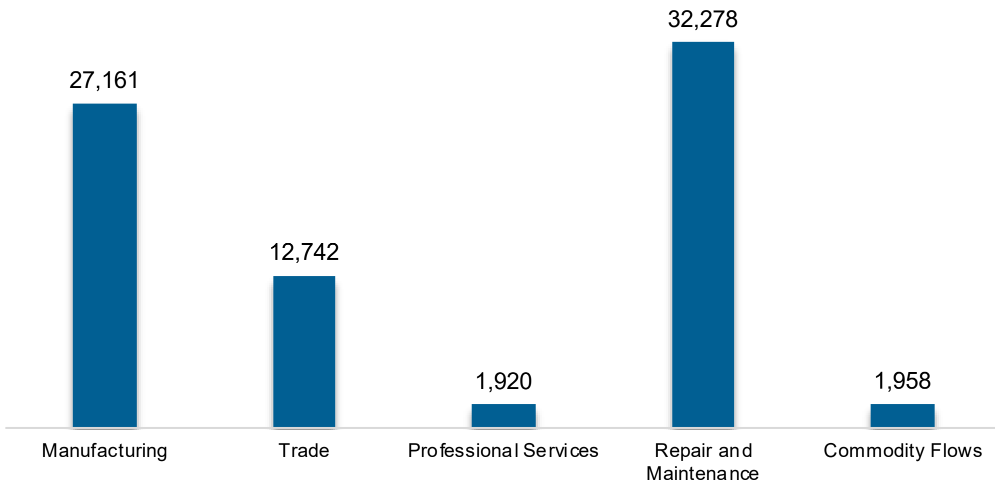
Figure NC-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts and Component Parts

The motor vehicles and component sector employed 76,059 workers in North Carolina, 3% of the national total for the sector. Motor vehicles and component parts added 8,206 jobs and increased 12.1% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure NC-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in North Carolina are less optimistic than their peers across the country about energy sector job growth over the next year.

Table NC-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.5	2.2
Electric Power Transmission, Distribution, and Storage	0.9	1.1
Energy Efficiency	1.2	1.7
Fuels	1.9	3.0
Motor Vehicles	2.0	3.2

Hiring Difficulty

Employers in North Carolina reported 58.7% overall hiring difficulty.

Table NC-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	27.0	31.7	7.6	33.7	58.7

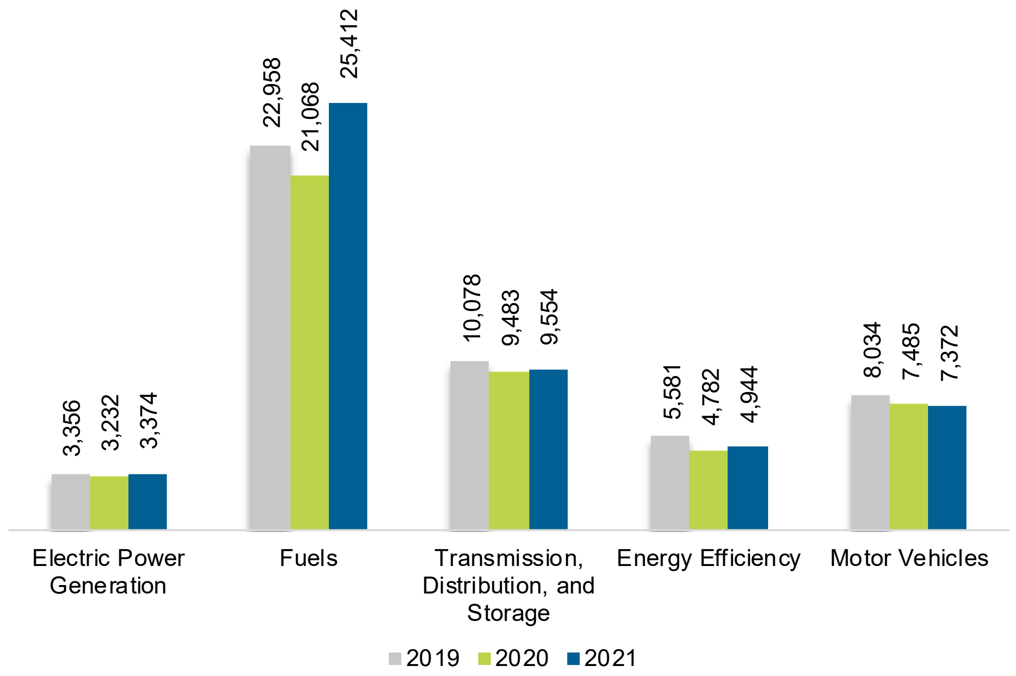
North Dakota

ENERGY AND EMPLOYMENT — 2022

Overview

North Dakota had 50,657 energy workers statewide in 2021, representing 0.6% of all U.S. energy jobs. Of these energy jobs, 3,374 are in electric power generation; 25,412 in fuels; 9,554 in transmission, distribution, and storage; 4,944 in energy efficiency; and 7,372 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 4,607 jobs, or 10%. The energy sector in North Dakota represents 12.6% of total state employment.

Figure ND-1.
Employment by Major Energy Technology Application

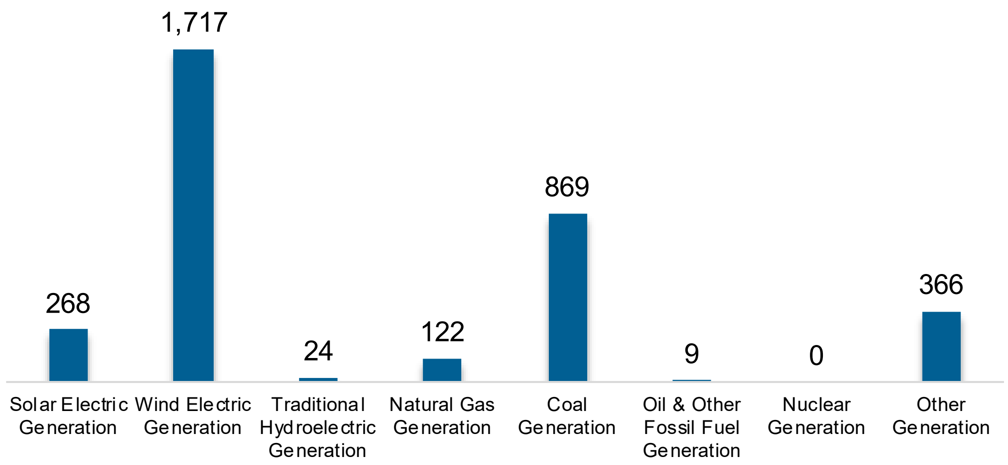


Breakdown by Technology Applications

Electric Power Generation

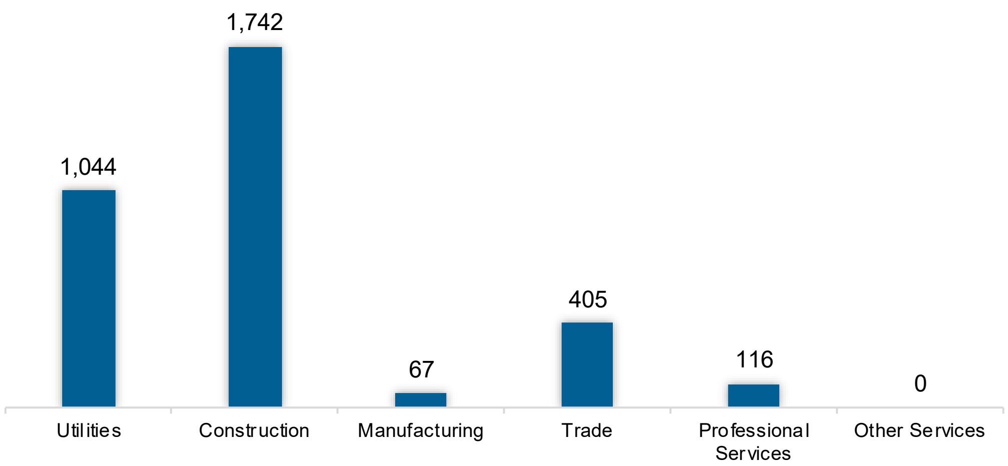
The electric power generation sector employed 3,374 workers in North Dakota, 0.4% of the national electricity total, and added 143 jobs over the past year (4.4%).

Figure ND-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 51.6% of jobs. Utilities is second largest with 31%.

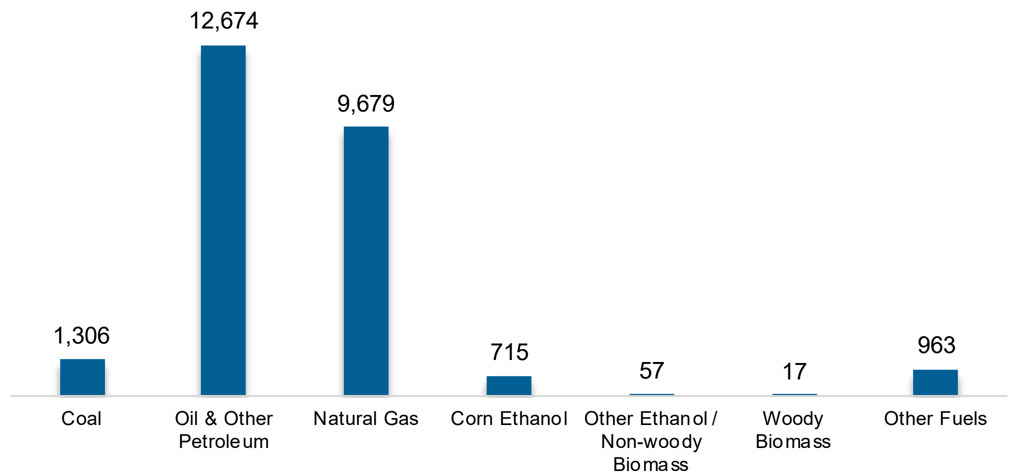
Figure ND-3.
Electric Power Generation Employment by Industry Sector



Fuels

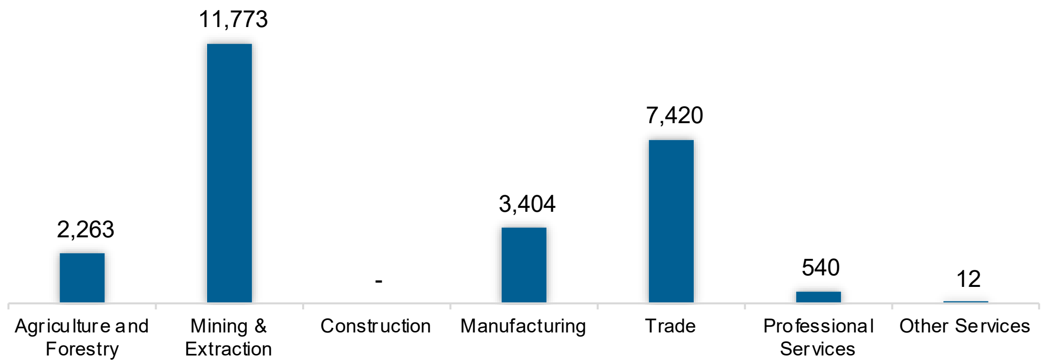
The fuel sector employed 25,412 workers in North Dakota, 2.8% of the national total in fuels. The sector gained 4,344 jobs and increased 20.6% in the past year.

Figure ND-4.
Fuels Employment by Detailed Technology Application



Mining and extraction jobs represent 46.3% of fuel jobs in North Dakota.

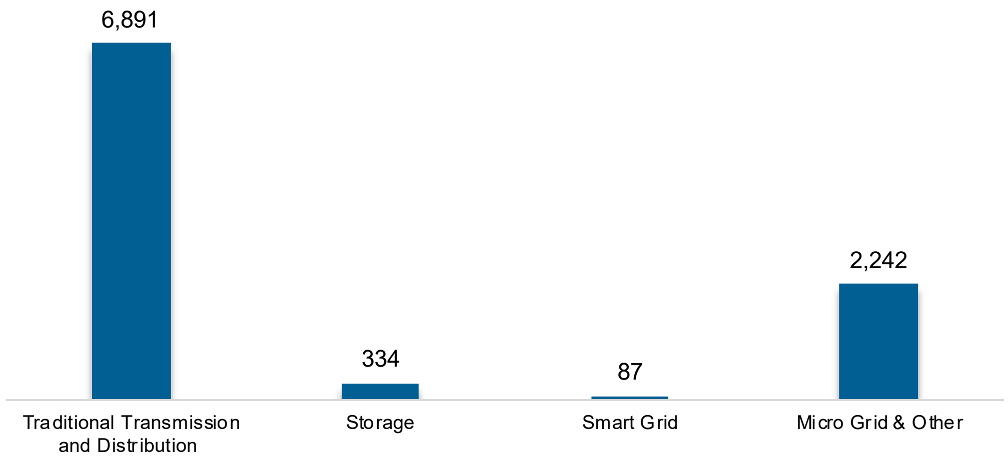
Figure ND-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

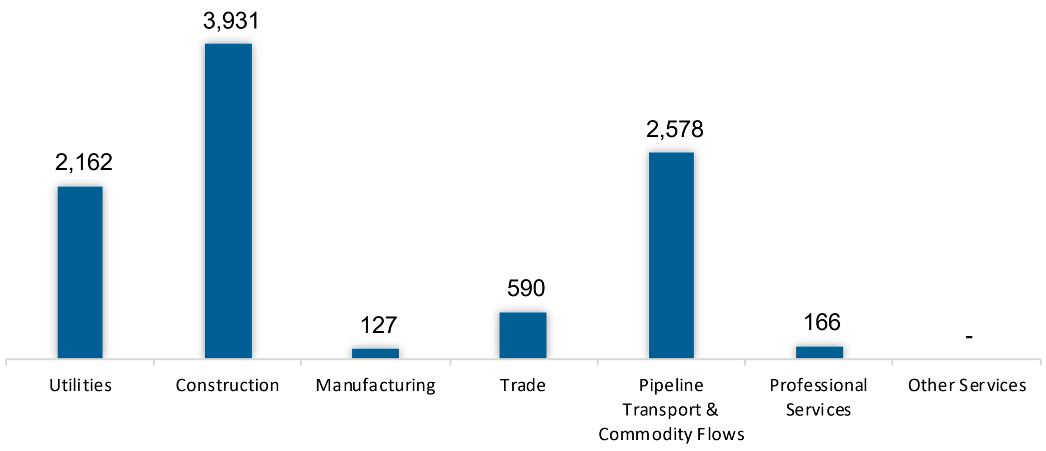
The transmission, distribution, and storage (TDS) sector employed 9,554 workers in North Dakota, 2.8% of the national TDS total. The sector gained 71 jobs and increased 0.7% in the past year.

Figure ND-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in North Dakota, accounting for 41.1% of the sector's jobs statewide.

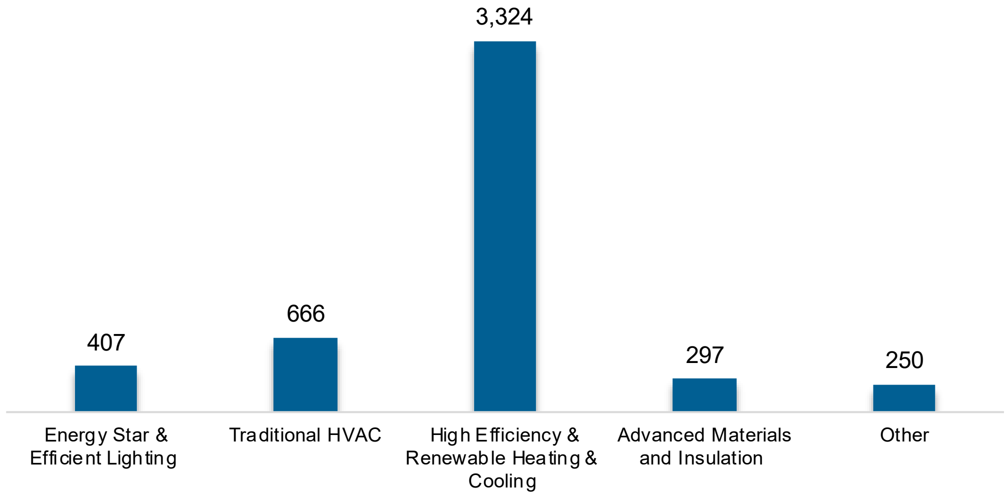
Figure ND-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

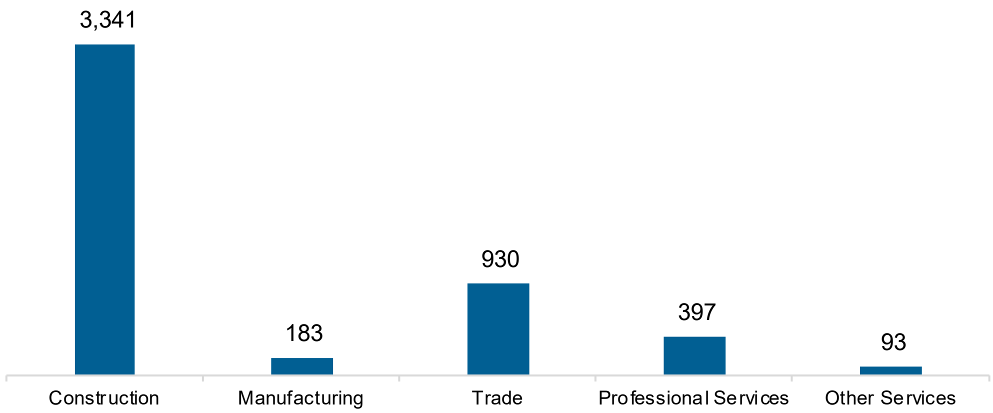
The energy efficiency (EE) sector employed 4,944 workers in North Dakota, 0.2% of the national EE total. The EE sector added 162 jobs and increased 3.4% in the past year.

Figure ND-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

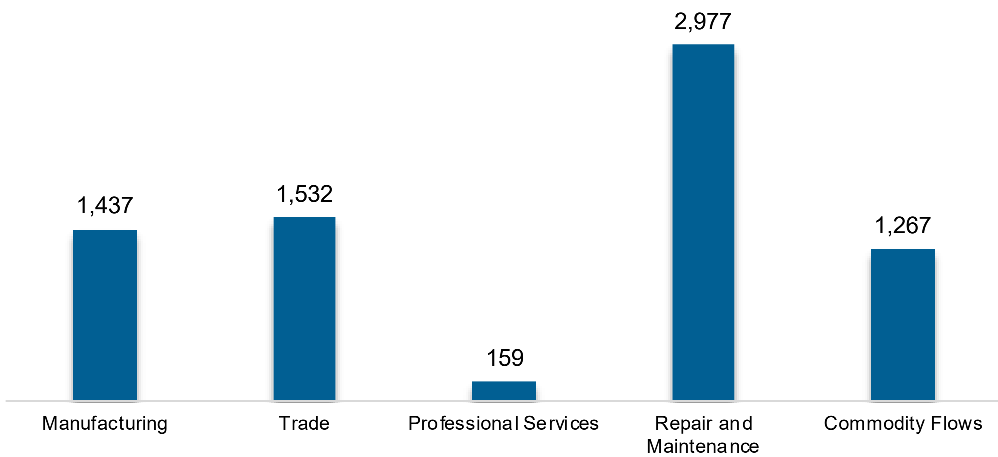
Figure ND-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 7,372 workers in North Dakota, 0.3% of the national total for the sector. Motor vehicles and component parts lost 112 jobs and decreased 1.5% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure ND-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in New York are less optimistic than their peers across the country about energy sector job growth over the next year.

Table ND-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.1	2.2
Electric Power Transmission, Distribution, and Storage	0.6	1.1
Energy Efficiency	0.9	1.7
Fuels	1.5	3.0
Motor Vehicles	1.6	3.2

Hiring Difficulty

Employers in North Dakota reported 53.7% overall hiring difficulty.

Table ND-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	16.9	36.8	5.2	41.1	53.7

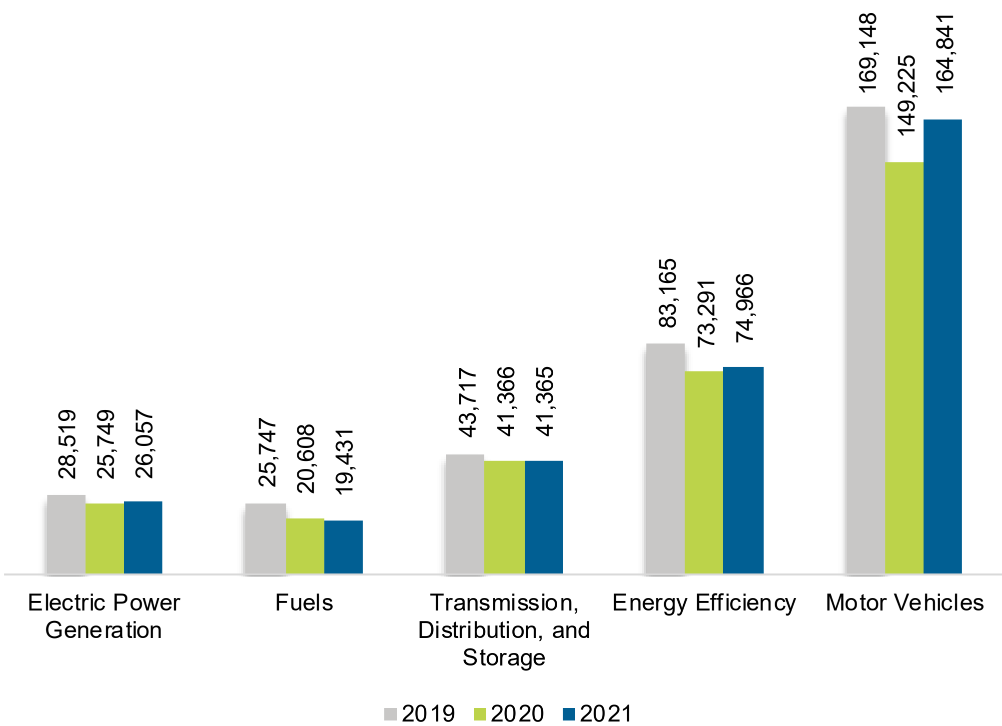
Ohio

ENERGY AND EMPLOYMENT — 2022

Overview

Ohio had 326,660 energy workers statewide in 2021, representing 4.2% of all U.S. energy jobs. Of these energy jobs, 26,057 are in electric power generation; 19,431 in fuels; 41,365 in transmission, distribution, and storage; 74,966 in energy efficiency; and 164,841 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 16,421 jobs, or 5.3%. The energy sector in Ohio represents 6.2% of total state employment.

Figure OH-1.
Employment by Major Energy Technology Application

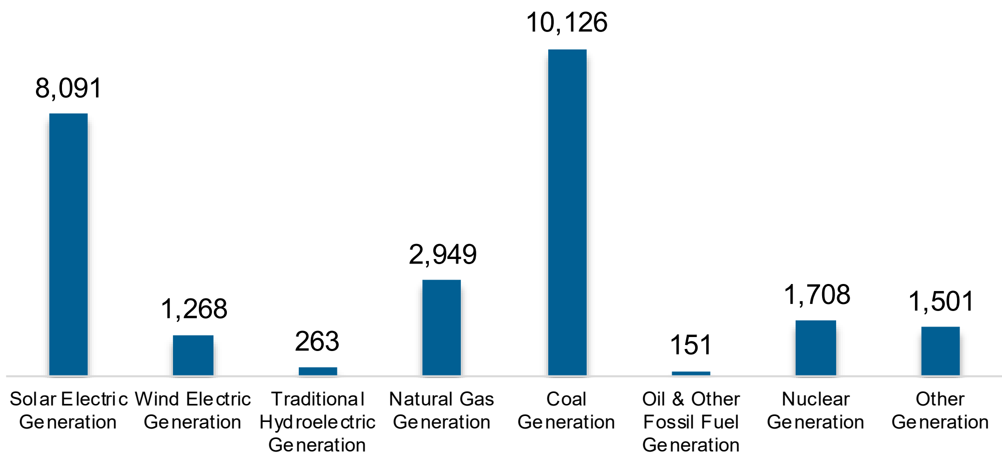


Breakdown by Technology Applications

Electric Power Generation

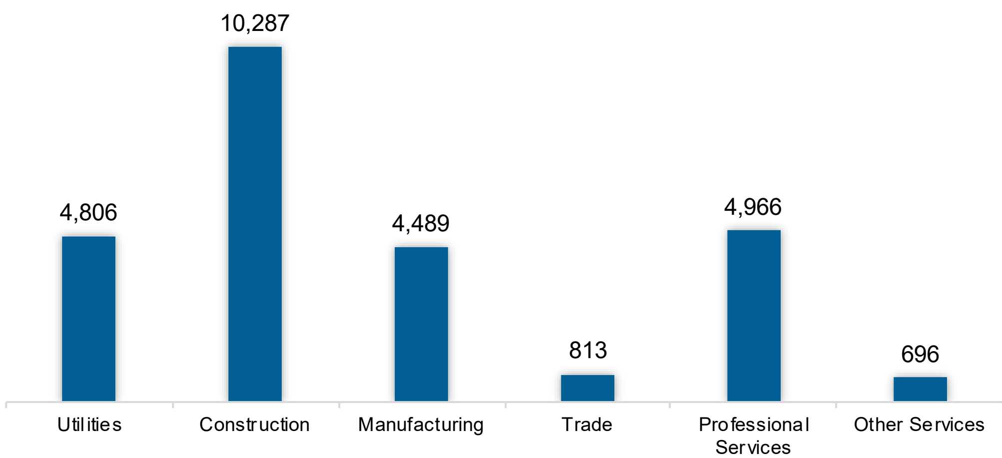
The electric power generation sector employed 26,057 workers in Ohio, 3% of the national electricity total, and added 307 jobs over the past year (1.2%).

Figure OH-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 39.5% of jobs. Professional and business services is second largest with 19.1%.

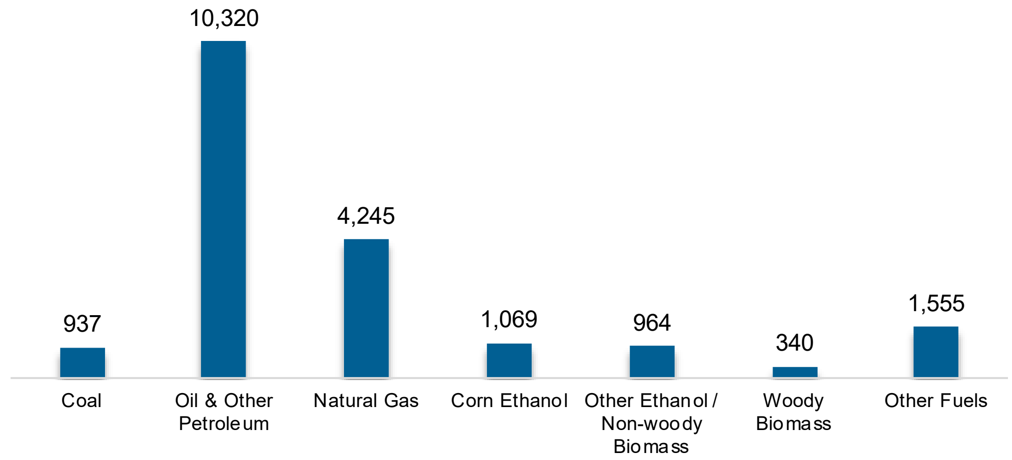
Figure OH-3.
Electric Power Generation Employment by Industry Sector



Fuels

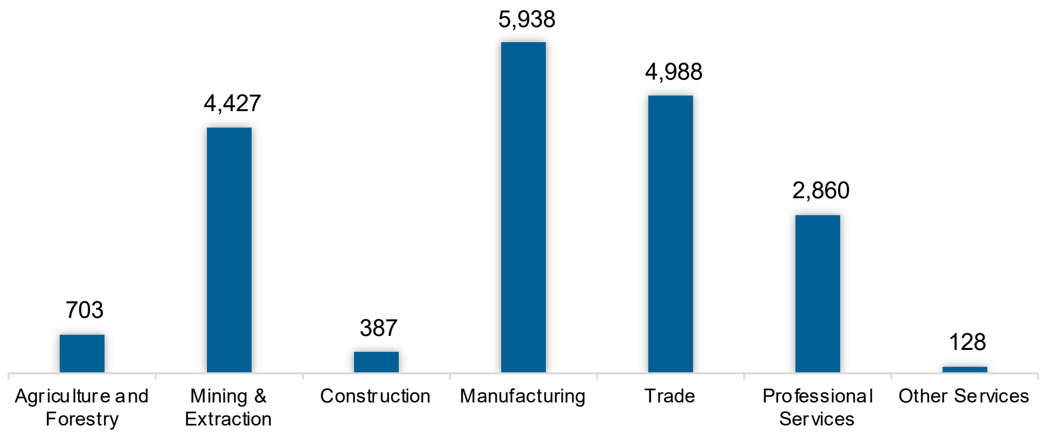
The fuel sector employed 19,431 workers in Ohio, 2.1% of the national total in fuels. The sector lost 1,177 jobs and decreased 5.7% in the past year.

Figure OH-4.
Fuels Employment by Detailed Technology Application



Manufacturing jobs represent 30.6% of fuel jobs in Ohio.

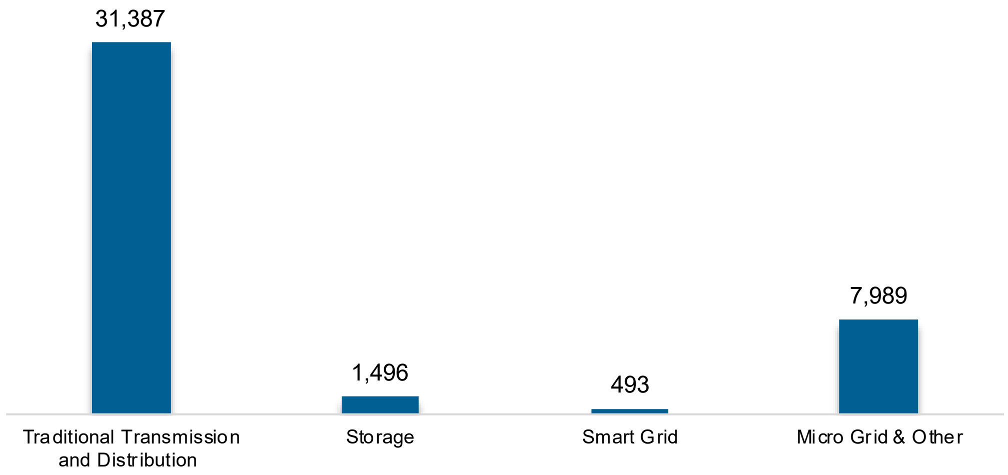
Figure OH-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

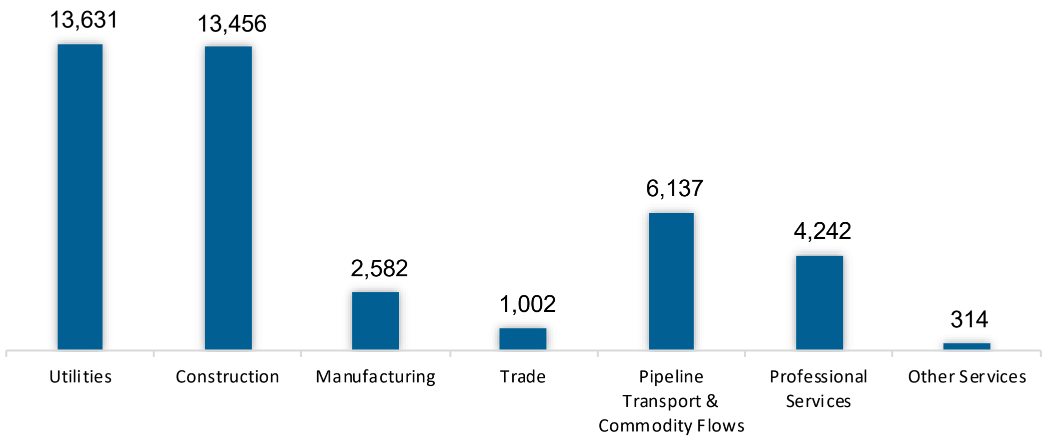
The transmission, distribution, and storage (TDS) sector employed 41,365 workers in Ohio, 2.1% of the national TDS total. The sector lost one job, effectively decreasing 0% in the past year.

Figure OH-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the largest percentage of TDS jobs in Ohio, with 33.0% of such jobs statewide.

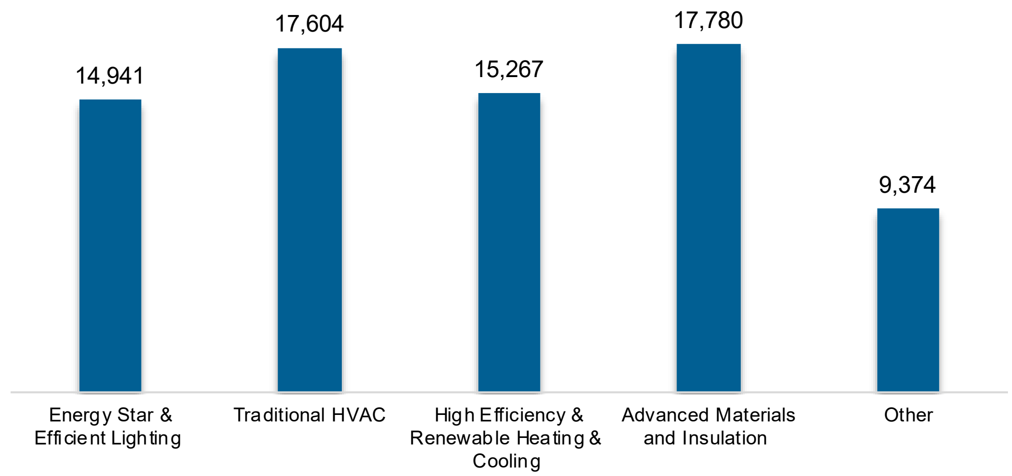
Figure OH-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

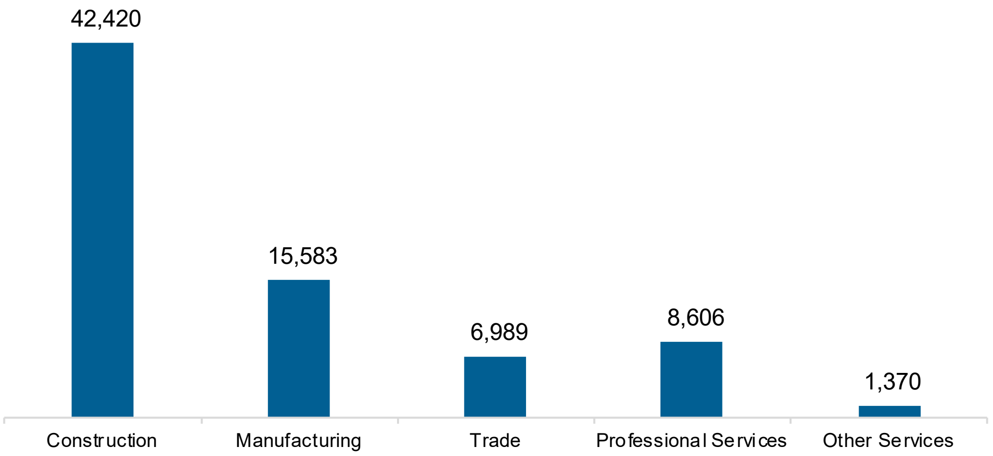
The energy efficiency (EE) sector employed 74,966 workers in Ohio, 3.5% of the national EE total. The EE sector added 1,676 jobs and increased 2.3% in the past year.

Figure OH-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

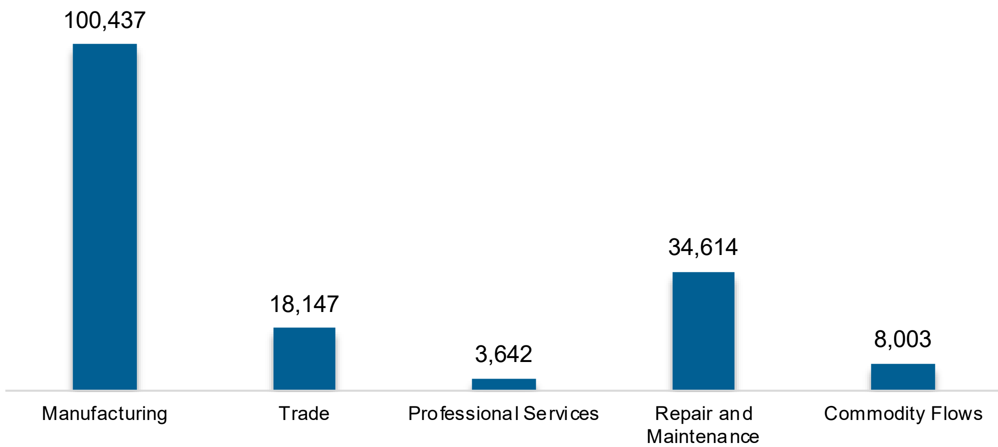
Figure OH-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 164,841 workers in Ohio, 6.5% of the national total for the sector. Motor vehicles and component parts added 15,616 jobs and increased 10.5% in the past year. Manufacturing work represents the largest proportion of motor vehicle jobs.

Figure OH-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Ohio are less optimistic than their peers across the country about energy sector job growth over the next year.

Table OH-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.2	2.2
Electric Power Transmission, Distribution, and Storage	0.6	1.1
Energy Efficiency	0.9	1.7
Fuels	1.6	3.0
Motor Vehicles	1.7	3.2

Hiring Difficulty

Employers in Ohio reported 51.6% overall hiring difficulty.

Table OH-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	22.1	29.5	8.7	39.8	51.6

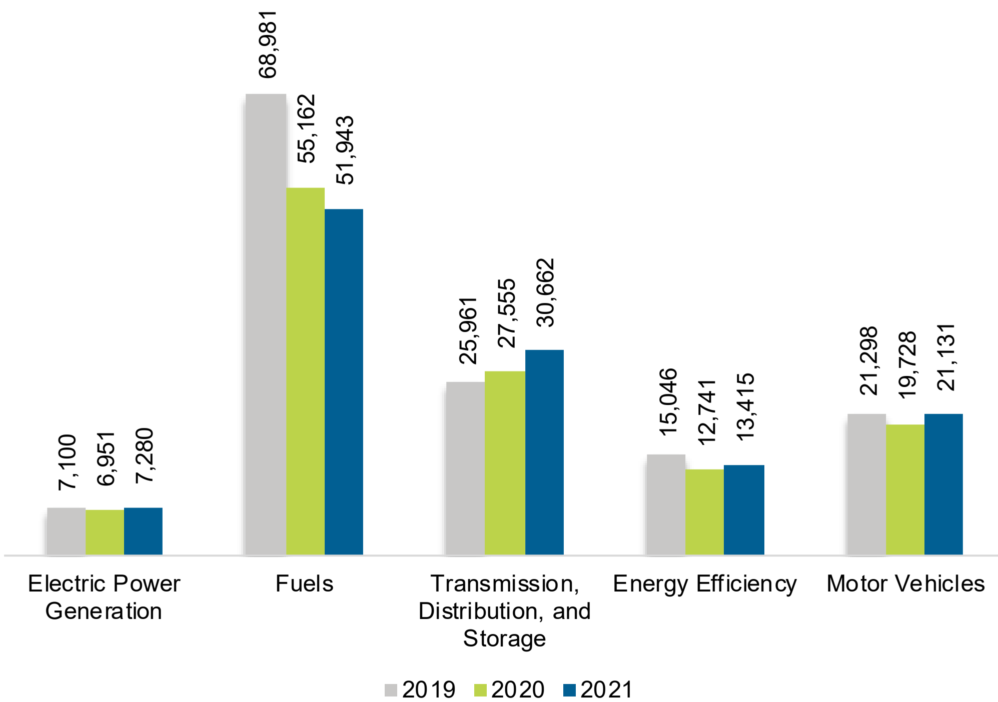
Oklahoma

ENERGY AND EMPLOYMENT — 2022

Overview

Oklahoma had 124,431 energy workers statewide in 2021, representing 1.6% of all U.S. energy jobs. Of these energy jobs, 7,280 are in electric power generation; 51,943 in fuels; 30,662 in transmission, distribution, and storage; 13,415 in energy efficiency; and 21,131 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 2,293 jobs, or 1.9%. The energy sector in Oklahoma represents 7.9% of total state employment.

Figure OK-1.
Employment by Major Energy Technology Application

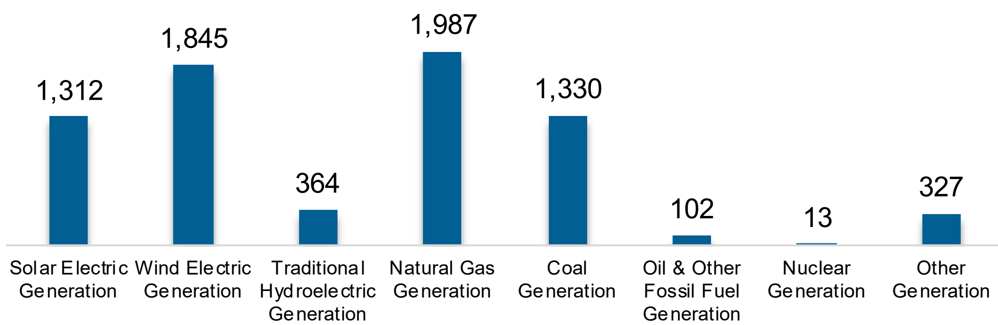


Breakdown by Technology Applications

Electric Power Generation

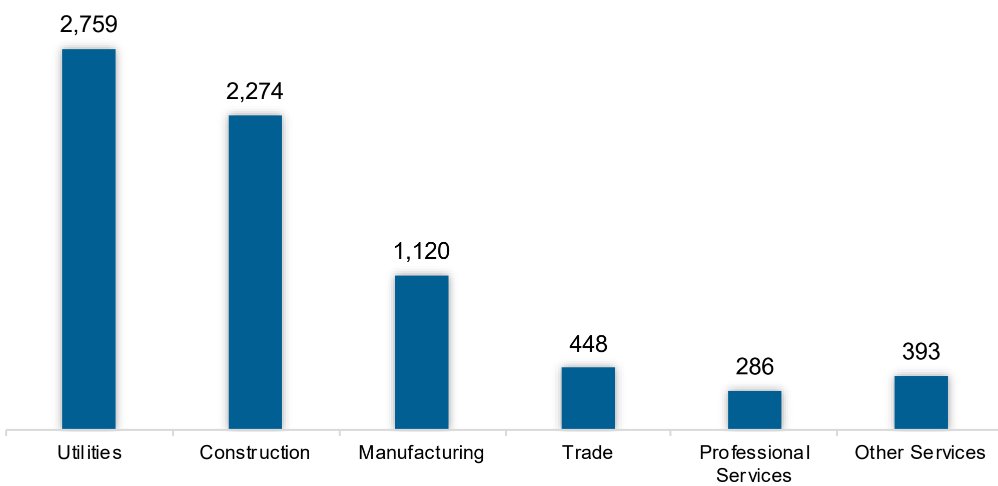
The electric power generation sector employed 7,280 workers in Oklahoma, 0.8% of the national electricity total, and added 328 jobs over the past year (4.7%).

Figure OK-2.
Electric Power Generation Employment by Detailed Technology Application



Utilities work represents the largest industry sector in the electric power generation sector, with 37.9% of jobs. Construction is second largest with 31.2%.

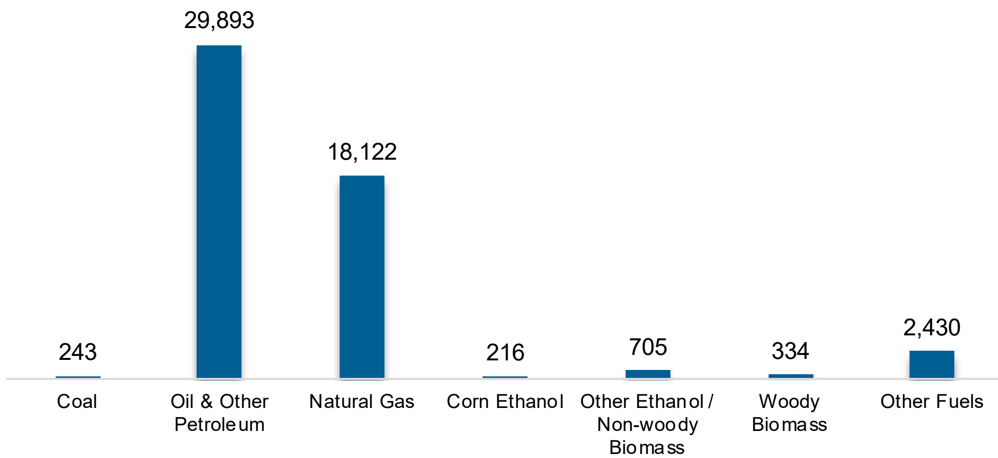
Figure OK-3.
Electric Power Generation Employment by Industry Sector



Fuels

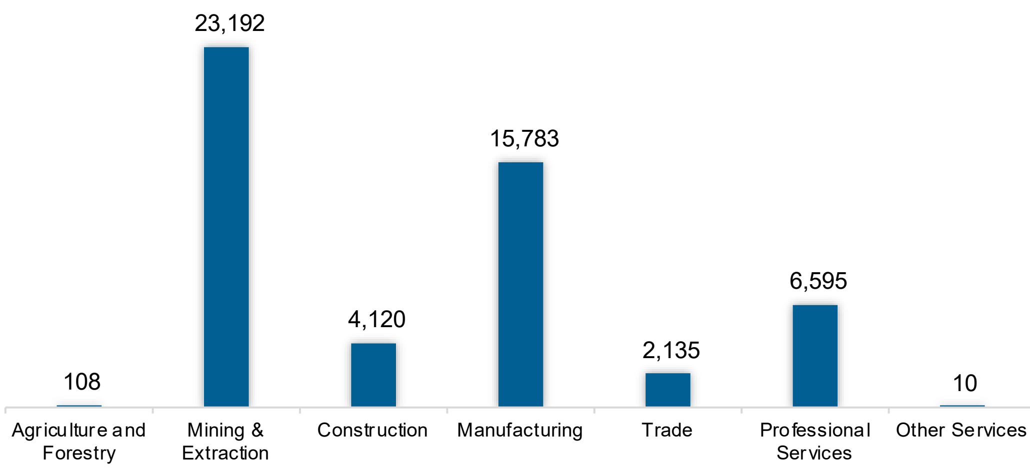
The fuel sector employed 51,943 workers in Oklahoma, 5.7% of the national total in fuels. The sector lost 3,219 jobs and decreased 5.8% in the past year.

Figure OK-4.
Fuels Employment by Detailed Technology Application



Mining and extraction jobs represent 44.6% of fuel jobs in Oklahoma.

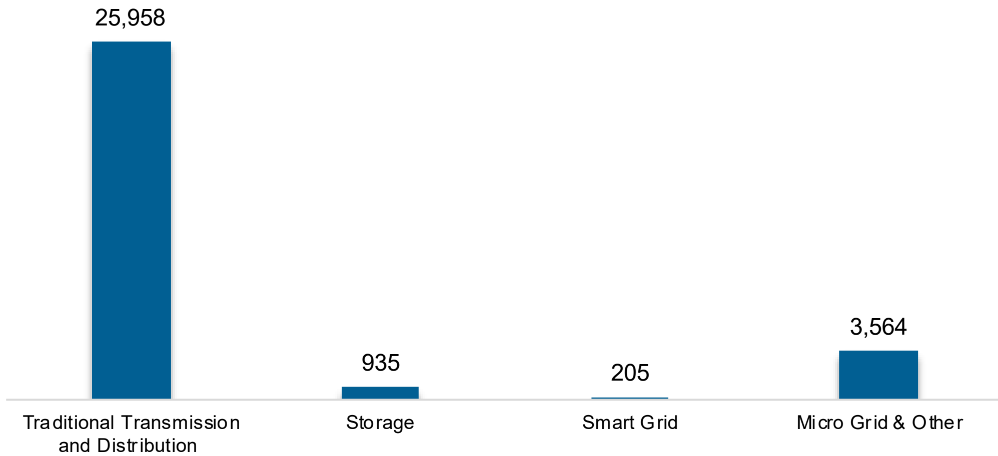
Figure OK-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

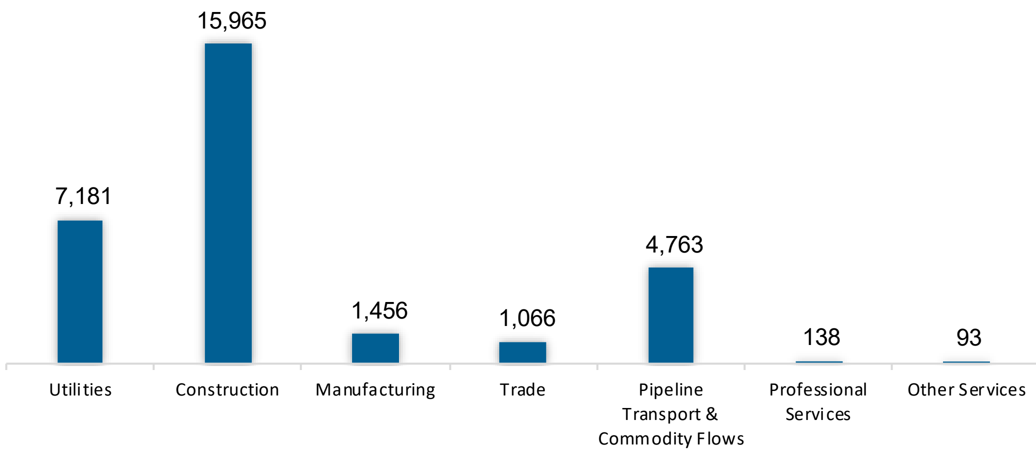
The transmission, distribution, and storage (TDS) sector employed 30,662 workers in Oklahoma, 5.7% of the national TDS total. The sector gained 3,107 jobs and increased 11.3% in the past year.

Figure OK-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in Oklahoma, accounting for 52.1% of the sector's jobs statewide.

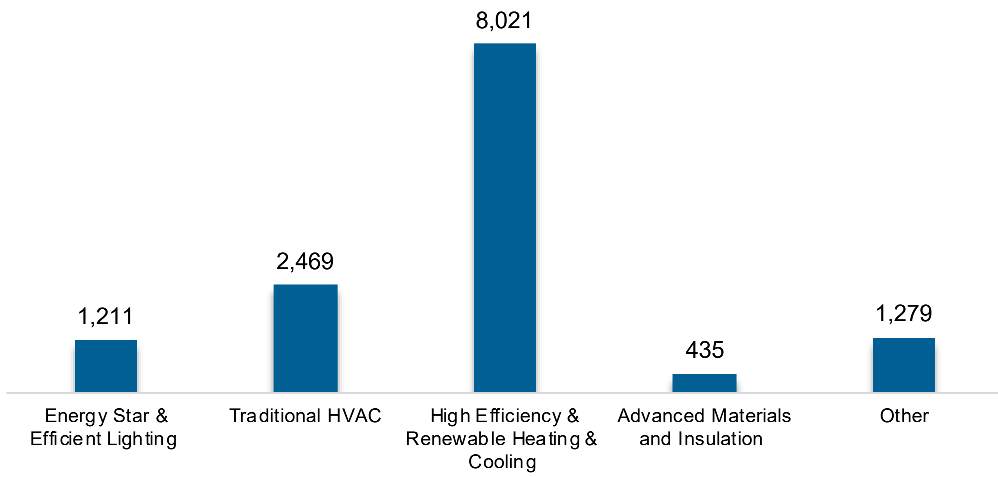
Figure OK-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

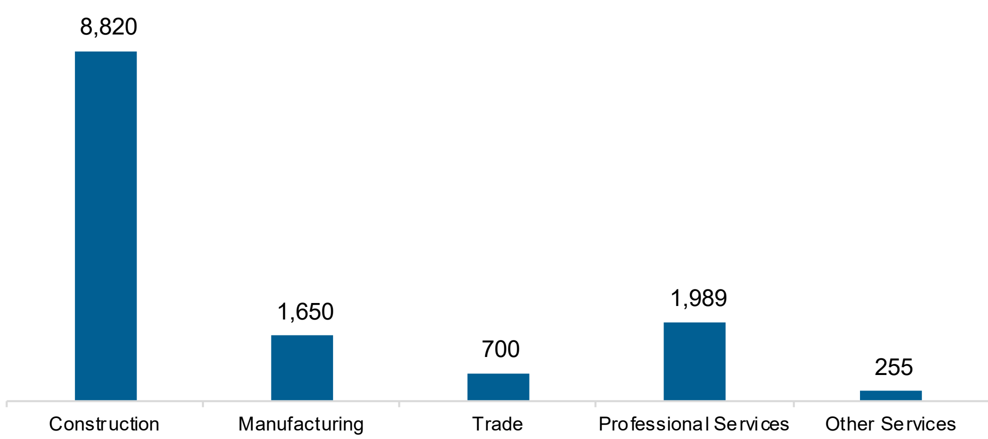
The energy efficiency (EE) sector employed 13,415 workers in Oklahoma, 0.6% of the national EE total. The EE sector added 674 jobs and increased 5.3% in the past year.

Figure OK-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

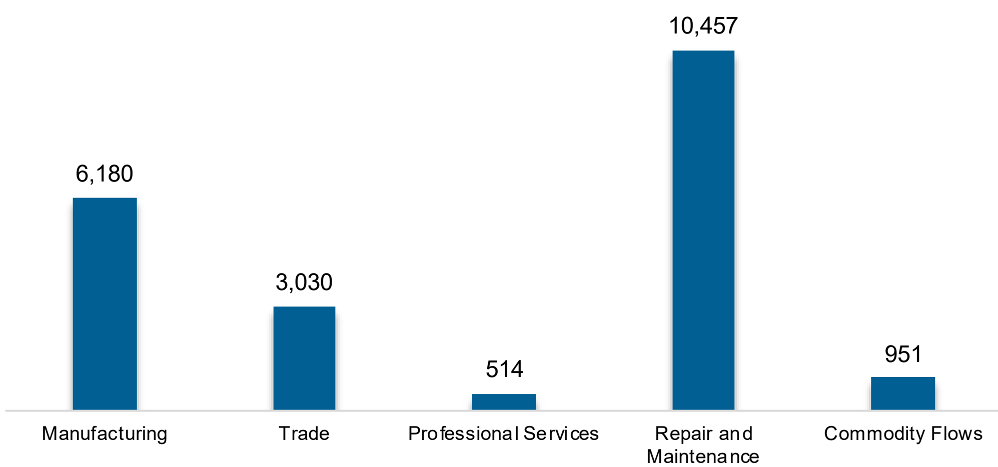
Figure OK-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 21,131 workers in Oklahoma, 0.8% of the national total for the sector. Motor vehicles and component parts added 1,403 jobs and increased 7.1% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure OK-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Oklahoma are more optimistic than their peers across the country about energy sector job growth over the next year.

Table OK-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	4.6	2.2
Electric Power Transmission, Distribution, and Storage	4.0	1.1
Energy Efficiency	4.3	1.7
Fuels	5.0	3.0
Motor Vehicles	5.1	3.2

Hiring Difficulty

Employers in Oklahoma reported 60.8% overall hiring difficulty.

Table OK-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	24.1	36.8	7.6	31.5	60.8

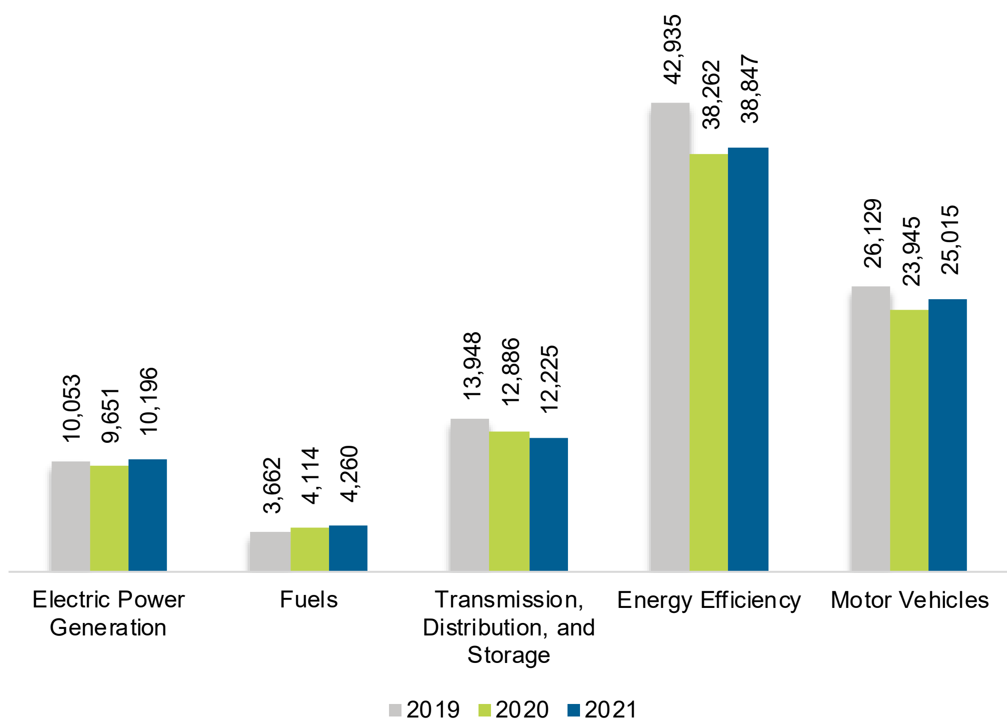
Oregon

ENERGY AND EMPLOYMENT — 2022

Overview

Oregon had 90,543 energy workers statewide in 2021, representing 1.2% of all U.S. energy jobs. Of these energy jobs, 10,196 are in electric power generation; 4,260 in fuels; 12,225 in transmission, distribution, and storage; 38,847 in energy efficiency; and 25,015 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 1,685 jobs, or 1.9%. The energy sector in Oregon represents 4.8% of total state employment.

Figure OR-1.
Employment by Major Energy Technology Application

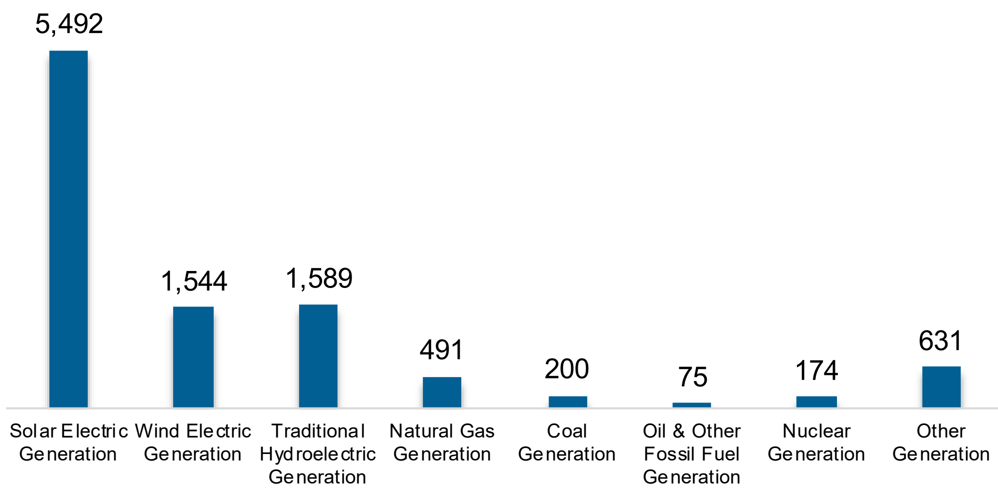


Breakdown by Technology Applications

Electric Power Generation

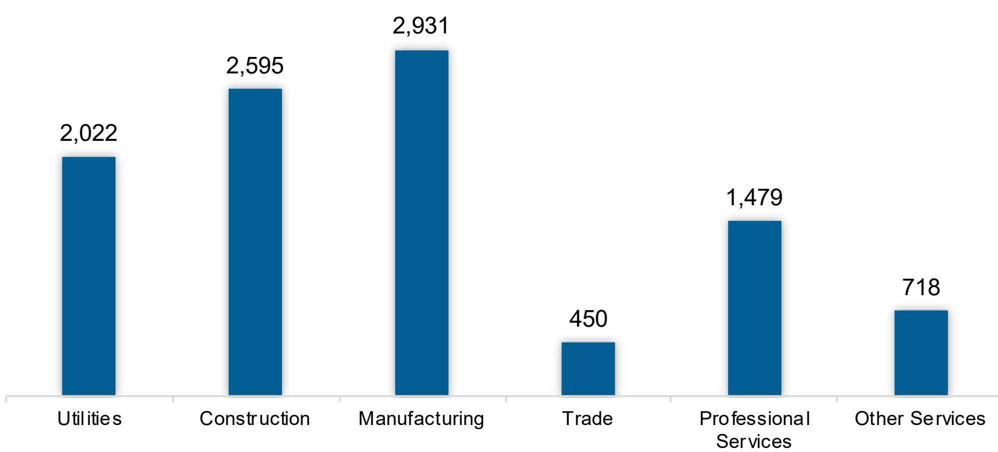
The electric power generation sector employed 10,196 workers in Oregon, 1.2% of the national electricity total, and added 545 jobs over the past year (5.6%).

Figure OR-2.
Electric Power Generation Employment by Detailed Technology Application



Manufacturing work represents the largest industry sector in the electric power generation sector, with 28.7% of jobs. Construction is second largest with 25.5%.

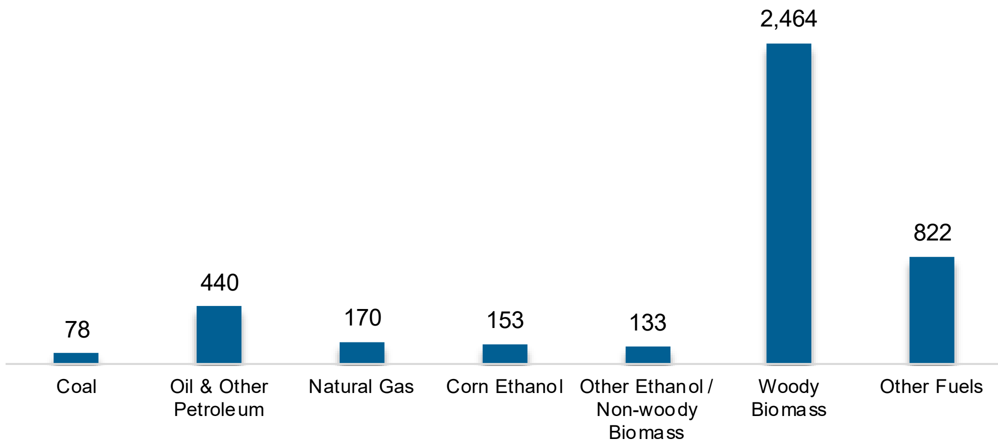
Figure OR-3.
Electric Power Generation Employment by Industry Sector



Fuels

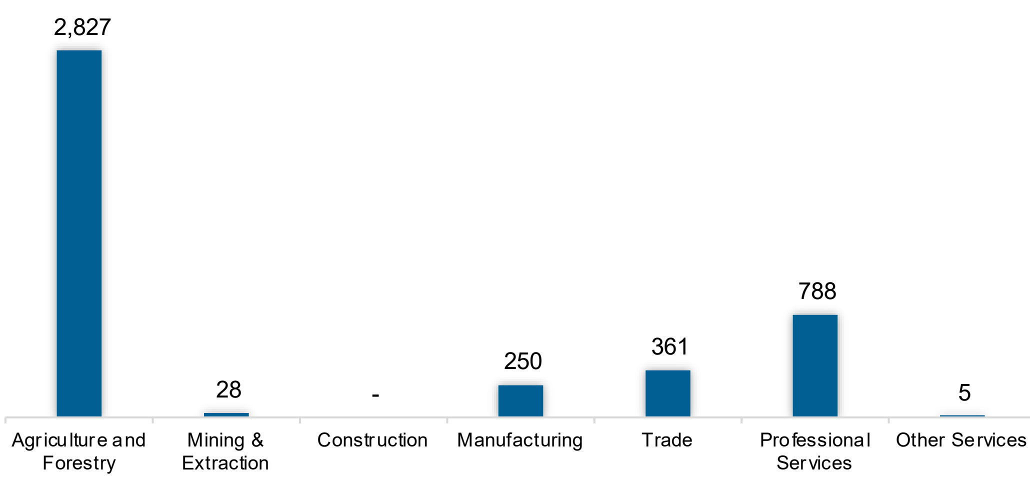
The fuel sector employed 4,260 workers in Oregon, 0.5% of the national total in fuels. The sector gained 146 jobs and increased 3.5% in the past year.

Figure OR-4.
Fuels Employment by Detailed Technology Application



Agriculture jobs represent 66.4% of fuel jobs in Oregon.

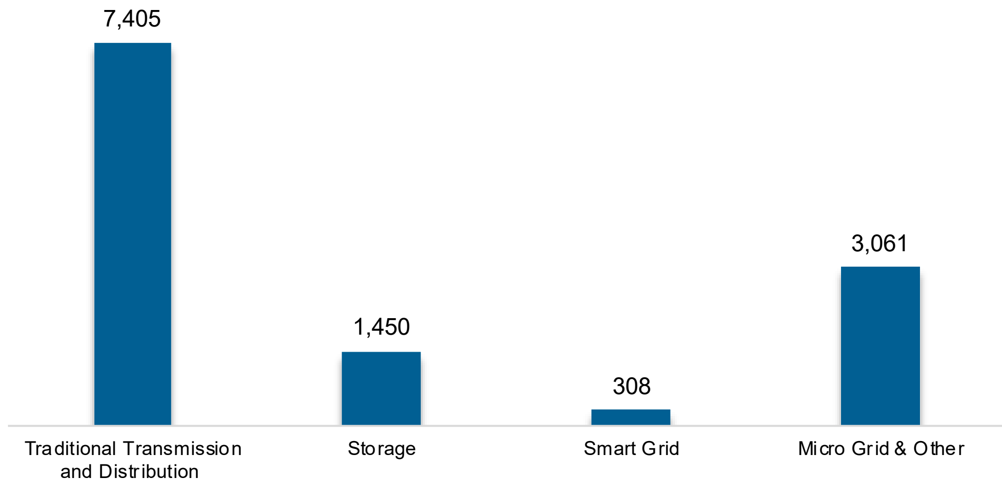
Figure OR-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

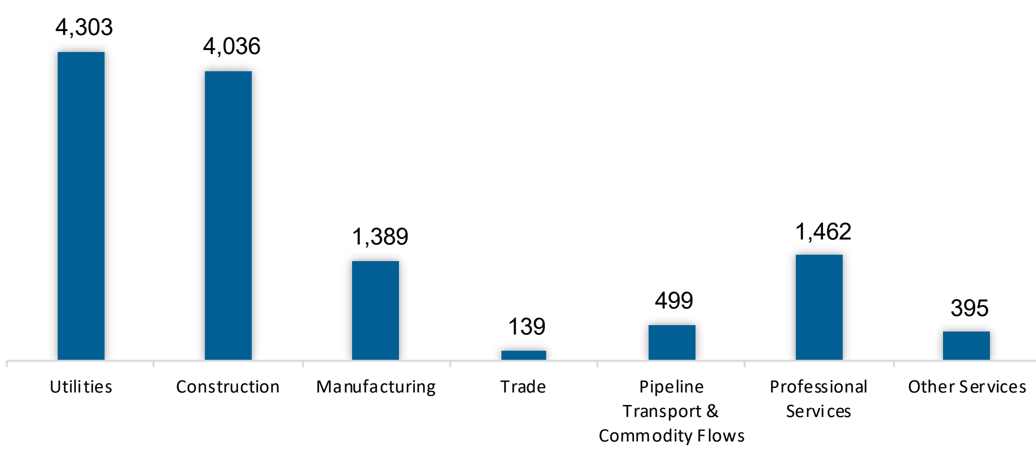
The transmission, distribution, and storage (TDS) sector employed 12,225 workers in Oregon, 0.5% of the national TDS total. The sector lost 661 jobs and decreased 5.1% in the past year.

Figure OR-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Oregon, accounting for 35.2% of the sector's jobs statewide.

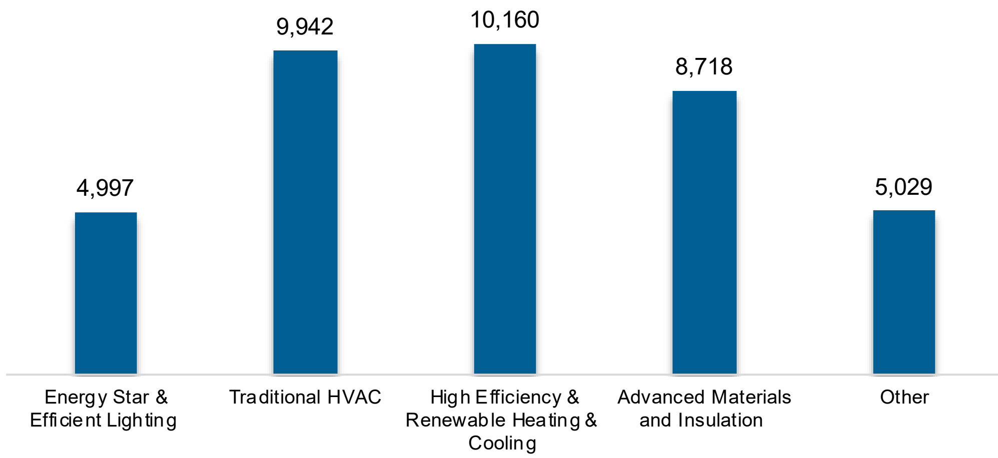
Figure OR-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

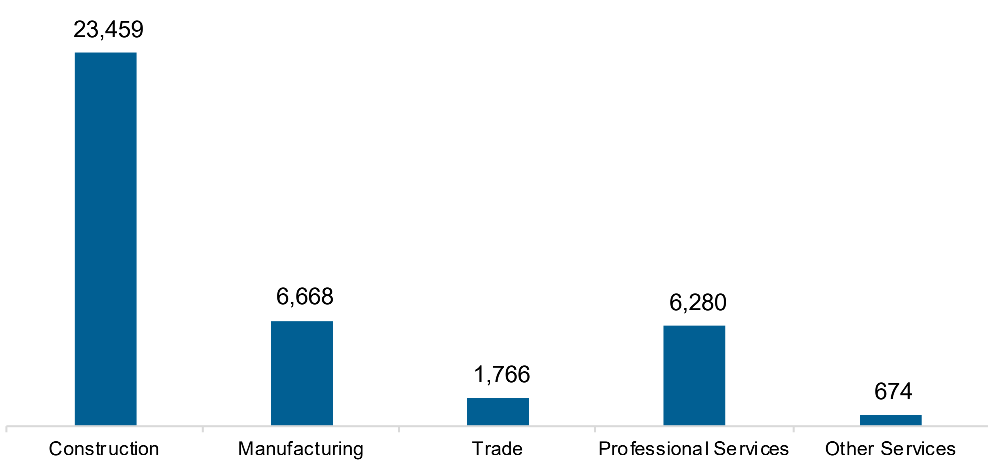
The energy efficiency (EE) sector employed 38,847 workers in Oregon, 1.8% of the national EE total. The EE sector added 585 jobs and increased 1.5% in the past year.

Figure OR-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

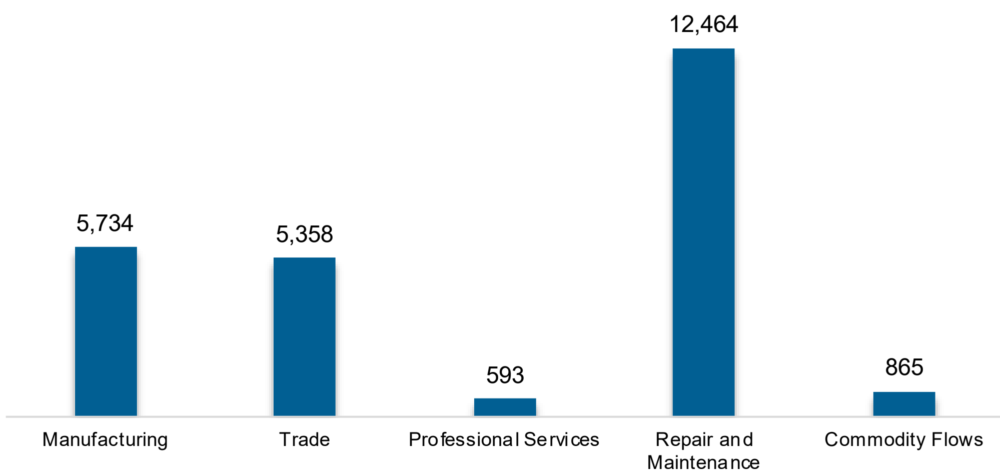
Figure OR-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 25,015 workers in Oregon, 1% of the national total for the sector. Motor vehicles and component parts added 1,070 jobs and increased 4.5% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure OR-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Oregon are more optimistic than their peers across the country about energy sector job growth over the next year.

Table OR-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	3.0	2.2
Electric Power Transmission, Distribution, and Storage	2.4	1.1
Energy Efficiency	2.7	1.7
Fuels	3.4	3.0
Motor Vehicles	3.5	3.2

Hiring Difficulty

Employers in Oregon reported 63.1% overall hiring difficulty.

Table OR-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	22.7	40.4	5.2	31.6	63.1

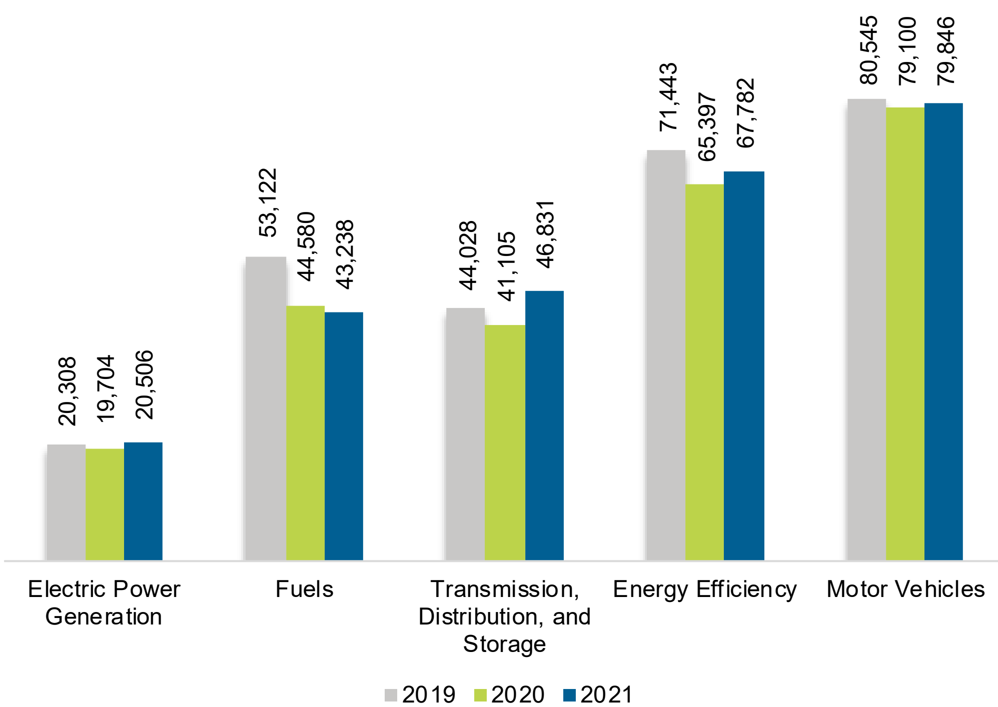
Pennsylvania

ENERGY AND EMPLOYMENT — 2022

Overview

Pennsylvania had 258,202 energy workers statewide in 2021, representing 3.3% of all U.S. energy jobs. Of these energy jobs, 20,506 are in electric power generation; 43,238 in fuels; 46,831 in transmission, distribution, and storage; 67,782 in energy efficiency; and 79,846 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 8,316 jobs, or 3.3%. The energy sector in Pennsylvania represents 4.6% of total state employment.

Figure PA-1.
Employment by Major Energy Technology Application

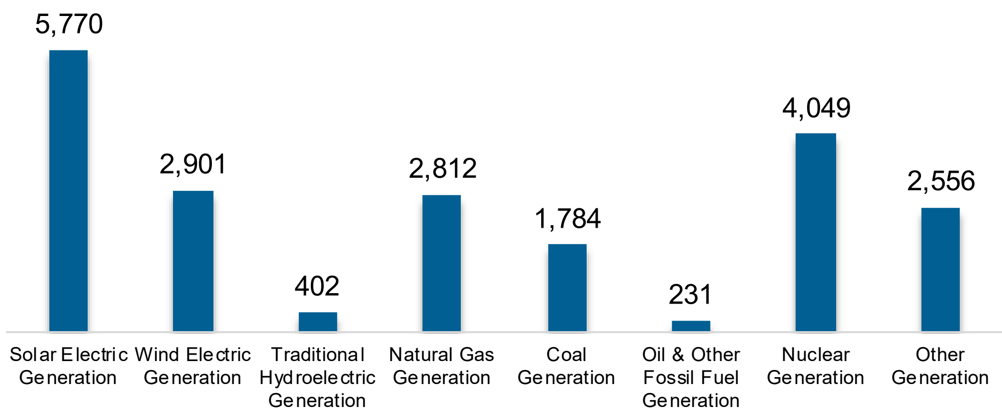


Breakdown by Technology Applications

Electric Power Generation

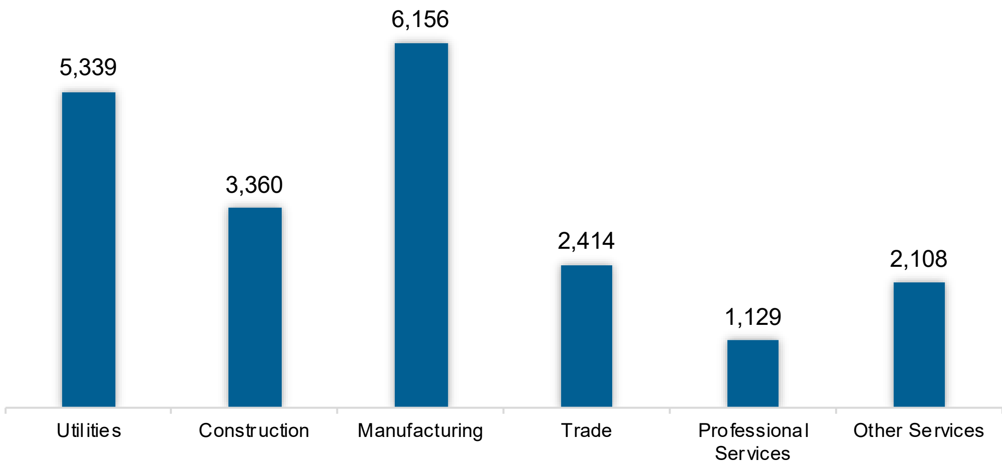
The electric power generation sector employed 20,506 workers in Pennsylvania, 2.4% of the national electricity total, and added 802 jobs over the past year (4.1%).

Figure PA-2.
Electric Power Generation Employment by Detailed Technology Application



Manufacturing work represents the largest industry sector in the electric power generation sector, with 30% of jobs. Utilities is second largest with 26%.

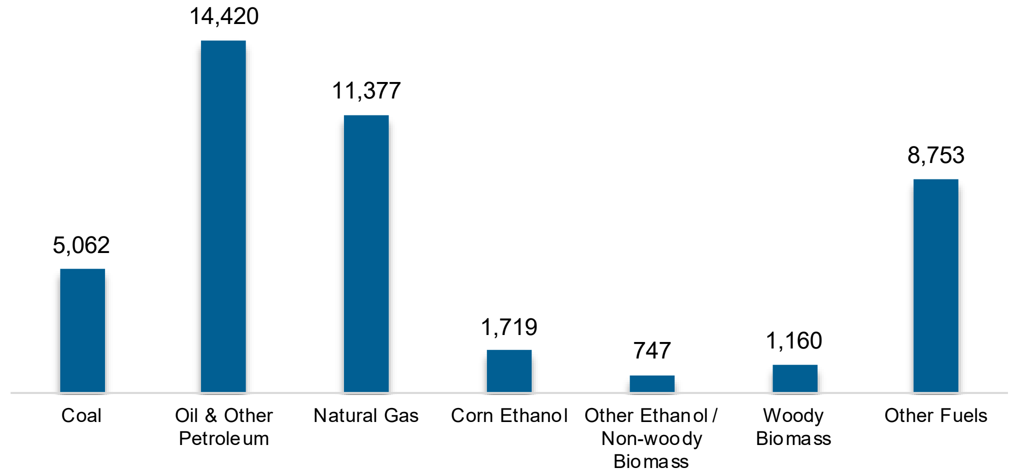
Figure PA-3.
Electric Power Generation Employment by Industry Sector



Fuels

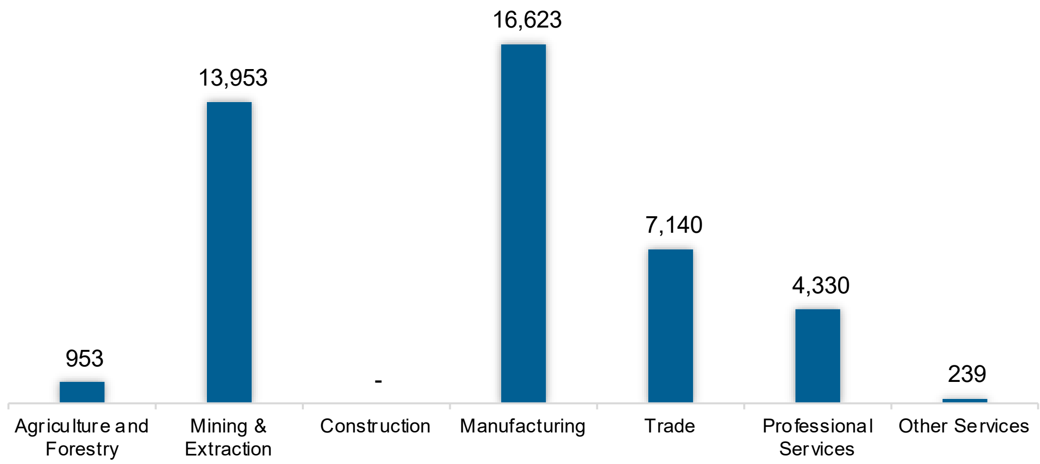
The fuel sector employed 43,238 workers in Pennsylvania, 4.8% of the national total in fuels. The sector lost 1,342 jobs and decreased 3% in the past year.

Figure PA-4.
Fuels Employment by Detailed Technology Application



Manufacturing jobs represent 38.4% of fuel jobs in Pennsylvania.

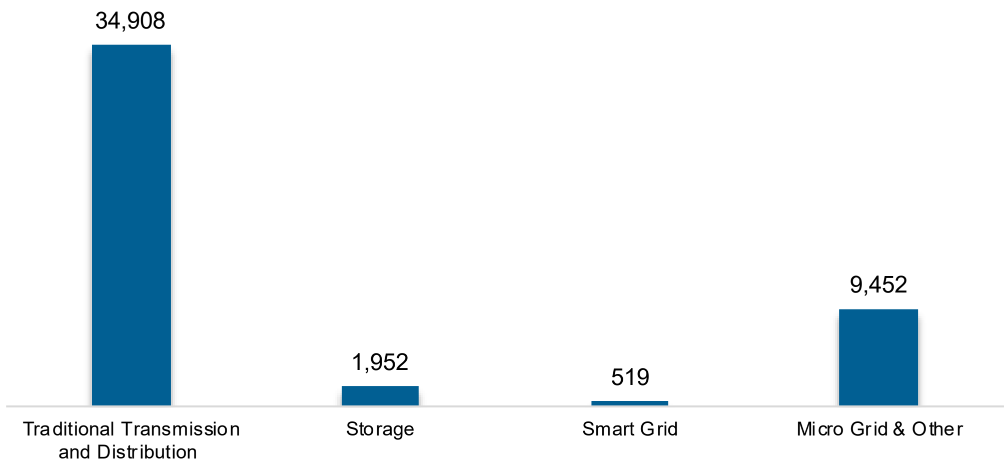
Figure PA-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

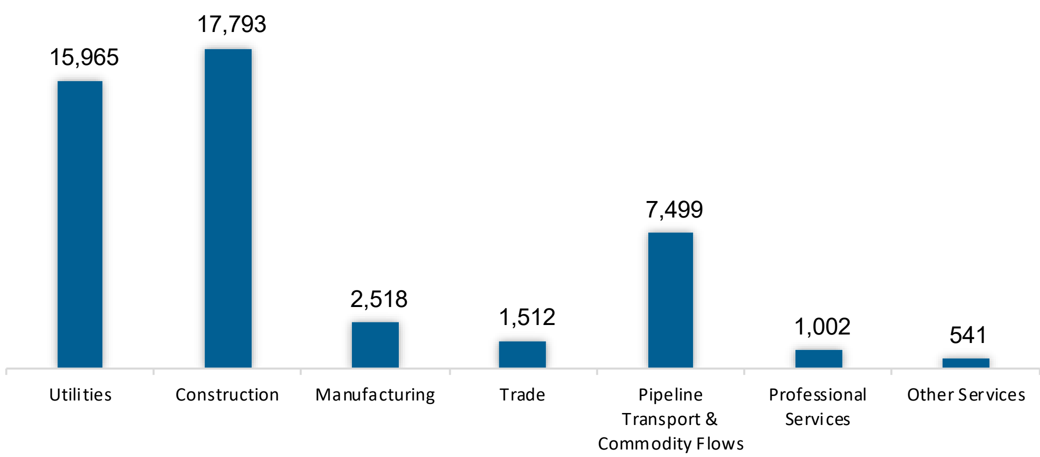
The transmission, distribution, and storage (TDS) sector employed 46,831 workers in Pennsylvania, 4.8% of the national TDS total. The sector gained 5,726 jobs and increased 13.9% in the past year.

Figure PA-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in Pennsylvania, accounting for 38% of the sector's jobs statewide.

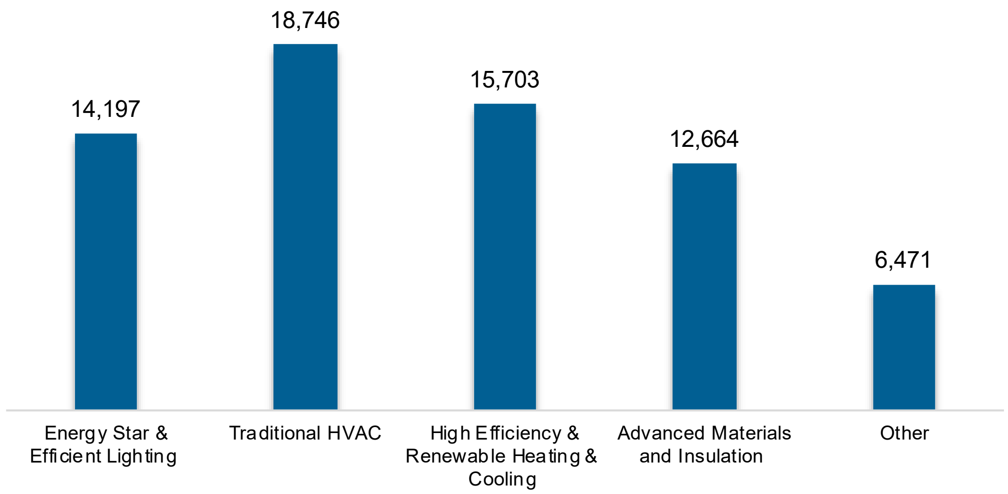
Figure PA-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

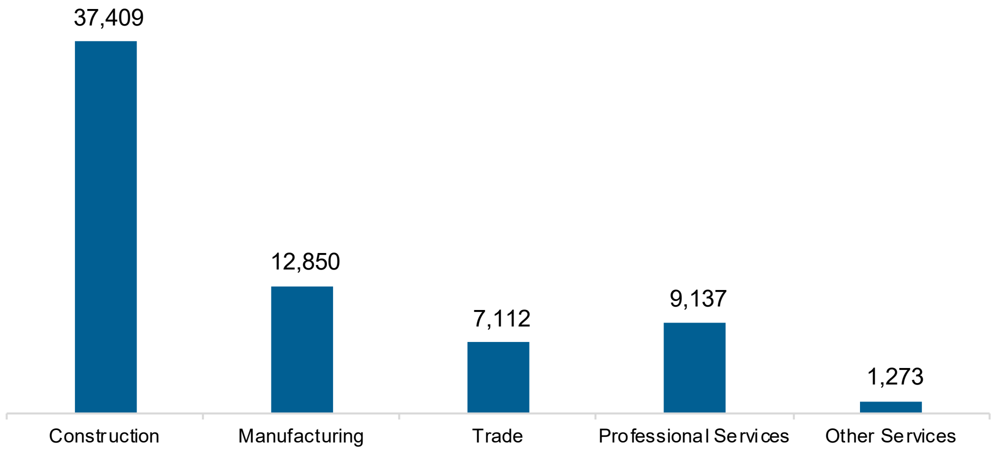
The energy efficiency (EE) sector employed 67,782 workers in Pennsylvania, 3.1% of the national EE total. The EE sector added 2,385 jobs and increased 3.6% in the past year.

Figure PA-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

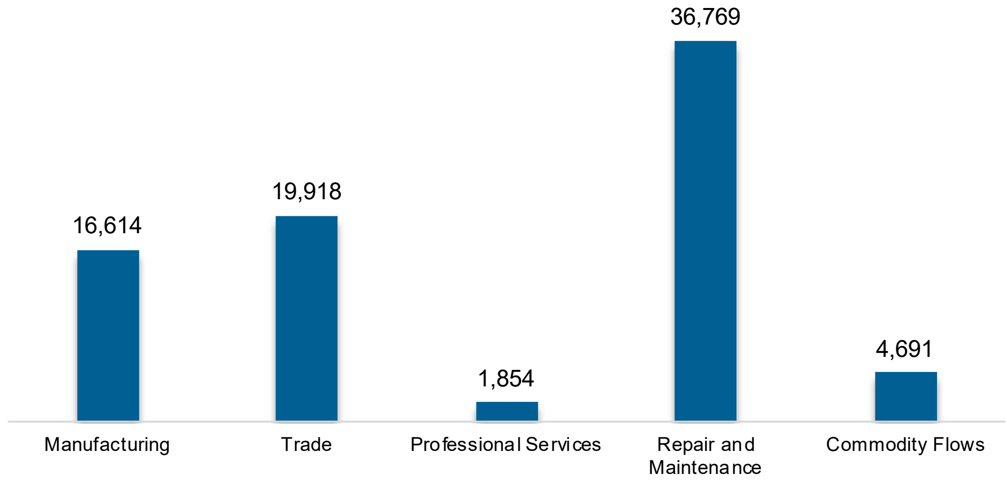
Figure PA-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 79,846 workers in Pennsylvania, 3.1% of the national total for the sector. Motor vehicles and component parts added 746 jobs and increased 0.9% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure PA-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Pennsylvania are more optimistic than their peers across the country about energy sector job growth over the next year.

Table PA-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	5.5	2.2
Electric Power Transmission, Distribution, and Storage	4.9	1.1
Energy Efficiency	5.2	1.7
Fuels	5.9	3.0
Motor Vehicles	6.0	3.2

Hiring Difficulty

Employers in Pennsylvania reported 56.1% overall hiring difficulty.

Table PA-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	27.1	28.9	6.6	37.3	56.1

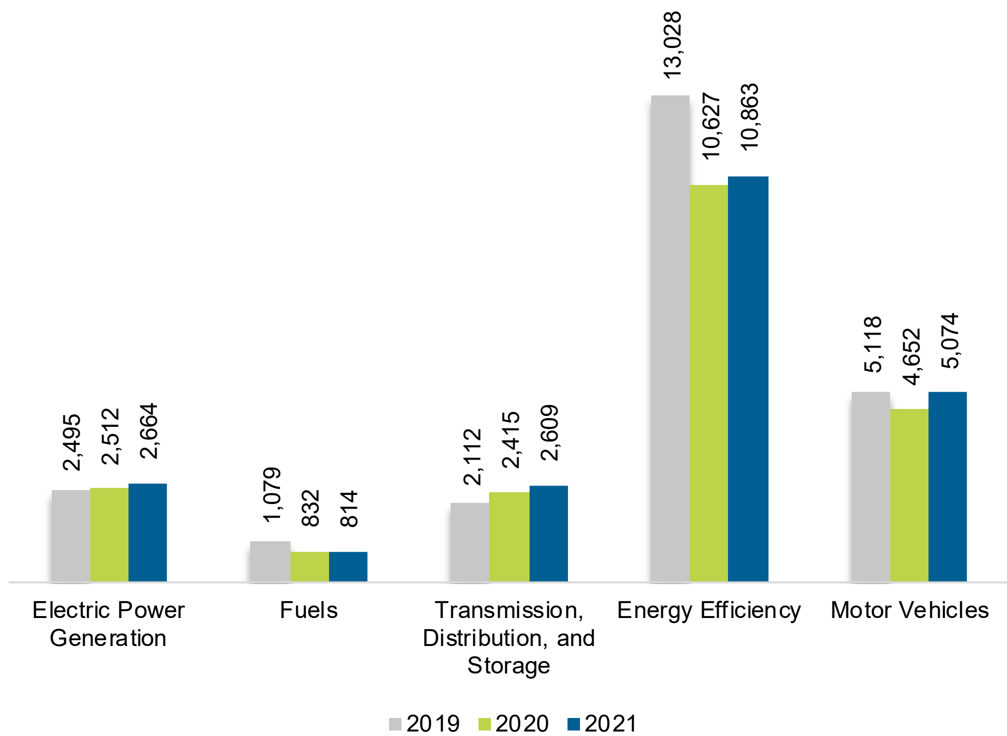
Rhode Island

ENERGY AND EMPLOYMENT — 2022

Overview

Rhode Island had 22,024 energy workers statewide in 2021, representing 0.3% of all U.S. energy jobs. Of these energy jobs, 2,664 are in electric power generation; 814 in fuels; 2,609 in transmission, distribution, and storage; 10,863 in energy efficiency; and 5,074 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 979 jobs, or 4.7%. The energy sector in Rhode Island represents 4.7% of total state employment.

Figure RI-1.
Employment by Major Energy Technology Application

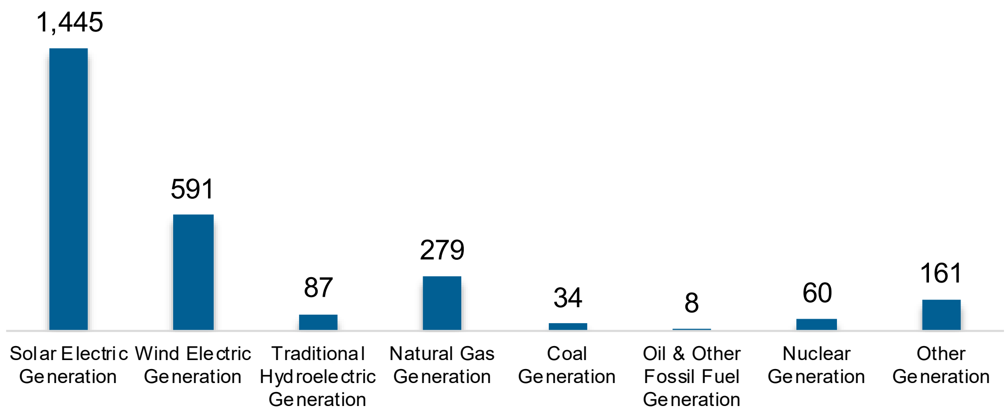


Breakdown by Technology Applications

Electric Power Generation

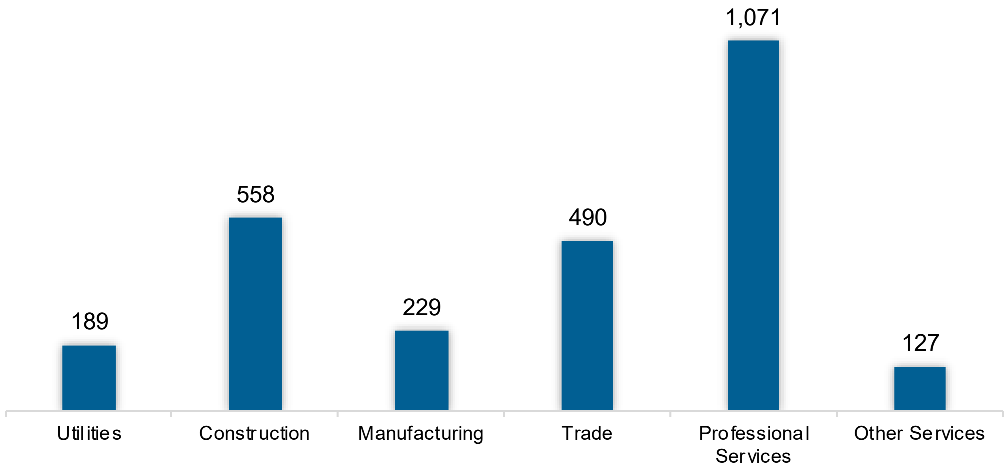
The electric power generation sector employed 2,664 workers in Rhode Island, 0.3% of the national electricity total, and added 152 jobs over the past year (6.1%).

Figure RI-2.
Electric Power Generation Employment by Detailed Technology Application



Professional and business services work represents the largest industry sector in the electric power generation sector, with 40.2% of jobs. Construction is second largest with 20.9%.

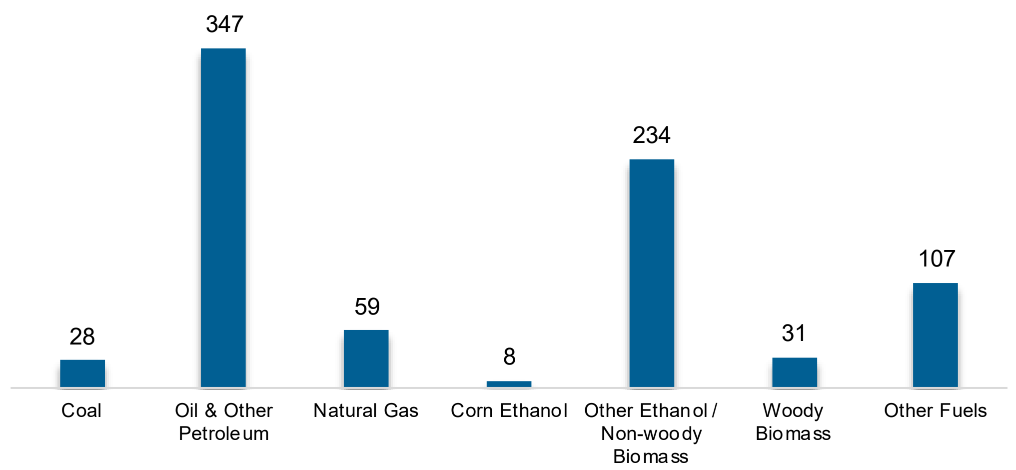
Figure RI-3.
Electric Power Generation Employment by Industry Sector



Fuels

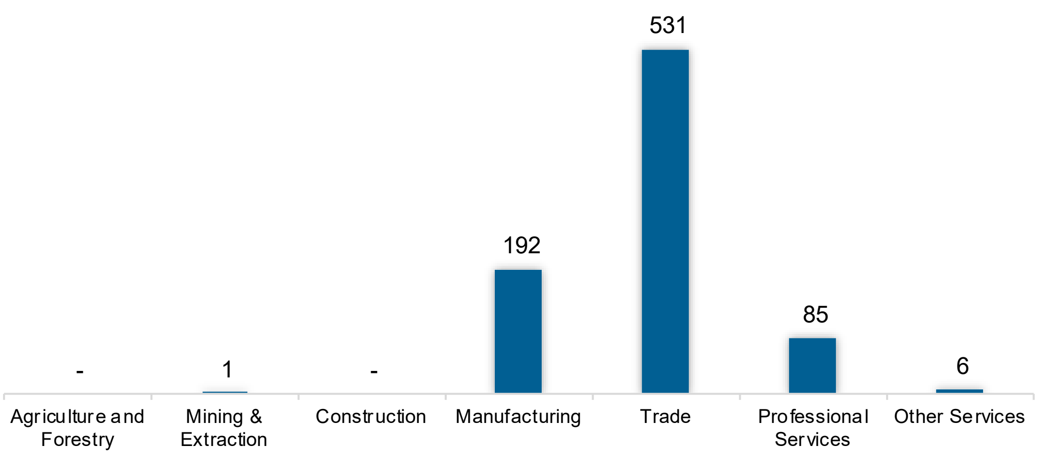
The fuel sector employed 814 workers in Rhode Island, 0.1% of the national total in fuels. The sector lost 18 jobs and decreased 2.1% in the past year.

Figure RI-4.
Fuels Employment by Detailed Technology Application



Wholesale trade jobs represent 65.2% of fuel jobs in Rhode Island.

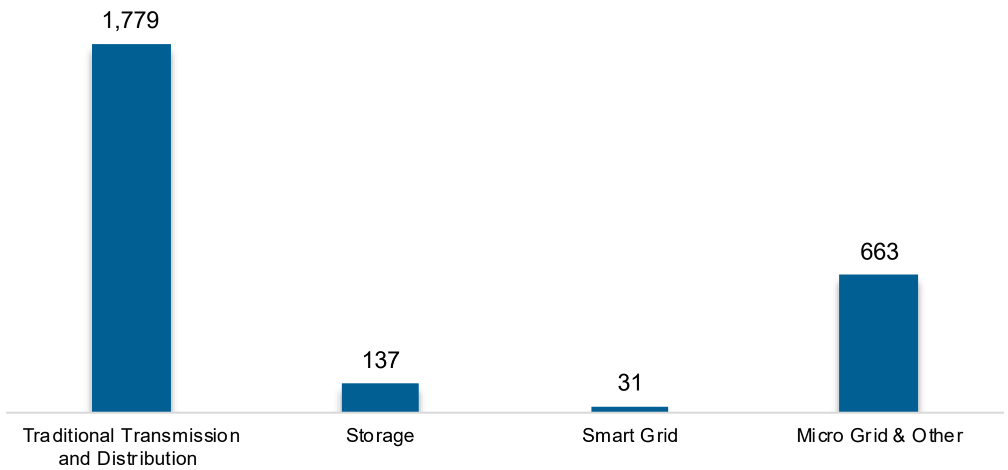
Figure RI-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

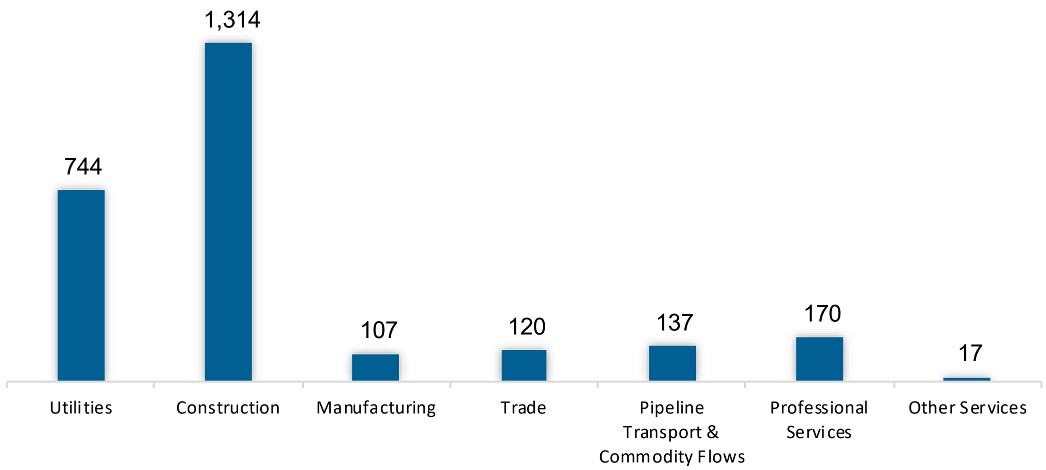
The transmission, distribution, and storage (TDS) sector employed 2,609 workers in Rhode Island, 0.1% of the national TDS total. The sector gained 194 jobs and increased 8% in the past year.

Figure RI-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in Rhode Island, accounting for 50.4% of the sector's jobs statewide.

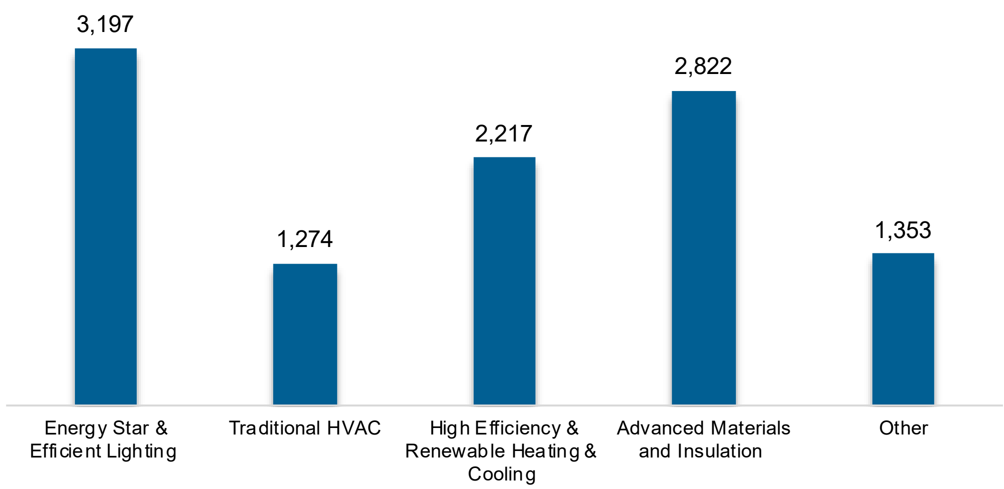
Figure RI-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

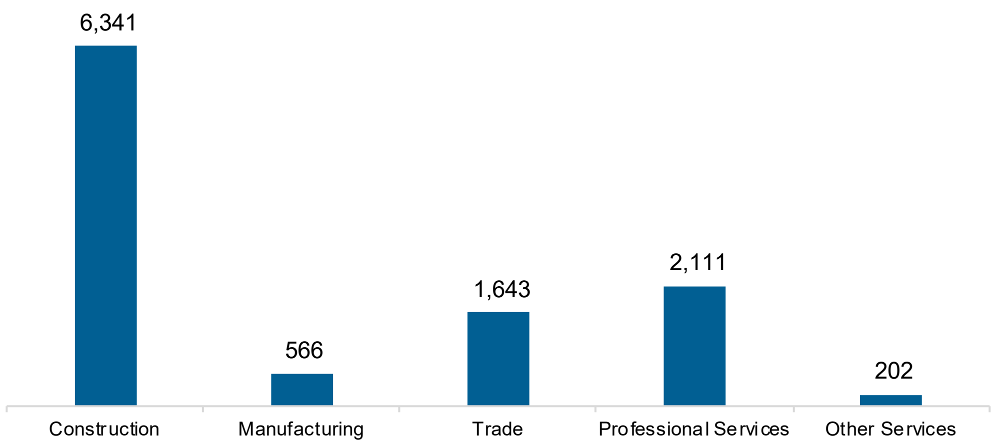
The energy efficiency (EE) sector employed 10,863 workers in Rhode Island, 0.5% of the national EE total. The EE sector added 236 jobs and increased 2.2% in the past year.

Figure RI-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

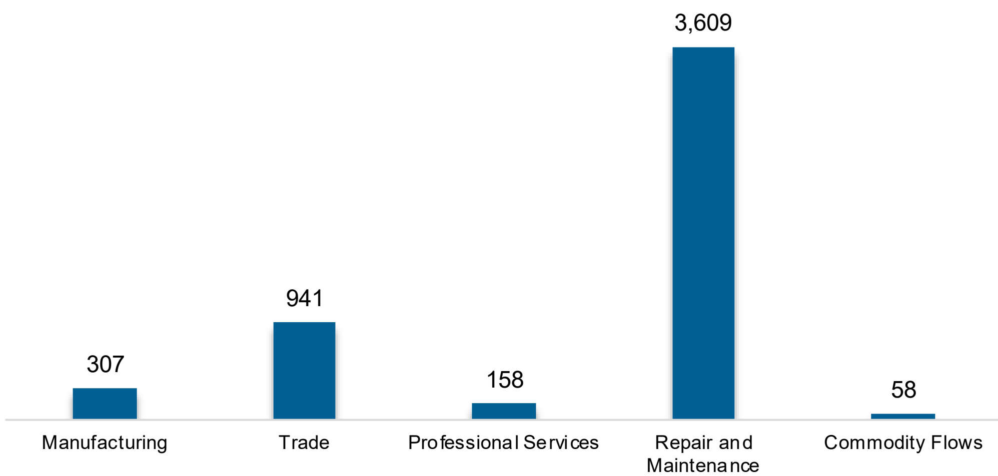
Figure RI-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 5,074 workers in Rhode Island, 0.2% of the national total for the sector. Motor vehicles and component parts added 422 jobs and increased 9.1% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure RI-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Rhode Island are less optimistic than their peers across the country about energy sector job growth over the next year.

Table RI-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.7	2.2
Electric Power Transmission, Distribution, and Storage	1.2	1.1
Energy Efficiency	1.5	1.7
Fuels	2.1	3.0
Motor Vehicles	2.2	3.2

Hiring Difficulty

Employers in Rhode Island reported 70.4% overall hiring difficulty.

Table RI-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	25.3	45.1	5.2	24.4	70.4

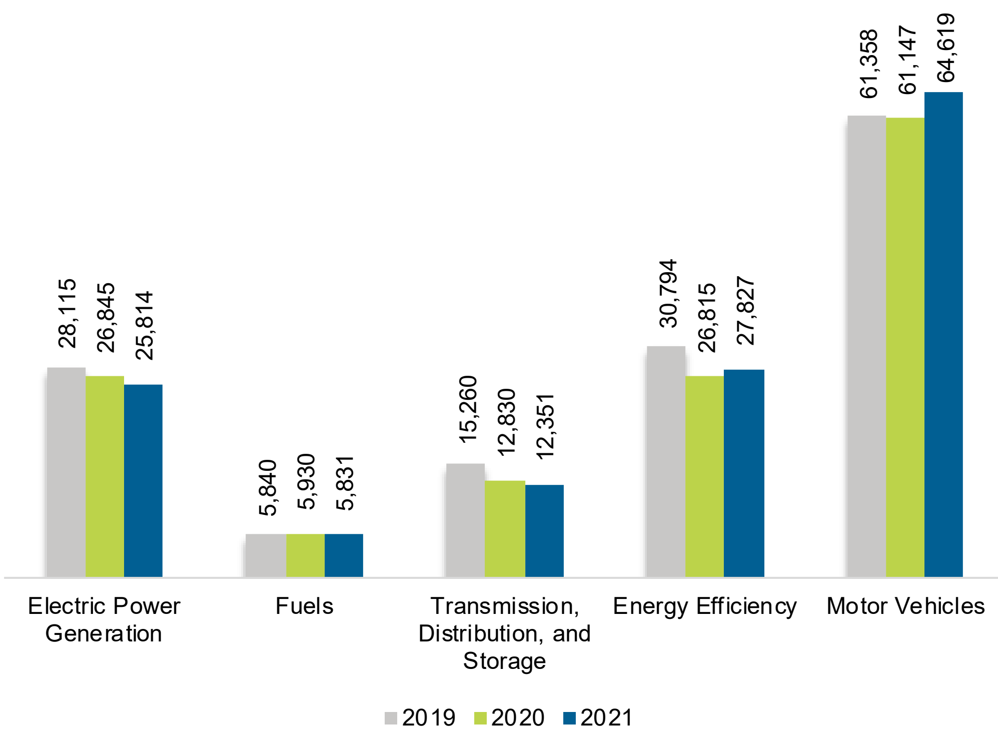
South Carolina

ENERGY AND EMPLOYMENT — 2022

Overview

South Carolina had 136,442 energy workers statewide in 2021, representing 1.7% of all U.S. energy jobs. Of these energy jobs, 25,814 are in electric power generation; 5,831 in fuels; 12,351 in transmission, distribution, and storage; 27,827 in energy efficiency; and 64,619 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 2,875 jobs, or 2.2%. The energy sector in South Carolina represents 6.5% of total state employment.

Figure SC-1.
Employment by Major Energy Technology Application

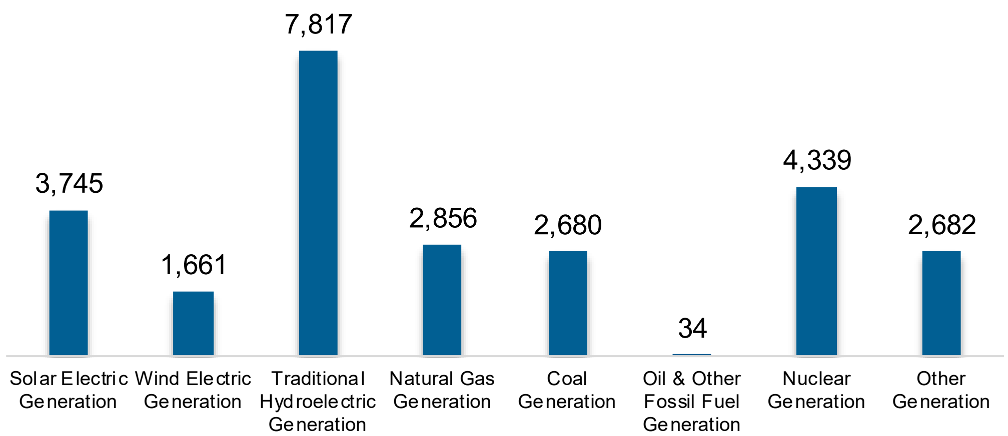


Breakdown by Technology Applications

Electric Power Generation

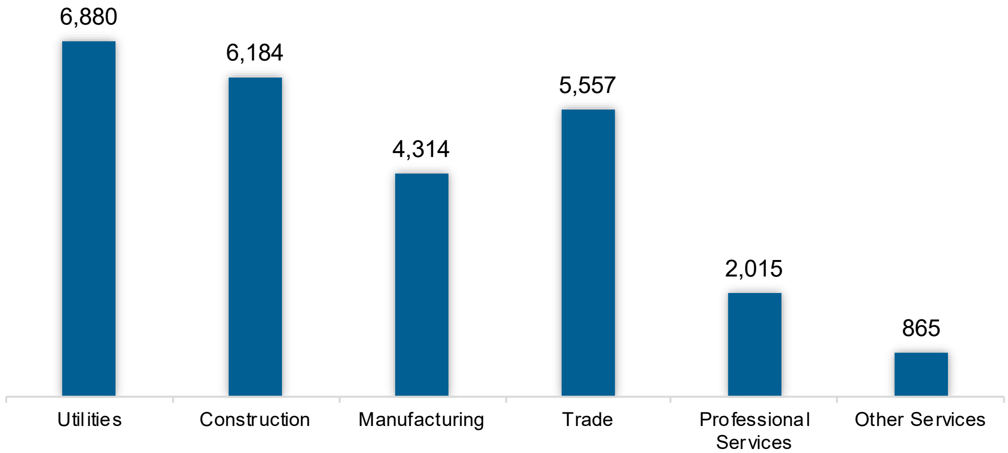
The electric power generation sector employed 25,814 workers in South Carolina, 3% of the national electricity total, and lost 1,031 jobs over the past year (-3.8%).

Figure SC-2.
Electric Power Generation Employment by Detailed Technology Application



Utilities work represents the largest industry sector in the electric power generation sector, with 26.6% of jobs. Construction is second largest with 24%.

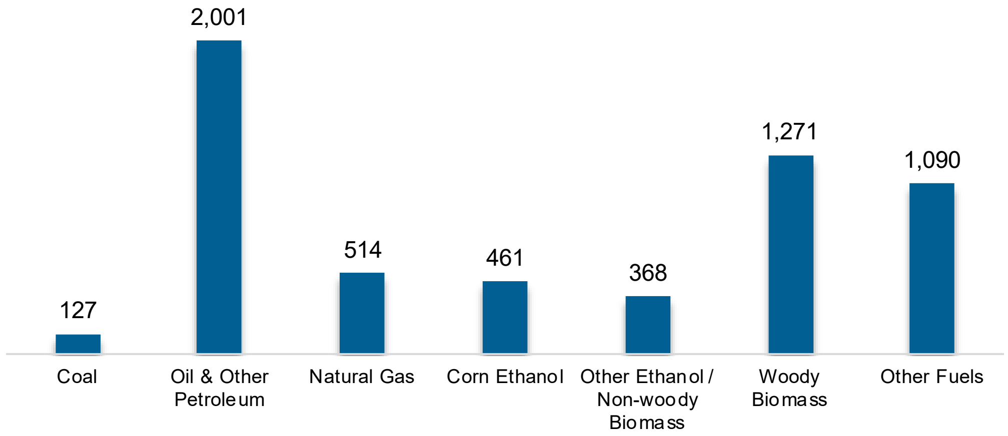
Figure SC-3.
Electric Power Generation Employment by Industry Sector



Fuels

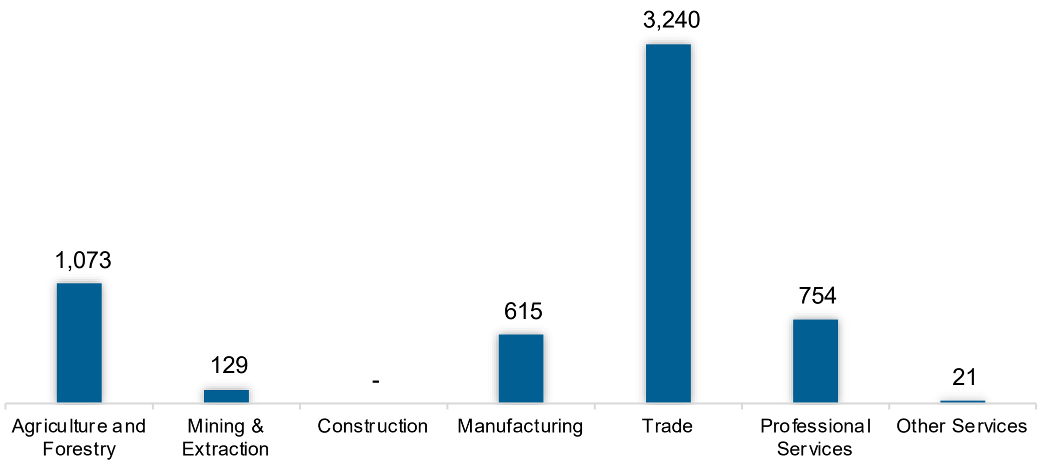
The fuel sector employed 5,831 workers in South Carolina, 0.6% of the national total in fuels. The sector lost 99 jobs and decreased 1.7% in the past year.

Figure SC-4.
Fuels Employment by Detailed Technology Application



Wholesale trade jobs represent 55.6% of fuel jobs in South Carolina.

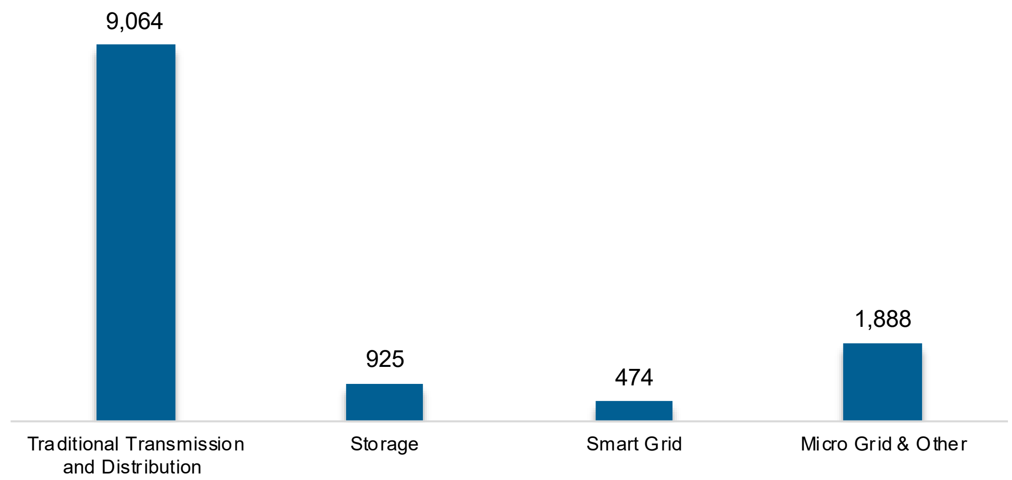
Figure SC-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

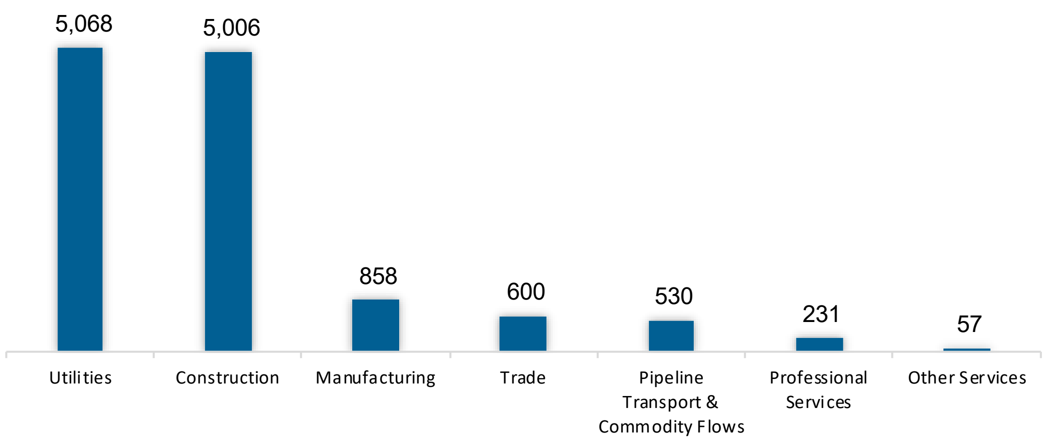
The transmission, distribution, and storage (TDS) sector employed 12,351 workers in South Carolina, 0.6% of the national TDS total. The sector lost 479 jobs and decreased 3.7% in the past year.

Figure SC-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the largest percentage of TDS jobs in South Carolina, with 41% of such jobs statewide.

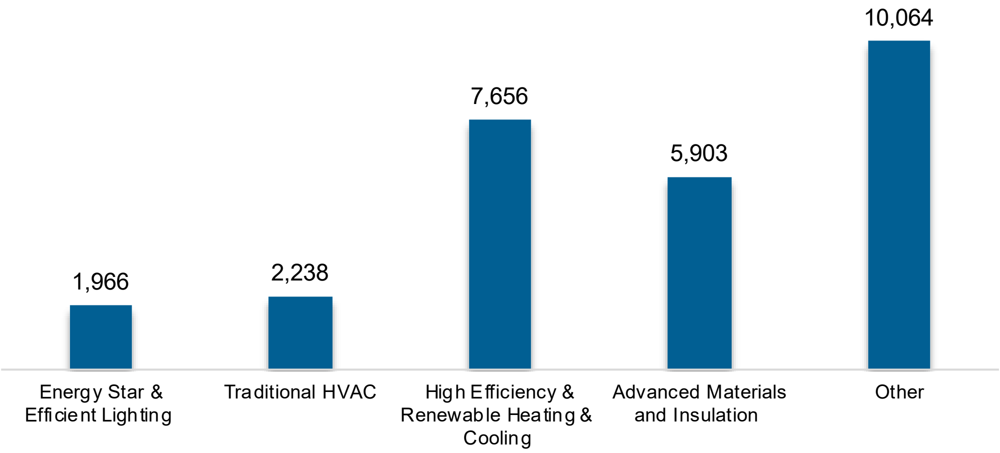
Figure SC-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

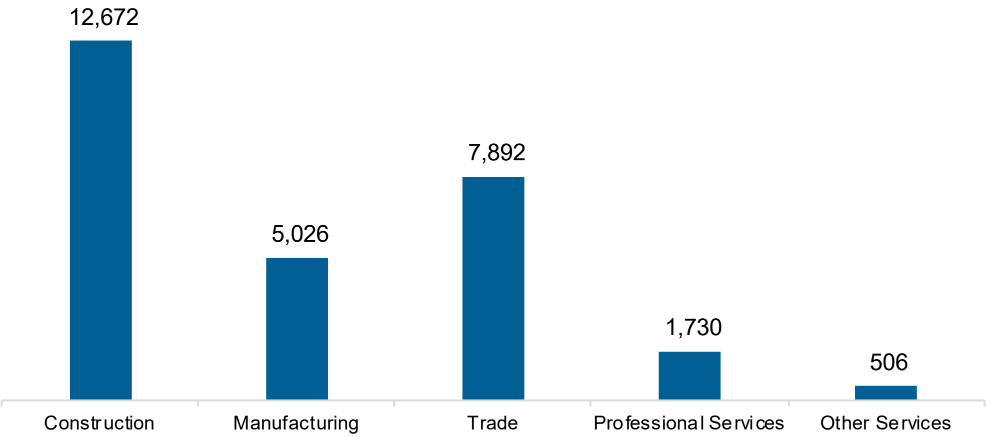
The energy efficiency (EE) sector employed 27,827 workers in South Carolina, 1.3% of the national EE total. The EE sector added 1,013 jobs and increased 3.8% in the past year.

Figure SC-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

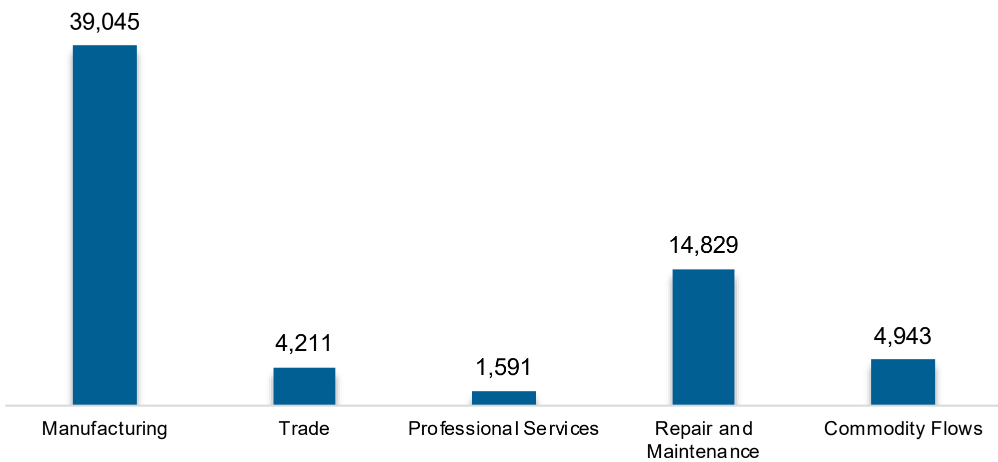
Figure SC-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 64,619 workers in South Carolina, 2.5% of the national total for the sector. Motor vehicles and component parts added 3,471 jobs and increased 5.7% in the past year. Manufacturing work represents the largest proportion of motor vehicle jobs.

Figure SC-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in South Carolina are less optimistic than their peers across the country about energy sector job growth over the next year.

Table SC-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	0.8	2.2
Electric Power Transmission, Distribution, and Storage	0.2	1.1
Energy Efficiency	0.5	1.7
Fuels	1.2	3.0
Motor Vehicles	1.3	3.2

Hiring Difficulty

Employers in South Carolina reported 49.5% overall hiring difficulty.

Table SC-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	25.3	24.3	5.2	45.2	49.5

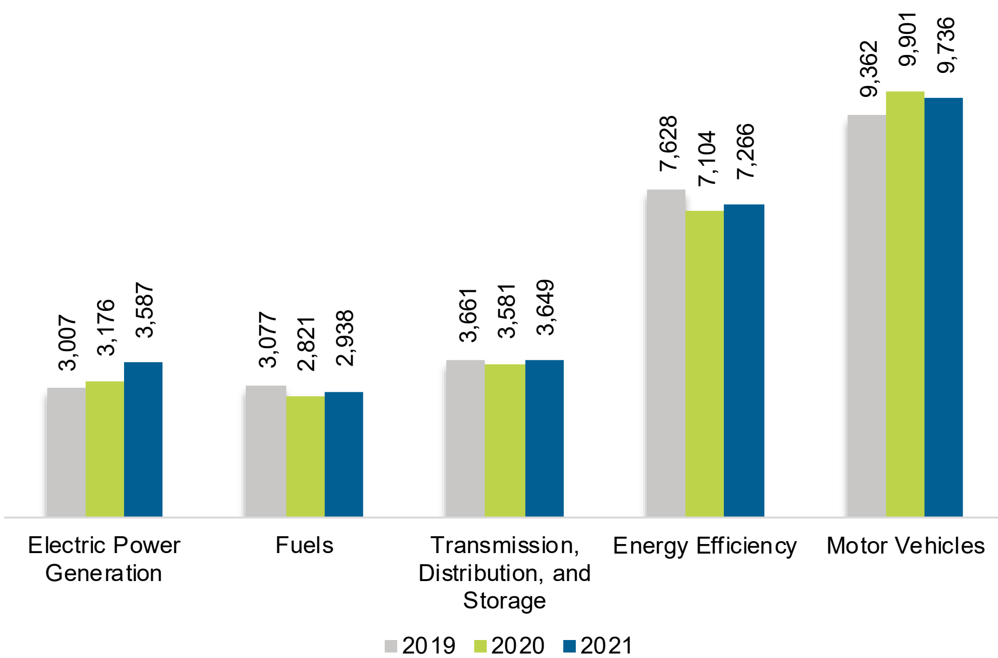
South Dakota

ENERGY AND EMPLOYMENT — 2022

Overview

South Dakota had 27,176 energy workers statewide in 2021, representing 0.3% of all U.S. energy jobs. Of these energy jobs, 3,587 are in electric power generation; 2,938 in fuels; 3,649 in transmission, distribution, and storage; 7,266 in energy efficiency; and 9,736 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 594 jobs, or 2.2%. The energy sector in South Dakota represents 6.3% of total state employment.

Figure SD-1.
Employment by Major Energy Technology Application

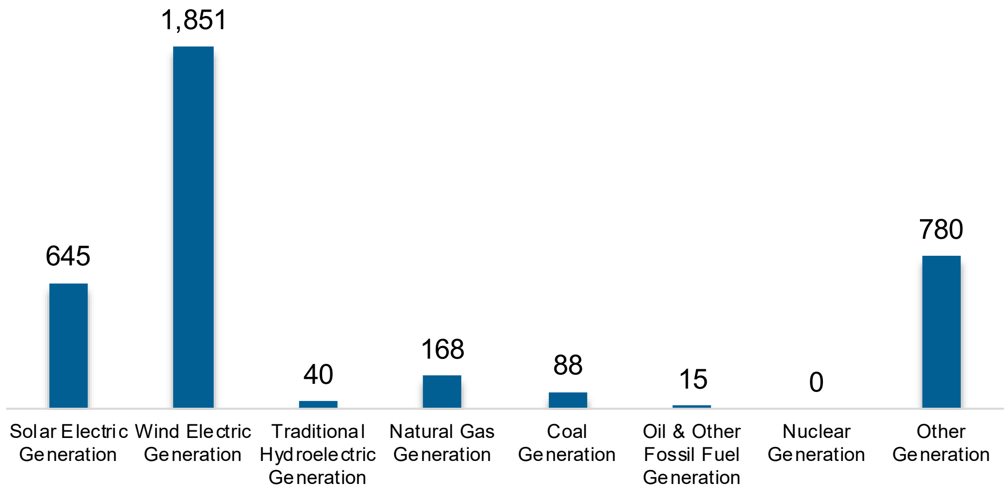


Breakdown by Technology Applications

Electric Power Generation

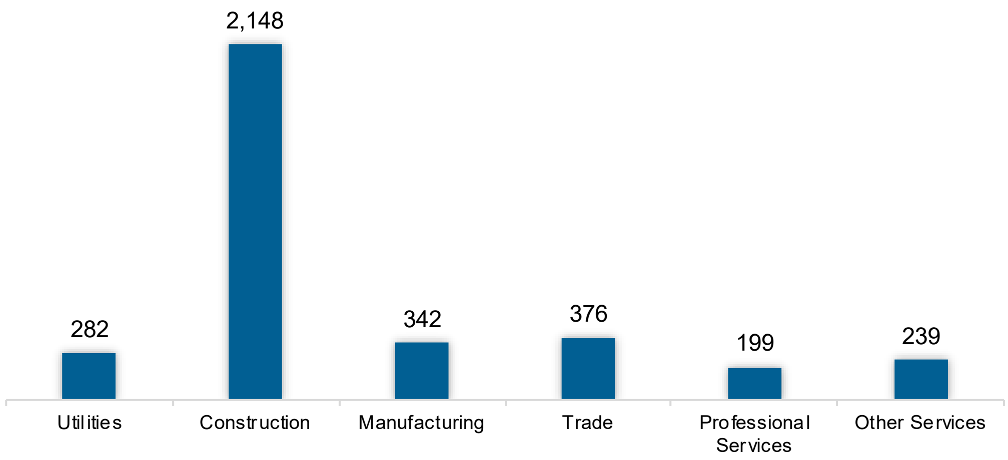
The electric power generation sector employed 3,587 workers in South Dakota, 0.4% of the national electricity total, and added 412 jobs over the past year (13%).

Figure SD-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 59.9% of jobs. Wholesale trade is next with 10.5%.

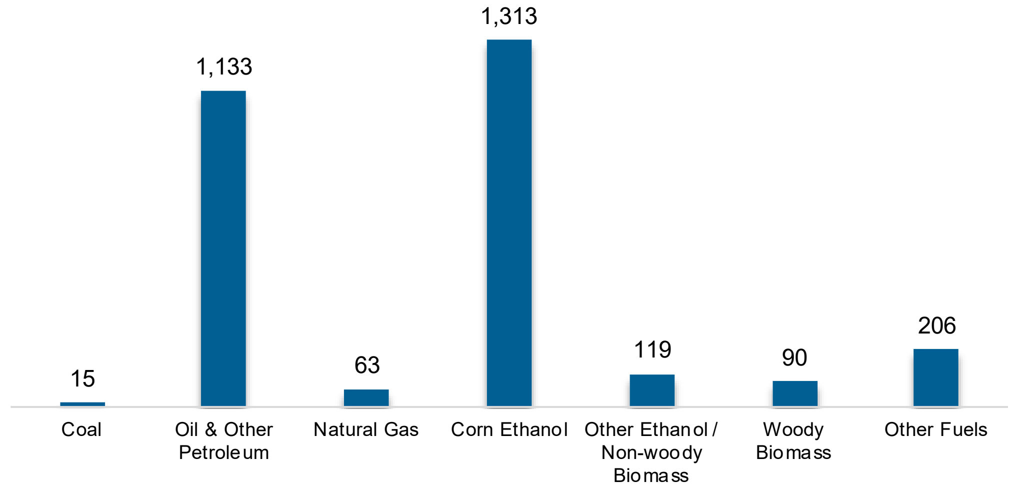
Figure SD-3.
Electric Power Generation Employment by Industry Sector



Fuels

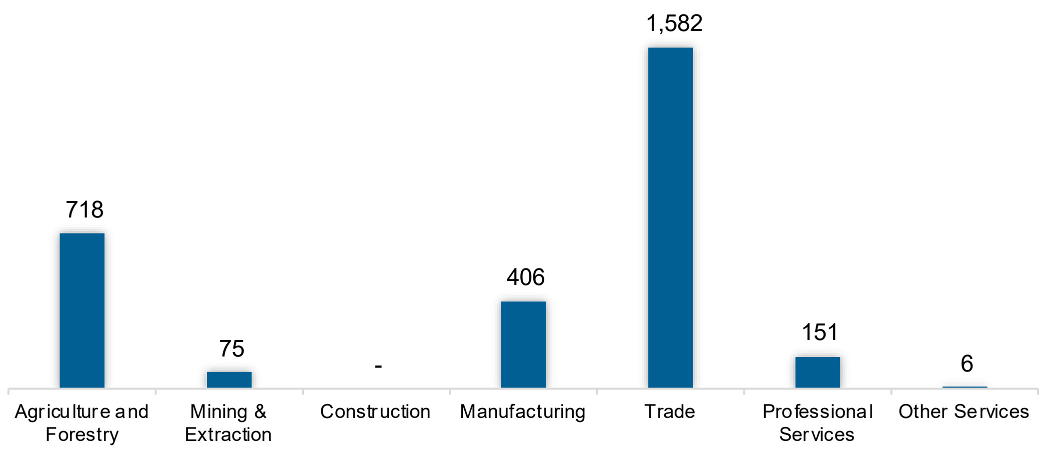
The fuel sector employed 2,938 workers in South Dakota, 0.3% of the national total in fuels. The sector gained 117 jobs and increased 4.2% in the past year.

Figure SD-4.
Fuels Employment by Detailed Technology Application



Wholesale trade jobs represent 53.8% of fuel jobs in South Dakota.

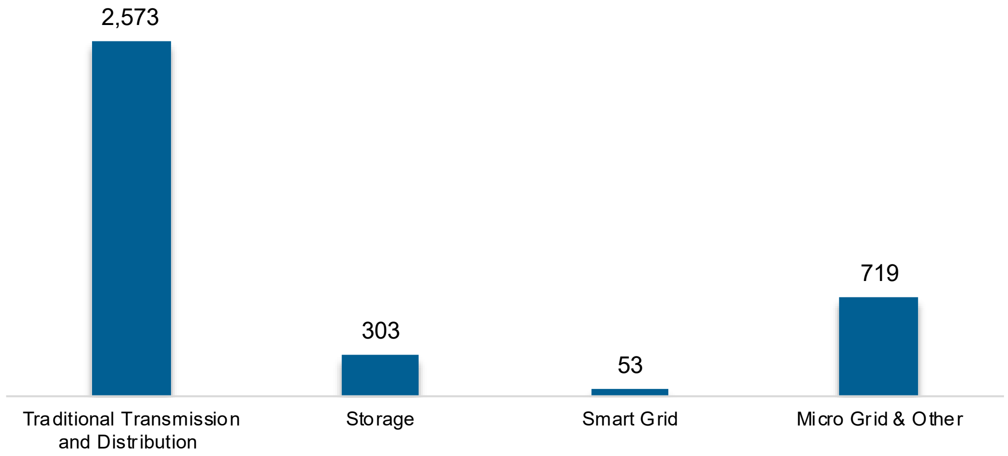
Figure SD-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

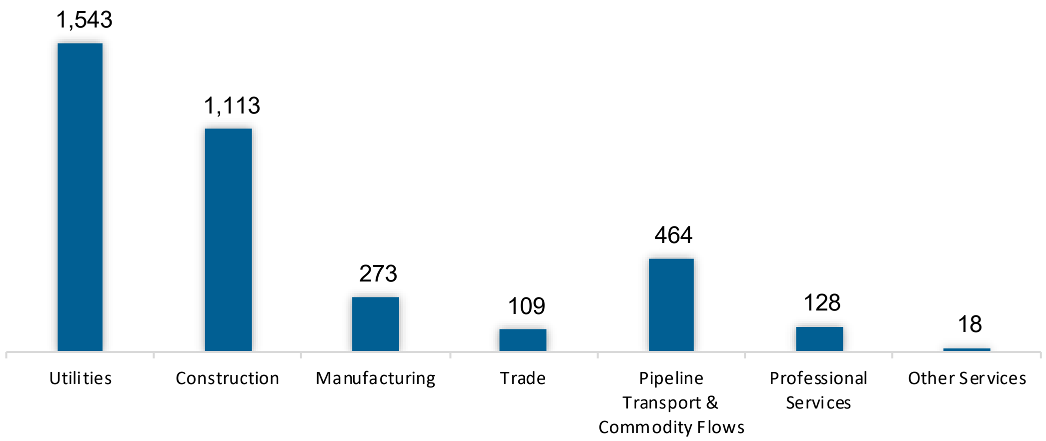
The transmission, distribution, and storage (TDS) sector employed 3,649 workers in South Dakota, 0.3% of the national TDS total. The sector gained 68 jobs and increased 1.9% in the past year.

Figure SD-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the largest percentage of TDS jobs in South Dakota, accounting for 42.3% of the sector's jobs statewide.

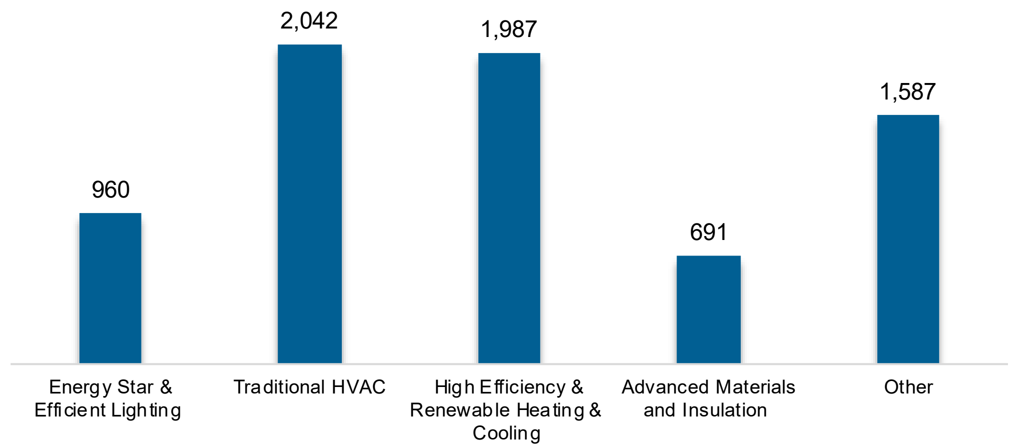
Figure SD-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

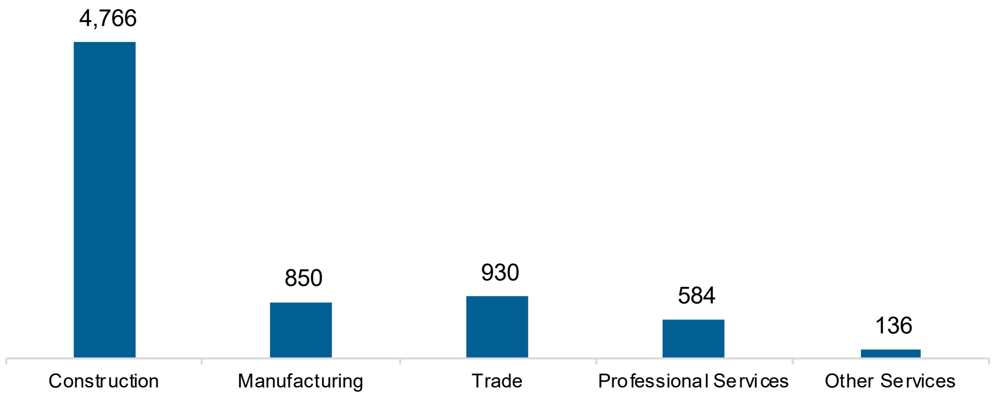
The energy efficiency (EE) sector employed 7,266 workers in South Dakota, 0.3% of the national EE total. The EE sector added 162 jobs and increased 2.3% in the past year.

Figure SD-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

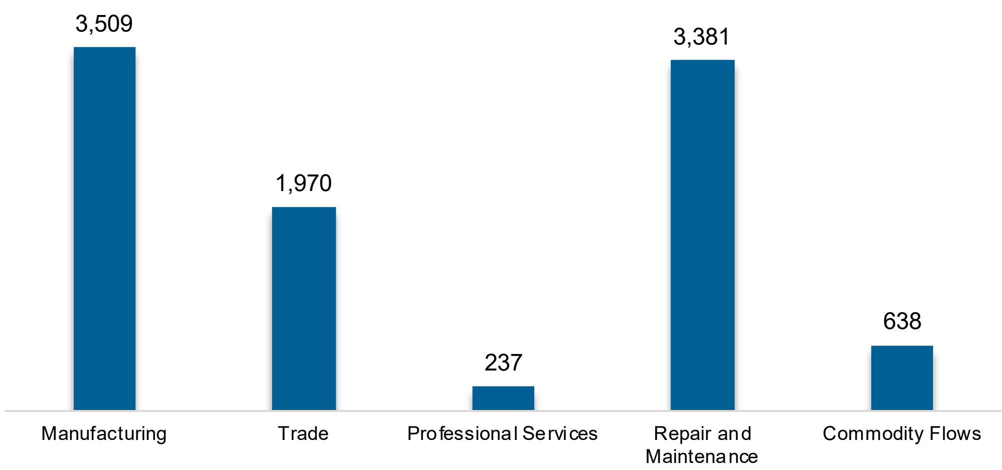
Figure SD-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 9,736 workers in South Dakota, 0.4% of the national total for the sector. Motor vehicles and component parts lost 165 jobs and decreased 1.7% in the past year. Manufacturing work represents the largest proportion of motor vehicle jobs.

Figure SD-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in South Dakota are less optimistic than their peers across the country about energy sector job growth over the next year.

Table SD-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.2	2.2
Electric Power Transmission, Distribution, and Storage	0.6	1.1
Energy Efficiency	0.9	1.7
Fuels	1.6	3.0
Motor Vehicles	1.7	3.2

Hiring Difficulty

Employers in South Dakota reported 43.7% overall hiring difficulty.

Table SD-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	23.6	20.1	11.9	44.4	43.7

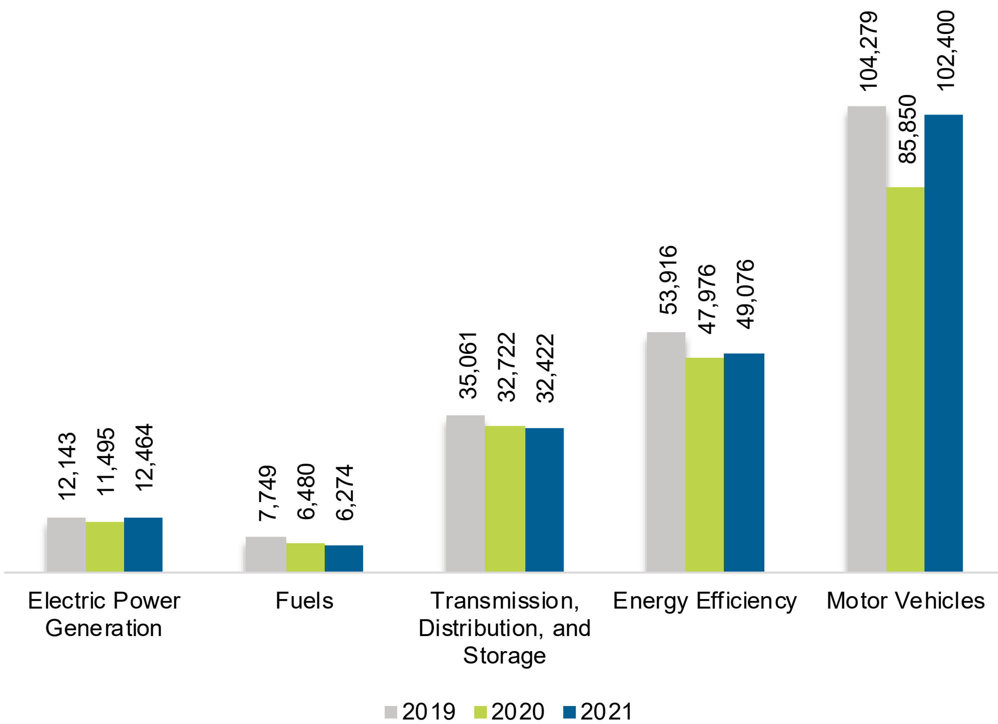
Tennessee

ENERGY AND EMPLOYMENT — 2022

Overview

Tennessee had 202,637 energy workers statewide in 2021, representing 2.6% of all U.S. energy jobs. Of these energy jobs, 12,464 are in electric power generation; 6,274 in fuels; 32,422 in transmission, distribution, and storage; 49,076 in energy efficiency; and 102,400 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 18,114 jobs, or 9.8%. The energy sector in Tennessee represents 6.7% of total state employment.

Figure TN-1.
Employment by Major Energy Technology Application

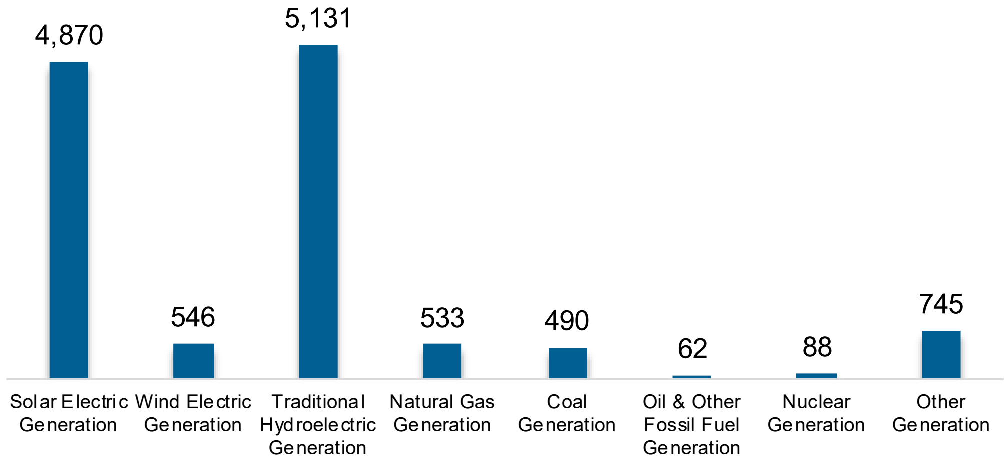


Breakdown by Technology Applications

Electric Power Generation

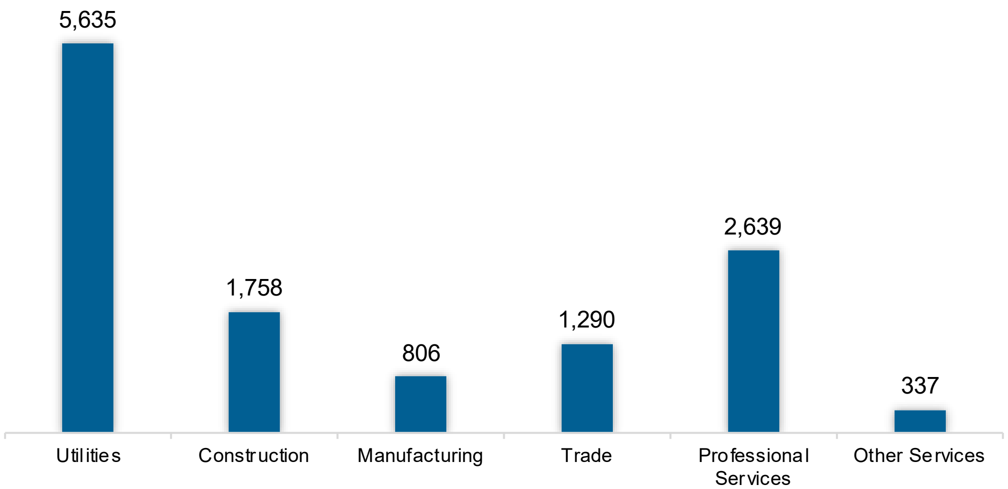
The electric power generation sector employed 12,464 workers in Tennessee, 1.5% of the national electricity total, and added 969 jobs over the past year (8.4%).[3]

Figure TN-2.
Electric Power Generation Employment by Detailed Technology Application



Utilities work represents the largest industry sector in the electric power generation sector, with 45.2% of jobs. Professional and business services is second largest with 21.2%.

Figure TN-3.
Electric Power Generation Employment by Industry Sector

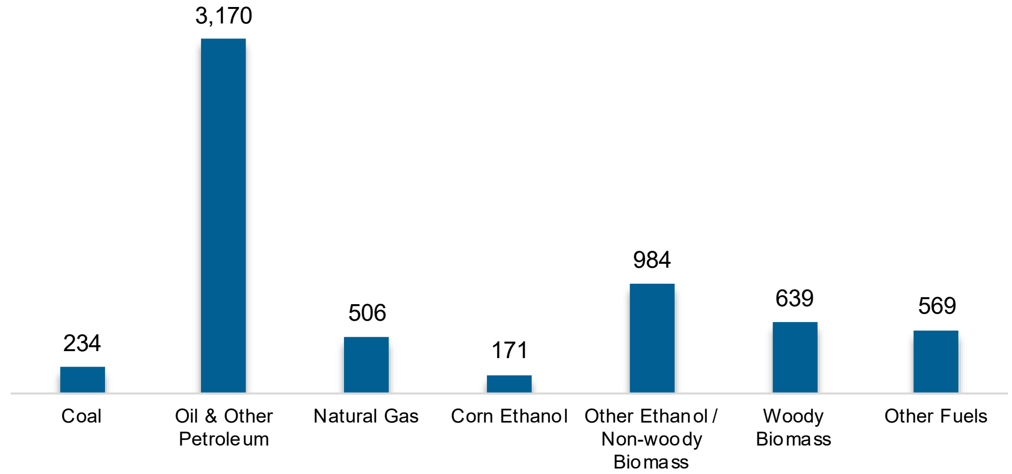


[3] Nuclear electric power generation job figures in Tennessee are preliminary, under review, and subject to change.

Fuels

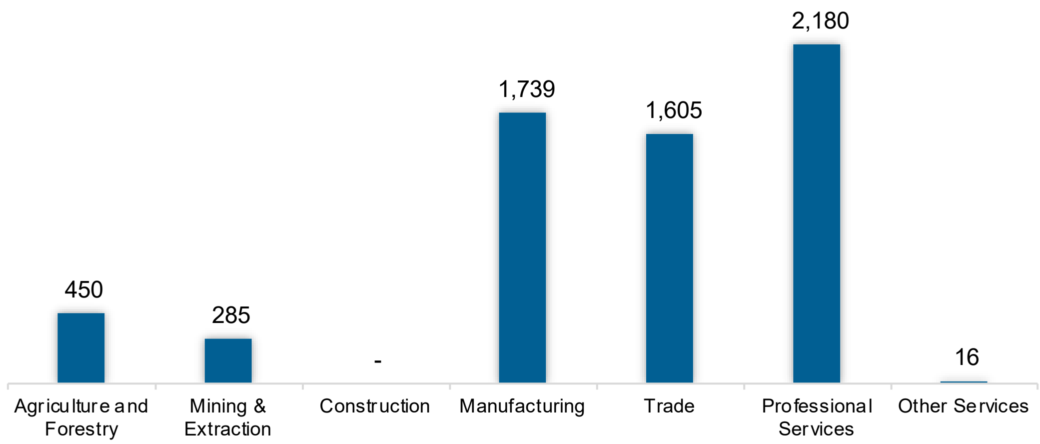
The fuel sector employed 6,274 workers in Tennessee, 0.7% of the national total in fuels. The sector lost 206 jobs and decreased 3.2% in the past year.

Figure TN-4.
Fuels Employment by Detailed Technology Application



Professional and business services jobs represent 34.7% of fuel jobs in Tennessee.

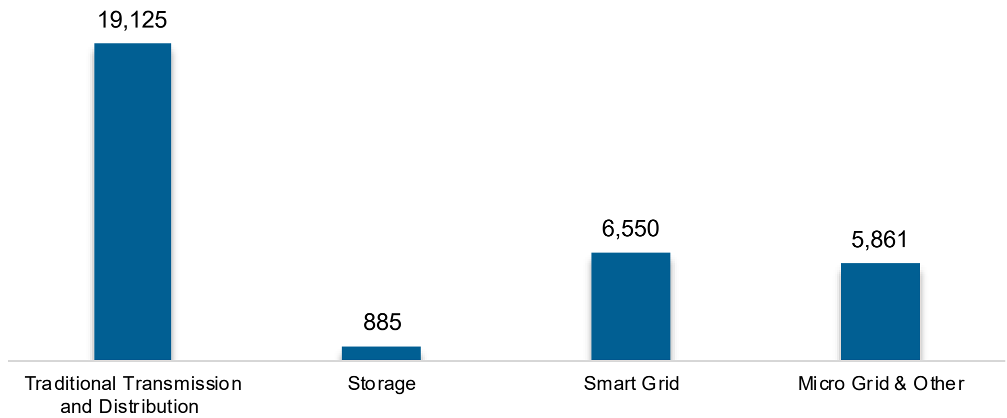
Figure TN-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

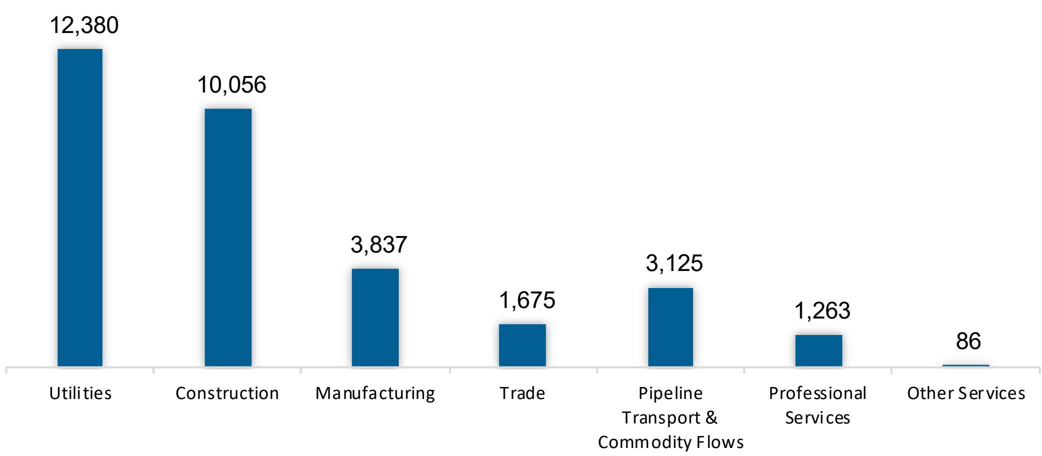
The transmission, distribution, and storage (TDS) sector employed 32,422 workers in Tennessee, 0.7% of the national TDS total. The sector lost 300 jobs and decreased 0.9% in the past year.

Figure TN-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Tennessee, accounting for 38.2% of the sector's jobs statewide.

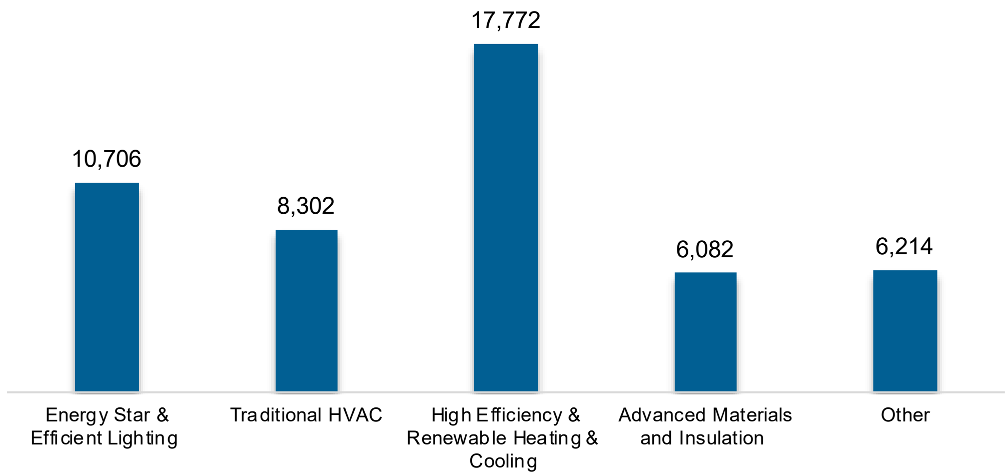
Figure TN-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

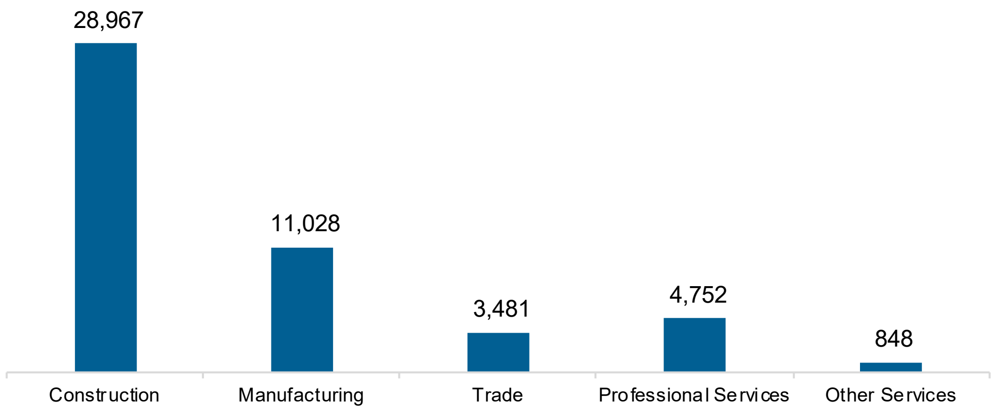
The energy efficiency (EE) sector employed 49,076 workers in Tennessee, 2.3% of the national EE total. The EE sector added 1,101 jobs and increased 2.3% in the past year.

Figure TN-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

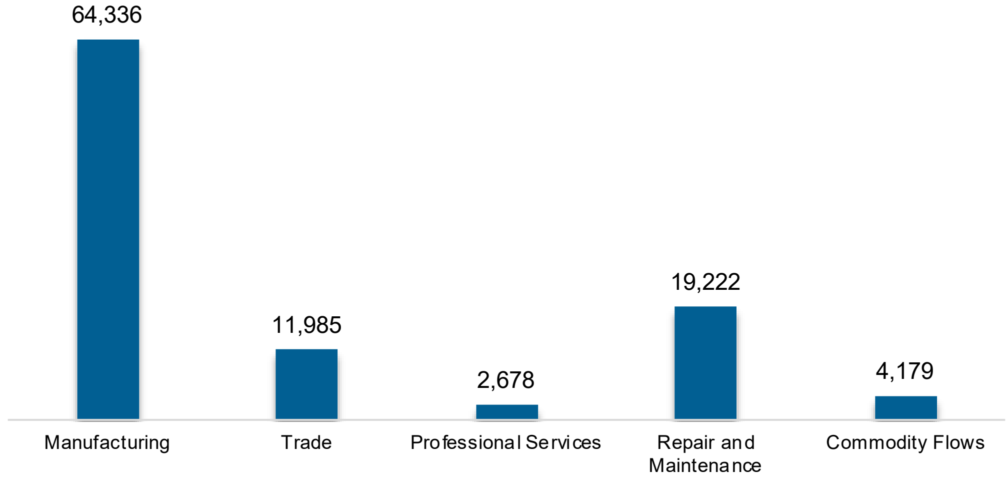
Figure TN-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 102,400 workers in Tennessee, 4% of the national total for the sector. Motor vehicles and component parts added 16,550 jobs and increased 19.3% in the past year. Manufacturing work represents the largest proportion of motor vehicle jobs.

Figure TN-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Tennessee are less optimistic than their peers across the country about energy sector job growth over the next year.

Table TN-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.2	2.2
Electric Power Transmission, Distribution, and Storage	0.6	1.1
Energy Efficiency	0.9	1.7
Fuels	1.6	3.0
Motor Vehicles	1.7	3.2

Hiring Difficulty

Employers in Tennessee reported 50.0% overall hiring difficulty.

Table TN-2
Hiring Difficulty

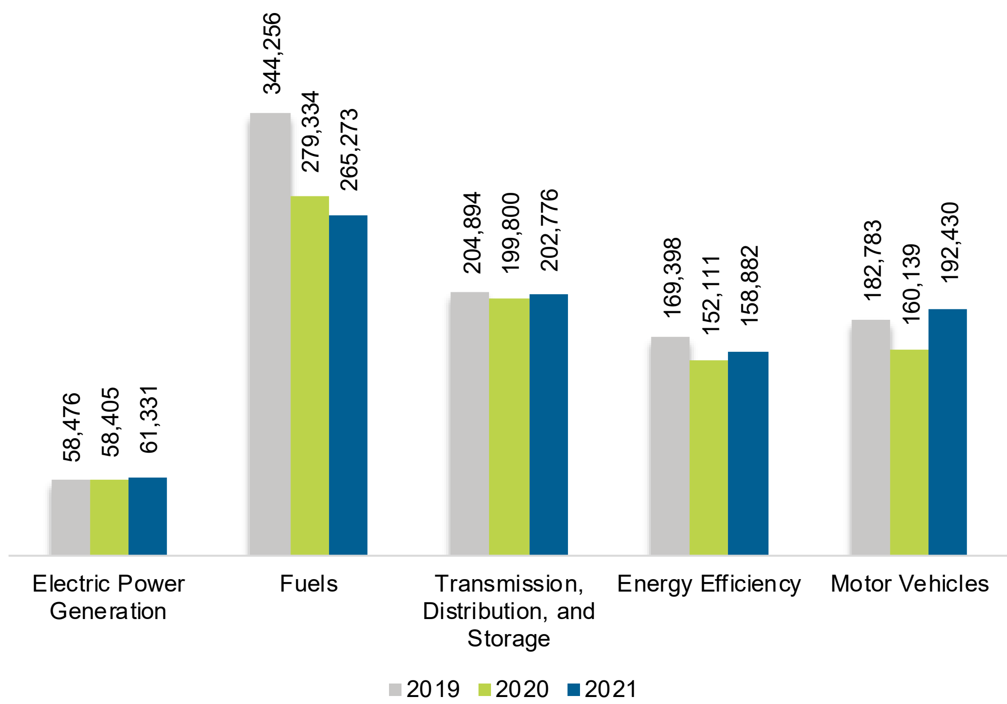
Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	20.6	29.4	10.8	39.2	50.0

Texas
ENERGY AND EMPLOYMENT — 2022

Overview

Texas had 880,692 energy workers statewide in 2021, representing 11.3% of all U.S. energy jobs. Of these energy jobs, 61,331 are in electric power generation; 265,273 in fuels; 202,776 in transmission, distribution, and storage; 158,882 in energy efficiency; and 192,430 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 30,903 jobs, or 3.6%. The energy sector in Texas represents 7% of total state employment.

Figure TX-1.
Employment by Major Energy Technology Application

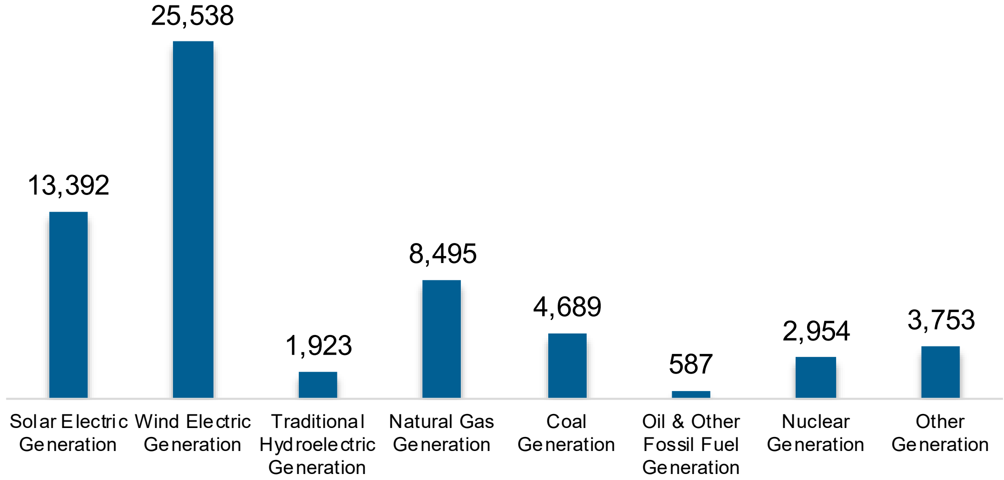


Breakdown by Technology Applications

Electric Power Generation

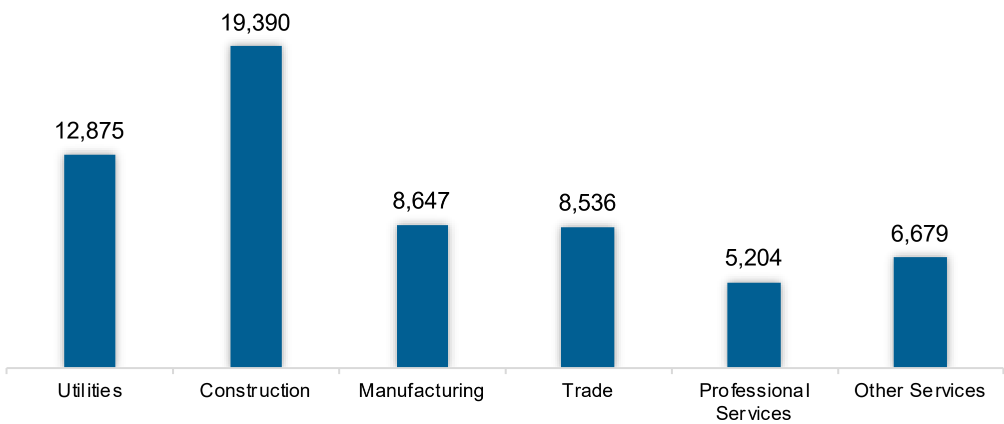
The electric power generation sector employed 61,331 workers in Texas, 7.2% of the national electricity total, and added 2,926 jobs over the past year (5%).

Figure TX-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 31.6% of jobs. Utilities is second largest with 21%.

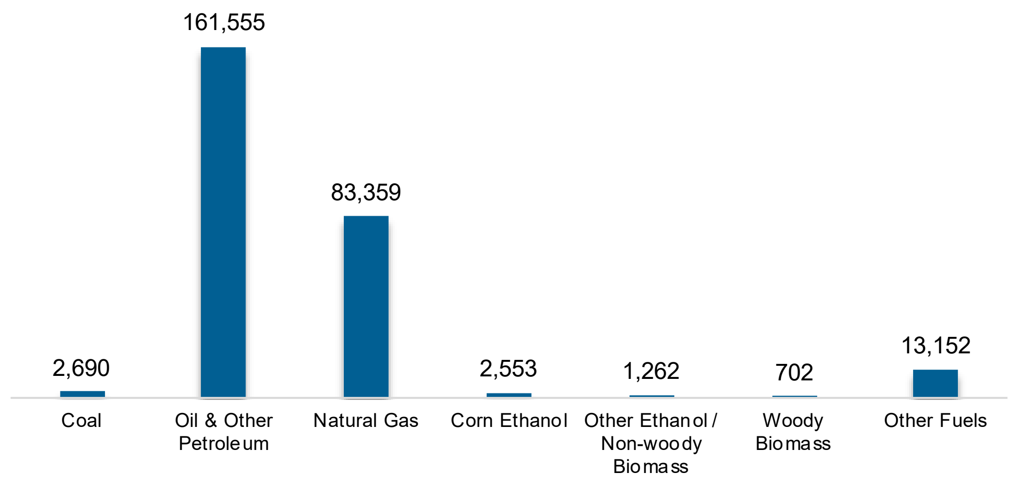
Figure TX-3.
Electric Power Generation Employment by Industry Sector



Fuels

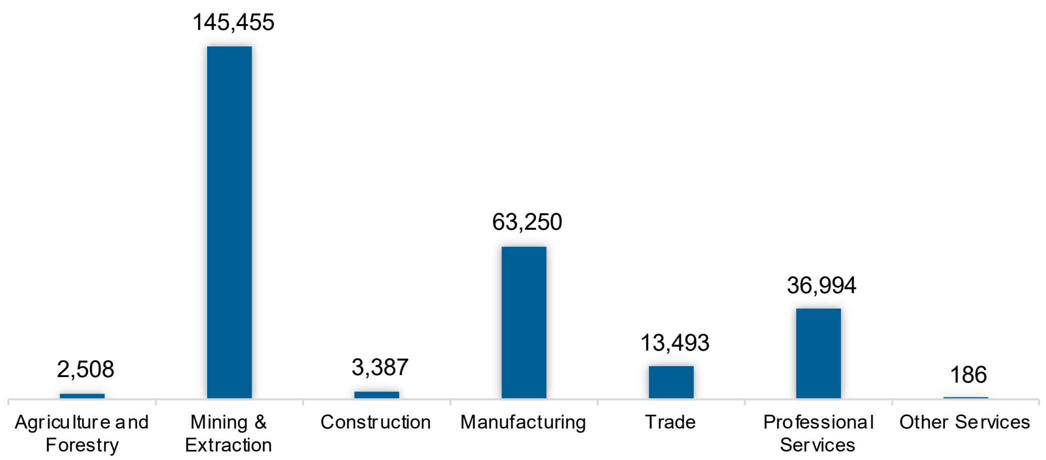
The fuel sector employed 265,273 workers in Texas, 29.2% of the national total in fuels. The sector lost 14,061 jobs and decreased 5% in the past year.

Figure TX-4.
Fuels Employment by Detailed Technology Application



Mining and extraction jobs represent 54.8% of fuel jobs in Texas.

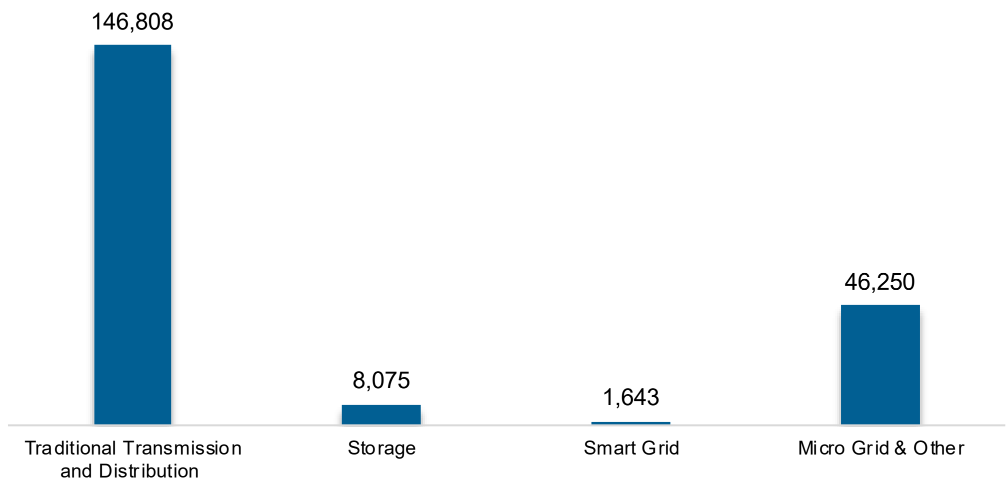
Figure TX-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

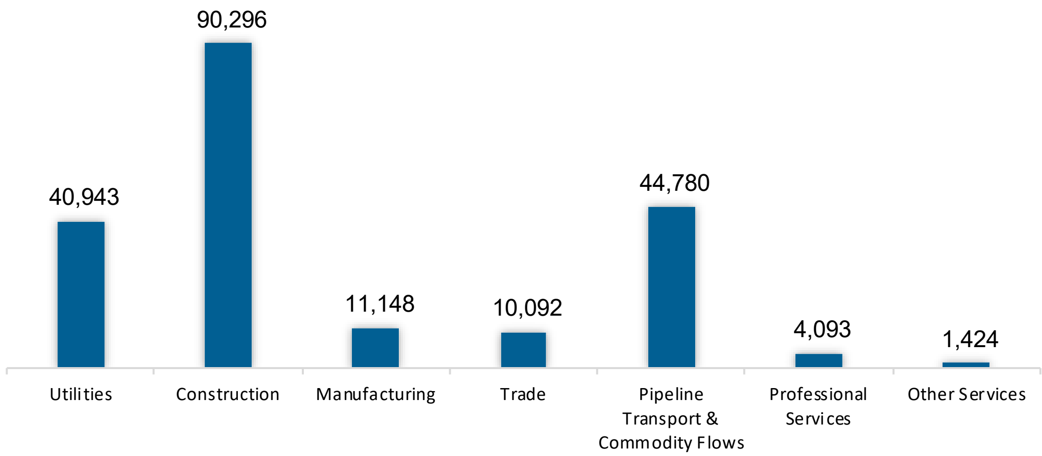
The transmission, distribution, and storage (TDS) sector employed 202,776 workers in Texas, 29.2% of the national TDS total. The sector gained 2,976 jobs and increased 1.5% in the past year.

Figure TX-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in Texas, accounting for 44.5% of the sector's jobs statewide.

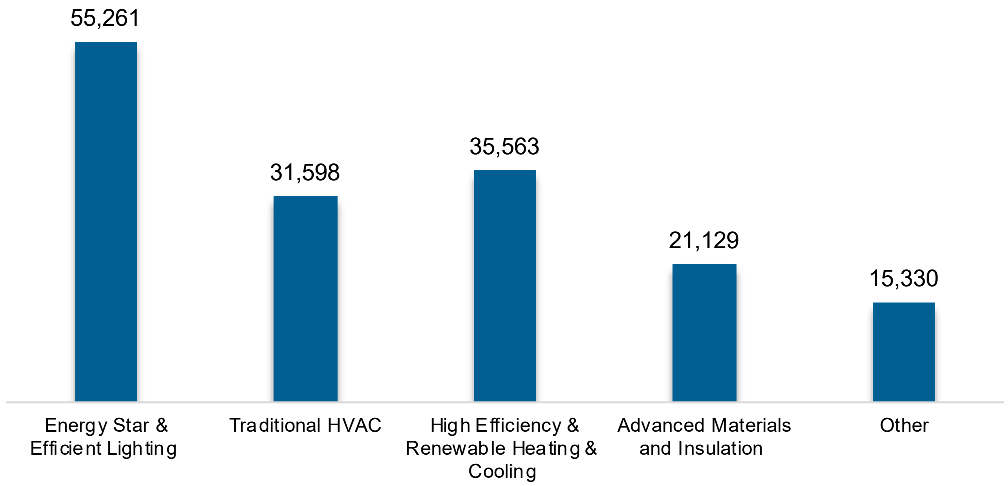
Figure TX-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

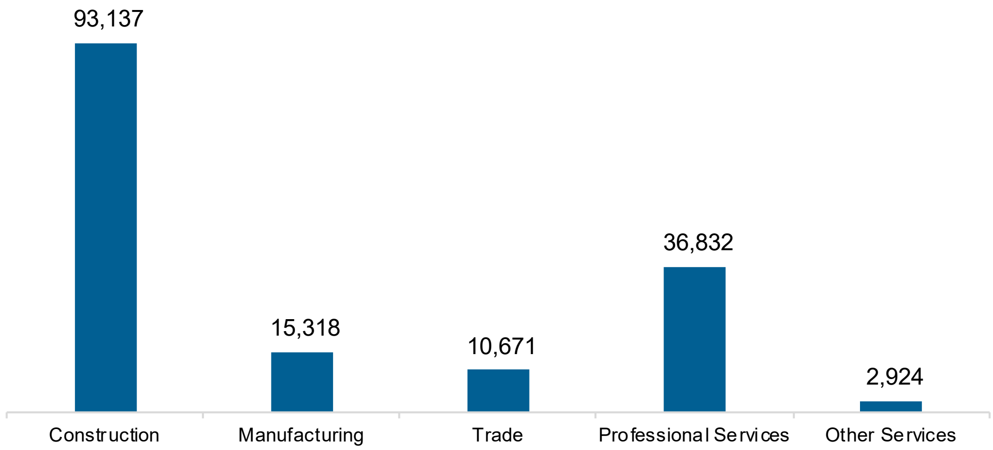
The energy efficiency (EE) sector employed 158,882 workers in Texas, 7.3% of the national EE total. The EE sector added 6,771 jobs and increased 4.5% in the past year.

Figure TX-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

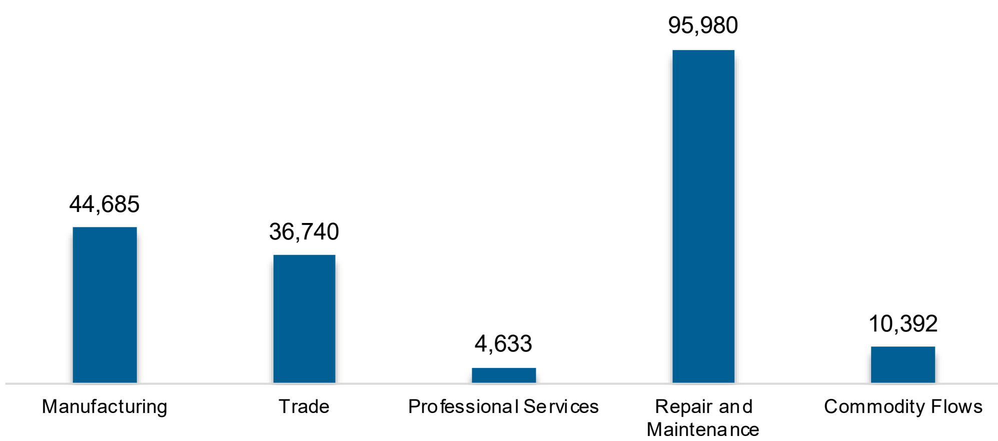
Figure TX-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 192,430 workers in Texas, 7.5% of the national total for the sector. Motor vehicles and component parts added 32,291 jobs and increased 20.2% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs

Figure TX-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Texas are less optimistic than their peers across the country about energy sector job growth over the next year.

Table TX-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.5	2.2
Electric Power Transmission, Distribution, and Storage	1.0	1.1
Energy Efficiency	1.3	1.7
Fuels	1.9	3.0
Motor Vehicles	2.0	3.2

Hiring Difficulty

Employers in Texas reported 56.1% overall hiring difficulty.

Table TX-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	22.7	33.4	9.5	34.4	56.1

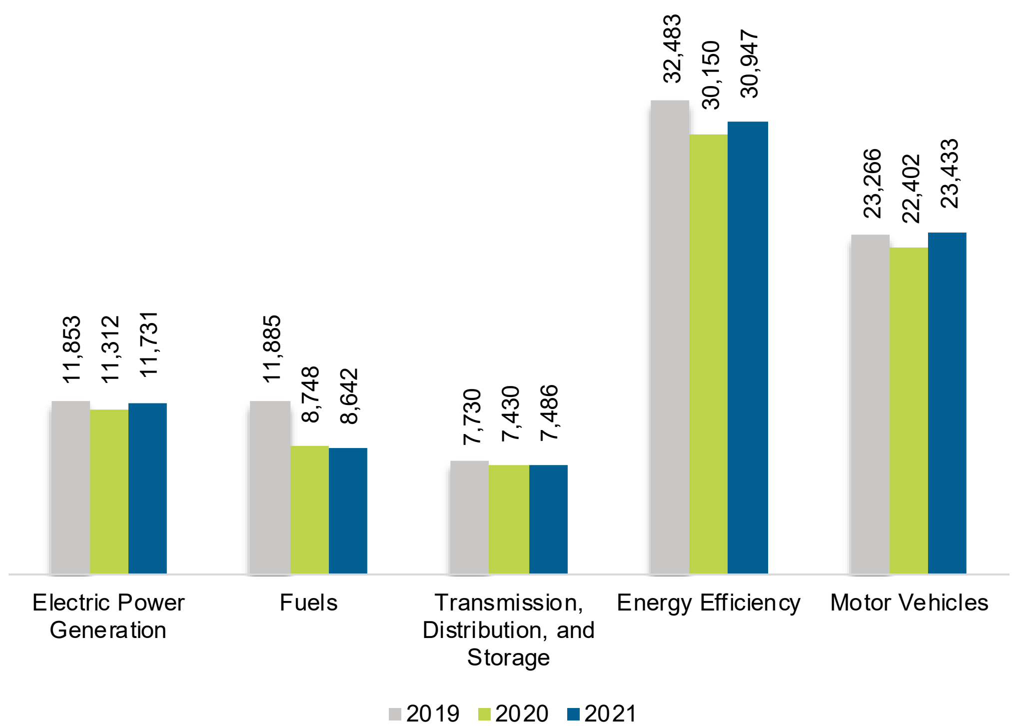
Utah

ENERGY AND EMPLOYMENT — 2022

Overview

Utah had 82,239 energy workers statewide in 2021, representing 1.1% of all U.S. energy jobs. Of these energy jobs, 11,731 are in electric power generation; 8,642 in fuels; 7,486 in transmission, distribution, and storage; 30,947 in energy efficiency; and 23,433 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 2,196 jobs, or 2.7%. The energy sector in Utah represents 5.2% of total state employment.

Figure UT-1.
Employment by Major Energy Technology Application

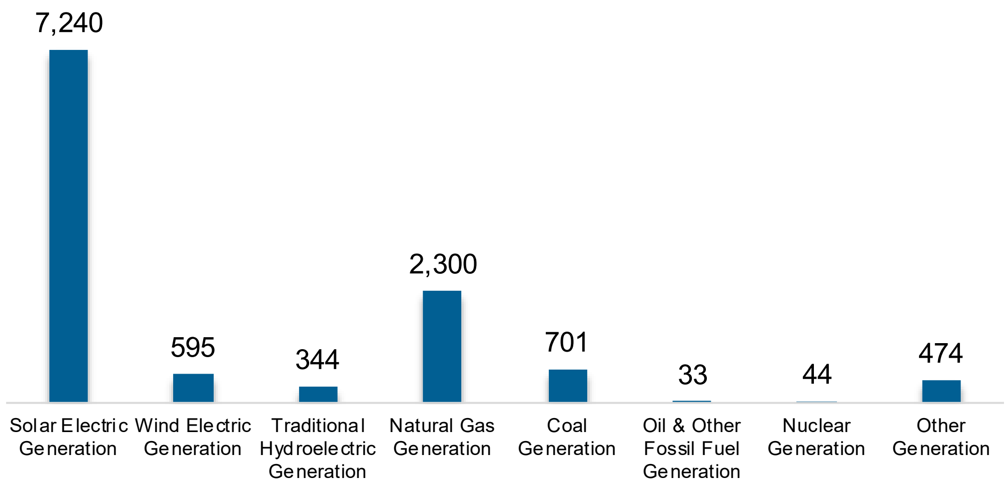


Breakdown by Technology Applications

Electric Power Generation

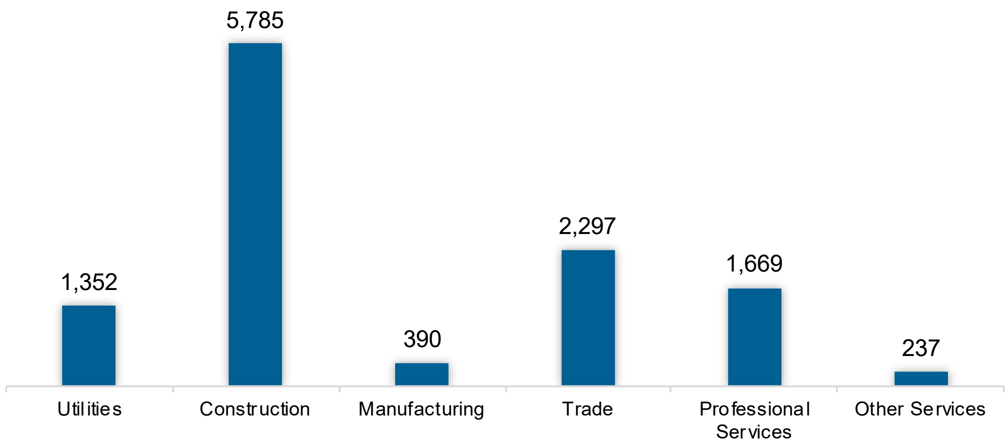
The electric power generation sector employed 11,731 workers in Utah, 1.4% of the national electricity total, and added 419 jobs over the past year (3.7%).

Figure UT-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 49.3% of jobs. Wholesale trade is second largest with 19.6%.

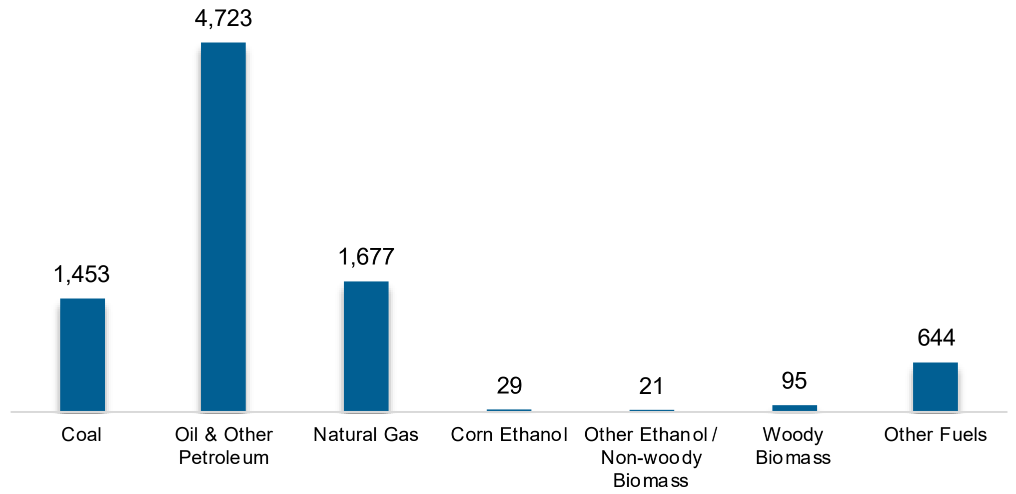
Figure UT-3.
Electric Power Generation Employment by Industry Sector



Fuels

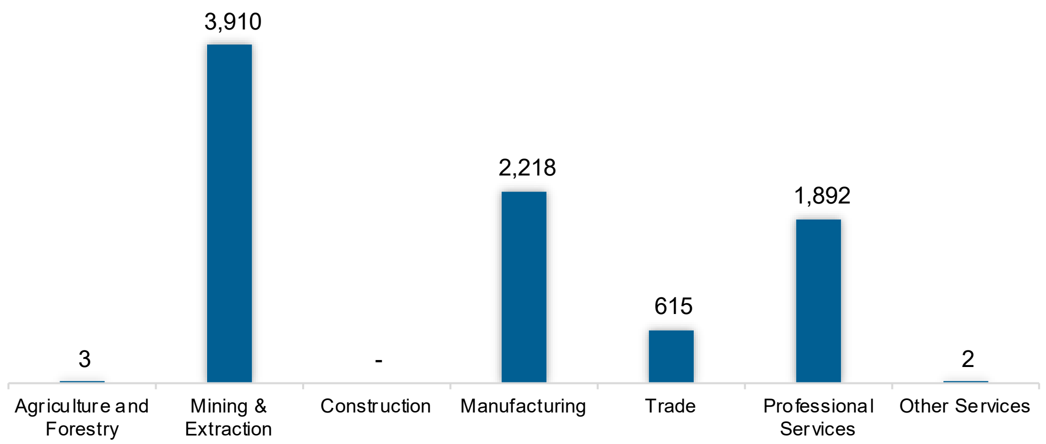
The fuel sector employed 8,642 workers in Utah, 1% of the national total in fuels. The sector lost 107 jobs and decreased 1.2% in the past year.

Figure UT-4.
Fuels Employment by Detailed Technology Application



Mining and extraction jobs represent 45.2% of fuel jobs in Utah.

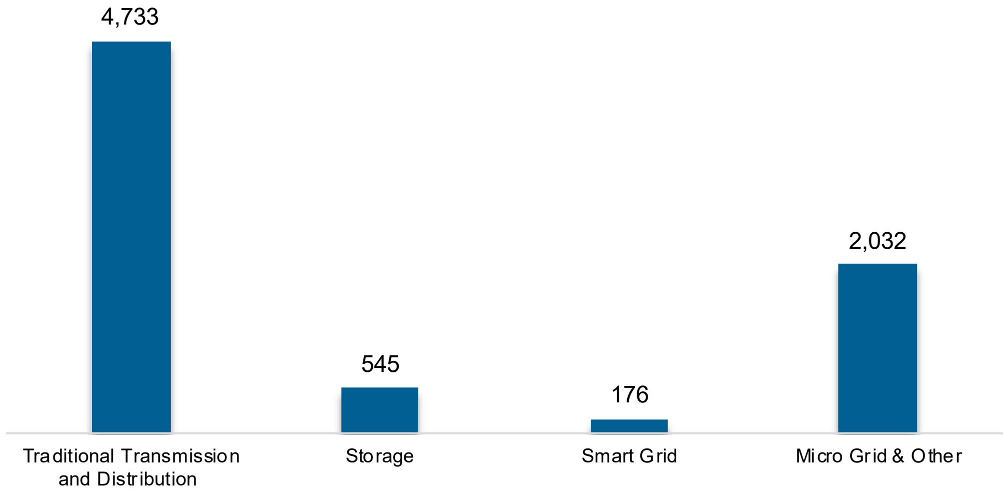
Figure UT-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

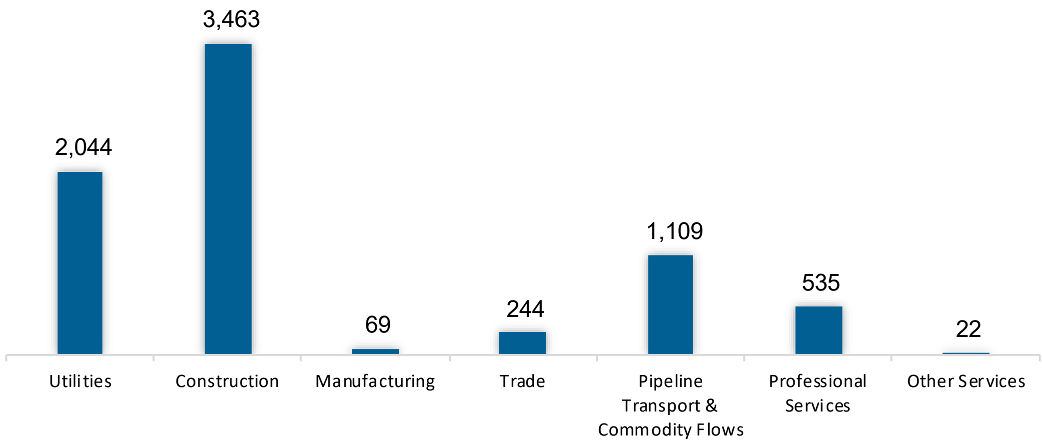
The transmission, distribution, and storage (TDS) sector employed 7,486 workers in Utah, 1% of the national TDS total. The sector gained 56 jobs and increased 0.8% in the past year.

Figure UT-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in Utah, accounting for 46.3% of the sector's jobs statewide.

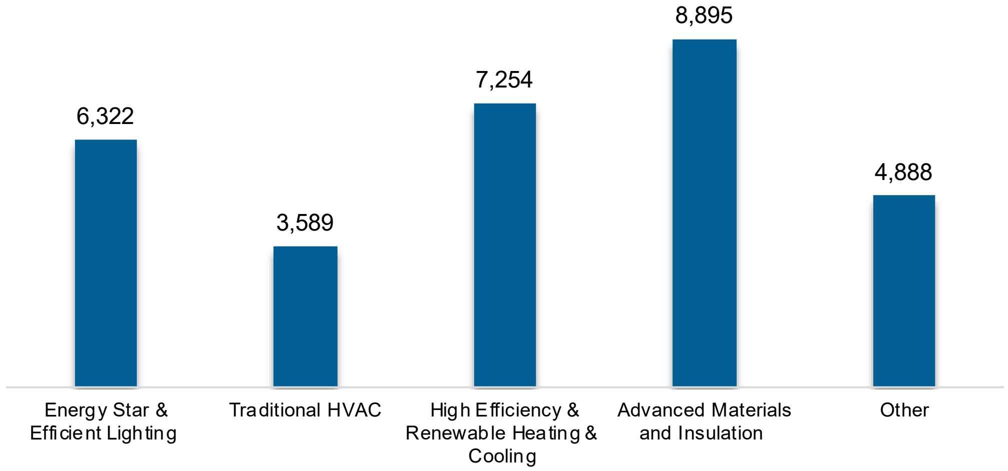
Figure UT-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

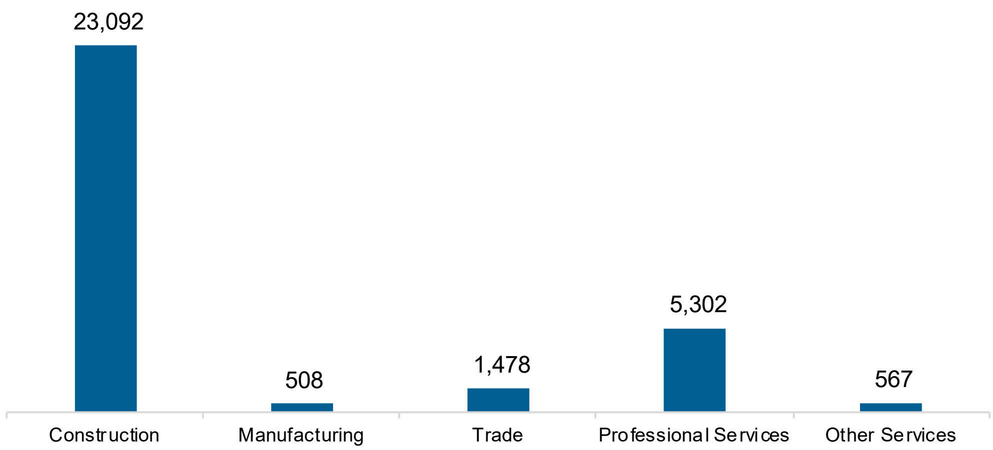
The energy efficiency (EE) sector employed 30,947 workers in Utah, 1.4% of the national EE total. The EE sector added 797 jobs and increased 2.6% in the past year.

Figure UT-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

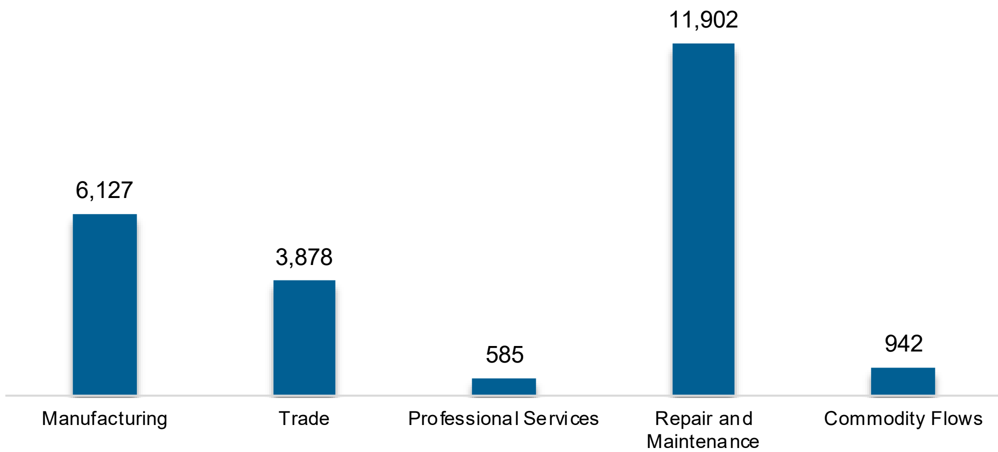
Figure UT-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 23,433 workers in Utah, 0.9% of the national total for the sector. Motor vehicles and component parts added 1,032 jobs and increased 4.6% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure UT-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Utah are less optimistic than their peers across the country about energy sector job growth over the next year.

Table UT-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	0.3	2.2
Electric Power Transmission, Distribution, and Storage	-0.2	1.1
Energy Efficiency	0.1	1.7
Fuels	0.7	3.0
Motor Vehicles	0.8	3.2

Hiring Difficulty

Employers in Utah reported 57.0% overall hiring difficulty.

Table UT-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	23.6	33.4	8.6	34.4	57.0

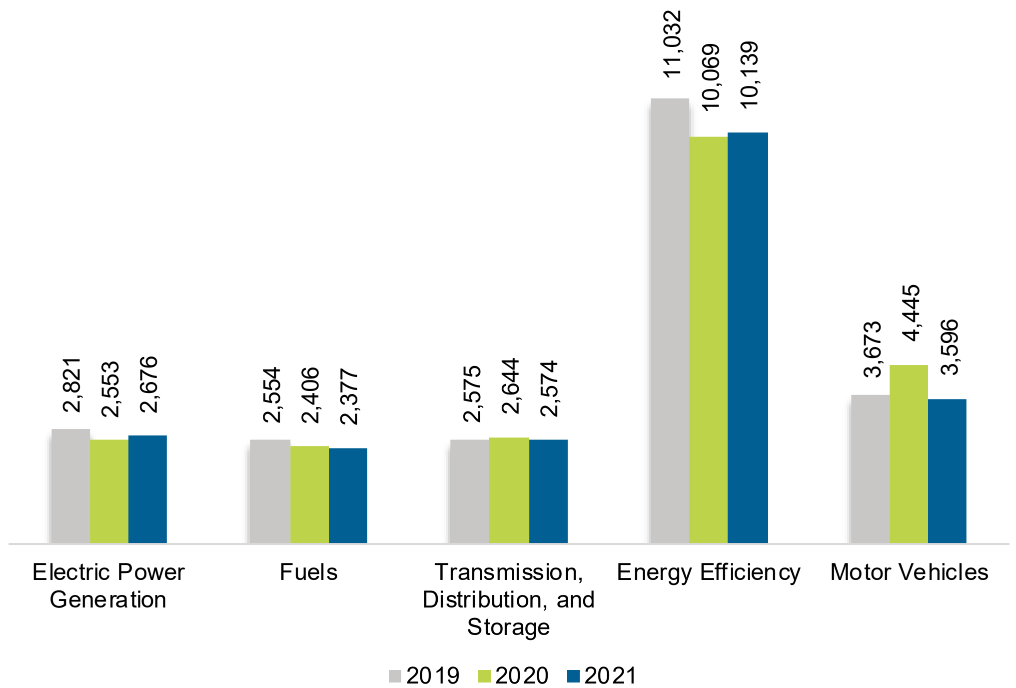
Vermont

ENERGY AND EMPLOYMENT — 2022

Overview

Vermont had 21,361 energy workers statewide in 2021, representing 0.3% of all U.S. energy jobs. Of these energy jobs, 2,676 are in electric power generation; 2,377 in fuels; 2,574 in transmission, distribution, and storage; 10,139 in energy efficiency; and 3,596 in motor vehicles. From 2020 to 2021, energy jobs in the state decreased by 756 jobs, or 3.4%. The energy sector in Vermont represents 7.3% of total state employment.

Figure VT-1.
Employment by Major Energy Technology Application

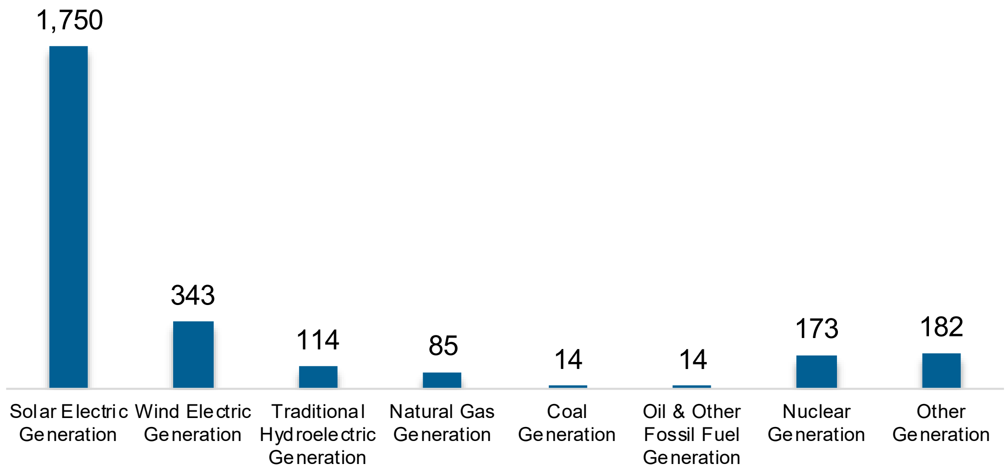


Breakdown by Technology Applications

Electric Power Generation

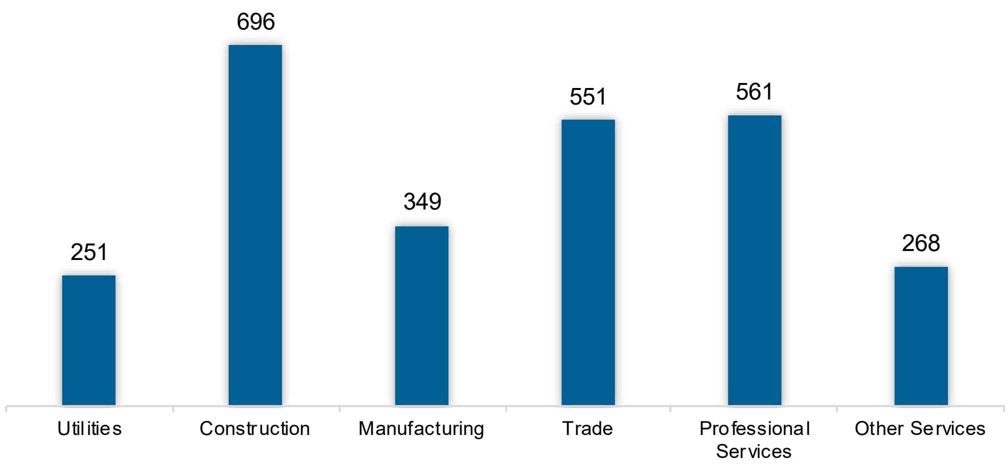
The electric power generation sector employed 2,676 workers in Vermont, 0.3% of the national electricity total, and added 123 jobs over the past year (4.8%).

Figure VT-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 26% of jobs. Professional and business services is second largest with 20.9%.

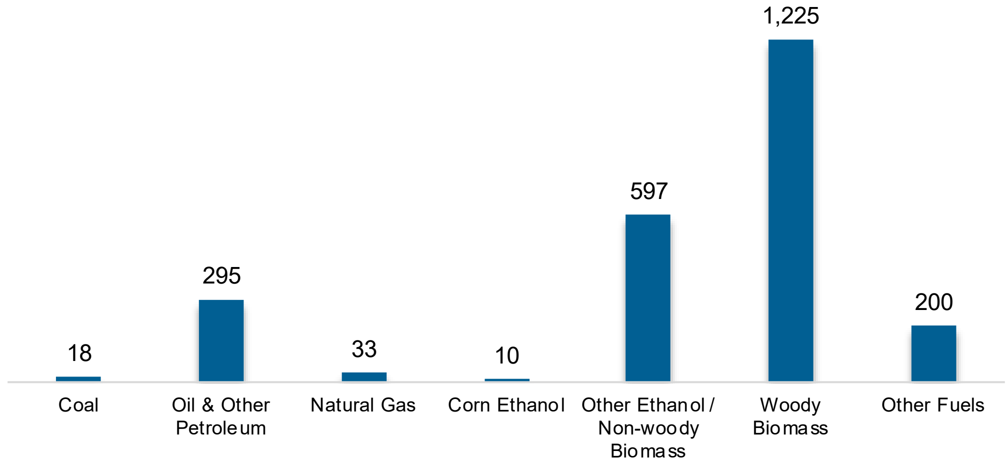
Figure VT-3.
Electric Power Generation Employment by Industry Sector



Fuels

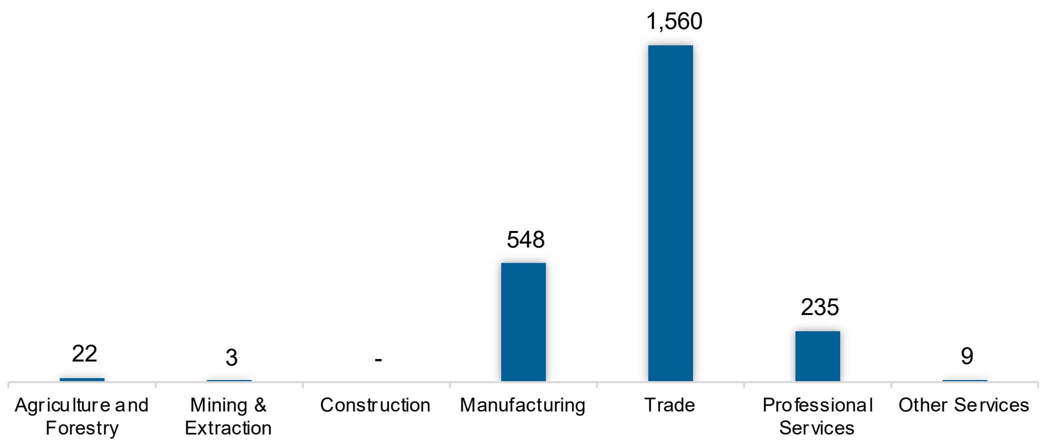
The fuel sector employed 2,377 workers in Vermont, 0.3% of the national total in fuels. The sector lost 28 jobs and decreased 1.2% in the past year.

Figure VT-4.
Fuels Employment by Detailed Technology Application



Wholesale trade jobs represent 65.6% of fuel jobs in Vermont.

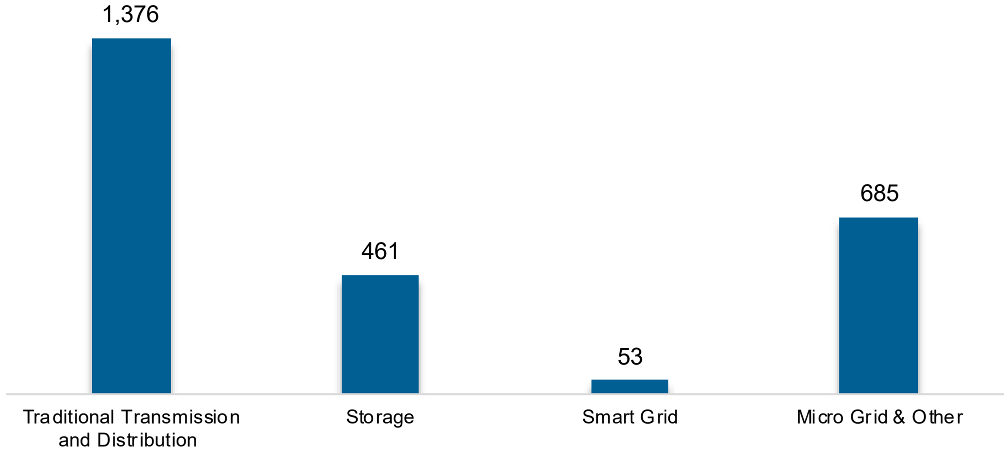
Figure VT-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

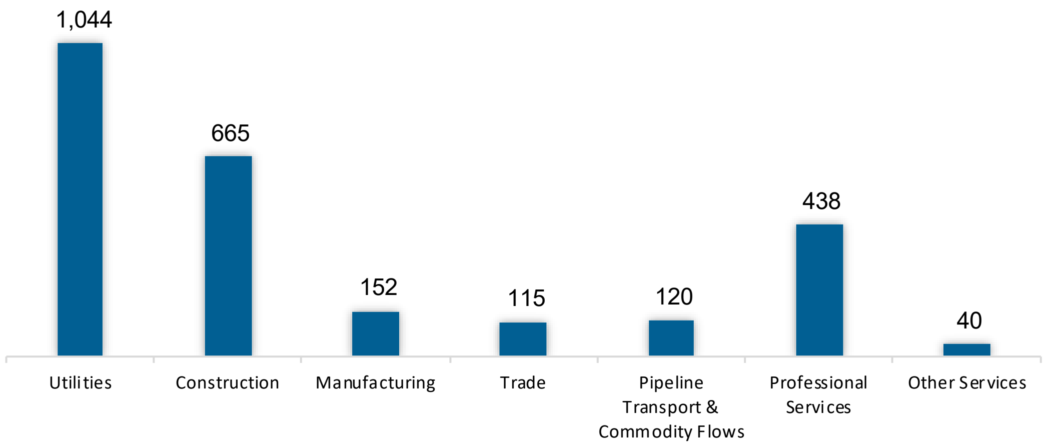
The transmission, distribution, and storage (TDS) sector employed 2,574 workers in Vermont, 0.3% of the national TDS total. The sector lost 71 jobs and decreased 2.7% in the past year.

Figure VT-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Vermont, accounting for 40.6% of the sector's jobs statewide.

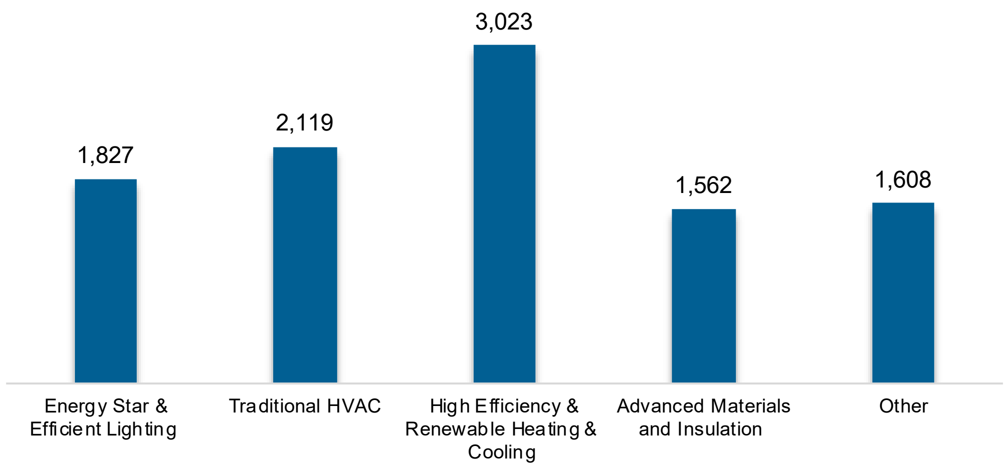
Figure VT-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

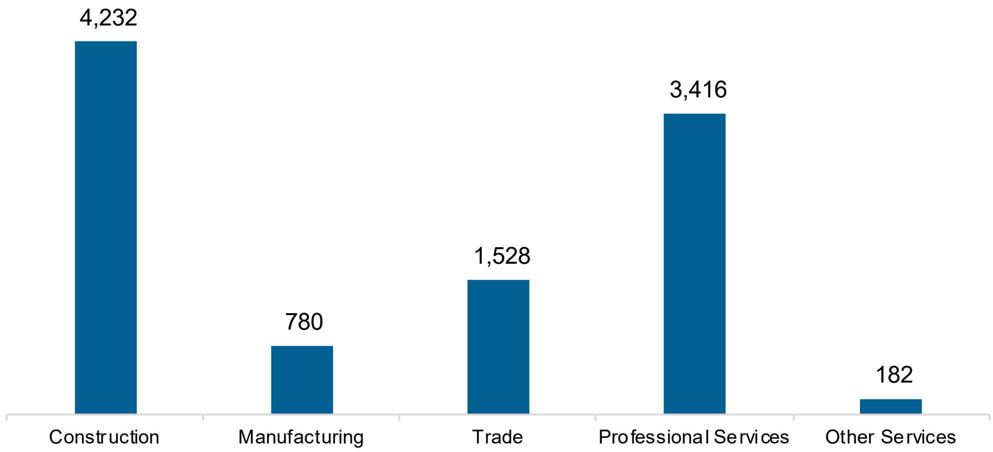
The energy efficiency (EE) sector employed 10,139 workers in Vermont, 0.5% of the national EE total. The EE sector added 70 jobs and increased 0.7% in the past year.

Figure VT-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

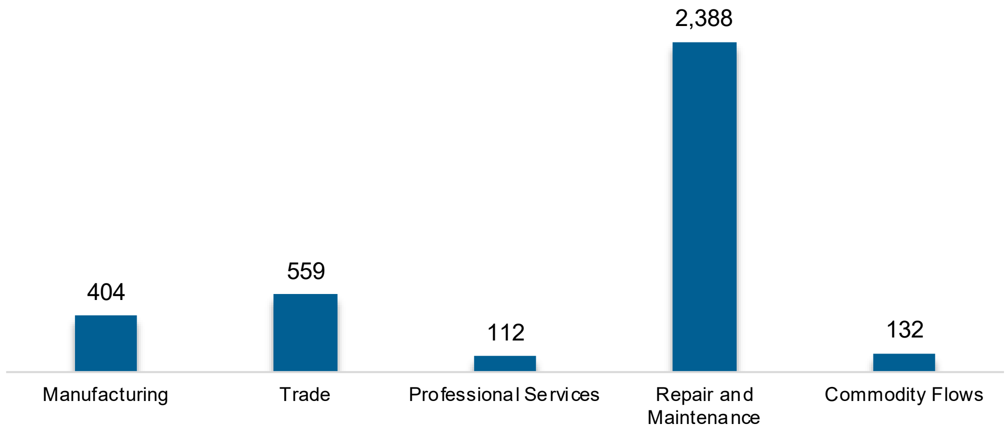
Figure VT-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 3,596 workers in Vermont, 0.1% of the national total for the sector. Motor vehicles and component parts lost 850 jobs and decreased 19.1% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure VT-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Vermont are less optimistic than their peers across the country about energy sector job growth over the next year.

Table VT-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.3	2.2
Electric Power Transmission, Distribution, and Storage	0.8	1.1
Energy Efficiency	1.1	1.7
Fuels	1.7	3.0
Motor Vehicles	1.8	3.2

Hiring Difficulty

Employers in Vermont reported 54.4% overall hiring difficulty.

Table VT-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	27.6	26.8	5.2	40.4	54.4

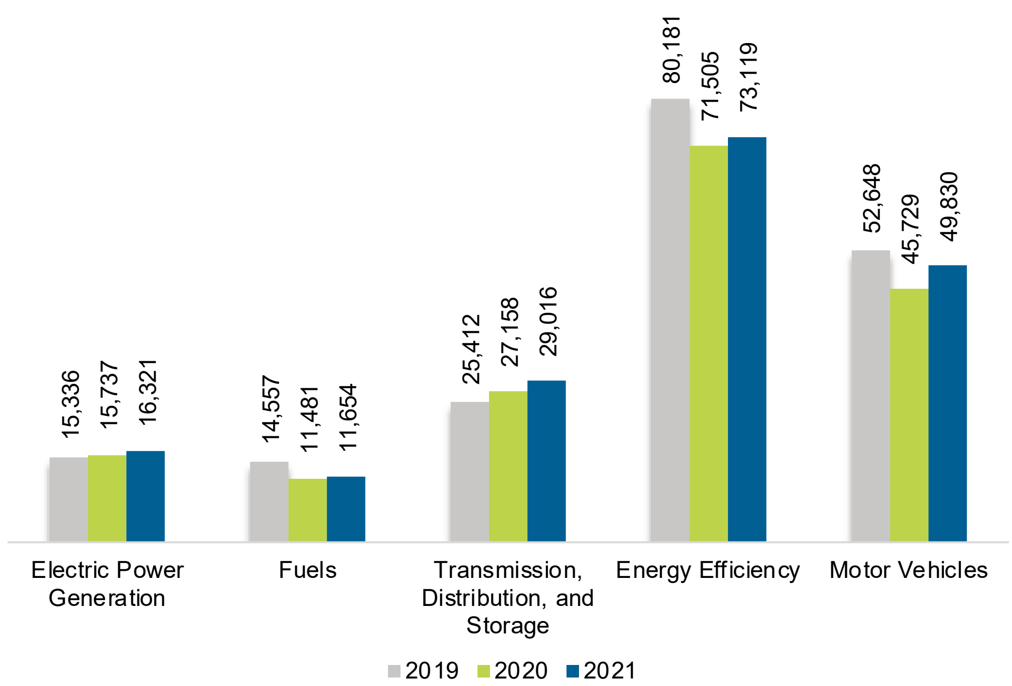
Virginia

ENERGY AND EMPLOYMENT — 2022

Overview

Virginia had 179,940 energy workers statewide in 2021, representing 2.3% of all U.S. energy jobs. Of these energy jobs, 16,321 are in electric power generation; 11,654 in fuels; 29,016 in transmission, distribution, and storage; 73,119 in energy efficiency; and 49,830 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 8,330 jobs, or 4.9%. The energy sector in Virginia represents 4.7% of total state employment.

Figure VA-1.
Employment by Major Energy Technology Application

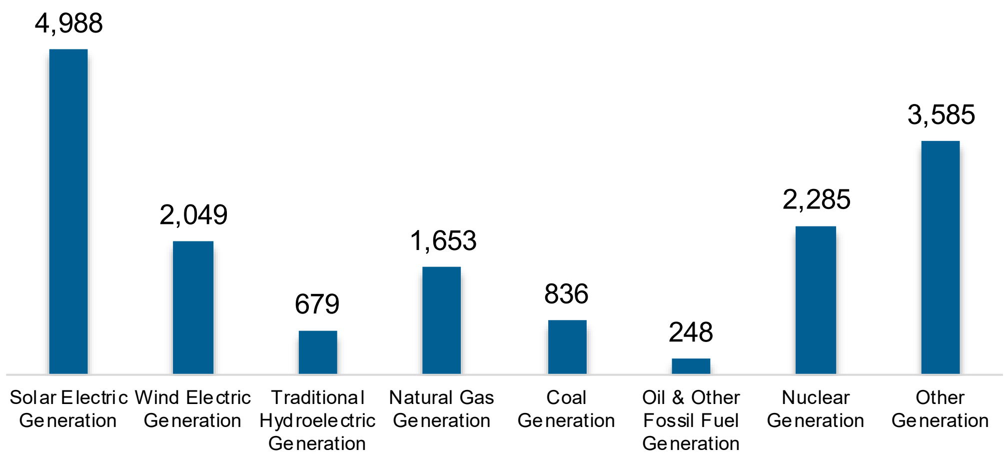


Breakdown by Technology Applications

Electric Power Generation

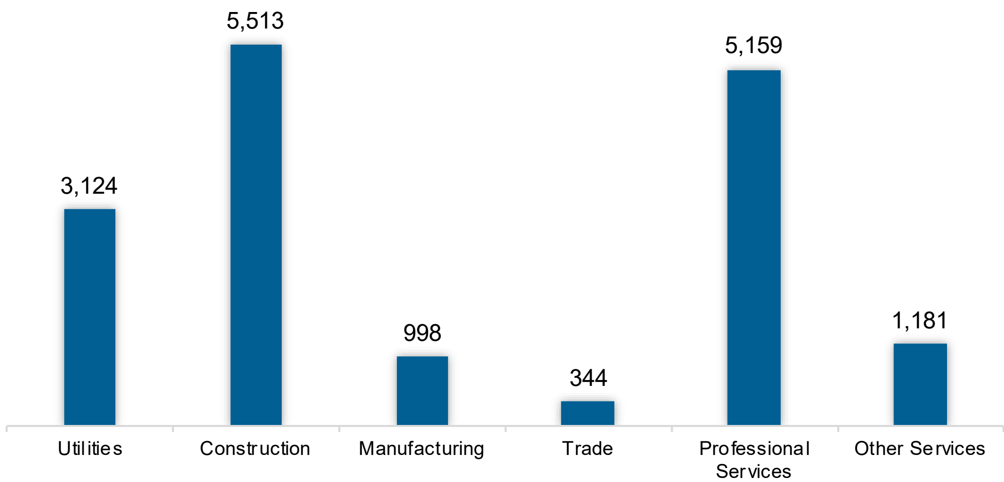
The electric power generation sector employed 16,321 workers in Virginia, 1.9% of the national electricity total, and added 584 jobs over the past year (3.7%).

Figure VA-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 33.8% of jobs. Professional and business services is second largest with 31.6%.

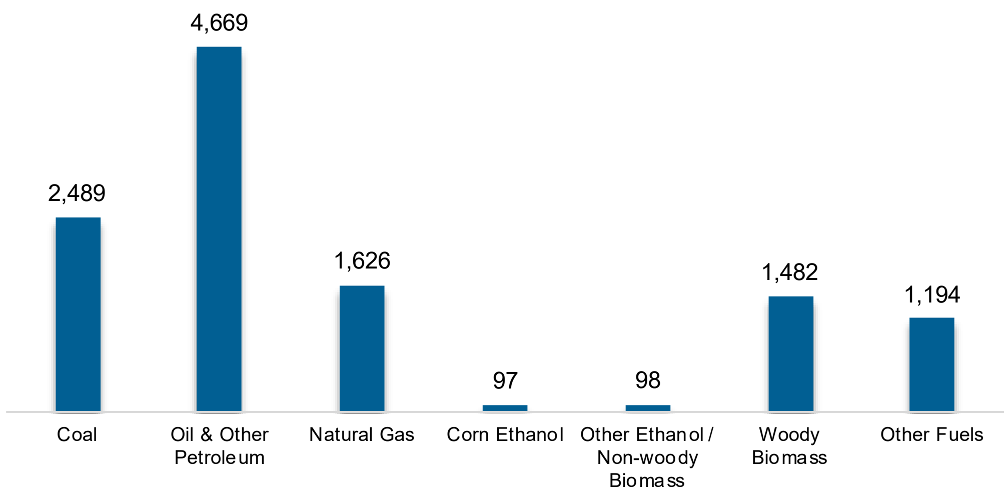
Figure VA-3.
Electric Power Generation Employment by Industry Sector



Fuels

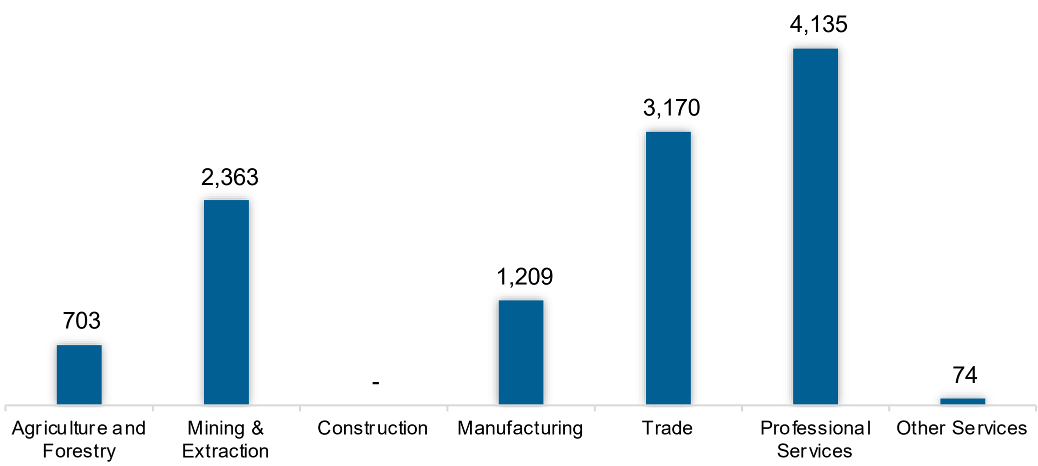
The fuel sector employed 11,654 workers in Virginia, 1.3% of the national total in fuels. The sector gained 173 jobs and increased 1.5% in the past year.

Figure VA-4.
Fuels Employment by Detailed Technology Application



Professional and business services jobs represent 35.5% of fuel jobs in Virginia.

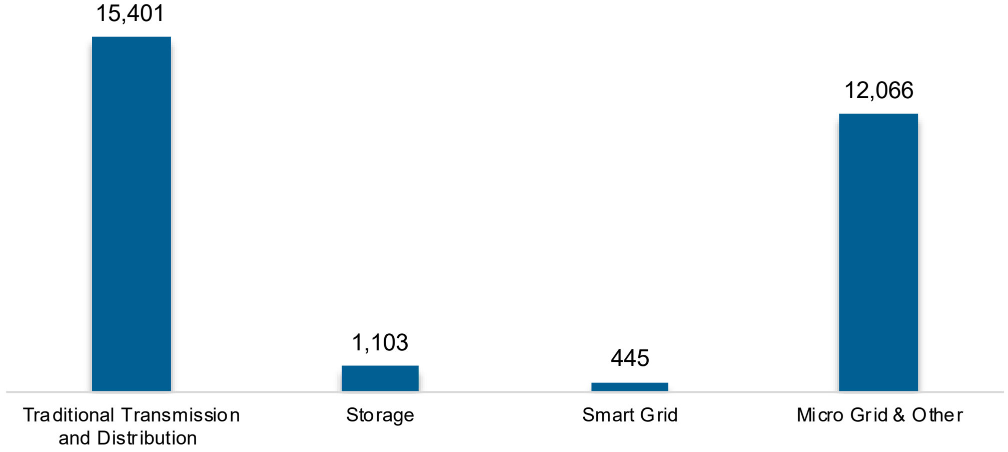
Figure VA-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

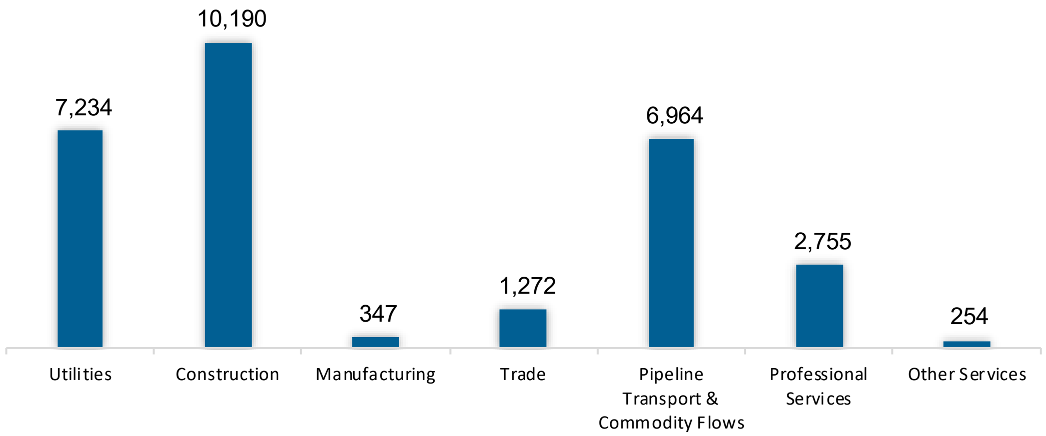
The transmission, distribution, and storage (TDS) sector employed 29,016 workers in Virginia, 1.3% of the national TDS total. The sector gained 1,858 jobs and increased 6.8% in the past year.

Figure VA-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in Virginia, accounting for 35.1% of the sector's jobs statewide.

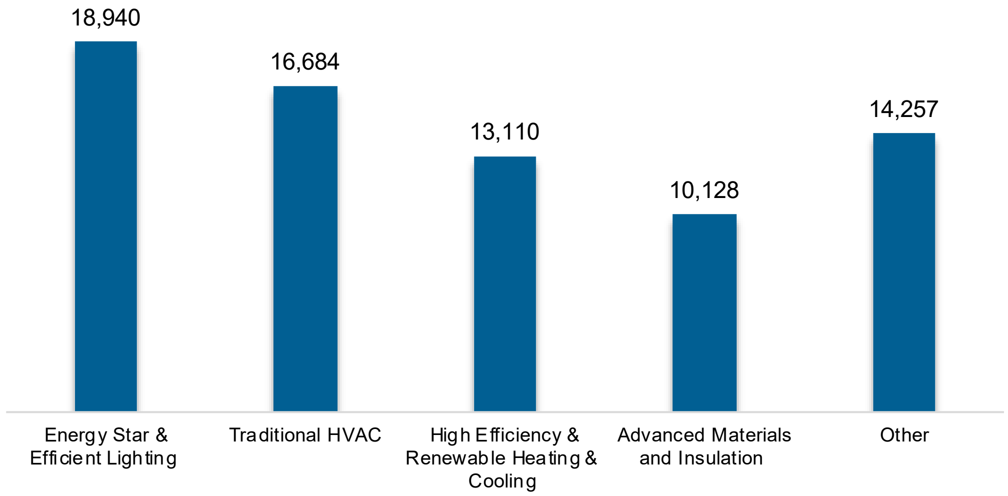
Figure VA-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

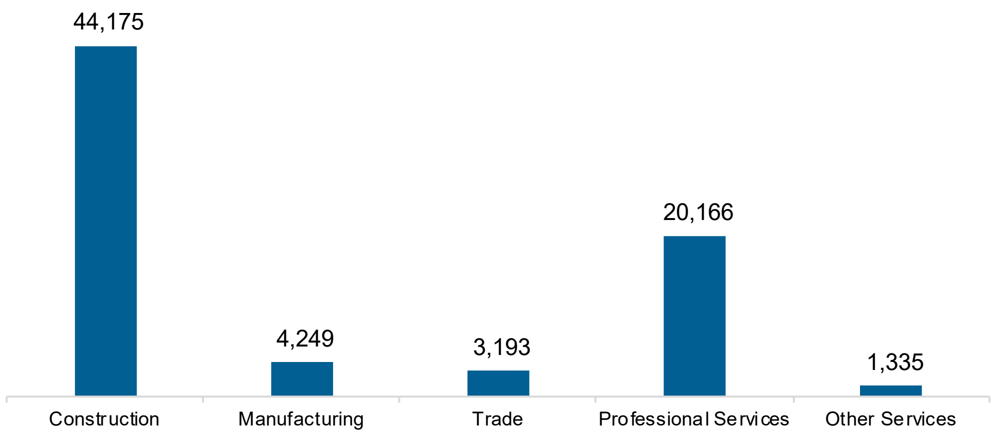
The energy efficiency (EE) sector employed 73,119 workers in Virginia, 3.4% of the national EE total. The EE sector added 1,614 jobs and increased 2.3% in the past year.

Figure VA-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

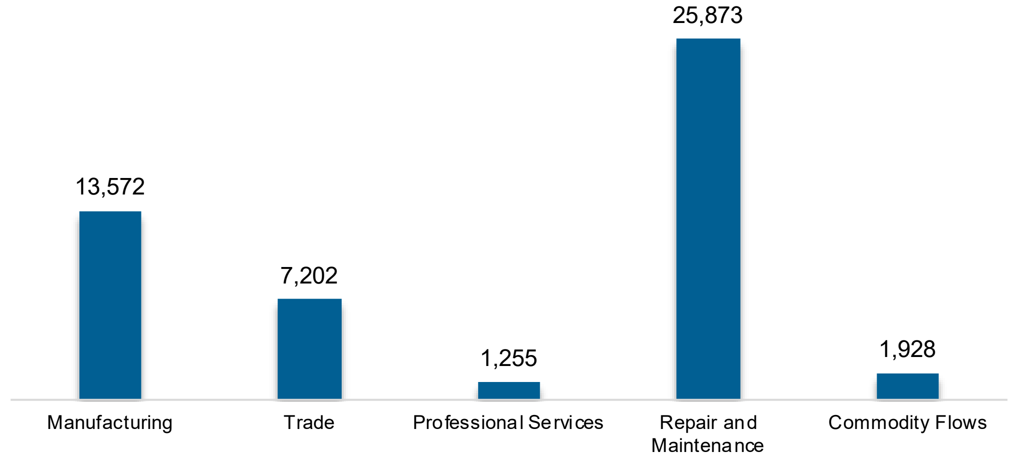
Figure VA-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 49,830 workers in Virginia, 2% of the national total for the sector. Motor vehicles and component parts added 4,101 jobs and increased 9% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure VA-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Virginia are less optimistic than their peers across the country about energy sector job growth over the next year.

Table VA-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.7	2.2
Electric Power Transmission, Distribution, and Storage	1.1	1.1
Energy Efficiency	1.4	1.7
Fuels	2.1	3.0
Motor Vehicles	2.2	3.2

Hiring Difficulty

Employers in Virginia reported 57.7% overall hiring difficulty.

Table VA-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	26.1	31.6	7.5	34.7	57.7

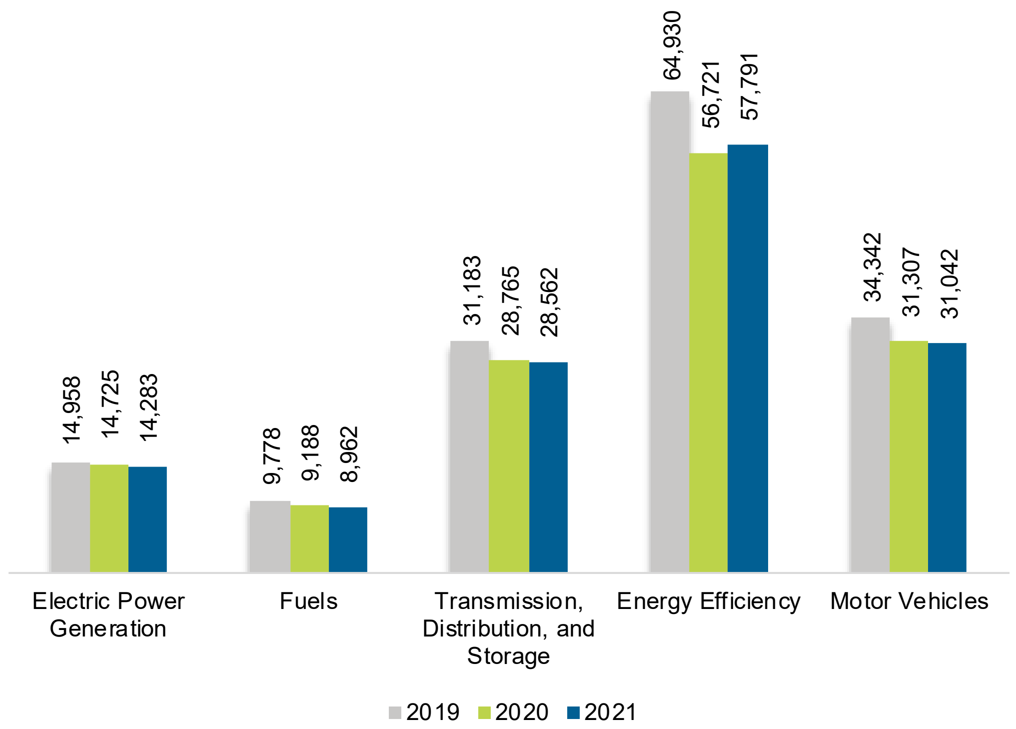
Washington

ENERGY AND EMPLOYMENT — 2022

Overview

Washington had 140,640 energy workers statewide in 2021, representing 1.8% of all U.S. energy jobs. Of these energy jobs, 14,283 are in electric power generation; 8,962 in fuels; 28,562 in transmission, distribution, and storage; 57,791 in energy efficiency; and 31,042 in motor vehicles. From 2020 to 2021, energy jobs in the state decreased by 65 jobs, effectively 0%. The energy sector in Washington represents 4.2% of total state employment.

Figure WA-1.
Employment by Major Energy Technology Application

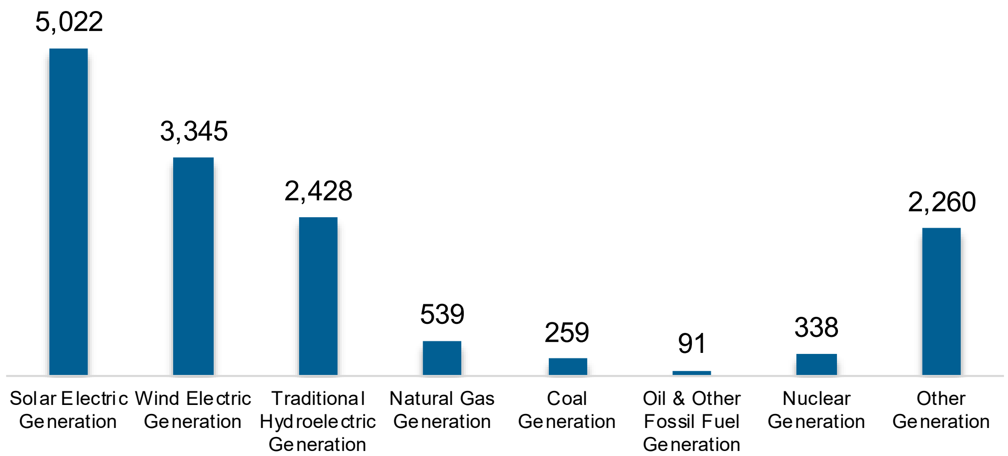


Breakdown by Technology Applications

Electric Power Generation

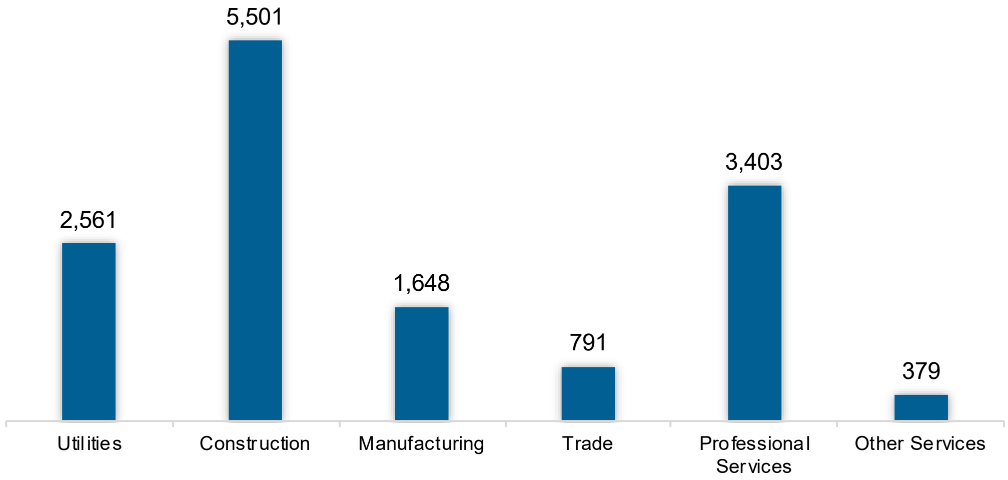
The electric power generation sector employed 14,283 workers in Washington, 1.7% of the national electricity total, and lost 442 jobs over the past year (-3%).

Figure WA-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 38.5% of jobs. Professional and business services is second largest with 23.8%.

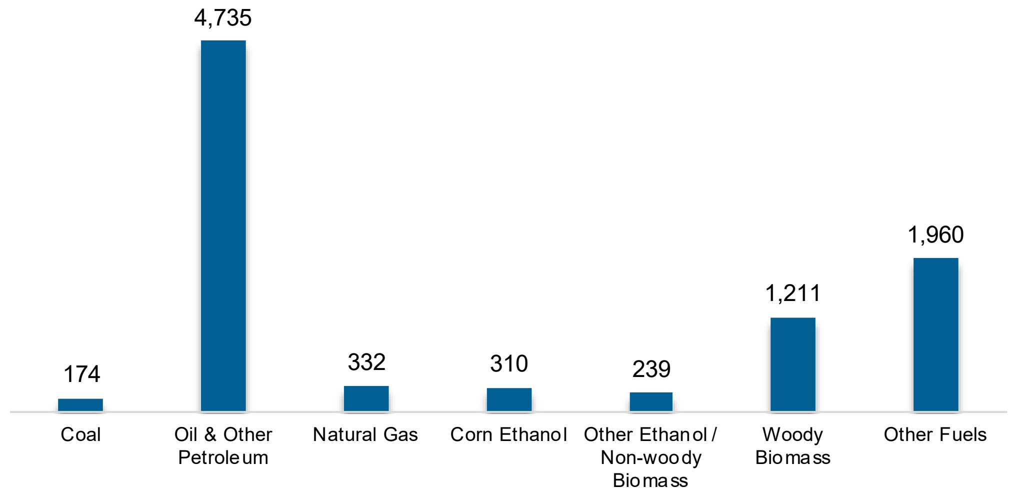
Figure WA-3.
Electric Power Generation Employment by Industry Sector



Fuels

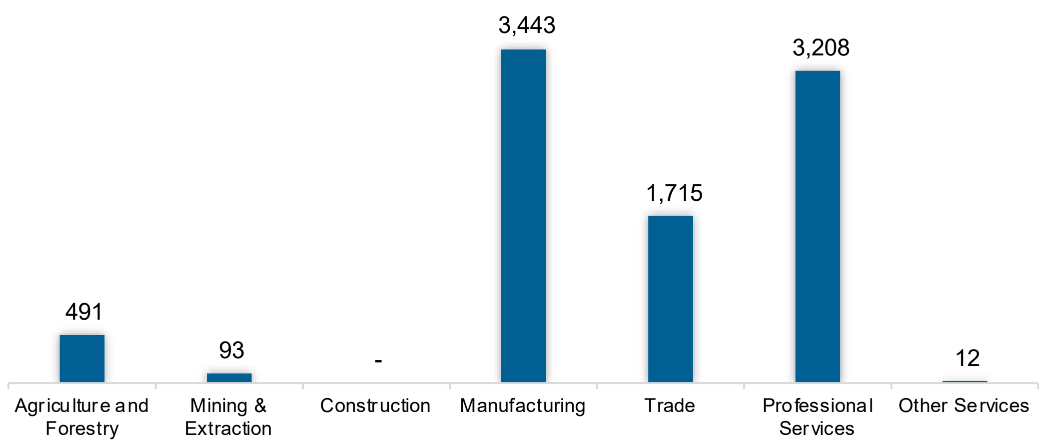
The fuel sector employed 8,962 workers in Washington, 1% of the national total in fuels. The sector lost 226 jobs and decreased 2.5% in the past year.

Figure WA-4.
Fuels Employment by Detailed Technology Application



Manufacturing jobs represent 38.4% of fuel jobs in Washington.

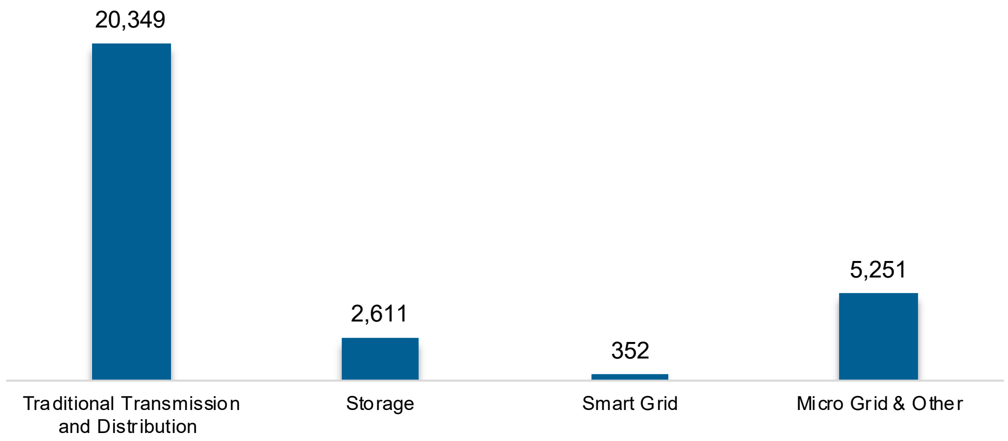
Figure WA-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

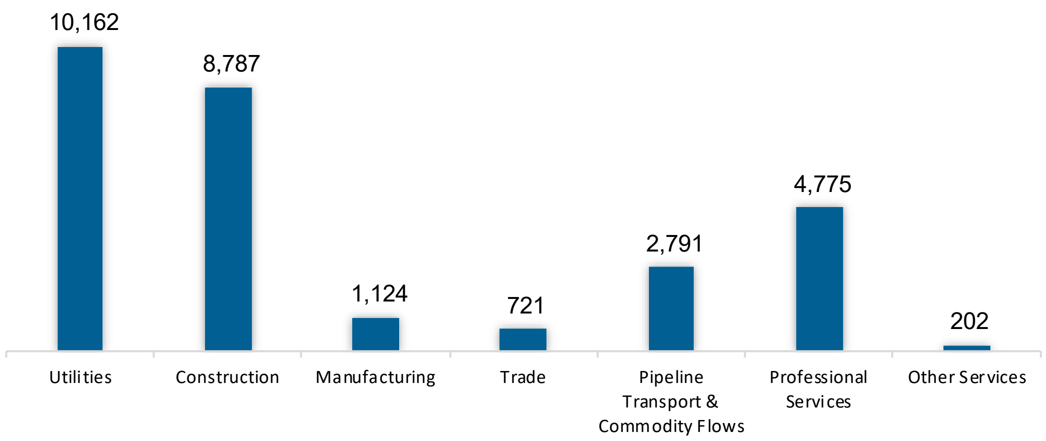
The transmission, distribution, and storage (TDS) sector employed 28,562 workers in Washington, 1% of the national TDS total. The sector lost 203 jobs and decreased 0.7% in the past year.

Figure WA-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Utilities work represents the greatest proportion of TDS jobs in Washington, accounting for 35.6% of the sector's jobs statewide.

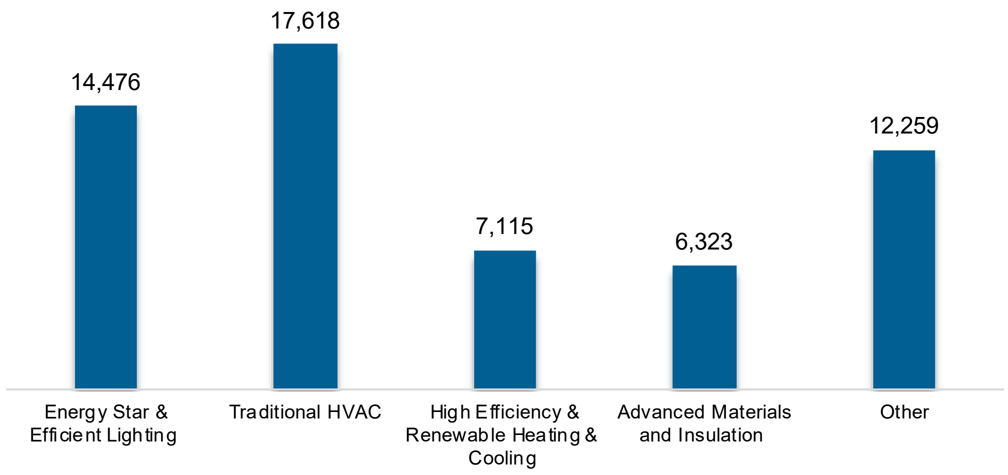
Figure WA-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

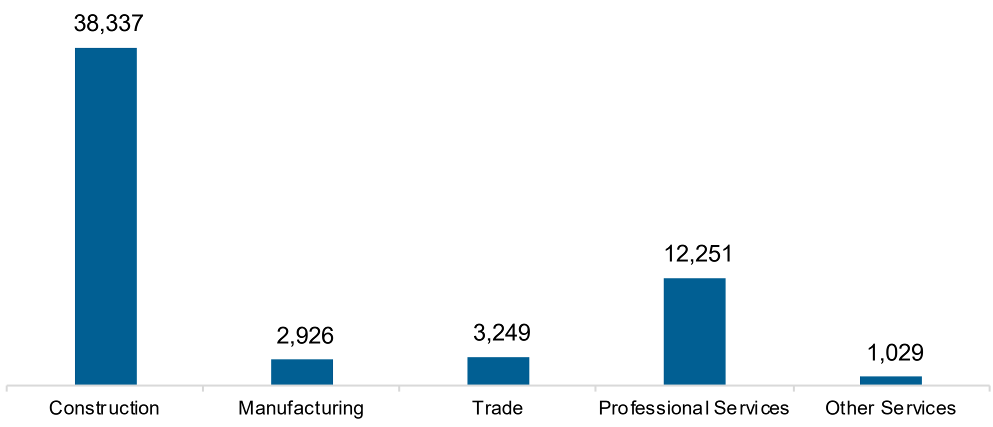
The energy efficiency (EE) sector employed 57,791 workers in Washington, 2.7% of the national EE total. The EE sector added 1,071 jobs and increased 1.9% in the past year.

Figure WA-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

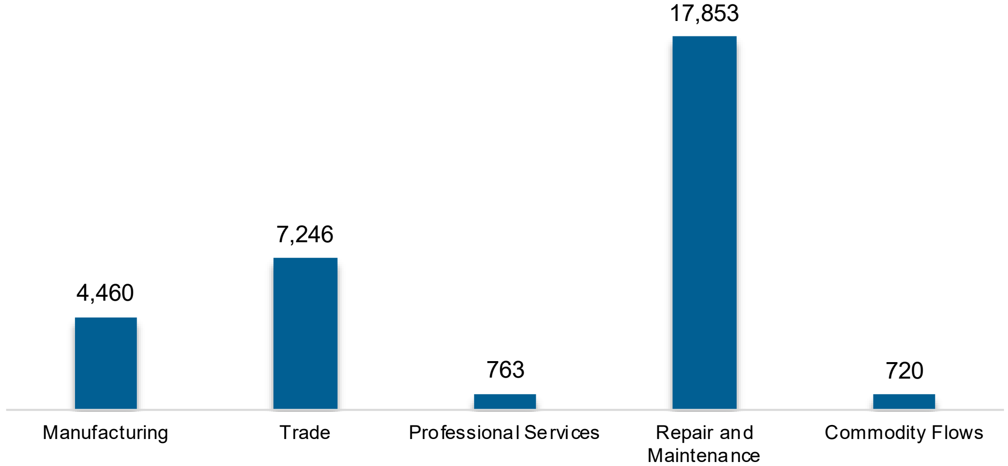
Figure WA-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 31,042 workers in Washington, 1.2% of the national total for the sector. Motor vehicles and component parts lost 264 jobs and decreased 0.8% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure WA-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Washington are less optimistic than their peers across the country about energy sector job growth over the next year.

Table WA-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	-0.2	2.2
Electric Power Transmission, Distribution, and Storage	-0.8	1.1
Energy Efficiency	-0.5	1.7
Fuels	0.2	3.0
Motor Vehicles	0.3	3.2

Hiring Difficulty

Employers in Washington reported 56.0% overall hiring difficulty.

Table WA-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	26.8	29.2	9.0	35.0	56.0

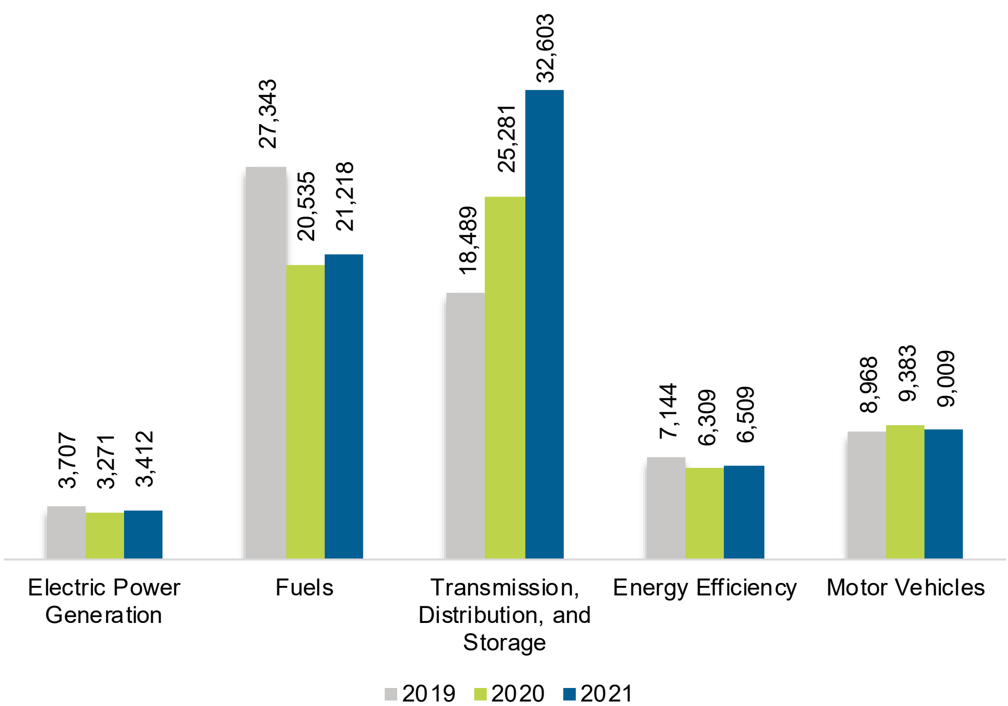
West Virginia

ENERGY AND EMPLOYMENT — 2022

Overview

West Virginia had 72,750 energy workers statewide in 2021, representing 0.9% of all U.S. energy jobs. Of these energy jobs, 3,412 are in electric power generation; 21,218 in fuels; 32,603 in transmission, distribution, and storage; 6,509 in energy efficiency; and 9,009 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 7,970 jobs, or 12.3%. The energy sector in West Virginia represents 11.1% of total state employment.

Figure WV-1.
Employment by Major Energy Technology Application

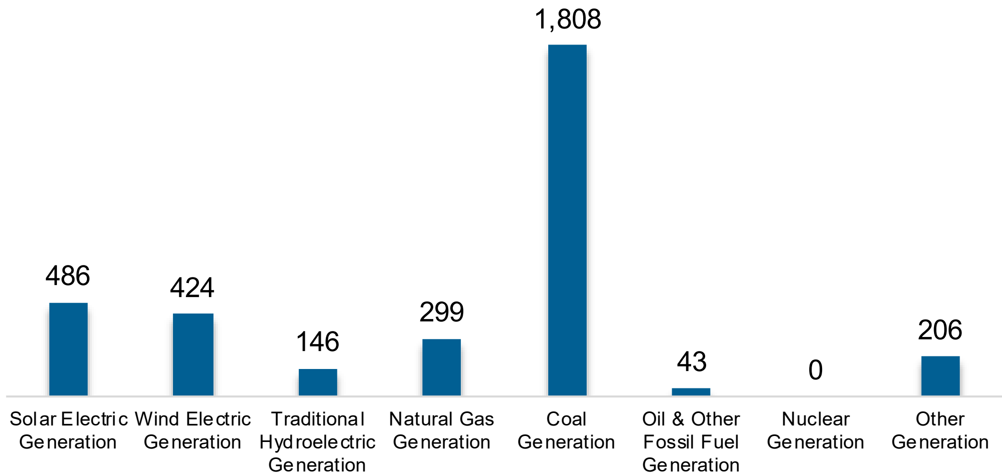


Breakdown by Technology Applications

Electric Power Generation

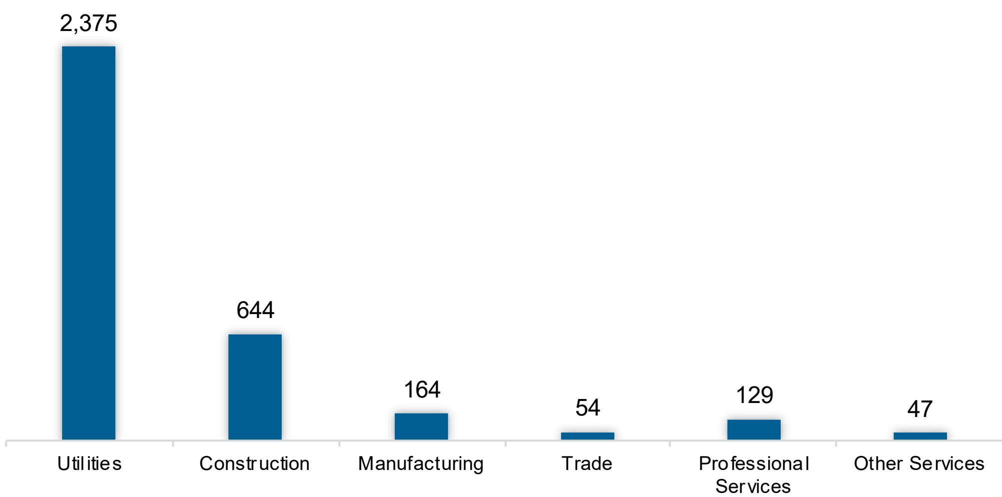
The electric power generation sector employed 3,412 workers in West Virginia, 0.4% of the national electricity total, and added 141 jobs over the past year (4.3%).

Figure WV-2.
Electric Power Generation Employment by Detailed Technology Application



Utilities work represents the largest industry sector in the electric power generation sector, with 69.6% of jobs. Construction is second largest with 18.9%.

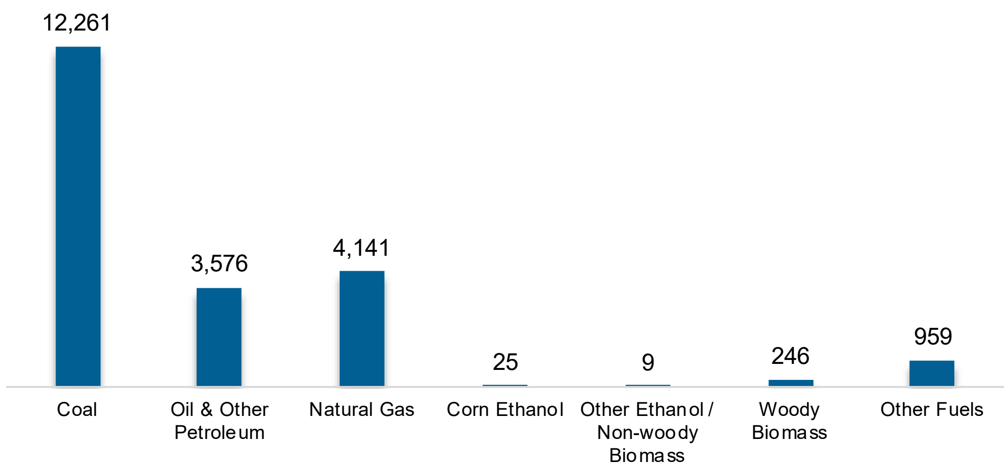
Figure WV-3.
Electric Power Generation Employment by Industry Sector



Fuels

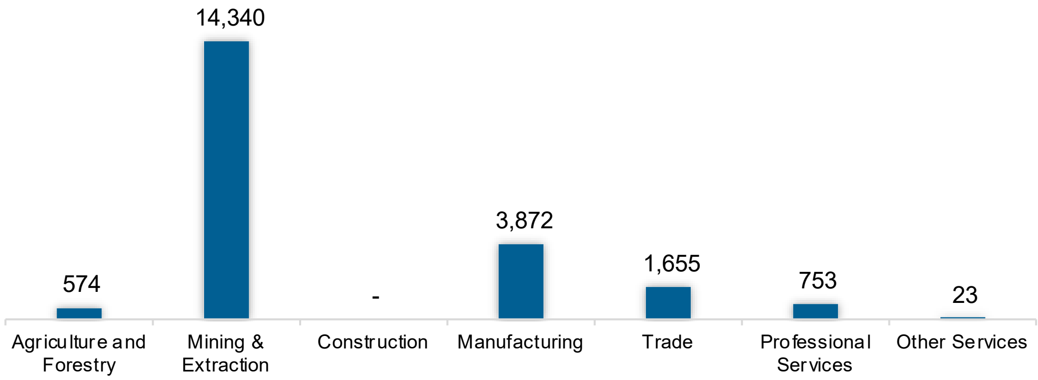
The fuel sector employed 21,218 workers in West Virginia, 2.3% of the national total in fuels. The sector gained 682 jobs and increased 3.3% in the past year.

Figure WV-4.
Fuels Employment by Detailed Technology Application



Mining and extraction jobs represent 67.6% of fuel jobs in West Virginia.

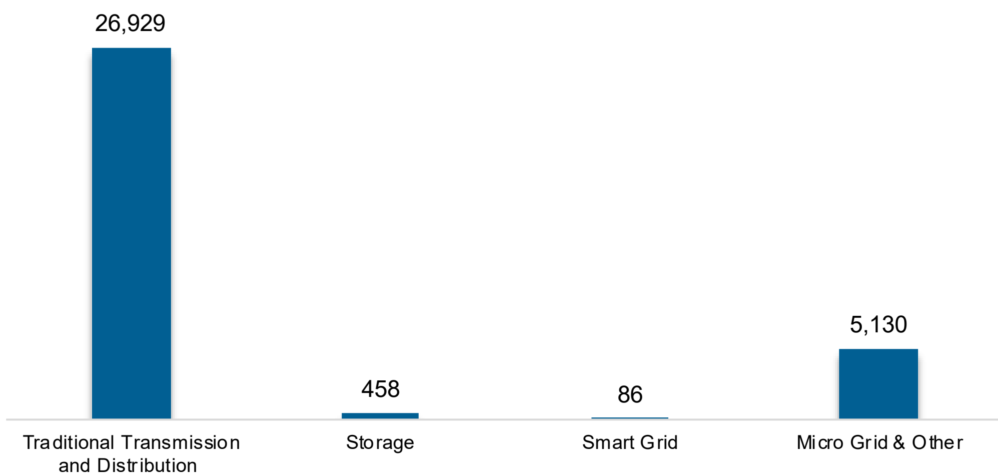
Figure WV-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

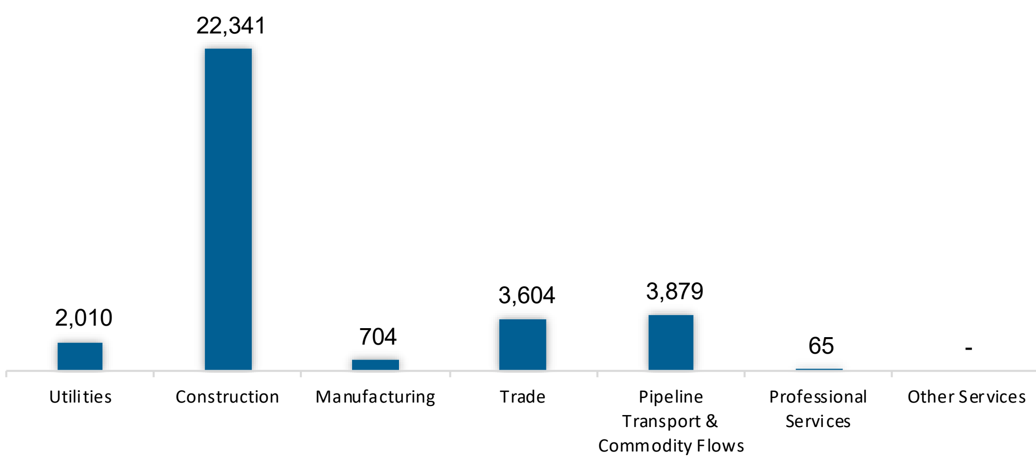
The transmission, distribution, and storage (TDS) sector employed 32,603 workers in West Virginia, 2.3% of the national TDS total. The sector gained 7,321 jobs and increased 29% in the past year.

Figure WV-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in West Virginia, accounting for 68.5% of the sector's jobs statewide.

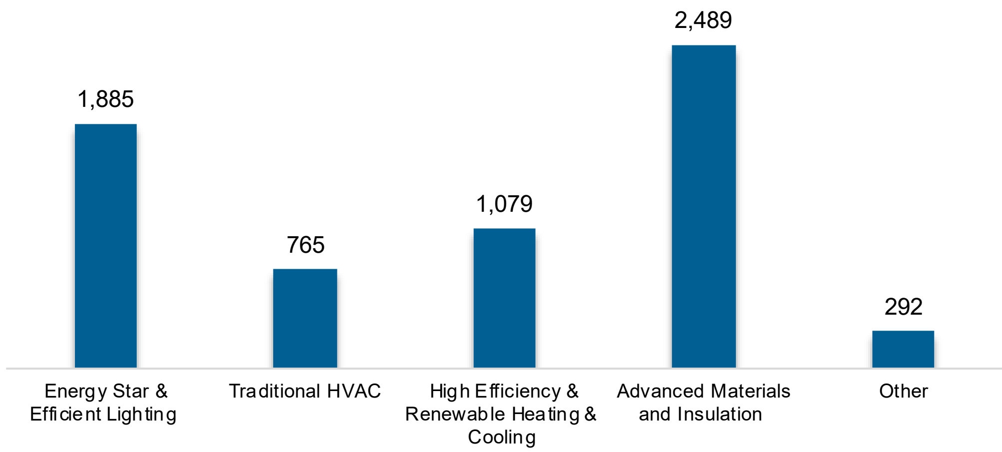
Figure WV-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

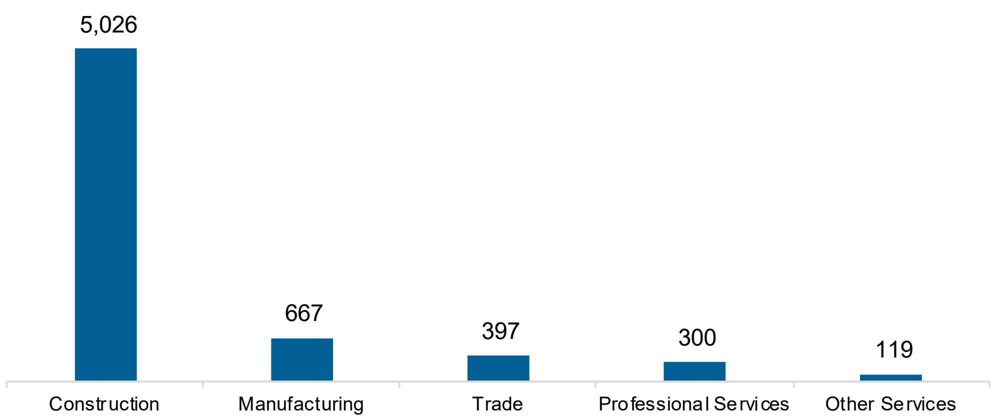
The energy efficiency (EE) sector employed 6,509 workers in West Virginia, 0.3% of the national EE total. The EE sector added 200 jobs and increased 3.2% in the past year.

Figure WV-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

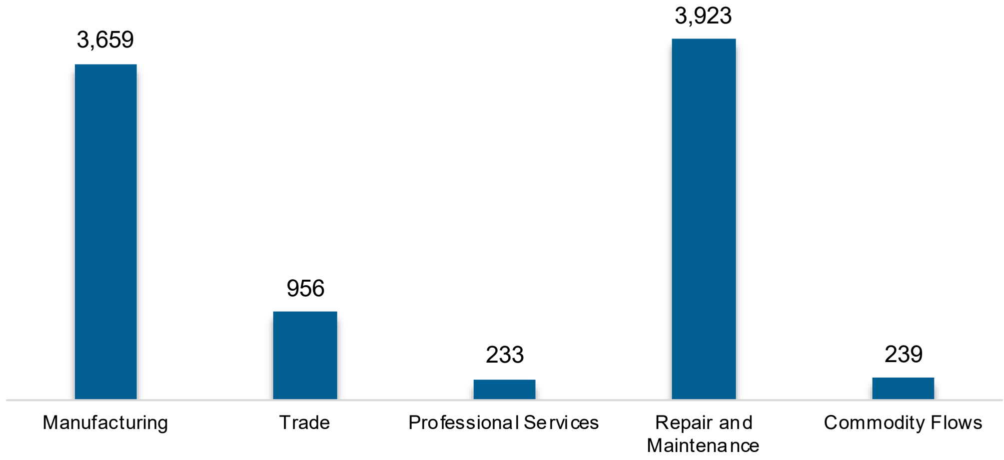
Figure WV-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 9,009 workers in West Virginia, 0.4% of the national total for the sector. Motor vehicles and component parts lost 374 jobs and decreased 4% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure WV-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in West Virginia are less optimistic than their peers across the country about energy sector job growth over the next year.

Table WV-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	1.1	2.2
Electric Power Transmission, Distribution, and Storage	0.6	1.1
Energy Efficiency	0.9	1.7
Fuels	1.5	3.0
Motor Vehicles	1.6	3.2

Hiring Difficulty

Employers in West Virginia reported 48.1% overall hiring difficulty.

Table WV-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	28.0	20.1	16.4	35.5	48.1

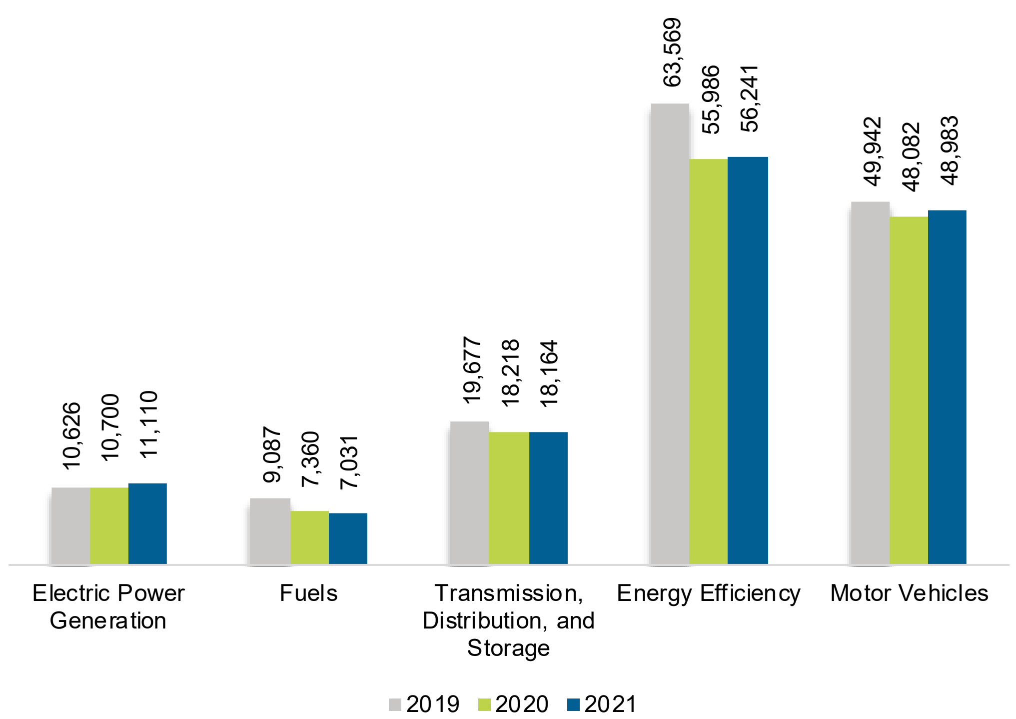
Wisconsin

ENERGY AND EMPLOYMENT — 2022

Overview

Wisconsin had 141,530 energy workers statewide in 2021, representing 1.8% of all U.S. energy jobs. Of these energy jobs, 11,110 are in electric power generation; 7,031 in fuels; 18,164 in transmission, distribution, and storage; 56,241 in energy efficiency; and 48,983 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 1,183 jobs, or 0.8%. The energy sector in Wisconsin represents 5.1% of total state employment.

Figure WI-1.
Employment by Major Energy Technology Application

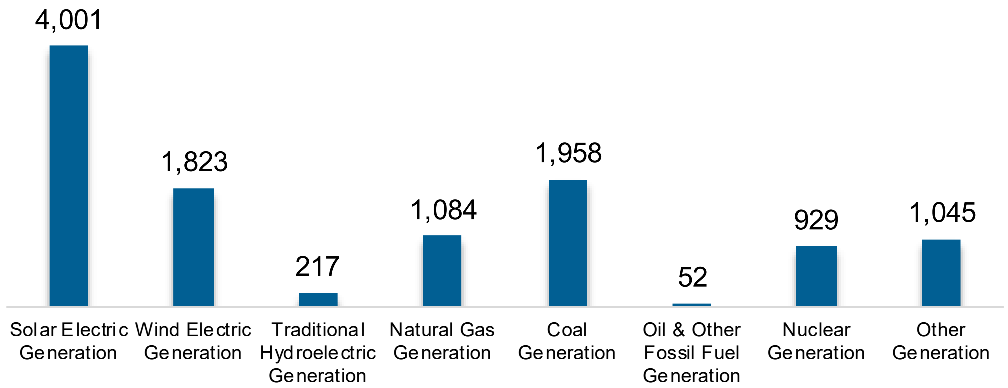


Breakdown by Technology Applications

Electric Power Generation

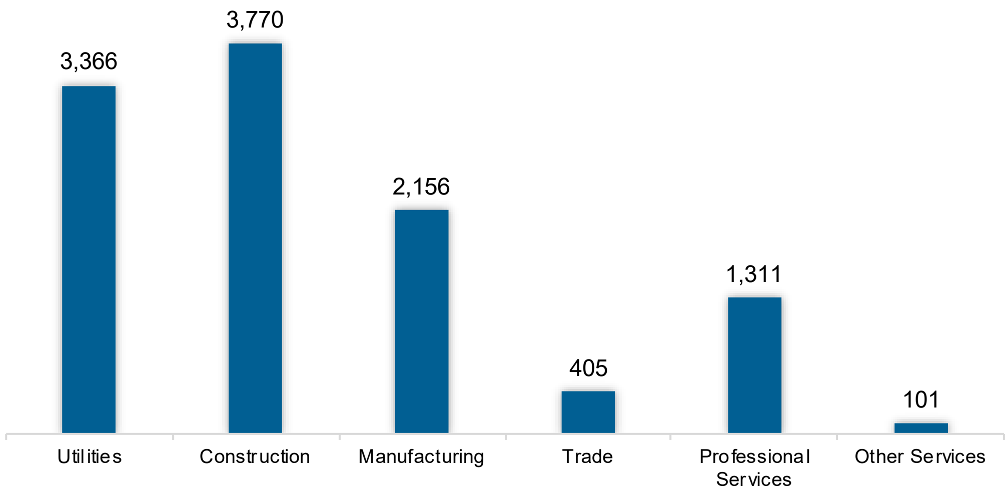
The electric power generation sector employed 11,110 workers in Wisconsin, 1.3% of the national electricity total, and added 410 jobs over the past year (3.8%).

Figure WI-2.
Electric Power Generation Employment by Detailed Technology Application



Construction work represents the largest industry sector in the electric power generation sector, with 33.9% of jobs. Utilities is second largest with 30.3%.

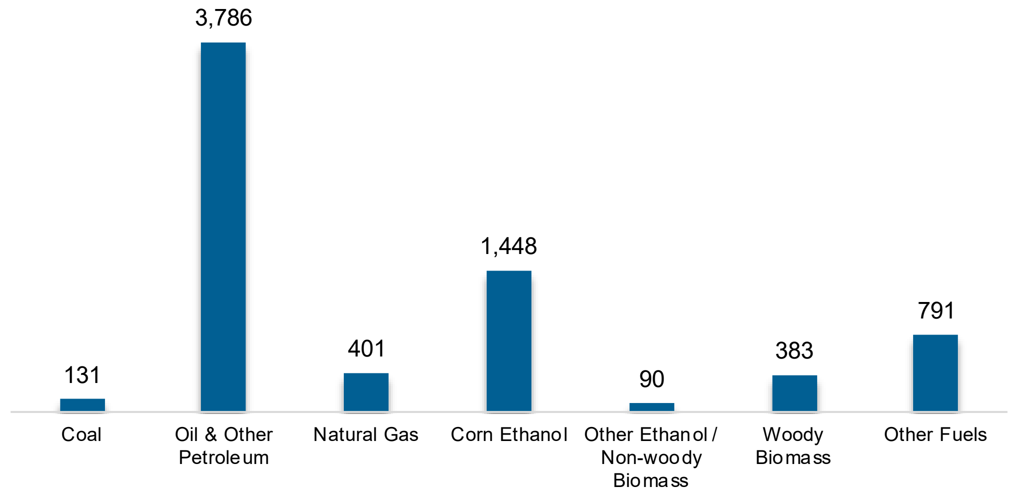
Figure WI-3.
Electric Power Generation Employment by Industry Sector



Fuels

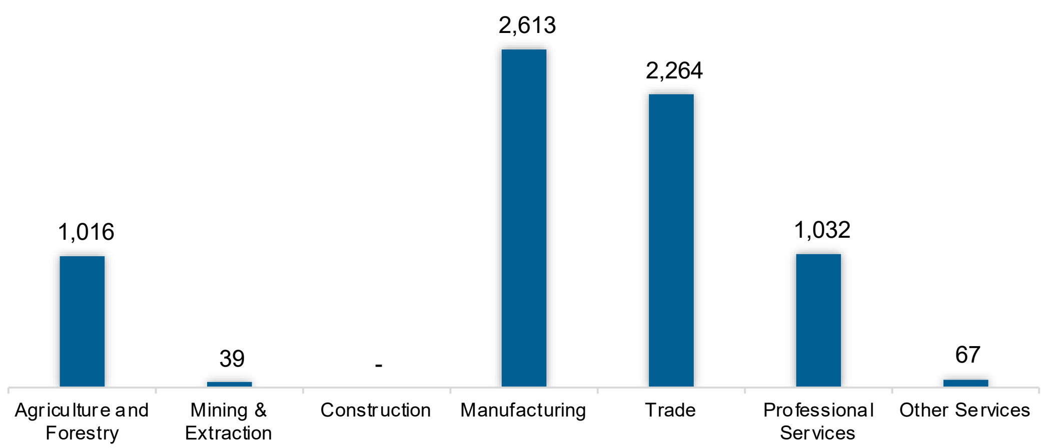
The fuel sector employed 7,031 workers in Wisconsin, 0.8% of the national total in fuels. The sector lost 329 jobs and decreased 4.5% in the past year.

Figure WI-4.
Fuels Employment by Detailed Technology Application



Manufacturing jobs represent 37.2% of fuel jobs in Wisconsin.

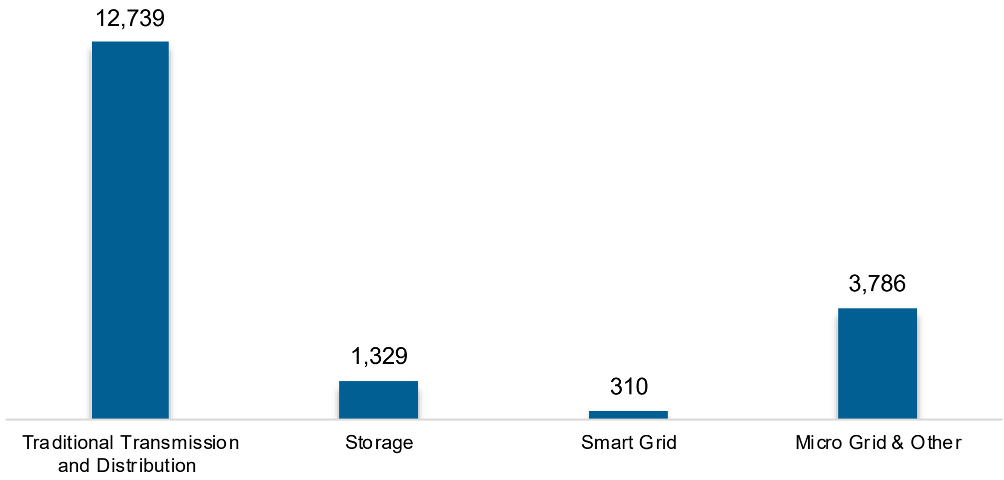
Figure WI-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

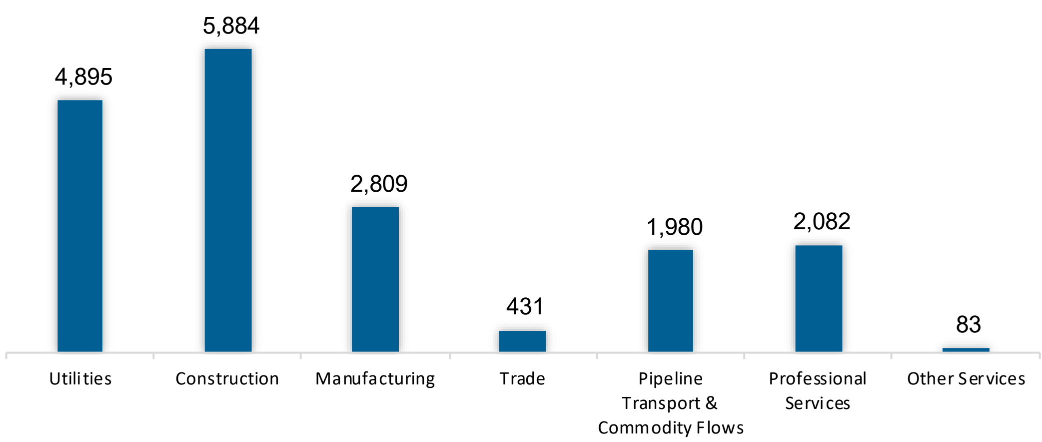
The transmission, distribution, and storage (TDS) sector employed 18,164 workers in Wisconsin, 0.8% of the national TDS total. The sector lost 54 jobs and decreased 0.3% in the past year.

Figure WI-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Construction work represents the greatest proportion of TDS jobs in Wisconsin, accounting for 32.4% of the sector's jobs statewide.

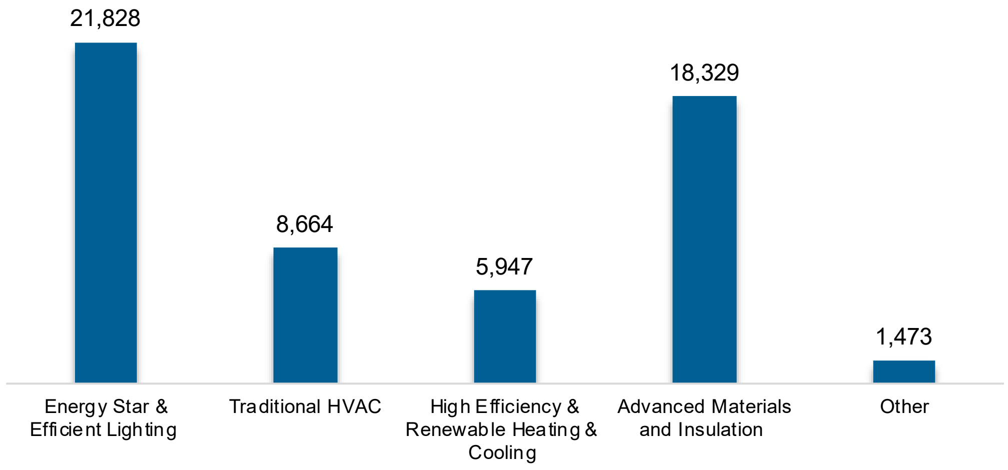
Figure WI-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

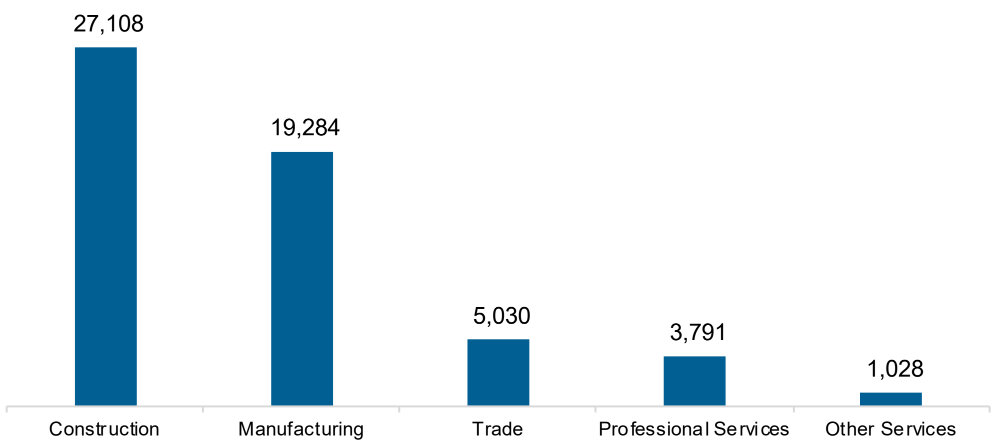
The energy efficiency (EE) sector employed 56,241 workers in Wisconsin, 2.6% of the national EE total. The EE sector added 255 jobs and increased 0.5% in the past year.

Figure WI-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

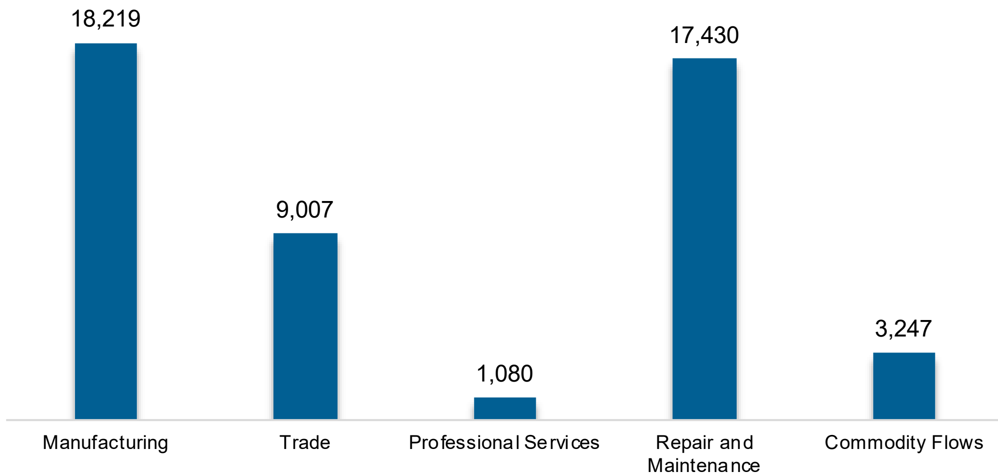
Figure WI-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 48,983 workers in Wisconsin, 1.9% of the national total for the sector. Motor vehicles and component parts added 901 jobs and increased 1.9% in the past year. Manufacturing work represents the largest proportion of motor vehicle jobs.

Figure WI-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Wisconsin are more optimistic than their peers across the country about energy sector job growth over the next year.

Table WI-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	3.8	2.2
Electric Power Transmission, Distribution, and Storage	3.2	1.1
Energy Efficiency	3.5	1.7
Fuels	4.2	3.0
Motor Vehicles	4.3	3.2

Hiring Difficulty

Employers in Wisconsin reported 49.3% overall hiring difficulty.

Table WI-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	22.2	27.1	8.7	41.9	49.3

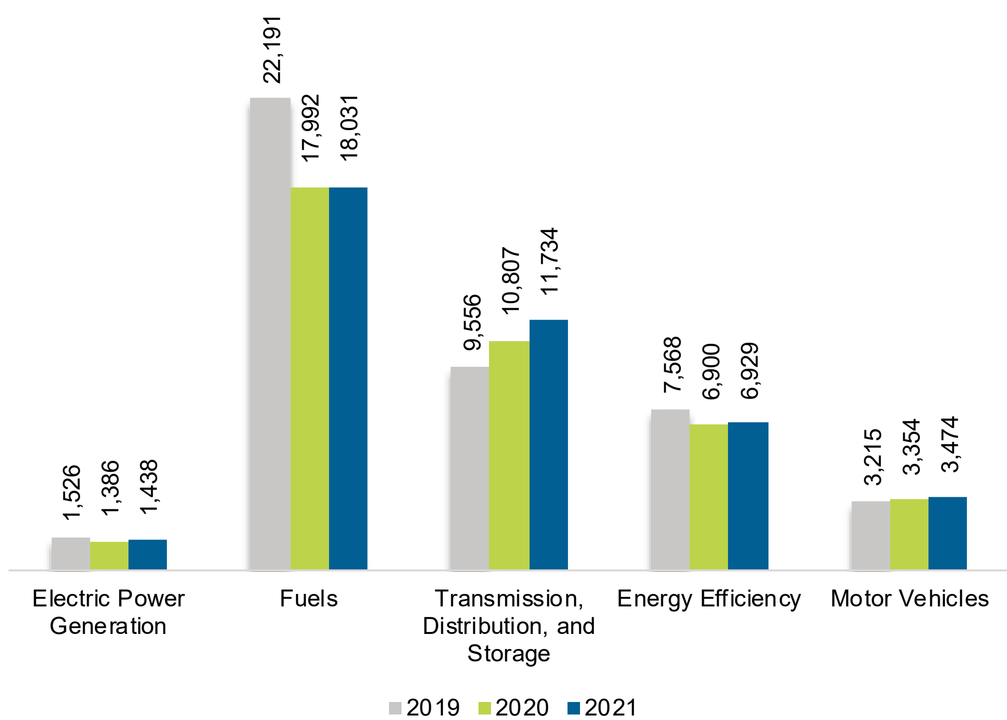
Wyoming

ENERGY AND EMPLOYMENT — 2022

Overview

Wyoming had 41,606 energy workers statewide in 2021, representing 0.5% of all U.S. energy jobs. Of these energy jobs, 1,438 are in electric power generation; 18,031 in fuels; 11,734 in transmission, distribution, and storage; 6,929 in energy efficiency; and 3,474 in motor vehicles. From 2020 to 2021, energy jobs in the state increased by 1,168 jobs, or 2.9%. The energy sector in Wyoming represents 15.7% of total state employment.

Figure WY-1.
Employment by Major Energy Technology Application

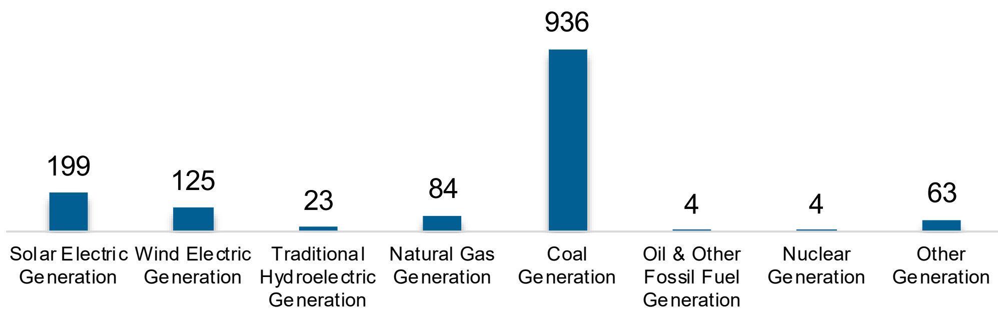


Breakdown by Technology Applications

Electric Power Generation

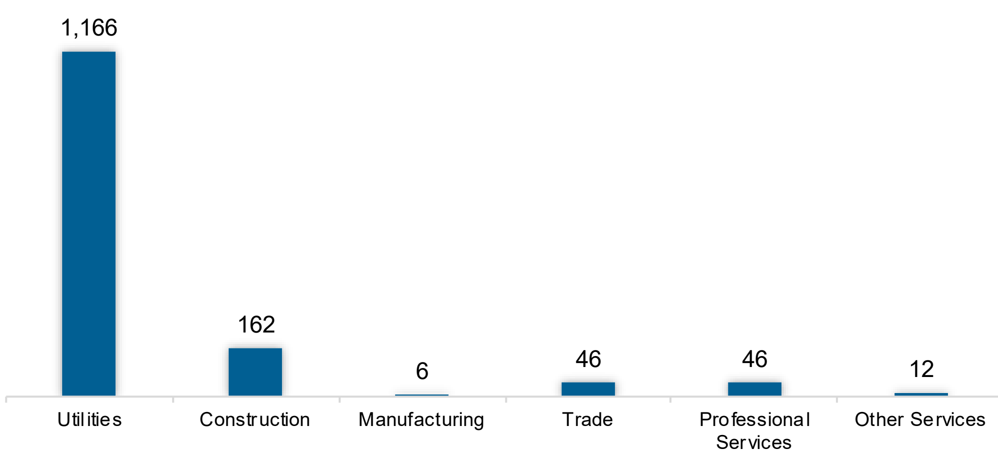
The electric power generation sector employed 1,438 workers in Wyoming, 0.2% of the national electricity total, and added 52 jobs over the past year (3.7%).

Figure WY-2.
Electric Power Generation Employment by Detailed Technology Application



Utilities work represents the largest industry sector in the electric power generation sector, with 81.1% of jobs. Construction is second largest with 11.2%.

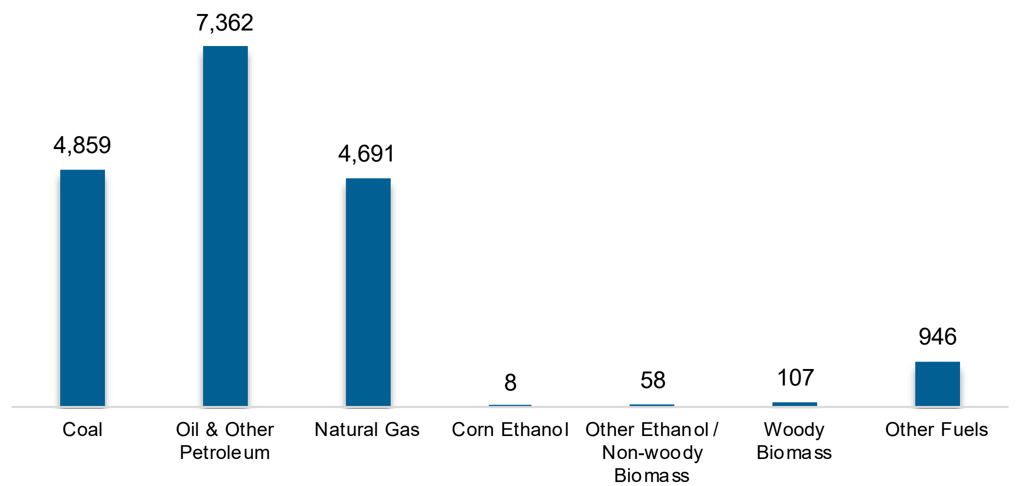
Figure WY-3.
Electric Power Generation Employment by Industry Sector



Fuels

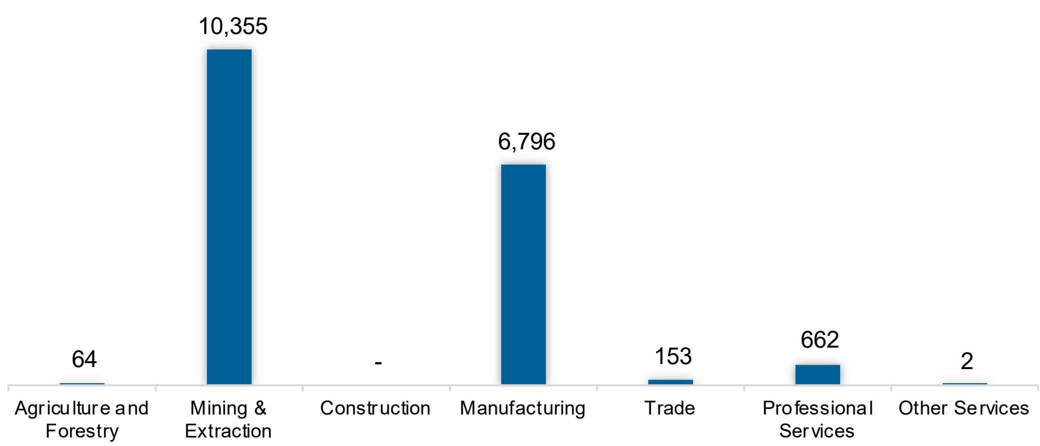
The fuel sector employed 18,031 workers in Wyoming, 2% of the national total in fuels. The sector gained 40 jobs and increased 0.2% in the past year.

Figure WY-4.
Fuels Employment by Detailed Technology Application



Mining and extraction jobs represent 57.4% of fuel jobs in Wyoming.

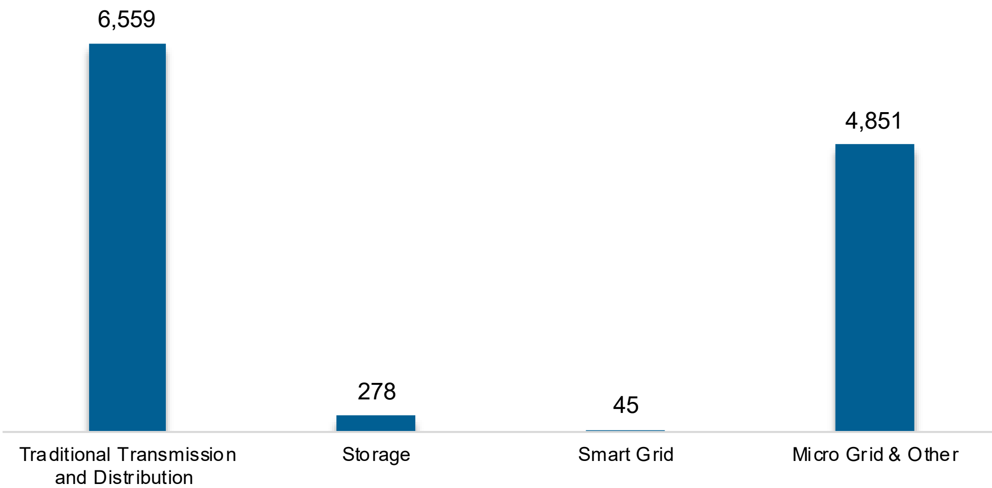
Figure WY-5.
Fuels Employment by Industry Sector



Transmission, Distribution and Storage

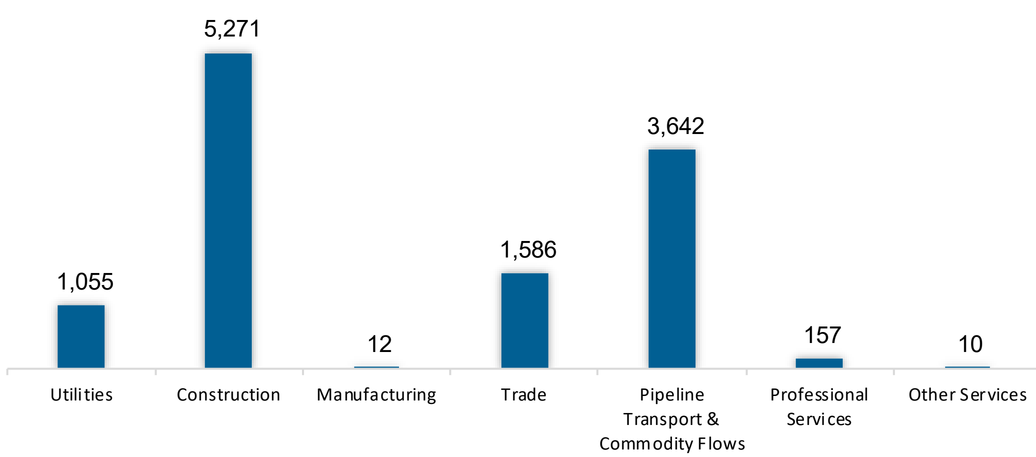
The transmission, distribution, and storage (TDS) sector employed 11,734 workers in Wyoming, 2% of the national TDS total. The sector gained 927 jobs and increased 8.6% in the past year.

Figure WY-6.
Transmission, Distribution and Storage Employment by Detailed Technology



Pipeline transport and commodity flows work represents the greatest proportion of TDS jobs in Wyoming, accounting for 31% of the sector's jobs statewide.

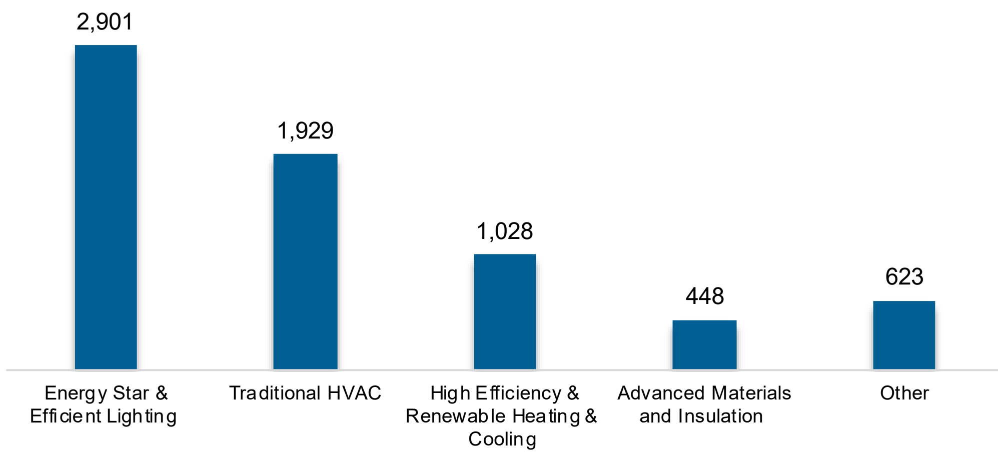
Figure WY-7.
Transmission, Distribution and Storage Employment by Industry Sector



Energy Efficiency

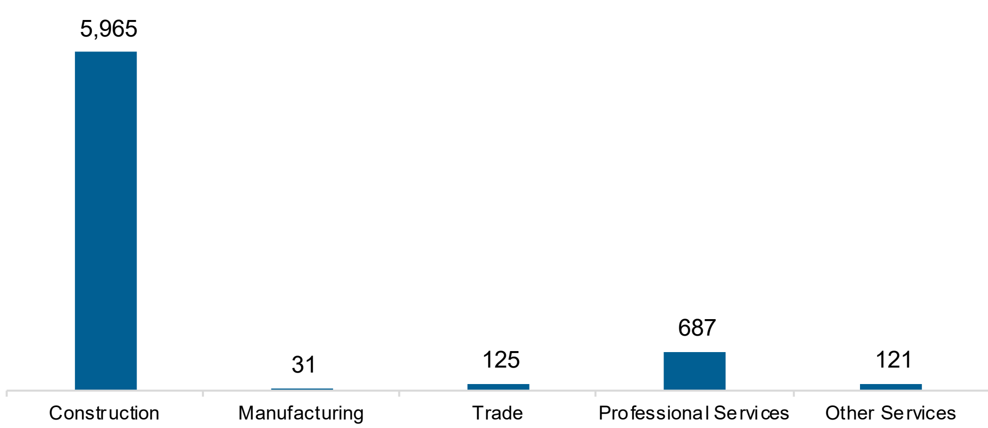
The energy efficiency (EE) sector employed 6,929 workers in Wyoming, 0.3% of the national EE total. The EE sector added 28 jobs and increased 0.4% in the past year.

Figure WY-8.
Energy Efficiency Employment by Detailed Technology Application



EE employment is primarily found in the construction industry.

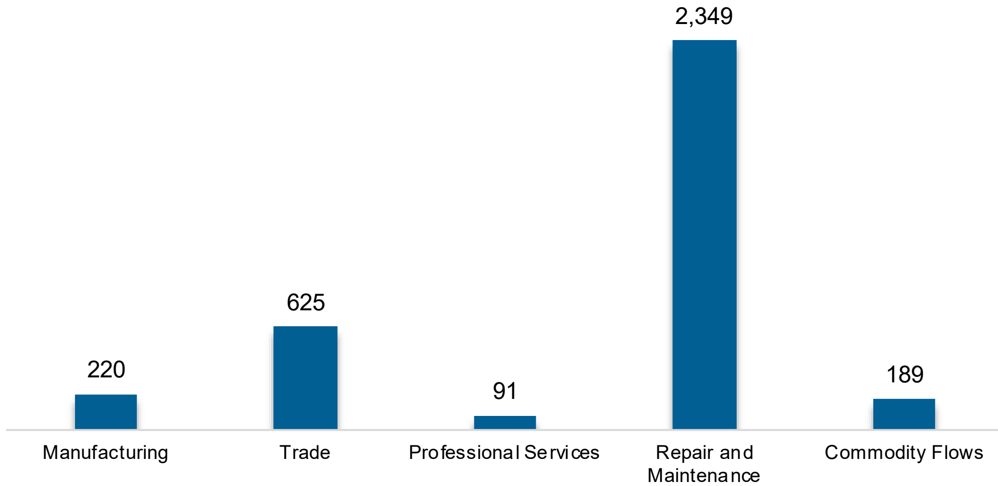
Figure WY-9.
Energy Efficiency Employment by Industry Sector



Motor Vehicles and Component Parts

The motor vehicles and component sector employed 3,474 workers in Wyoming, 0.1% of the national total for the sector. Motor vehicles and component parts added 120 jobs and increased 3.6% in the past year. Repair and maintenance work represents the largest proportion of motor vehicle jobs.

Figure WY-10.
Motor Vehicle Employment by Industry Sector



Workforce Characteristics

Employer Growth

Employers in Wyoming are less optimistic than their peers across the country about energy sector job growth over the next year.

Table WY-1
Projected Growth by Major Technology Application

Technology	State Projected Growth Next 12 Months (percent)	U.S. Projected Growth Next 12 Months (percent)
Electric Power Generation	0.1	2.2
Electric Power Transmission, Distribution, and Storage	-0.5	1.1
Energy Efficiency	-0.2	1.7
Fuels	0.5	3.0
Motor Vehicles	0.6	3.2

Hiring Difficulty

Employers in Wyoming reported 55.2% overall hiring difficulty.

Table WY-2
Hiring Difficulty

Hiring Difficulty	Very Difficult (percent)	Somewhat Difficult (percent)	Not at All Difficult (percent)	Did Not Hire (percent)	Overall Hiring Difficulty
Overall	29.1	26.2	5.2	39.5	55.2

U.S. DEPARTMENT OF ENERGY

For more information,
visit energy.gov/useer.
DOE/OP-0017 • June 2022

U.S. DEPARTMENT OF ENERGY

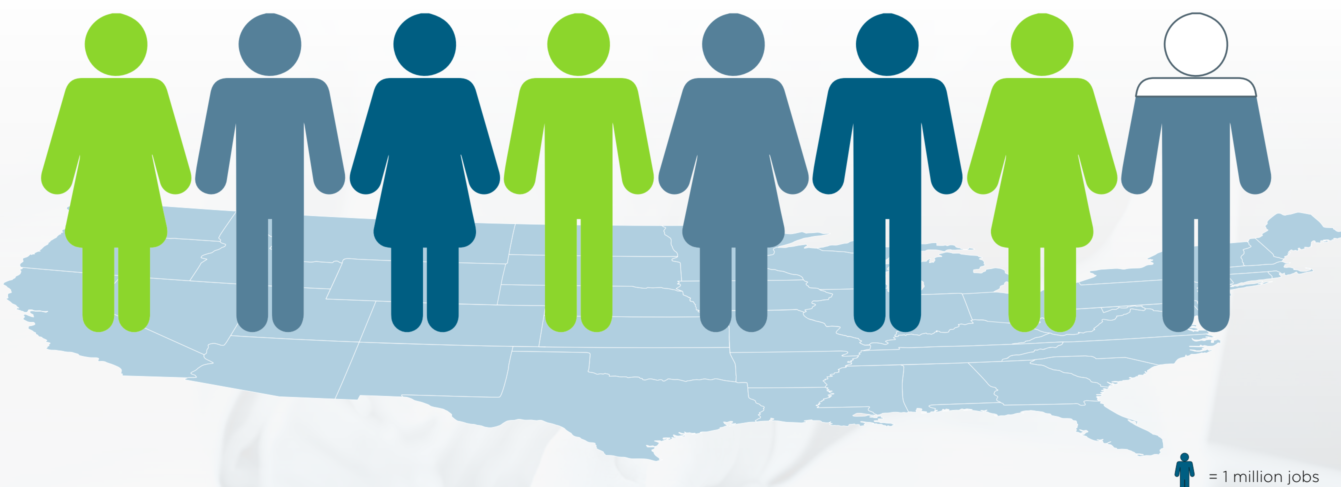
The United States Energy and Employment Report (USEER) captures employment, workforce, industry, occupation, unionization, demographic, and hiring information by energy industry technology groups. These groups represent the fields of electric power generation; transmission, distribution, and storage; fuels; energy efficiency; and motor vehicles and component parts.

The national report, along with companion reports giving state-level details, are available at energy.gov/useer

EMPLOYMENT TRENDS

In 2021, the Energy sector employed more than 7.8 million Americans.

7.8 MILLION JOBS

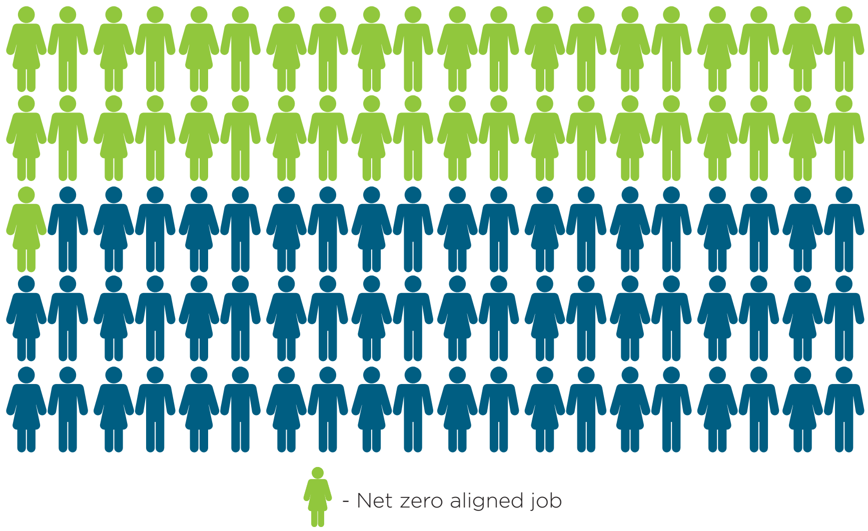


4.0% Total energy employment rose by 4.0% from 2020 to 2021.

2.8% Energy jobs grew faster than the U.S. workforce overall, which rose 2.8% in 2021.

JOBS IN NET-ZERO ALIGNED AREAS

There were 3,086,467 jobs in net-zero aligned areas, making up 41% of total energy jobs in 2021.



Jobs in net-zero aligned areas are defined as jobs related to: renewable energy; grid technologies and storage; traditional transmission and distribution; nuclear energy; a subset of energy efficiency; biofuels; and plug-in hybrid, fully electric, and hydrogen fuel cell vehicles and components.

UNIONIZATION

Across all energy jobs in 2021, 10% of workers were represented by a union or project labor agreement, compared to 6% in the private sector.

Energy Workers	Private Sector Overall
10%	6%

2021 ENERGY JOBS

ELECTRIC POWER GENERATION

The Electric Power Generation sector employed 857,579 people in 2021, an increase of 24,006 jobs (+2.9%).

Nearly all subtechnologies added jobs from 2020 through 2021. Wind energy was one of the few industries that did not lose jobs in 2020.

An increase of
24,006 JOBS,
UP 2.9%,
from 2020 to 2021.

Solar
+ 17,212 jobs
(+ 5.4%)

Wind
+3,347 jobs
(+ 2.9%)

Coal
-572 jobs
(-0.8%)

Nuclear
-2,440 jobs
(-4.2%)

Hydropower
+1,383 jobs
(+2.2%)

Combined Heat and Power
+996 jobs
(+3.5)

Bioenergy
+349 jobs
(+2.9%)

Geothermal
+220 jobs
(+2.8%)

TRANSMISSION, DISTRIBUTION, AND STORAGE

The Transmission, Distribution, and Storage sector employed more than 1.3 million people in 2021.

An increase of **21,460 JOBS, UP 1.6%,** from 2020 to 2021.

All transmission, distribution, and storage technologies experienced job growth in 2021.

Traditional Transmission and Distribution

+13,008 jobs (+1.4%)

Traditional transmission and distribution added the most TDS jobs.

Batteries

+2,949 jobs (+4.4%)

Batteries saw job increases both in the grid storage and electric vehicles sectors.

Smart Grids

+1,136 jobs (+4.9%)

Smart grids outpaced virtually all other TDS technologies in growth rate.

FUELS

The Fuel sector employed 908,422 people in 2021.

A decrease of **29,270 JOBS, DOWN 3.1%,** from 2020 to 2021.

Fossil fuel jobs accounted for most of the fuel jobs lost.

Petroleum

-31,593 jobs (-6.4%).

Onshore and offshore petroleum sectors combined led total job losses.

Coal Fuel

-7,125 (-11.8%).

Coal fuel employment declined by the greatest percentage.

Biofuels

+1,180 jobs (+6.7%)

Renewable diesel fuels, biodiesel fuels, and waste fuels all added jobs.

ENERGY EFFICIENCY

The Energy Efficiency sector employed 2,164,914 people in 2021 in the design, installation, and manufacturing of energy efficiency products and services.

An increase of
57,741 JOBS,
UP 2.7%,
from 2020 to 2021.

All energy efficiency technologies experienced job growth in 2021.

Traditional Heating, Ventilation, and Air Conditioning (HVAC):
+17,740 jobs (**+3.3%**).

ENERGY STAR® Appliances, Products, and Services:
+12,941 (**+2.4%**).

Renewable Heating and Cooling:
+4,027 jobs (**+3.5%**)

MOTOR VEHICLES

The Motor Vehicle and Component Parts sector employed 2,553,368 people in 2021.

Motor vehicles and component parts is the largest energy sector.

An increase of **228,082 JOBS, UP 9.8%,** from 2020 to 2021.

Motor Vehicles:
+144,300 (+11.9%)

Hybrid Electric
+23,577 jobs (+19.7%)

Full Battery Electric
+21,961 jobs (+26.2%)

Plug-in Hybrid
+14,790 jobs (+30.9%)

Hydrogen Fuel Cell
+4,160 (+41.4%)

Component Parts:
+79,100 jobs (+7.9%)

25%

Jobs in carbon-reducing motor vehicles and component parts technologies grew a collective 25% in 2021, and were among the only subcategories of any type of energy jobs that did NOT decrease in 2020.

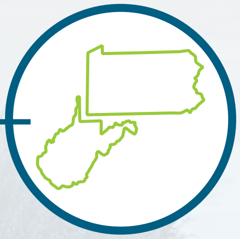
STATE LEVEL DATA

Carbon-reducing vehicles, renewable energy, and energy efficiency were a significant source of job growth in many states

Texas gained approximately 31,000 net jobs, which includes roughly 5,000 in carbon-reducing motor vehicles and nearly 7,000 in energy efficiency.

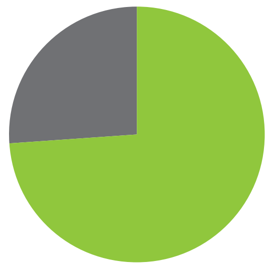
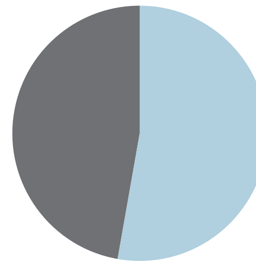
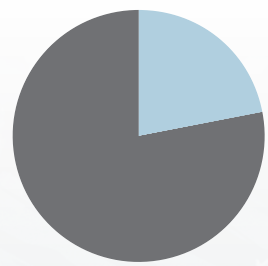
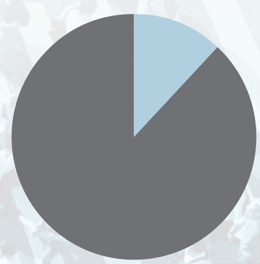
California gained more than 29,000 energy jobs, of which about 11,000 were in carbon-reducing motor vehicles and almost 2,000 were in solar.

Florida gained nearly 15,000 energy jobs, of which, over 5,000 were in energy efficiency.



West Virginia and Pennsylvania fared best nationally for growth in transmission, distribution, and storage, gaining 7,321 and 5,726 new jobs, respectively.

DEMOGRAPHICS

	Energy Workforce	Overall U.S. Workforce
The energy workforce is 74% male vs U.S. workforce average, which is 53% male.	74% 	53% 
Non-White workers: 26% in energy vs 22% across the US workforce.*	26% 	22% 
Black or African American: 8% compared to 12% across the U.S. workforce	8% 	12% 

*Surveys were filled out by employers who do not always have an accurate understanding of the racial and ethnic makeup of their employees

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