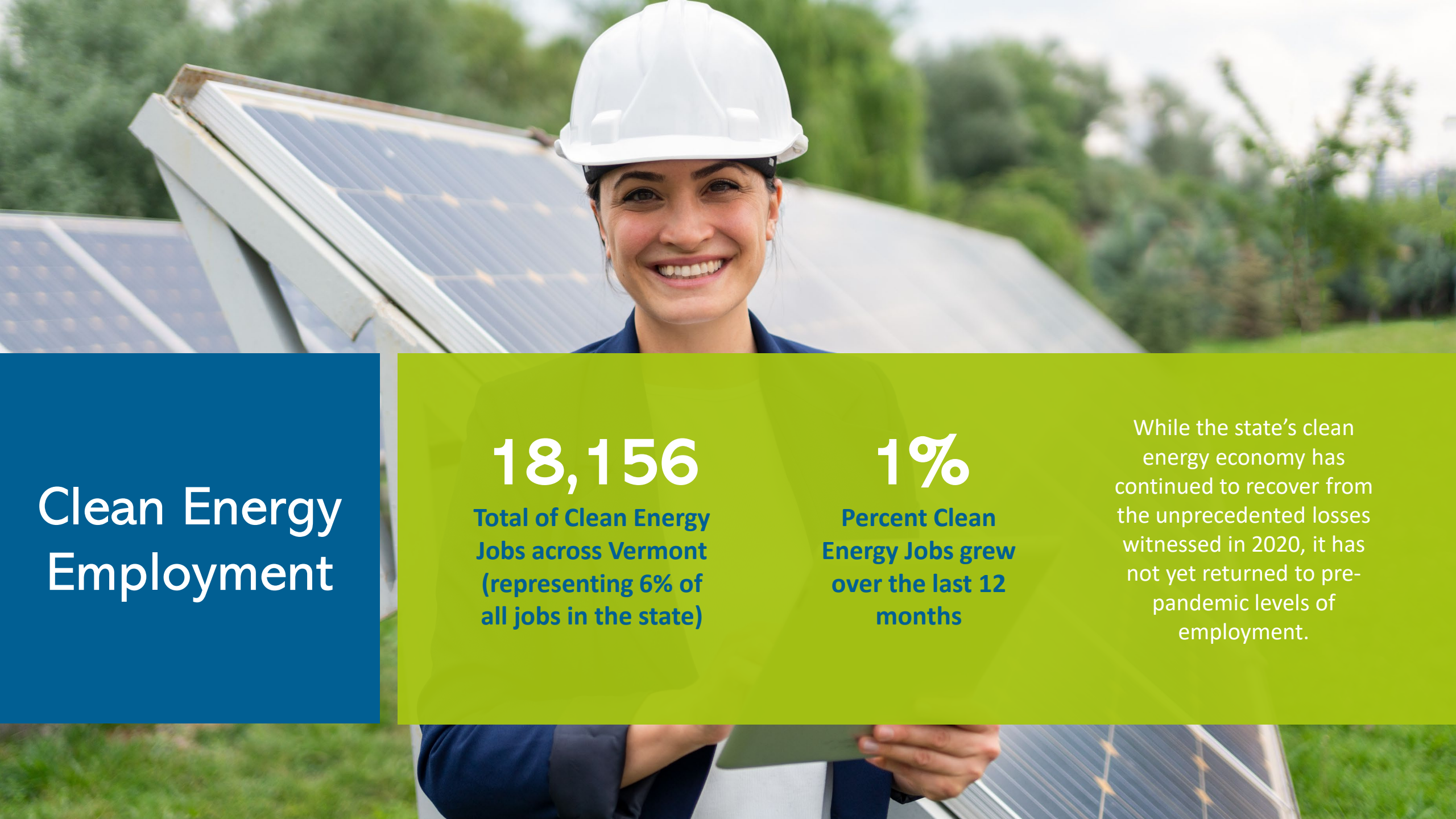


2023 Vermont Clean Energy Industry Report





Clean Energy Employment

18,156

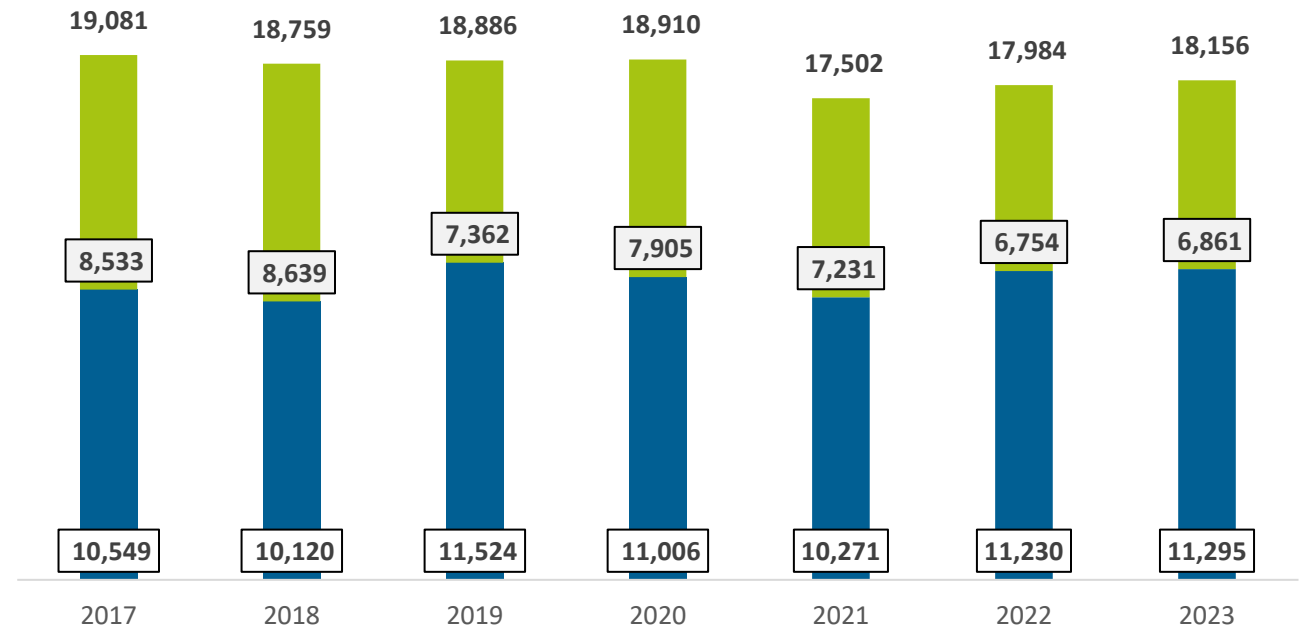
Total of Clean Energy Jobs across Vermont (representing 6% of all jobs in the state)

1%

Percent Clean Energy Jobs grew over the last 12 months

While the state's clean energy economy has continued to recover from the unprecedented losses witnessed in 2020, it has not yet returned to pre-pandemic levels of employment.

2017-2023 Clean Energy Employment

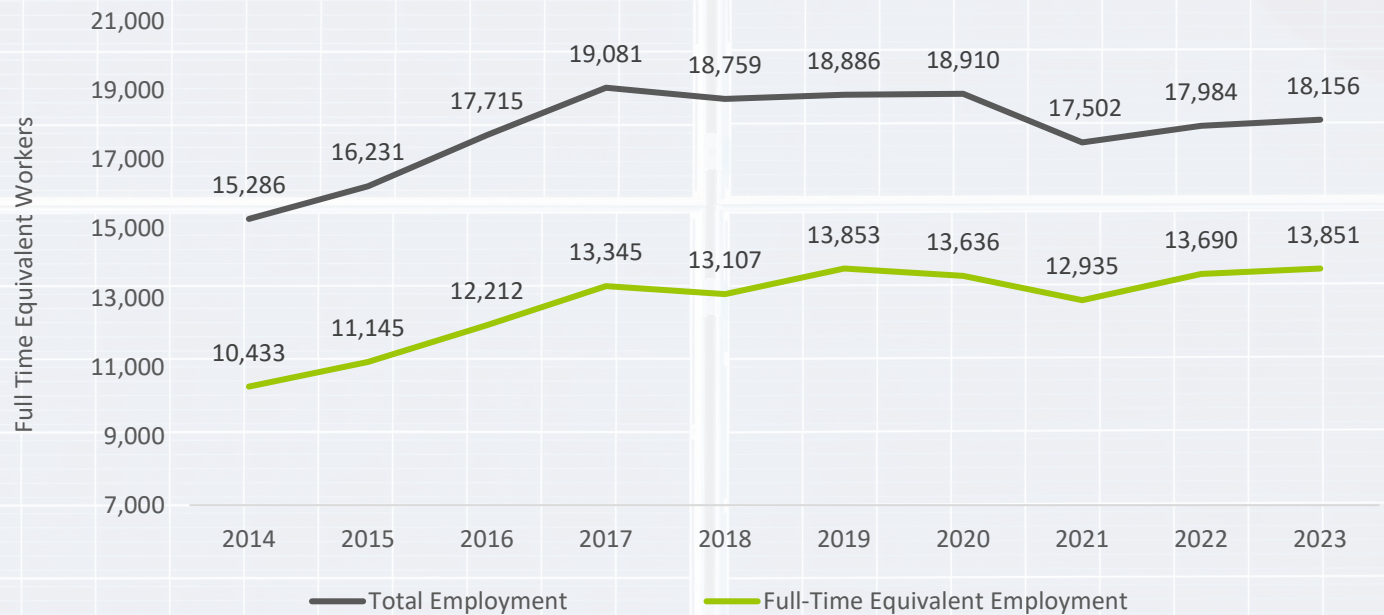


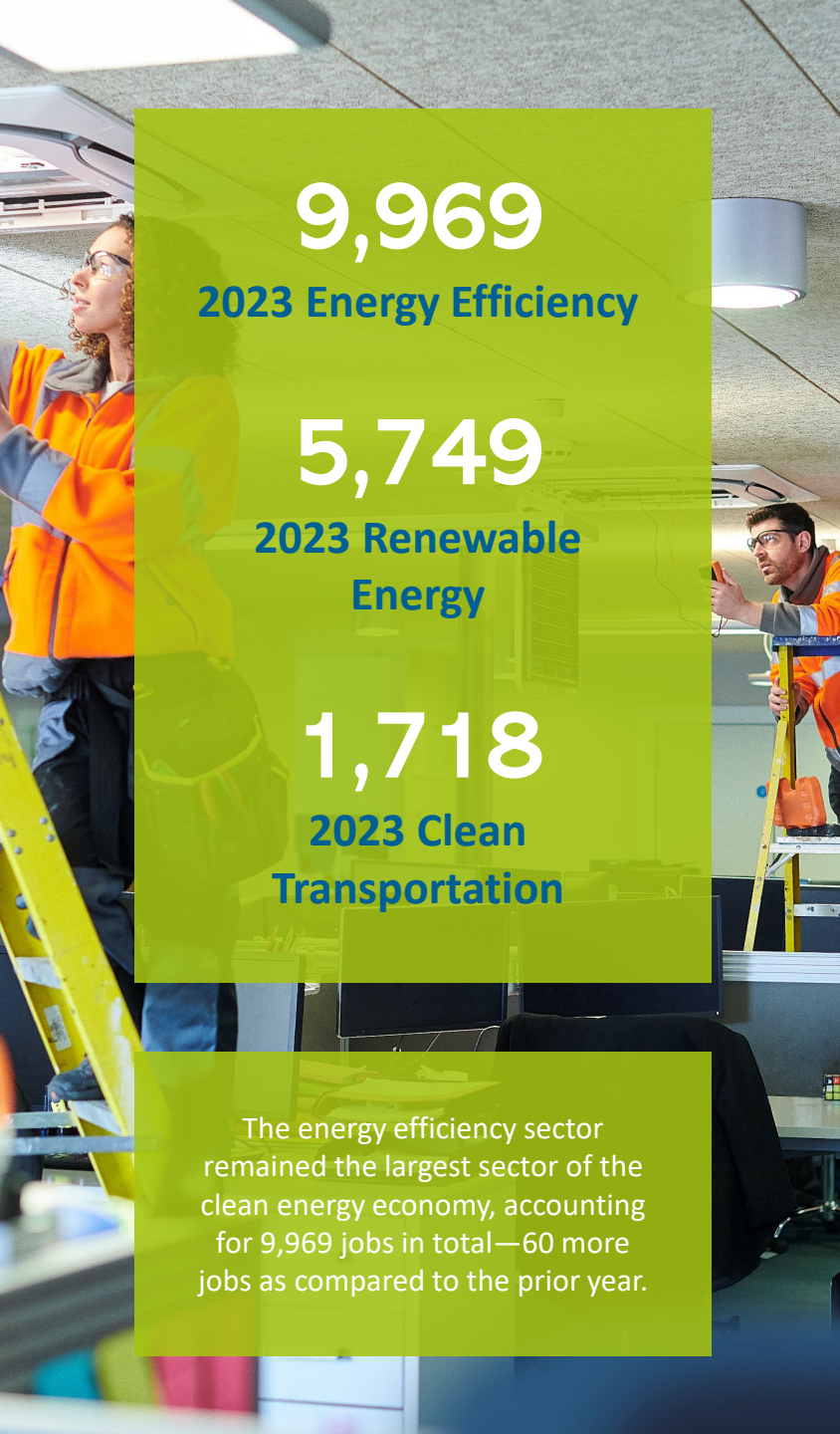
■ Remainder of clean energy workforce

■ Workers that spend 100 percent of their time on clean energy-related activities

2014 - 2023 Total & Full-Time Equivalent Clean Energy Employment

Vermont's clean energy FTE jobs nearly reached the record high reported pre-pandemic.





9,969

2023 Energy Efficiency

5,749

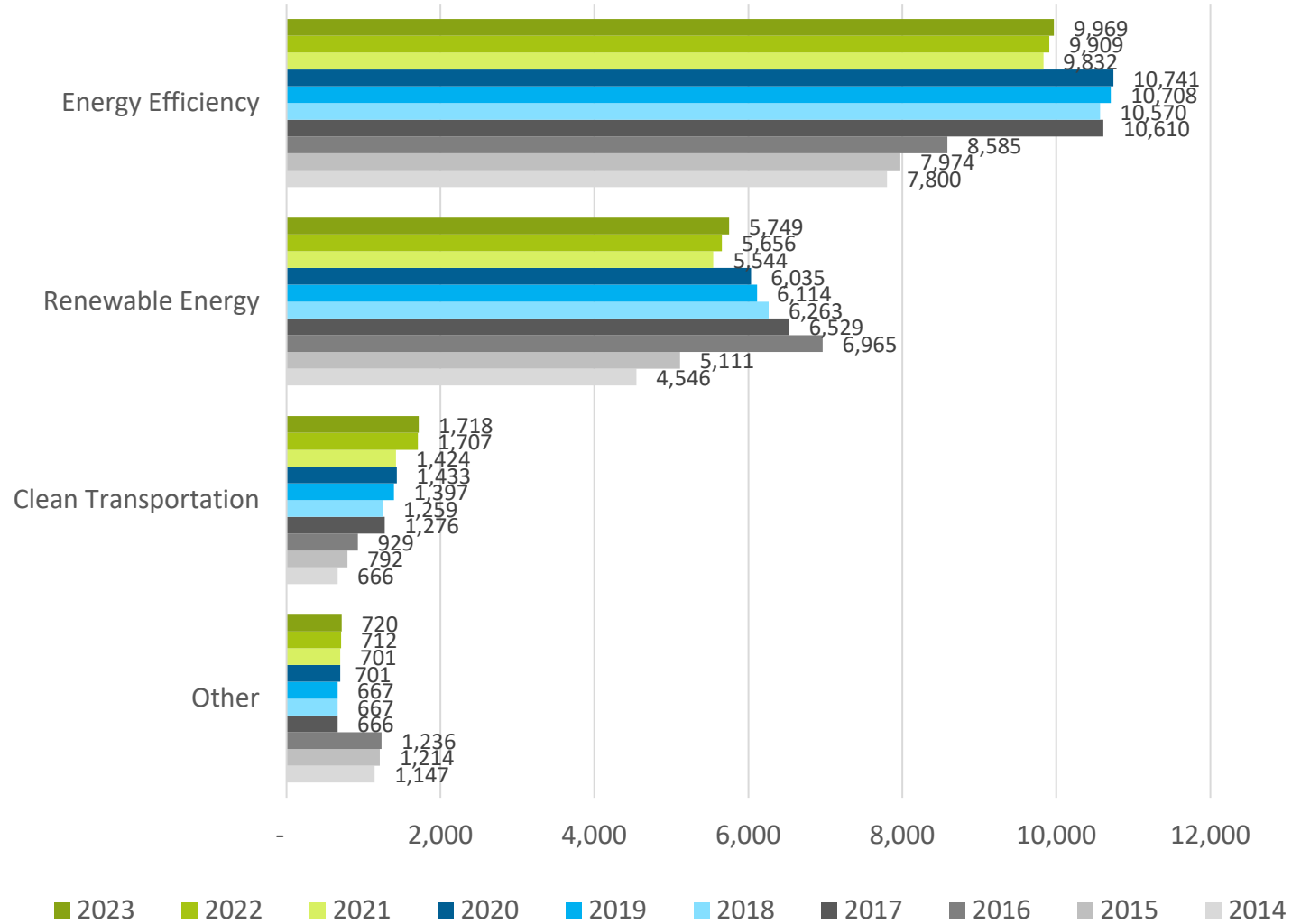
2023 Renewable Energy

1,718

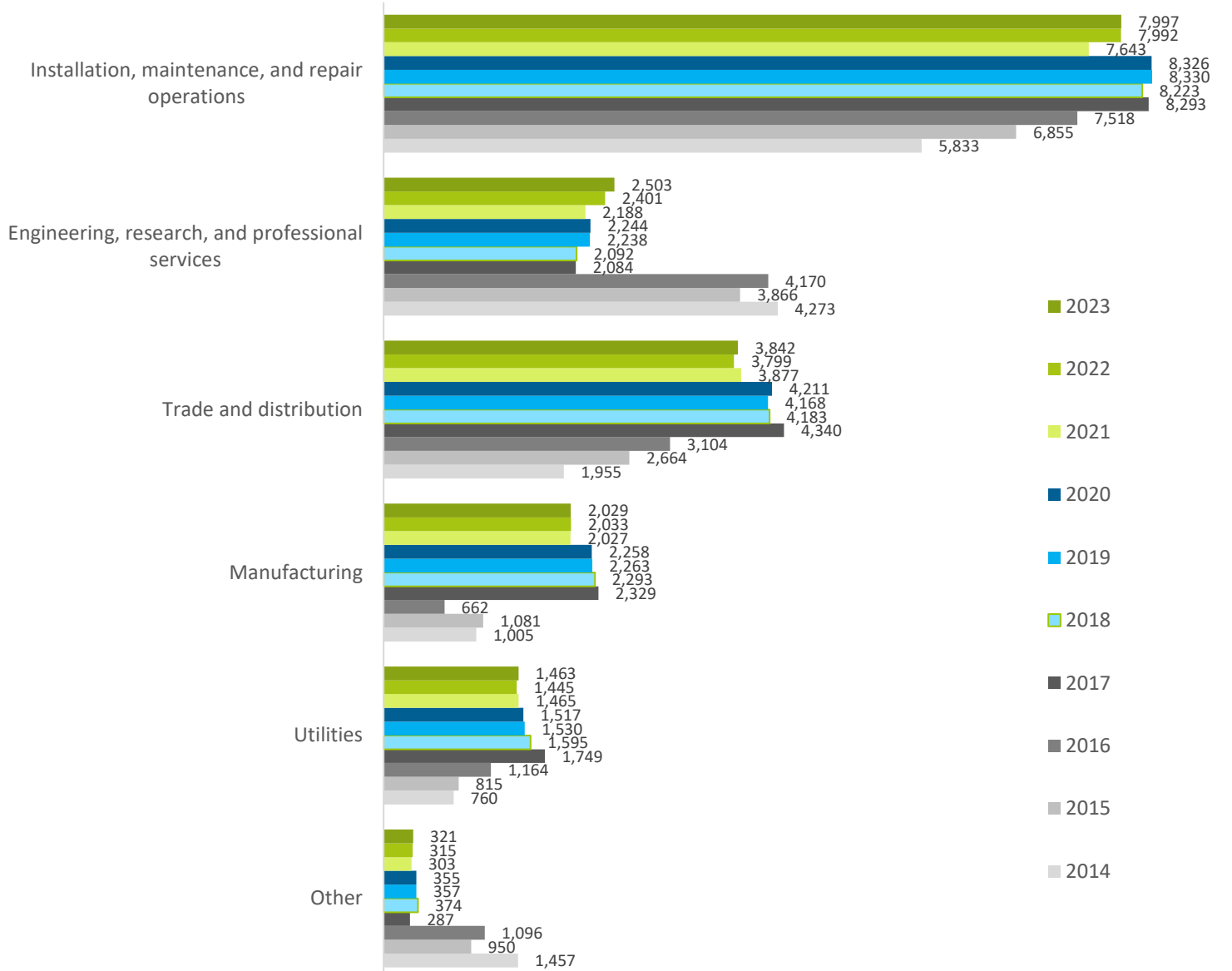
2023 Clean Transportation

The energy efficiency sector remained the largest sector of the clean energy economy, accounting for 9,969 jobs in total—60 more jobs as compared to the prior year.

Clean Energy Employment by Technology Sector



Clean Energy Employment by Value Chain Segment



2023

Selected Demographics of Clean Energy Workers in Vermont

73%
Men

27%
Women

0% Gender Non-Binary

Ethnicity

6% Hispanic or Latino
94% Not Hispanic or Latino

Race

1% American Indian or Alaska Native
4% Asian
4% Black or African American
0% Native Hawaiian or Other Pacific
Islander
88% White
4% Two or more Races

Veteran Status

7% Veterans

Age Group

14% 55 and over

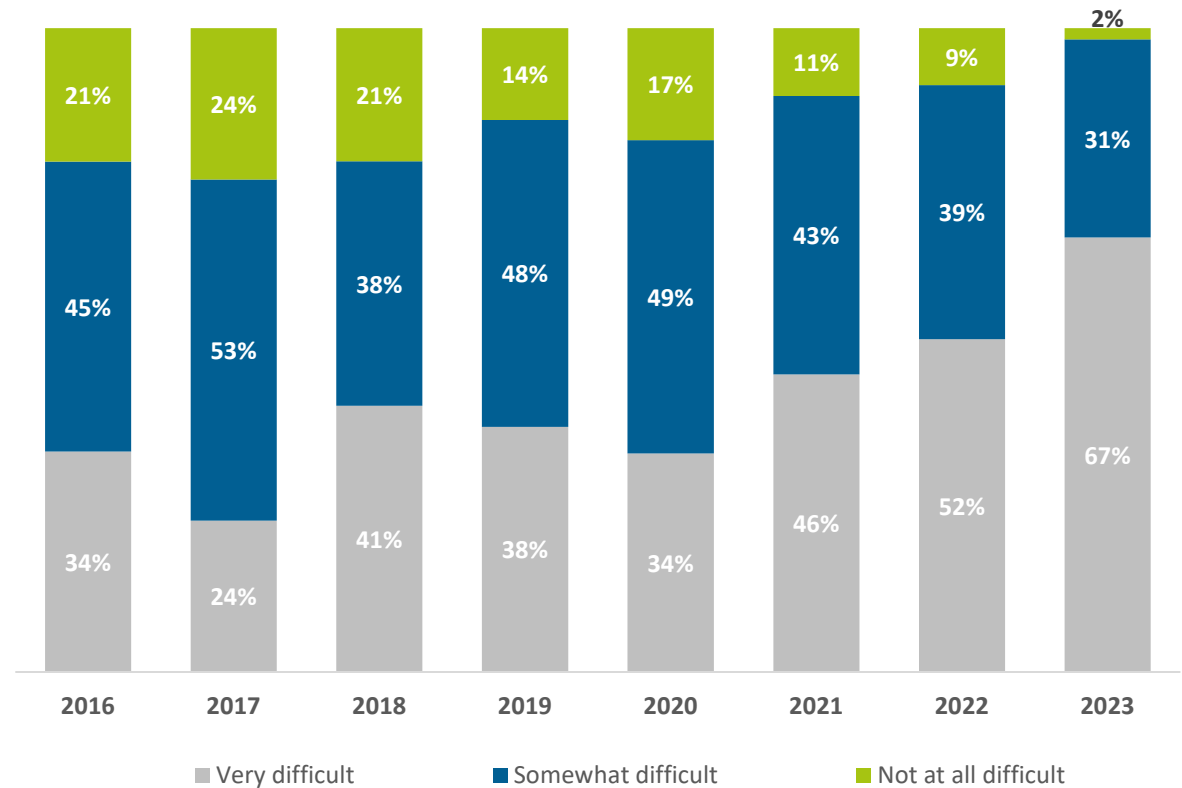


Employer-Reported Hiring Difficulty

98%

Of all employers hiring in Vermont reported encountering difficulties in hiring clean energy workers.

The proportion of employers reporting high levels of difficulty in hiring clean energy workers has continued to rise sharply since 2020, with more than two-thirds of employers (67%) reporting high levels of difficulty in hiring clean energy workers, as compared to just over one-half (52%) of employers one year ago.



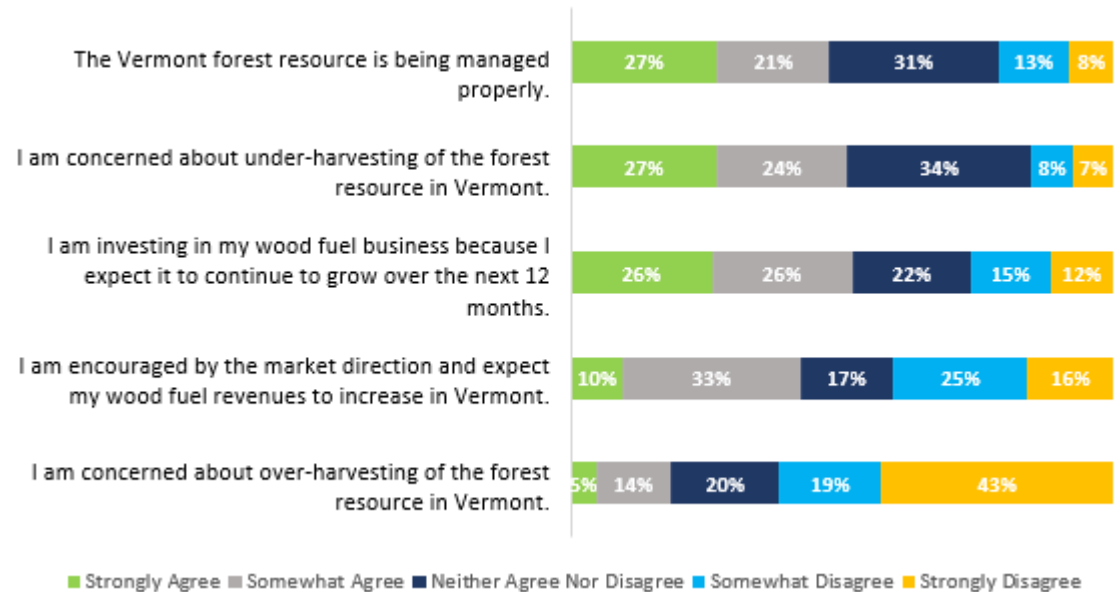
Wood Fuel Employment by Industry

In 2023, there were 1,901 wood fuel workers across the state of Vermont, a modest 6 percent increase over 2020, driven by substantial growth in employment at firms engaged in the manufacture, development, sales, or support of wood fuel combustion systems.

	2016	2018	2020	2023
Logging	517	461	452	407
Wood fuel processing and preparation, including chips, pellets, or firewood	982	790	768	684
Combustion systems, such as stoves, furnaces, boilers, inserts, etc.	629	554	536	778
Other	42	36	37	31
Total	2,171	1,841	1,794	1,901

2023 Wood Fuel Business and Forest Health

Despite concerns regarding harvesting levels and government regulations, most employers (52 percent) planned to invest in their wood fuel businesses in anticipation of continued growth over the next 12 months.





Methodology

The 2023 VCEIR uses publicly available data from the 2023 U.S. Energy and Employment Report (USEER) on Vermont energy employment produced by BW Research Partnership on behalf of the Department of Energy (DOE). These public data are refined and customized for Vermont based on additional analyses conducted on behalf of the Vermont Clean Energy Development Fund (CEDF) at the Vermont Department of Public Service by BW Research Partnership.

The 2023 USEER survey was administered by telephone and by web from January 31, 2023 through March 30, 2023, with almost 7,800 outbound calls and more than 1,000 emails sent to potential participants in Vermont. In total, 371 business establishments in Vermont participated in the survey effort. These responses were used to develop incidence rates among industries 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 Vermont is +/- 4.99% at a 95% confidence level.

Glossary

RENEWABLE ENERGY GENERATION

Renewable energy generation jobs cover all utility and non-utility employment for renewable electricity-generating technologies. Included in these employment estimates are any firms engaged in renewable energy facility construction, generation equipment manufacturing, wholesale parts distribution, and professional and business services such as consulting, finance, administrative, and legal support for the following renewable energy generation sub-technologies:

- Solar Photovoltaic Electric Generation
- Concentrated Solar Electric Generation
- Wind Generation
- Geothermal Generation
- Bioenergy/Biomass Generation
- Low-Impact Hydroelectric Generation, including wave/kinetic generation
- Traditional Hydroelectric Generation
- Combined Heat and Power
- Other Renewable Electric Power Generation
- Renewable Heating and Cooling
 - Solar Thermal Water Heating and Cooling
 - Other Renewable Heating and Cooling (geothermal, biomass, heat pumps, etc.)

RENEWABLE FUELS

These jobs encompass all work related to the production of clean fuels. Fuels employment spans industries such as agriculture and forestry, manufacturing, professional and business services, wholesale trade, transportation, and construction.

It is important to note the difference between bioenergy electricity generation jobs and woody biomass fuels jobs. The former includes workers that are involved in the utility generation of electricity from materials derived from biological sources or any organic material, while the latter encompasses those workers who are engaged in fuel development from these materials such as manure, vegetable oil, trees and woody plants, and other living matter. Bioenergy generation workers are expressly involved in the electricity-producing component (including the construction of facilities and manufacture and wholesale trade of generators or turbines) while woody biomass workers are involved in the production, refinement, and distribution of those fuels used to produce the electricity. Vermont includes the following renewable fuel sub-technologies under the overall renewable energy generation sector:

- Woody Biomass, including cellulosic biofuel
- Non-Woody Biomass, including biodiesel

Glossary (cont'd)

ENERGY EFFICIENCY

- Traditional HVAC goods, control systems, and services
- ENERGY STAR Certified Heating Ventilation and Air Conditioning (HVAC), including boilers and furnaces with an AFUE rating of 90 or greater and air and central air conditioning units of 15 SEER or greater
- ENERGY STAR® Appliances & Efficient Lighting
 - ENERGY STAR Certified Appliances, excluding HVAC
 - ENERGY STAR Certified Electronics (TVs, Telephones, Audio/Video, etc.)
 - ENERGY STAR Certified Windows and Doors
 - ENERGY STAR Certified Roofing
 - ENERGY STAR Certified Seal and Insulation
 - ENERGY STAR Certified Commercial Food Service Equipment
 - ENERGY STAR Certified Data Center Equipment
 - ENERGY STAR Certified LED Lighting
 - Other LED, CFL, and Efficient Lighting
- Advanced Building Materials/Insulation
- Other Energy Efficiency
 - Reduced Water Consumption Products and Appliances
 - Recycled Building Materials

CLEAN GRID & STORAGE

Electric Power Transmission and Distribution

- Smart Grid
- Microgrids
- Other Grid Modernization

Storage

- Pumped Hydropower Storage
- Battery Storage, including battery storage for solar generation
 - Lithium Batteries
 - Lead-Based Batteries
 - Other Solid-Electrode Batteries
 - Vanadium Redox Flow Batteries
 - Other Flow Batteries
- Mechanical Storage, including flywheels, compressed air energy storage, etc.
- Thermal Storage
- Biofuel, including ethanol and biodiesel storage

CLEAN TRANSPORTATION

- Hybrid Electric Vehicles
- Plug-In Hybrid Vehicles
- Electric Vehicles