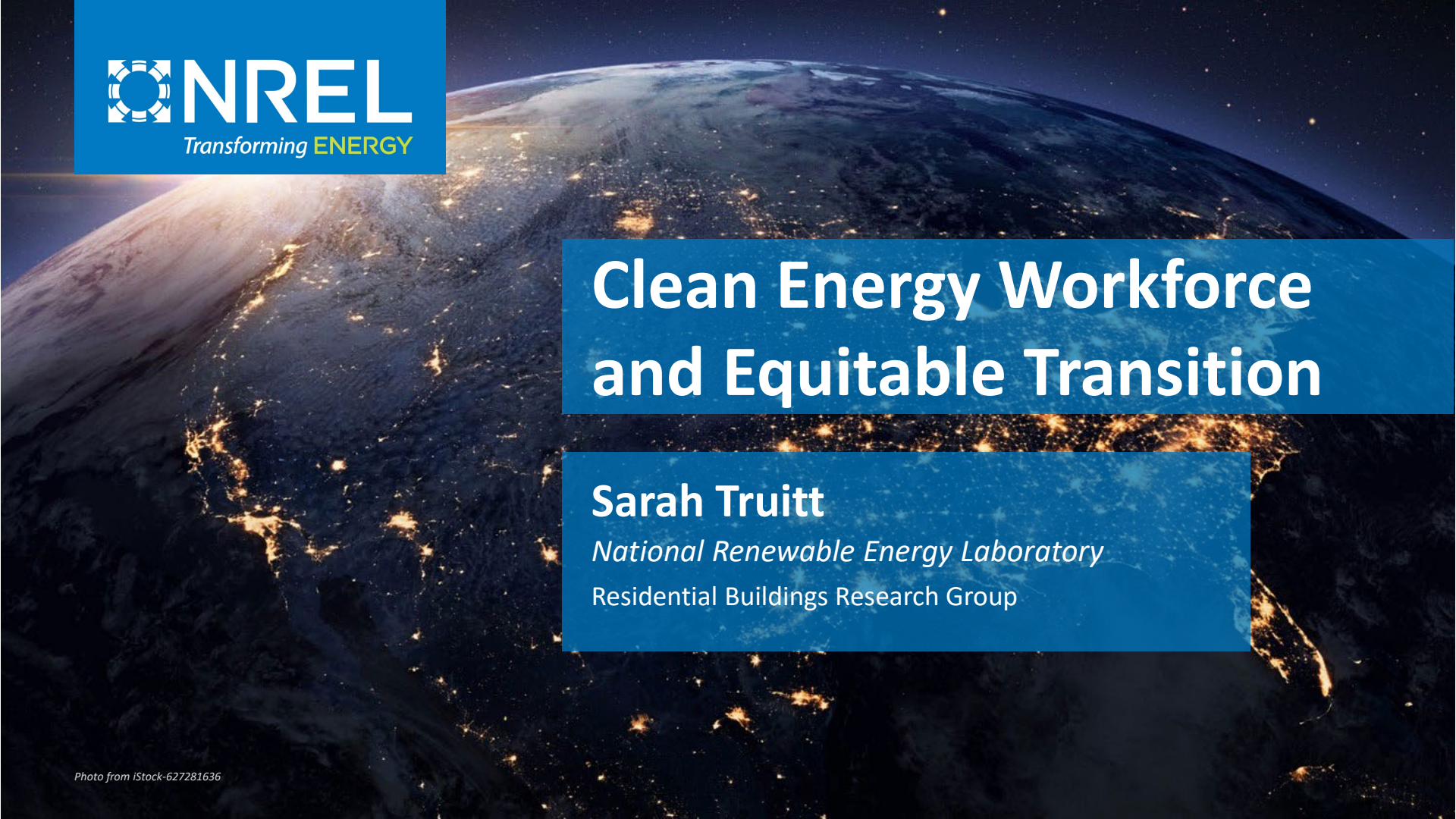


NREL
Transforming ENERGY

Clean Energy Workforce and Equitable Transition

Sarah Truitt
National Renewable Energy Laboratory
Residential Buildings Research Group

Photo from iStock-627281636

AGENDA

- Employment in Energy by the Numbers
- Wages & Demographics
- Increasing Equity in Energy Transitions

Q: True or False?

Q: Renewables were the world's cheapest source of energy in 2020.

A: True most of the time. Of the renewables that came online >60% were cheaper than new fossil fuel plants. (International Renewable Energy Agency IRENA).

Q: Renewables produced more electricity than nuclear or coal in the U.S. in 2020.

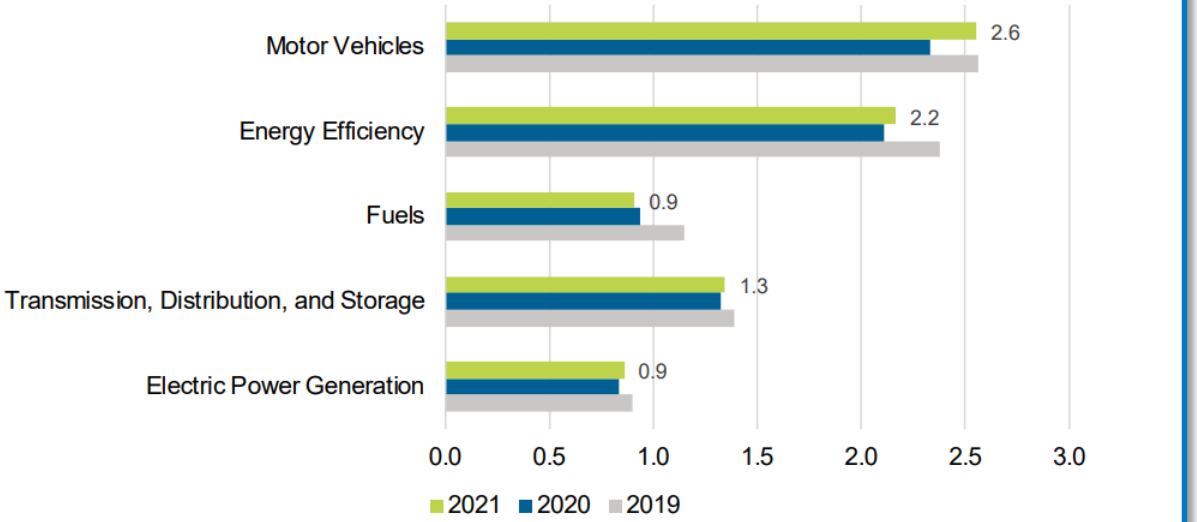
A: True. Renewables produced 834 B kWh, nuclear produced 790 B and coal 774 B. Only natural gas produced more (1,617 B kWh). (Energy Information Agency, EIA)

Q: U.S. green economy has 10x more jobs than fossil fuel industry. (headline from NewScientist.com)

A: Maybe. It depends on how you define the "green" economy and what jobs you count.

2021 Energy Industry Employment Statistics (U.S.)

- The U.S. energy sector grew 4% over 2021, outpacing the overall job growth of 2.8%
- In 2021, the energy sector added 300k jobs, totaling 7.8M workers nationwide.

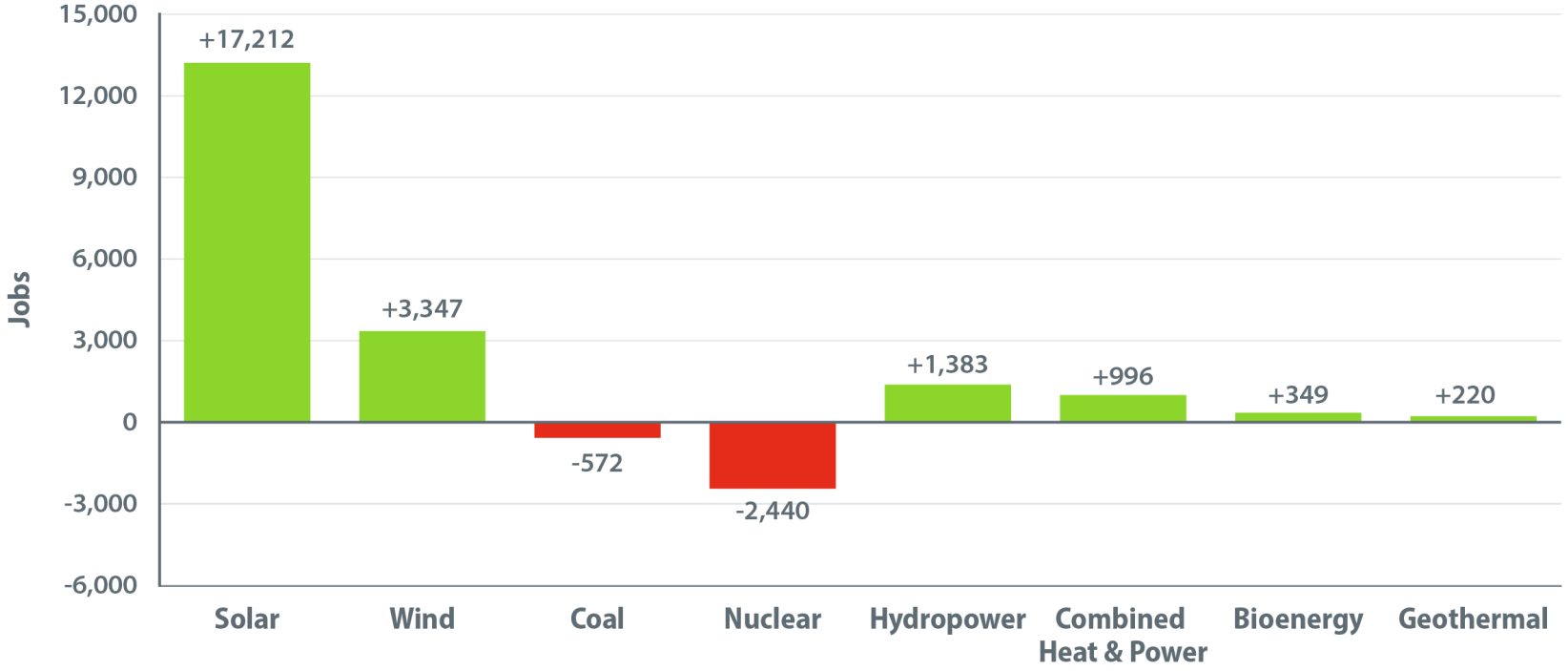


U.S. Energy & Employment Report 2022

Roughly 40% of 2021 energy jobs (about 3 million jobs) are in net-zero aligned* occupations.

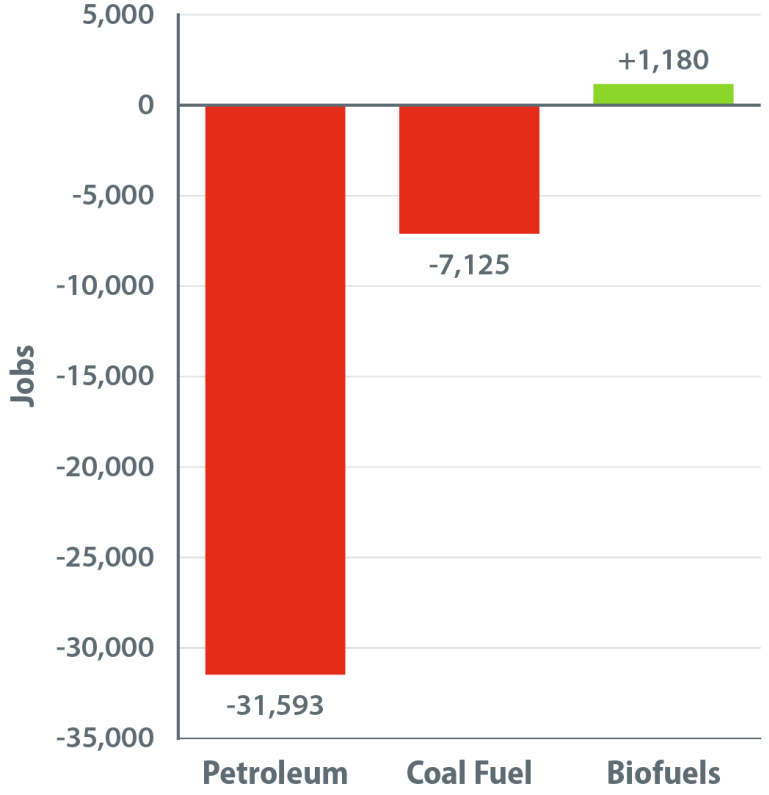
*Net-zero aligned occupations are those related to renewable energy, grid technologies and storage, transmission and distribution, nuclear energy, a subset of energy efficiency, biofuels, and plug-in hybrid, fully electric, and hydrogen fuel cell vehicles and components.

Jobs Added or Lost in 2021: Electric Power Generation (U.S.)

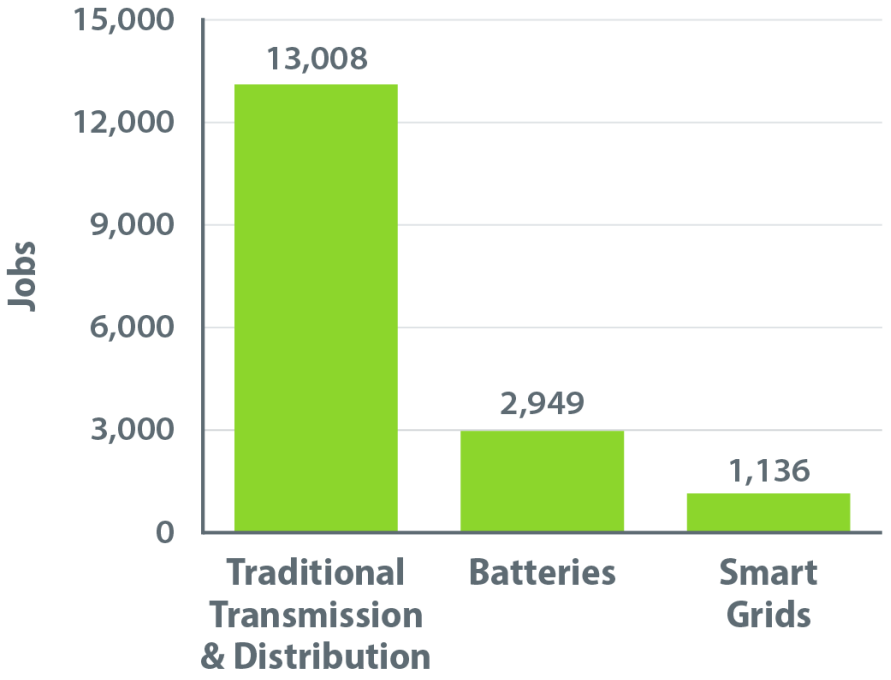


Source: https://www.energy.gov/sites/default/files/2022-06/USEER%202022%20Fact%20Sheet.pdf

Jobs Added or Lost in 2021: Fuels



Transmission, Distribution, and Storage



Source: https://www.energy.gov/sites/default/files/2022-06/USEER%202022%20Fact%20Sheet.pdf

Transitions are hyper-local and hyper-personal

Transitions come with a lot of uncertainty. Each instance is a unique case for each community and individual.

Community Questions

- Will we gain or lose jobs overall?
- What will happen to our tax base?
- What programs are needed to support this transitions and how will we pay for them?
- How will the community change/react?

Employee Questions

- Will my skills transfer?
- What new skills do I need?
- Will my commute change?
- Will my pay and benefits be commensurate?
- What will the corporate culture be like?

Resources

Sizing the Workforce

State-Level Employment Projections for Four Clean Energy Technologies in 2025 and 2030

Sarah Truitt, James Elsworth, Juliana Williams, David Keyser, Allison Moe, Julia Sullivan, Kevin Wu

National Renewable Energy Laboratory

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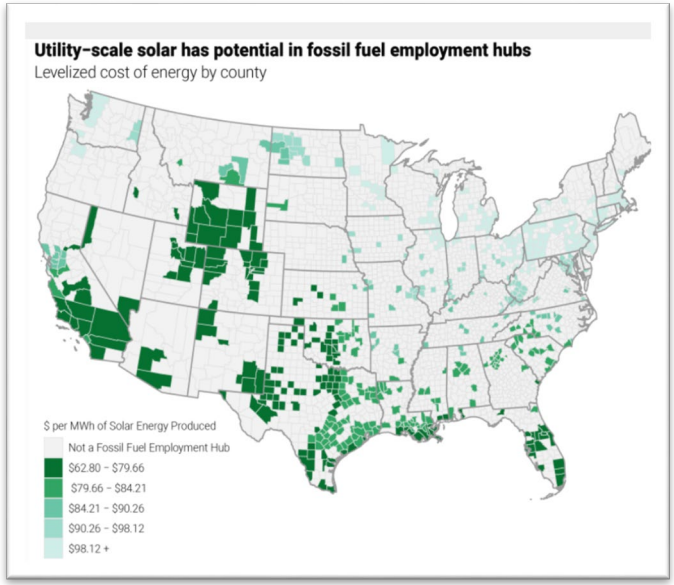
Technical Report
NREL/TP-5500-81486
March 2022

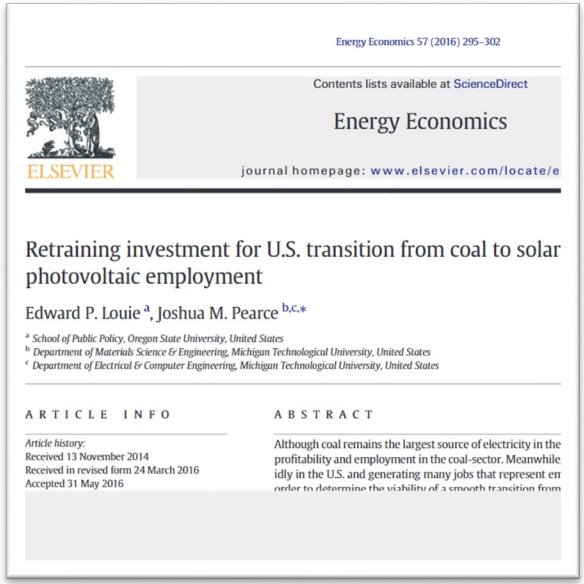
Visit NREL.gov to view the report.

Mapping the Geography of Industries



Visit brookings.edu to view the report.

Worker Retraining



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Retraining investment for U.S. transition from coal to solar photovoltaic employment

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ABSTRACT

Although coal remains the largest source of electricity in the profitability and employment in the coal-sector. Meanwhile idly in the U.S. and generating many jobs that represent en order to determine the viability of a smooth transition from

Visit ScienceDirect to view the report.

Q: True or False?

Q: Clean energy sector wages are higher than the national median wage.

A: True. Clean energy jobs pay ~25% more than the national median wage. (*Clean Jobs, Better Jobs*, E2)

Q: Regional median wages are family-sustaining wages in most metro areas.

A: False. Regional median wages can support families in only 6 metro areas nationwide (Brookings).

Q: Clean energy median hourly wages are higher than fossil industry wages.

A: False. The national median hourly wage is lower in clean energy industries than in fossil industries, but a 2016 study published in *Energy Economics* shows that may be skewed by large executive compensation packages.

A Closer Look at Wages

- Clean energy jobs pay ~25% more than the national median wage.
- The median wage is enough to sustain a family in only 6 metro areas.
- Equity in the energy transition is contextual and hyper-local.

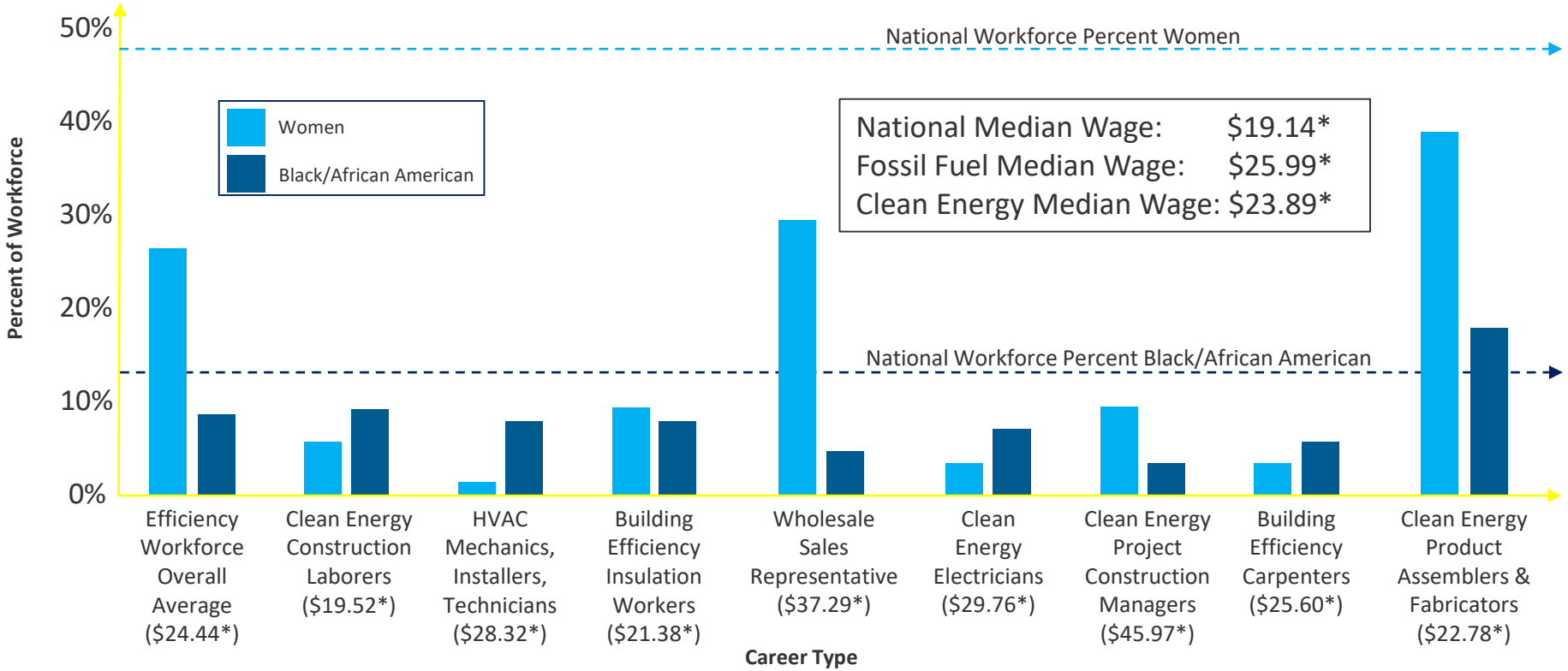
Data from E2, ACORE, and CELI (2020)

	State Clean Energy Wage, 2019	% Above/Below State-Specific Median Wage
Alabama	$18.56	10.8%
Alaska	$25.75	10.3%
Arizona	$21.27	14.9%
Arkansas	$16.71	5.5%
California	$27.49	29.2%
Colorado	$23.12	8.5%
Connecticut	$25.19	8.4%
Delaware	$22.44	13.6%
District of Columbia	$27.56	-21.8%
Florida	$19.13	11.1%
Georgia	$21.36	19.9%
Hawaii	$23.78	11.3%
Idaho	$17.91	5.8%
Illinois	$22.46	13.1%
Indiana	$17.37	-2.3%
Iowa	$17.93	-2.8%
Kansas	$18.67	5.0%
Kentucky	$17.92	5.0%
Louisiana	$20.98	24.9%
Maine	$18.22	-1.4%
Maryland	$24.37	10.6%
Massachusetts	$29.84	23.2%
Michigan	$19.93	6.8%
Minnesota	$22.44	5.9%
Mississippi	$14.69	-2.2%
Missouri	$18.97	6.2%

	State Clean Energy Wage, 2019	% Above/Below State-Specific Median Wage
Montana	$18.08	3.9%
Nebraska	$17.54	-4.6%
Nevada	$20.55	16.9%
New Hampshire	$23.02	14.4%
New Jersey	$24.22	11.1%
New Mexico	$18.95	11.7%
New York	$27.07	20.9%
North Carolina	$20.05	12.8%
North Dakota	$20.34	-0.1%
Ohio	$18.85	1.2%
Oklahoma	$17.50	1.9%
Oregon	$23.91	20.9%
Pennsylvania	$20.26	5.7%
Rhode Island	$21.33	0.2%
South Carolina	$17.98	7.8%
South Dakota	$16.15	-3.2%
Tennessee	$19.87	15.2%
Texas	$23.39	27.6%
Utah	$19.30	5.5%
Vermont	$18.81	-4.8%
Virginia	$21.84	7.1%
Washington	$25.39	10.7%
West Virginia	$17.91	10.3%
Wisconsin	$19.73	4.5%
Wyoming	$19.14	-4.4%

Note: Wages presented are pre-pandemic wages and do not reflect changes in the labor market since then.

Wages & Diversity



Source: E2, 2020, Clean Jobs, Better Jobs Report

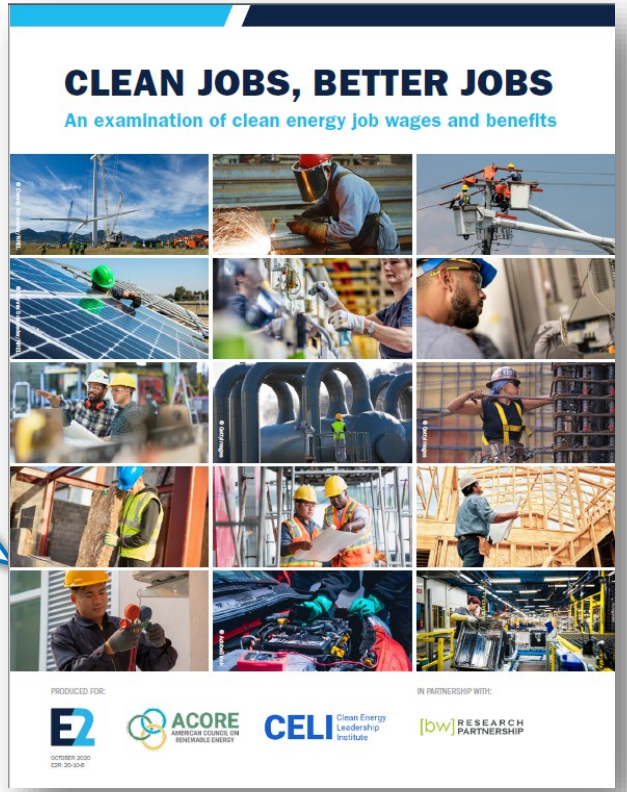
*Dollar value represents median hourly wage in sector.

COVID-19 Impacts on Diversity

"When it came to job losses in clean energy, Hispanic and Latino workers suffered the most. The clean energy industry is about 14 percent Hispanic or Latino, but an estimated 25 percent of the job losses in the clean energy industry were Hispanic or Latino workers.

All non-white racial and ethnic minorities constitute about 37 percent of the clean energy industry while representing 31 percent of job losses. These figures indicate more needs to be done to address racial inequities in clean energy and the broader economy."

- E2, 2020, Clean Jobs, Better Jobs Report



How Can We Achieve an Equitable Energy System?

Structural Equity

Decision makers **recognize the historical, cultural, and institutional dynamics** that have led to clean energy inequities

Procedural Equity

Decision makers **create inclusive and accessible processes** for developing and implementing clean energy programs

Distributional Equity

Clean energy policies and programs **fairly distribute the benefits and burdens** across all segments of communities

Transgenerational Equity

Decision makers **consider the impact on future generations** of the clean energy policies and programs they develop.

Graphic adapted from ***Ready to Go: State and Local Efforts Advancing Energy Efficiency, ACEEE 2021***

Justice40 Initiative

Executive Order 14008, Tackling the Climate Crisis at Home and Abroad states that 40% of the benefits of certain Federal investments to flow to disadvantaged communities (DACs).

Dept. of Energy's Justice40 policy priorities for DACs:

1. Decrease energy burden
2. Decrease environmental exposure
3. Increase parity in clean energy technology access and adoption
4. Increase access to low-cost capital
5. Increase clean energy enterprise creation and contracting
6. Increase clean energy jobs, job pipeline, and job training
7. Increase energy resiliency in DACs, and
8. Increase energy democracy in DACs.

DOE's Inclusive Energy Innovation Prize

- $5.1M prize to build community-based innovation ecosystems that enable a more just and equitable transition to a clean energy economy.
- 18 teams received $200k each in May.
- Up to 6 teams will win a share of a $1.5M prize pool in May 2023, based on successful implementation of programs.
- Competitors receive support from organizations that help them raise funds, find mentors, and implement their programs.

The Inclusive Energy Innovation Prize Goals

Aims to fund organizations for activities related to climate mitigation and clean energy deployment **that support, build trust, and strengthen relationships and partnerships with disadvantaged communities**.

Enable **clean energy and climate innovation** programming and capabilities institutions that serve students underrepresented in STEM.

Increase participation in clean energy and **climate-smart job training** and **job placement/hiring for disadvantaged communities**.

Foster **grassroots innovation related to equitable clean energy deployment** through activities that focus on community-centric networks and bottom-up solutions.

Fund activities that will help **disadvantaged communities access funding** in support of Justice40 goals.

Develop **replicable clean energy transitions** that deliver just and equitable benefits to disadvantaged communities

Highlighted Workforce Programs

SEEDing Knoxville's Just Energy Ecosystem

Knoxville, TN
Socially Equal Energy Efficient Development

Design a community-driven just energy ecosystem, encourage distribution of clean energy benefits to the community and develop clean energy jobs training for disadvantaged youth.

Community Engagement for a Clean Energy Economy

Bethesda, MD
Bethesda Green/One Montgomery Green

Work with the community to create an equitable and actionable carbon reduction roadmap, run entrepreneurship training programs, and facilitate community collaborations for clean energy transition initiatives

Imani Green Works!

Chicago, IL
Imani Green Works! Community Justice & Innovation

Provide clean energy workforce development programs for historically disenfranchised residents and conduct community workshops to foster grassroots innovation in climate smart projects.

Clean Energy Restoration for Rural Alaska Villages

Anchorage, AK
Tebughna Foundation

Create opportunities for Alaskan indigenous communities to develop clean and affordable energy resources based on traditional principles of land stewardship and create a handbook for equitable clean energy deployment in Alaskan Native Villages.

Accelerating the Impact of Diverse Entrepreneurs

Washington, DC
American Council on Renewable Energy (ACORE)

Support small and emerging renewable energy companies owned or operated by diverse leaders, manage a C-suite mentorship program, and release case studies on supporting diverse leadership and founders in the clean energy economy

"Xcelerating" Black Climate Startups in Portland

Portland, OR
NWX Launch Team

Climate justice related community building activities, STEAM workforce development, entrepreneur accelerator program consisting of startup development and incubation, incentivize investments using a just transition offset strategy, develop facilities for hands-on workforce training.

Take Aways

Energy transitions:

- are local and personal,
- require tailored support and programs for each situation,
- take time, effort, and resources to understand the context,
- and only then can you develop a solid plan for a smooth transition.

Contact:

- sarah.truitt@nrel.gov

"WHEN YOU HEAR PRESIDENT BIDEN SAY HE WANTS TO BUILD A BETTER AMERICA… HE MEANS A MORE EQUITABLE AMERICA. A MORE INCLUSIVE AMERICA. A MORE JUST AMERICA. AND WE'LL BUILD IT WITH CLEAN ENERGY."

- U.S. DEPARTMENT OF ENERGY SECRETARY JENNIFER GRANHOLM

- Read her letter to stakeholders **here**.

Thank You!

www.nrel.gov

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