

2023



**The American
Energy Transition:**
Reshaping the Economy
and Creating Good Jobs

Executive Summary

Revolutionizing the Green Horizon

The United States is making strides toward a clean energy revolution and has two ambitious targets:



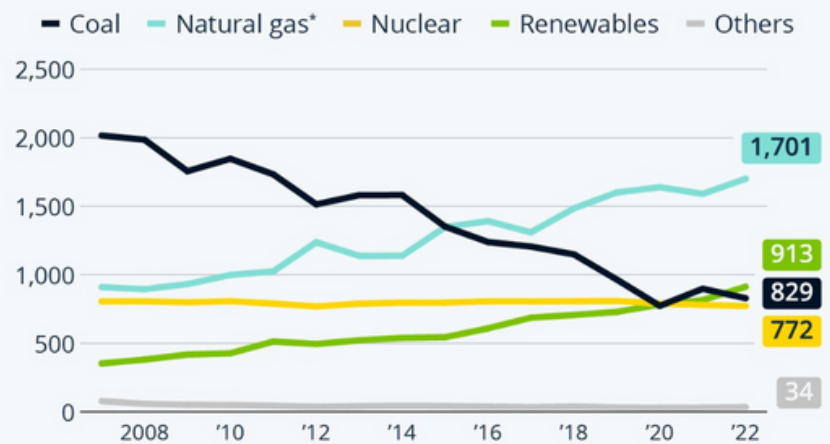
Decarbonize the power sector by 2035.



Achieve net zero emissions by 2050.

Under the Biden Administration, significant funds are being channeled into clean energy. This commitment bore fruit last year when clean energy surpassed coal in electricity generation for the first time.

Figure 1: Net generation of U.S. electricity by source (in TWh)



Source: U.S. Energy Information Administration



Supporting this Shift is Key Legislation

Despite being the world's **second-largest** emitter of greenhouse gases, the U.S. is pivoting towards a sustainable future. The [Inflation Reduction Act \(IRA\)](#) boosts clean energy and fights climate change with major federal investments.

These transformative policy decisions are projected to **ignite a jobs boom**. The Political Economy Research Institute at the University of Massachusetts Amherst expects the creation of over 9 million clean energy and climate-related employment opportunities over the next ten years.

The American workforce is at the epicenter of the green metamorphosis. There is a focus on offering well-compensated jobs with the opportunity to revamp and ensure a fair workforce.



This transformation offers promising job prospects for all in the green energy field.

But can it be achieved?

Unravelling the U.S. Energy Transition Journey

In the high-stakes pursuit of a carbon-free future, the United States grapples with its transmission infrastructure and domestic supply chain.



However, the government counters these obstacles with strategic vision, robust economic resources, and an unrelenting drive to catalyze the energy transition.



The questions that lingers is:

Can this colossal shift materialize within the proposed timeline matching the workforce's needs?

This White Paper is Designed to:

01

Paint a vivid picture of the U.S. decarbonization roadmap, unraveling how it is revolutionizing the energy sector.

02

Reflect on the crucial talent and competencies demanded in the rapidly evolving onshore and offshore wind, solar, energy storage, and green hydrogen industries, all of which are key players in the U.S. energy transition.

03

Investigate the challenges and opportunities proliferating in the surging field of renewables.



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From the World's Largest Emitter to the Return to the Paris Agreement

In one of his inaugural strokes of leadership, President Joe Biden orchestrated the United States' return to the Paris Agreement.

This defining accord, endorsed by over 190 nations since its inception in 2015, cements a pledge to contain global temperature increase **below two degrees** Celsius compared to pre-industrial levels. The aim of this pledge is to avert the most devastating outcomes of climate change.

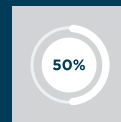
The United States undoubtedly plays a critical role in the success or failure of the Paris Agreement. For years, The U.S. held the dubious distinction of being the world's largest emitter of greenhouse gases. Only recently has that title been overtaken by China.

The North American titan's contribution to cumulative carbon dioxide emissions since the Industrial Revolution is unrivalled, with a staggering emission of **over 400 billion metric tons**. However, it is worth noting that U.S. emissions reached their pinnacle in the mid-2000s.

On the Pathway to Net Zero

To accelerate its journey to net zero emissions by 2050, the Biden Administration has outlined intermediary targets.

These include bold commitments to:



Slash emissions by 50 per cent by 2030 relative to 2005 levels.



Achieve a carbon pollution-free power sector by 2035.

These commitments signify a pivotal chapter in the nation's drive toward environmental resilience and sustainability.

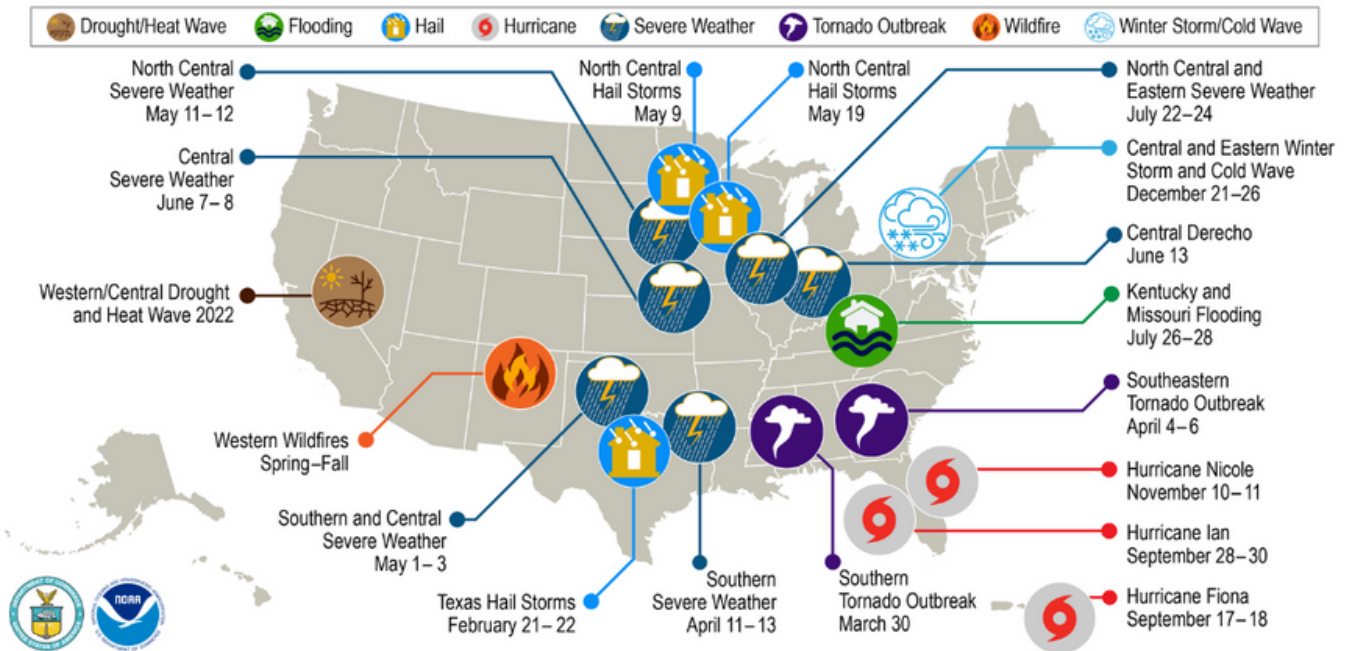
The shift toward a clean future isn't just a hot topic. The generations of tomorrow depend on the decisions made today.





In 2022, climate-related disasters forced an estimated 3.4 million Americans to evacuate their homes, according to the U.S. Census Bureau. These natural disasters also caused **\$165 billion in damage**, making it the third most costly year after 2017 and 2005.

Figure 2: 2022 U.S. billion-dollar weather & Climate disasters



Source: National Oceanic and Atmospheric Administration (NOAA)
map by National Centers for Environmental Information (NCEI)



Emissions Breakdown by Sector

After a turbulent year, economy-wide emissions crept up by a modest 1.0 per cent compared to 2021, with increases recorded across all major economic sectors, according to BloombergNEF (BNEF).

This uptick is seen as an extension of a trend that started in 2021 as the nation began its recovery from the Covid-19 pandemic. In this recovery phase, U.S. emissions skyrocketed by 5.8 per cent from 2020 to 2021.

However, there is a silver lining.

Despite the consecutive annual increase in emissions, 2022's emission levels were still **3 per cent lower** than those recorded before the pandemic hit in 2019. Given that U.S. emissions have generally been on a downward trajectory since 2005, this dip was not entirely unexpected.



U.S. Emissions increased by

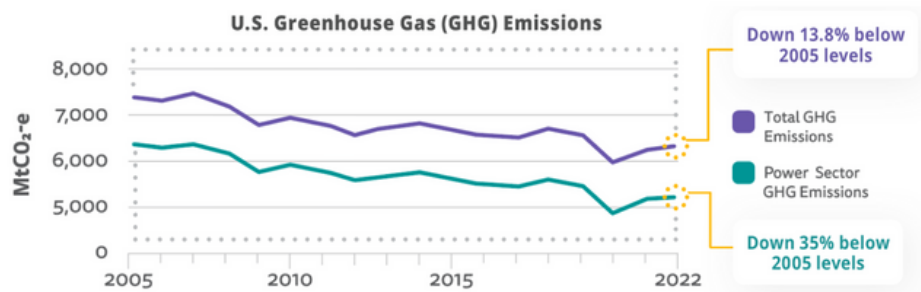
5.8%

from 2020 to 2021

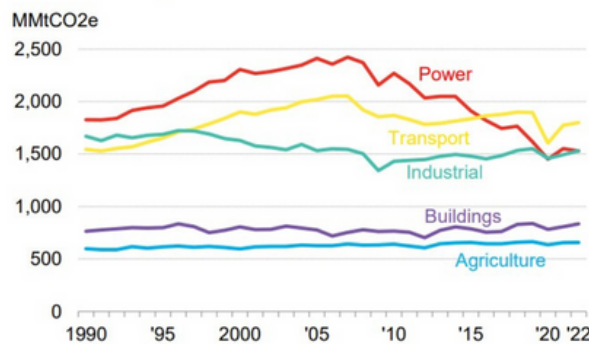
This evidence suggests that some of the emission reduction efforts initiated in 2020 have been successful, particularly in transportation, which recorded a noteworthy **5 per cent** dip compared to 2019 levels.

Interestingly, the **power sector**, which was once the top emitter in the U.S. economy, was dethroned by the **transportation sector** in 2016. As of 2022, power sector emissions are on an even keel with those of industrial sources, marking a significant shift in the landscape of U.S. emissions.

Figure 3: U.S. Greenhouse Gas (GHG) Emissions



Emissions by Sectors



Source: 2023 Sustainable Energy in America Factbook Business Council for Sustainable Energy by BloombergNEF



The U.S. Power Industry In the Climate Action

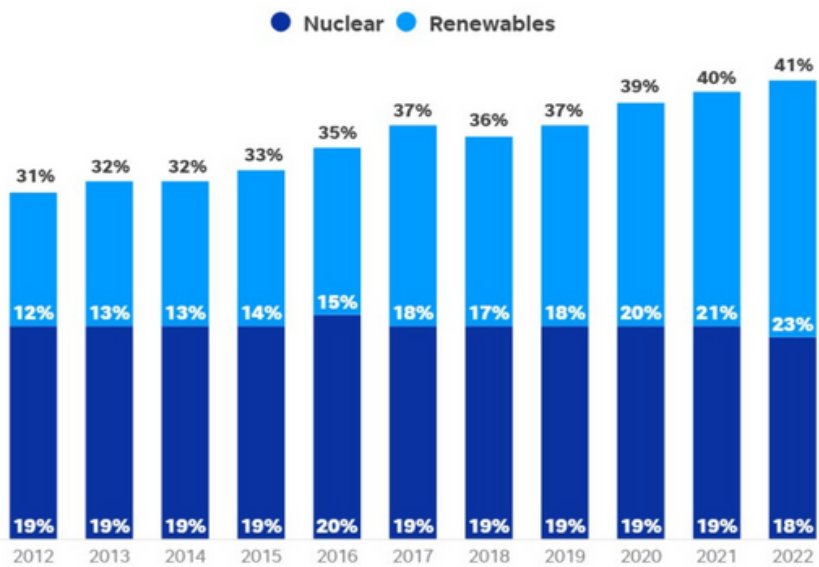
In its decade-long downward spiral of emissions, the power sector has decreased by 35 per cent since 2005.

Despite this positive trajectory, electricity demand is predicted to **surge by 30 per cent** in the next three decades, and the sector’s environmental footprint cannot be overlooked.

Thus, the power sector’s path towards decarbonization stands as a critical pillar in the edifice of U.S. climate action.

Over the course of this century, renewable capacity has soared exponentially. **Carbon-free** sources supplied over **40 per cent** of the electricity mix in 2022, while **fossil fuels** provided about **60 per cent**.

Figure 4: U.S. Electricity Generation Percentages, Total and Mix



Source: 2023 Sustainable Energy in America Factbook
Business Council for Sustainable Energy by BloombergNEF



Carbon-neutral vs. renewable energy?

Before delving further, it’s important to clarify the distinction between carbon-neutral and renewable energy.

Carbon-neutral energy pertains to any form of energy produced without contributing greenhouse gases to our atmosphere. This category includes not only renewable energy sources, but also nuclear power.

While nuclear energy doesn’t replenish itself naturally and is therefore not classified as renewable, it is worth noting that it doesn’t release greenhouse gases during power generation, hence its classification as carbon-neutral.

Renewable energy, on the other hand, is a subset of carbon-neutral energy. It involves electricity produced from sources that naturally replenish themselves and are not depleted when utilized for power generation. Examples of these self-renewing power sources include solar panels, wind turbines, hydroelectric dams, and, to a lesser extent, biomass.

Biomass involves the combustion of wood, crop waste, or garbage to produce energy. While this method does release some greenhouse gases, it is considered renewable because the material sources can be regrown.

Decarbonization Outlook

The U.S. achieved a major milestone in 2022 when, for the first time, the generation from renewable sources — wind, solar, hydro, biomass, and geothermal — [surpassed coal-fired](#) power production in the U.S. electric power sector.

This landmark shift was affirmed by data from the Energy Information Administration (EIA). On a global scale, a similar change is coming — according to the International Energy Agency (IEA), renewables are projected to outweigh coal electricity generation by 2027.

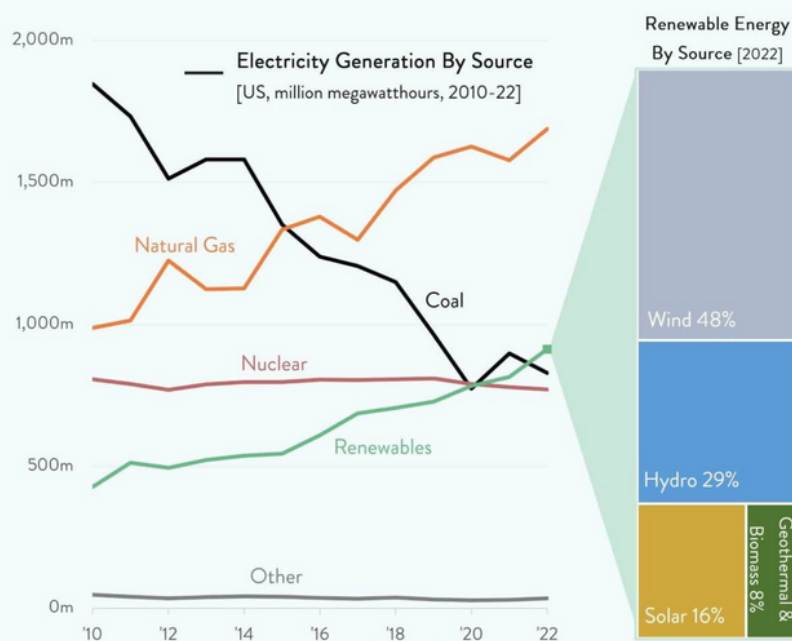
Renewable power outstripped nuclear generation in 2021 and maintained this precedence throughout the subsequent year.

While **natural gas** remained the predominant source of U.S. electricity generation, its share of U.S. generation experienced a modest increase from 37 per cent in 2021 to 39 per cent in 2022.

The **coal-fired** generation's slice of the energy pie shrank from 23 per cent in 2021 to 20 per cent in 2022, as a slew of coal-fired power plants were retired, and the remaining plants were utilized less frequently.

The proportion of **nuclear power** saw a dip from 19 per cent in 2021 to 18 per cent in 2022, a development precipitated by the retirement of the [Palisades nuclear power plant](#) in May 2022.

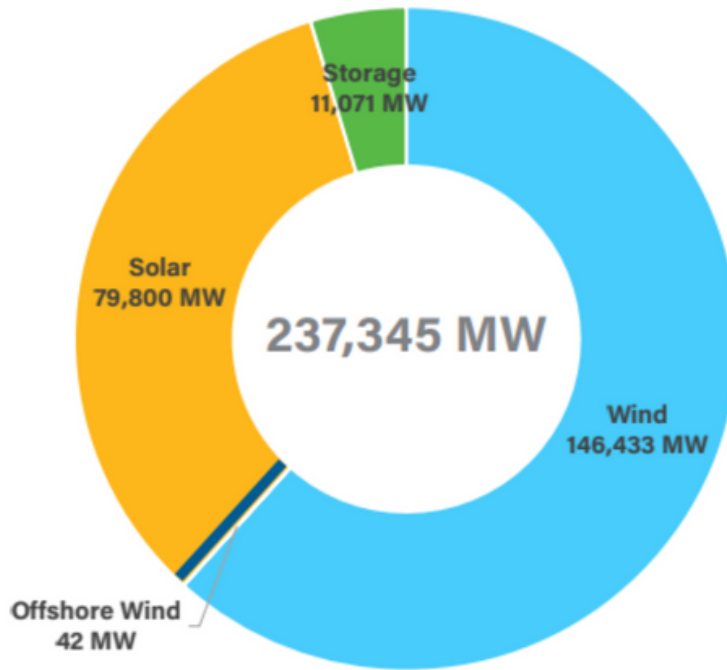
Figure 5: Renewable Generation in the U.S.A Surpassed Coal & Nuclear in 2022



Source: U.S. Energy Information Administration (EIA)



Figure 6: Cumulative Operating Clean Power Capacity in 2023



Source: Clean Power Quarterly Market Report / Q2 2023



Renewable Energy Broke Records in 2022:

- [Wind Energy](#) - over [10 per cent](#) of total U.S. utility-scale electricity generation.
- Hydropower - over [6 per cent](#) of total U.S. utility-scale electricity generation.
- [Solar Energy](#) - over [3 per cent](#) of total U.S. utility-scale electricity generation.
- Biomass - over [1 per cent](#) of total U.S. utility-scale electricity generation.
- Geothermal power plants - about [0.4 per cent](#) of total U.S. utility-scale electricity generation.

The sector broke records by meeting about **23 per cent** of electricity demand.

The expansion of wind and solar power was fueled by an increase in generating capacity year to year.



Utility-scale solar capacity in the U.S. power sector surged from 61,000 megawatts (MW) in 2021 to 79,800 MW in August 2023.



Onshore wind capacity grew in tandem, swelling from 133,000 MW in 2021 to 146,433 MW in the same period.

With over 20 years of business development experience in international trade and policy, the VP & Regional Director, North & Central America of the [Energy Industries Council \(EIC\)](#), Amanda Duhon, presents the renewable energy landscape and how promising it looks.

“

The U.S. has been slower than Europe to transition to clean energy. However, 30 states have renewable energy portfolio standards since 1991, while federal policies have been limited to Production Tax Credit (PTC) and Investment Tax Credit (ITC) initiatives up to the recent Inflation Reduction Act (IRA).

Despite this, renewable energy has doubled in the last decade and is projected to reach 30-50% by 2030.”

Amanda Duhon

VP & Regional Director, North & Central America (EIC)



Clean Energy Projects Lead the Pipeline in the U.S.

According to the Energy Industries Council (EIC), although CAPEX continues to be focused on traditional fossil fuels at 53 per cent, the current number of projects is concentrated within clean energy at **60 per cent**. This includes renewable energy and technologies such as hydrogen and Carbon Capture and Storage.

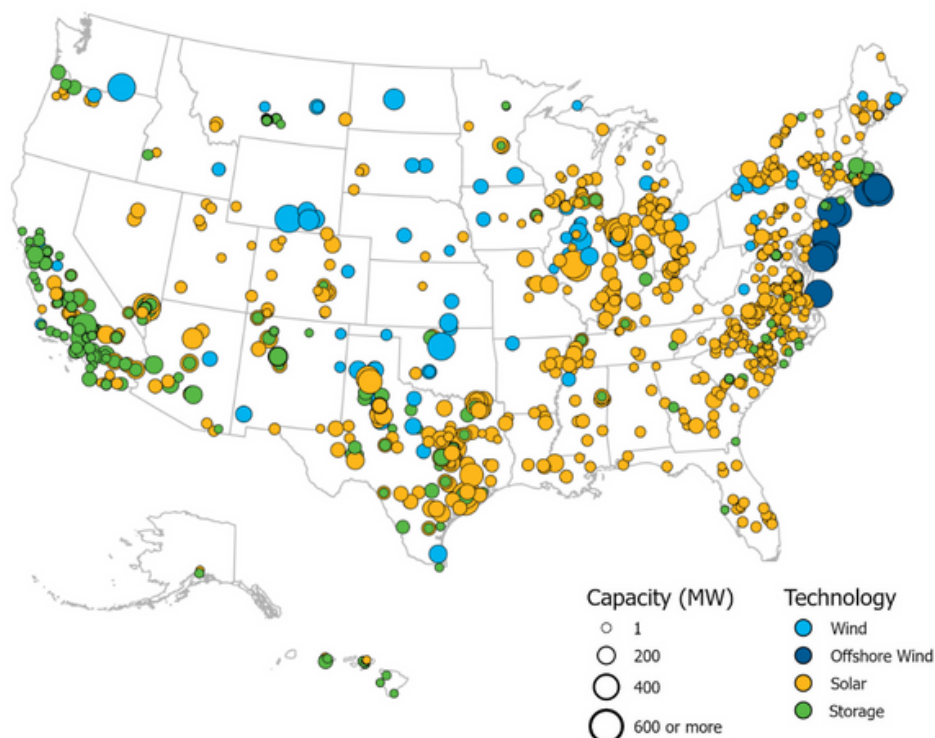
Clean power has seen record levels of announced activity, with the development pipeline swelling to more than **145 gigawatts (GW)** by the end of [Q2 2023](#) across all 50 states. Solar continues to be the leading technology in the pipeline.

- **Solar energy** accounts for **59 per cent** of the pipeline.
- The amount of clean power in development has increased **13 per cent** year-over-year. Compared to the second quarter of 2021, project pipeline has increased **43 per cent**.
- **Onshore wind** accounts for **15 per cent** of the pipeline.
- **Offshore wind** claims the remaining **12 per cent** of the pipeline.
- **Battery storage** represents **14 per cent** of the pipeline.

However, the industry wants to see the projects translate into installations, which have slowed for the first time since 2017, demonstrating lingering headwinds.

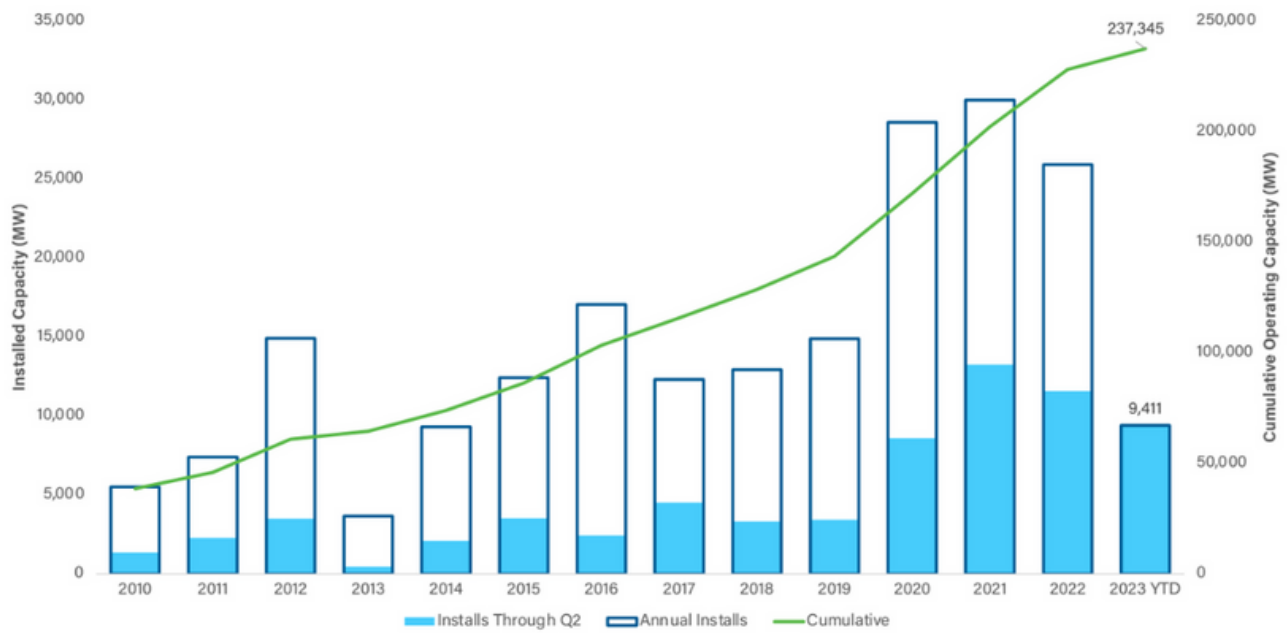
At the halfway point of 2023, total installations for the year stand at 9.4 GW — 19 per cent lower compared to the same period in 2022.

Figure 7: Clean Energy Projects Pipeline in the Second Quarter of 2023



Source: Clean Power Quarterly Market Report / Q2 2023

Figure 8: U.S. Annual and Cumulative Clean Power Capacity Growth



Source: Clean Power Quarterly Market Report / Q2 2023



The U.S. clean energy sector sees challenges as investment opportunities, especially for wind and solar power. The supply chain can meet growing local demand. But, addressing issues like transmission and storage is crucial for continued renewable energy growth.



Amanda Duhon

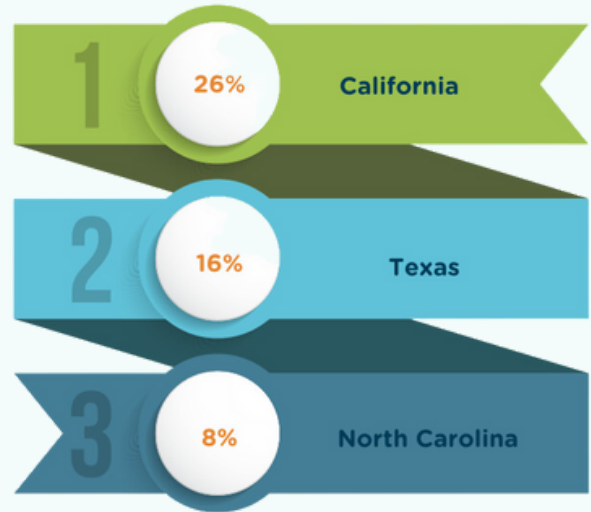
VP & Regional Director, North & Central America (EIC)

Harnessing the sunshine, the U.S. is generating an impressive amount of solar power:

- Currently, [79,800 MW](#) of utility-scale solar capacity operates nationwide, spanning all 50 states and the District of Columbia.
- **Top three recent additions:** Lightsource BP's 152 MW Bellflower Solar Project in Indiana, 102 MW Chaparral Springs Solar in California, and the 102 MW Cutlass Solar Project in Texas.
- **Solar pipeline growth:** A 16 per cent YoY increase with 848 projects totaling **85,328 MW** in development. Solar constitutes **59 per cent** of the total clean power pipeline.

Figure 9: Top 3 States by Source

Solar



Source: U.S. Energy Information Administration (EIA)



- In 2022, **California** ranked first in utility-scale solar generation, producing **26 per cent** of the country's utility-scale solar electricity. **Texas** was the second-largest producing state (**16 per cent**), followed by **North Carolina (8 per cent)**. Several of the largest solar plants built in the United States in the last three years are located in Texas, including the 275 MW Noble solar plant, which started operations in 2022.



However, the sector also navigated a rocky terrain in 2022:

- **Tariffs and import hurdles:**

An investigation by the U.S. Commerce Department into PV modules imported from Southeast Asian nations resulted in higher import tariffs, causing uncertainty. But a temporary suspension of these tariffs led to a surge in imports.

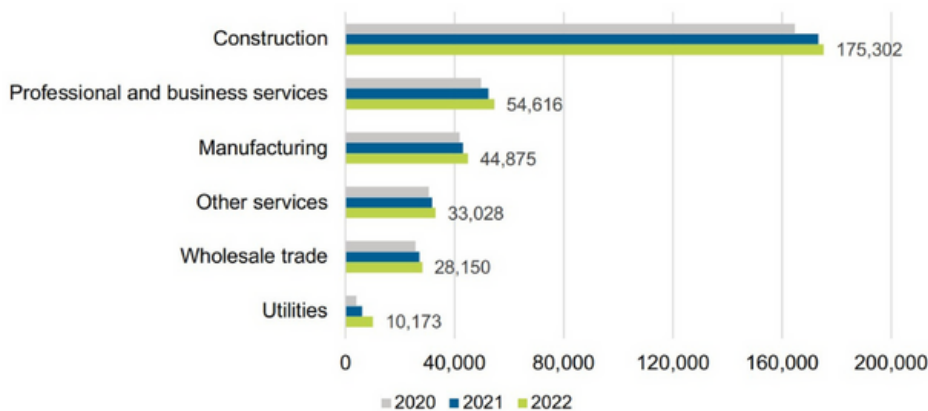
- **Trade-related bottlenecks:**

Compliance with the Uyghur Forced Labor Prevention Act (UFLPA) held up nearly 1 GW of modules at U.S. ports, as importers scrambled to prove their products contained no materials from Xinjiang, China.

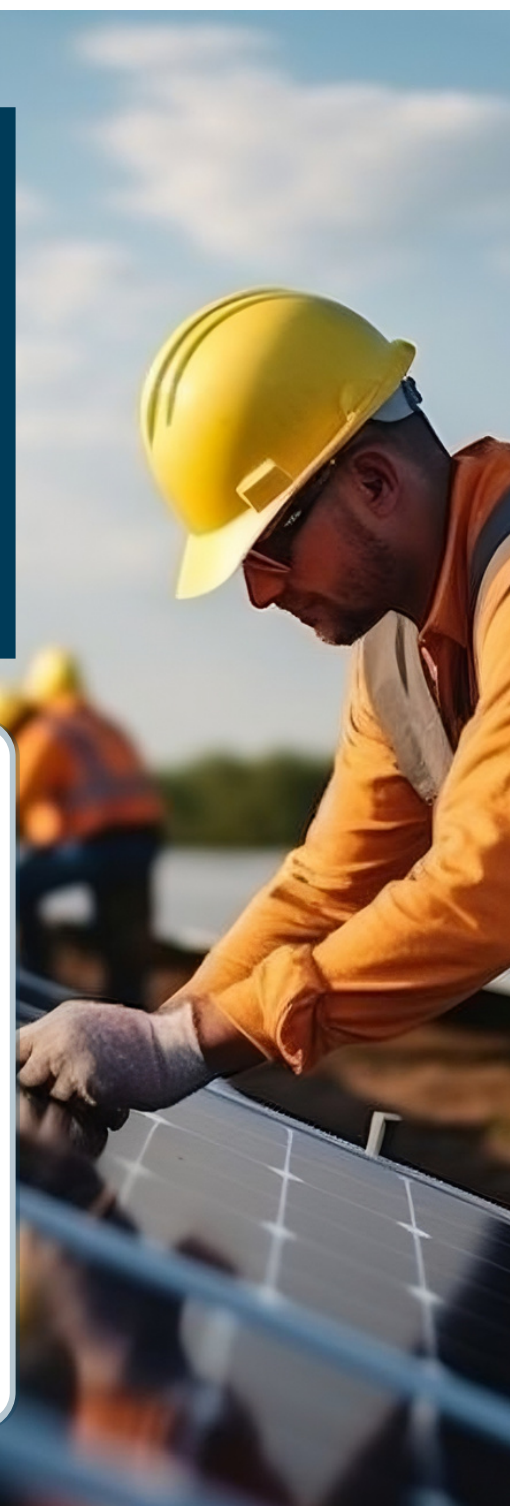
On the brighter side, the solar industry is a major job creator:

Solar companies, including the value chain of activities from research and development through installation, operations, and maintenance for both photovoltaics and concentrating solar power, employed [346,143 workers](#) in a part- or full-time capacity in 2022, up **12,256** (3.7 per cent) from those employed in 2021.

Figure 10: Solar Employees from 2020 to 2022 in the U.S.A



Source: United States Energy & Employment Report 2023 - U.S. Department of Energy



Onshore Wind

The U.S. onshore wind industry is now a force to be reckoned with:

- Striking growth: U.S. wind capacity currently stands at [146,433 MW](#).
- Key growth drivers: Tax incentives, lower turbine construction costs, and renewable energy targets have propelled the sector.
- Wind belt: The central part of the U.S., with its blustery winds and wide-open prairies, houses the majority of U.S. wind capacity.

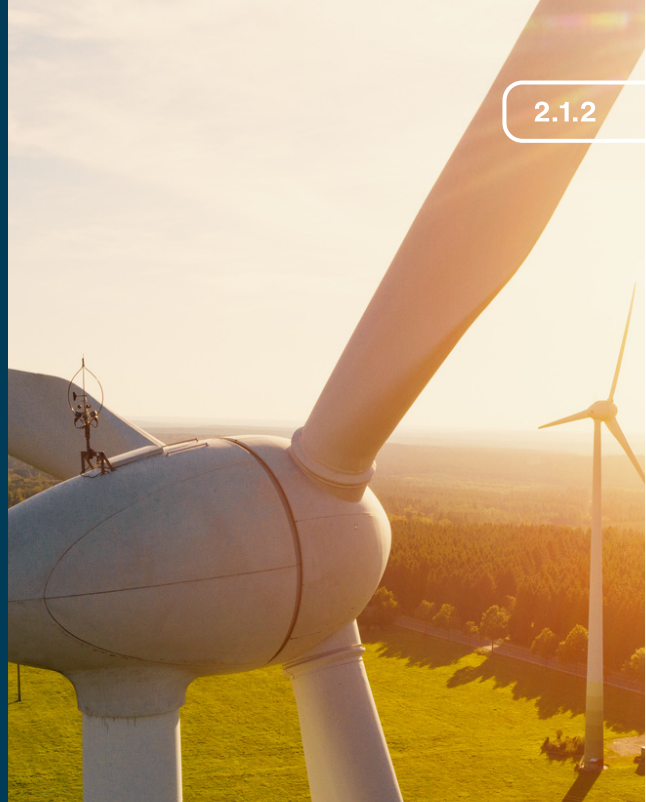
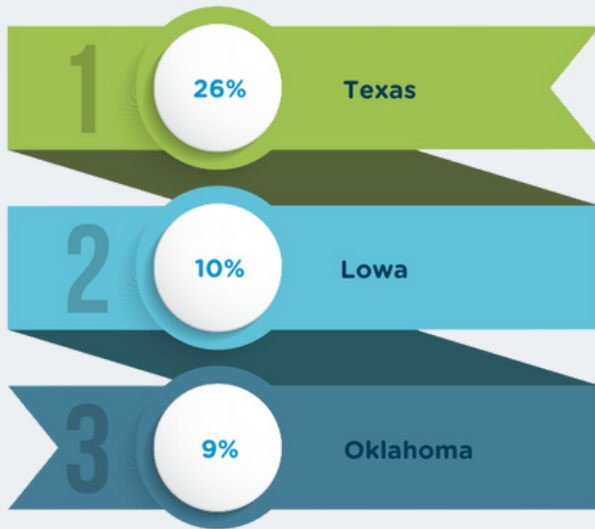


Figure 11: Top 3 States by Source

Onshore Wind



Source: U.S. Energy Information Administration (EIA)



Significant Projects & Production:

Top 2022 projects:

The Inertia Wind Project in Texas (301 MW) and the Seven Cowboy Project in Oklahoma (300 MW) by NextEra Energy Resources and Enel Green Power, respectively.

State leaders in wind production:

Texas led with **26 per cent** of total U.S. wind generation, followed by **Iowa (10 per cent)** and **Oklahoma (9 per cent)**.

Oklahoma also welcomed one of the largest U.S. wind farms (Traverse Wind Energy Center with nearly 1,000 MW) in 2022.

The future pipeline looks promising:

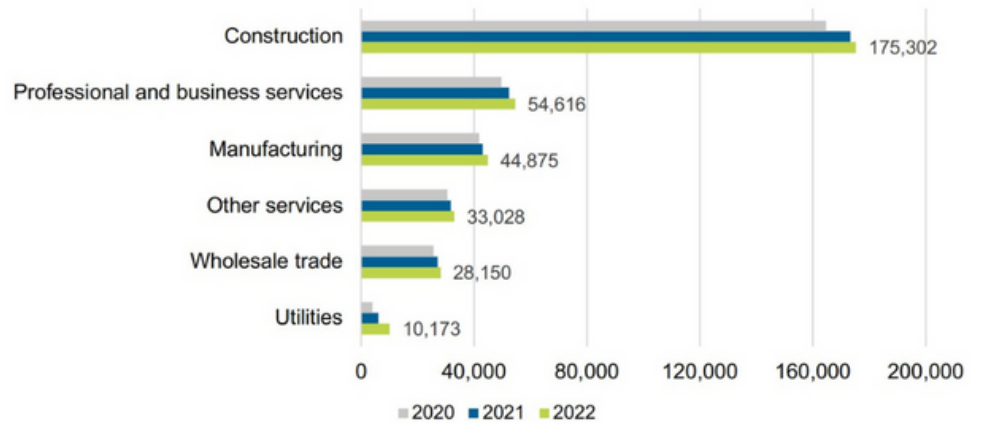
Upcoming projects:

The pipeline comprises [100 project phases](#) with a total capacity of **21,069 MW**.

State leaders in development:

Wyoming is now at the forefront with **4,889 MW** in development (23 per cent of the total pipeline), followed by **Texas** with **3,452 MW** in development. Eleven states have more than **500 MW** of land-based wind projects in development.

Figure 12: Wind Employees from 2020 to 2022 in the U.S.A



Source: United States Energy & Employment Report 2023 - U.S. Department of Energy



Employment Trends

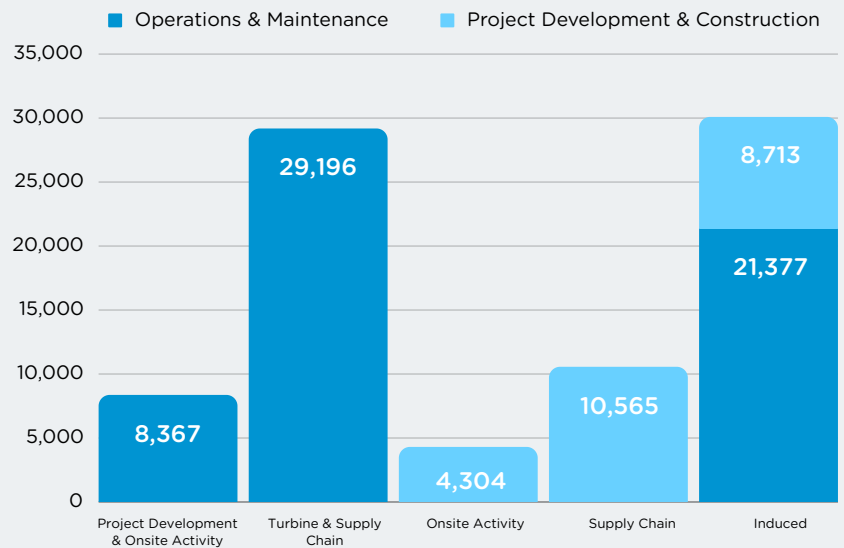
- Wind companies employed **125,580** workers in 2022, an increase of **5,416** positions (+4.5 per cent).
- Most workers were in **onshore wind** (124,524), and the remaining 1,056 were in **offshore wind power generation**.

The U.S. is charting a bold course towards an ambitious target: generating **30 GW of offshore wind energy by 2030**.

Here's a quick snapshot:

- The goal of generating **30 GW** of offshore wind energy is equivalent to powering over **10 million homes for a year**.
- Achieving it will generate **83,000** new [American offshore wind jobs](#).
- Project development and construction will support nearly **59,000** positions.
- Jobs supporting the operation and maintenance will total over **23,000**.

Figure 13: U.S. Offshore Wind Job Expected by 2030



Source: U.S. Offshore Wind Power Economic Impact Assessment / American Wind Energy Association (AWEA)



- Currently, the region of the U.S. holds only **42 MW** of capacity and two operational offshore commercial wind farms.

However, this path is not without its hurdles:

- **High upfront costs:**
Building the necessary offshore wind infrastructure demands considerable investment. Offshore wind components and maintenance costs outstrip their onshore counterparts, stressing the need for a domestic supply chain.
- **Regulatory complexities:**
Navigating through permits and jurisdiction, especially on the outer continental shelf, where most offshore wind projects are planned, can be daunting.

But help is at hand:

- **The Inflation Reduction Act (IRA)** supports the industry with financial measures, including extended Investment Tax Credits (ITC) and domestic manufacturing credits.
- **The Bureau of Ocean Energy Management (BOEM)** organized three lease auctions in 2022, setting new records for offshore wind seabed lease prices.



Not to mention, offshore wind energy carries enormous potential:

Proximity to Consumers:

With 80 per cent of the U.S. population living within 200 miles of the coast, offshore wind is a readily accessible resource.

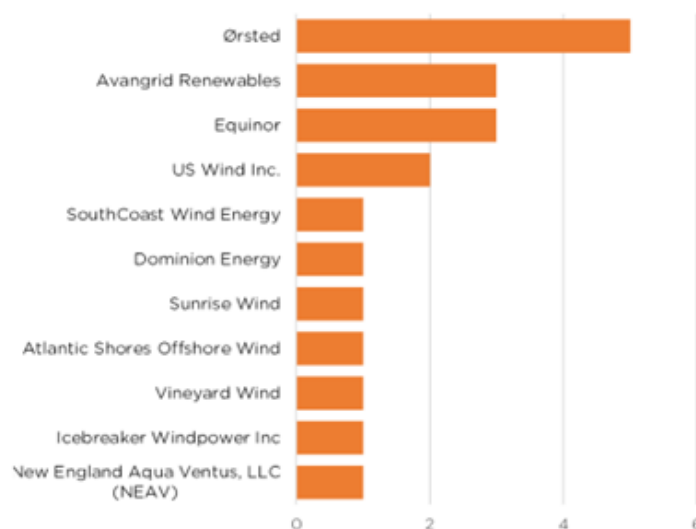
Declining Costs:

The maturing European industry hints at falling costs for turbines and components, making offshore wind increasingly competitive.

Amidst these challenges and opportunities, the offshore wind energy sector is gaining momentum:

- A growing offshore wind project pipeline across 32 leases totaling [51,377 MW](#) of expected capacity will provide electricity to power over **20 million homes**.
- Developers are slated to introduce over **11,000 MW** of offshore wind capacity by **2026 via 13 new projects**.
- Some of the leading offshore wind companies in the U.S.A pipeline include **Ørsted** (5 projects), **Avangrid Renewables** (3 projects), and **Equinor** (3 projects).
- The industry is expected to invest [\\$57 billion](#) in the U.S. economy by 2030 under a more aggressive scenario. As a result, the sector has the potential to drive \$25 billion annually in economic output.

Figure 14: Leading Offshore Wind Companies in the U.S.A



Source: Energy Industries Council (EIC)



Energy Storage

The energy storage pipeline is witnessing significant growth:

- Pipeline surged YOY:**
 The battery storage pipeline surged **45 per cent** year over year, and the capacity in development has more than doubled over the past two years.
- Upcoming projects:** There are 260 [projects](#) in development in 29 states, totaling 21,069 MW/59,925 MWh.
- State leaders:**
California leads with **9,235 MW** in development, followed by **Texas** with **3,751 MW**.

Highlights & Anticipations:

2022 performance:

Despite supply chain disruptions, an estimated 4.8 GW of non-hydropower storage capacity was commissioned, bringing the total capacity to 11.4 GW.

U.S. dominance:

The U.S. remains the world's largest energy storage market.

Key legislation:

The Inflation Reduction Act of 2022 offers both direct and indirect benefits to the energy storage sector, promising more future deployments.

Evolving share:

Large-scale lithium-ion batteries caused a decrease in pumped hydro's share of total energy storage to 67 per cent in 2022 from 78 per cent the year prior. However, raw material price hikes for lithium-ion batteries might spur a revival for pumped hydro storage.

Energy shifting:

Pairing renewables with storage is a cost-effective strategy for displacing fossil fuel projects, leading to energy shifting becoming a dominant use case for new batteries.

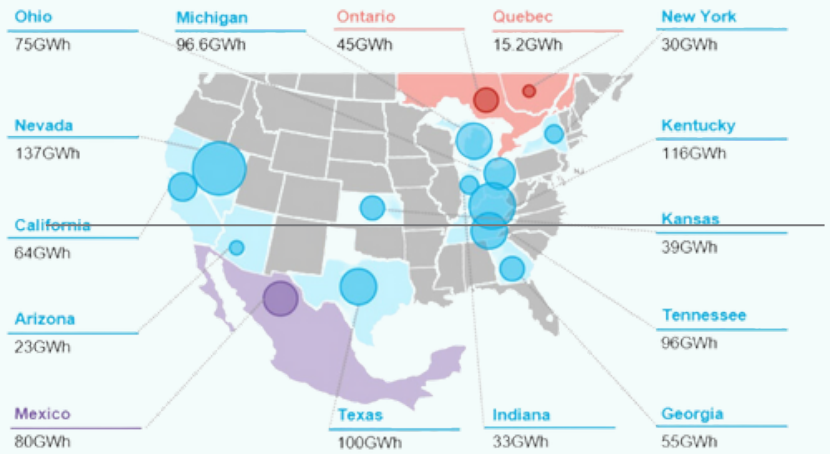
Battery production boost: The IRA introduced a **\$45/kWh** cell and module production tax credit, which is expected to significantly enhance battery manufacturing in the coming decade.



Significant manufacturing progress:

- As of end-2022, the U.S. had **108 GWh of lithium-ion** battery manufacturing capacity. Capacity additions nearly doubled compared to 2021, with 45 GWh added.
- Key players:** Major plant openings included Ultium Cells in Ohio, a joint venture between GM and LG Energy Solution, and iM3NY's plant in New York, which plans to expand to 38 GWh in the future.
- 2023 Forecast:** U.S. battery manufacturing capacity is expected to reach 178 GWh by the end of 2023, led by companies like **Ultium Cells**, **LG Energy Solution**, and **SKon**.

Figure 14: North America Battery Cell Manufacturing Projects

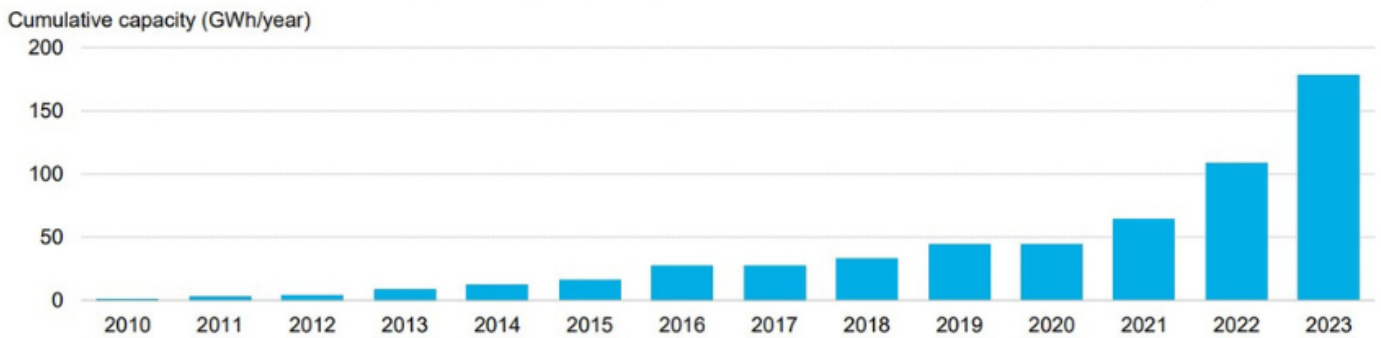


Source: BloombergNEF

Note: Bubble size corresponds to total capacity commissioned, under construction and announced since IRA passage.



Figure 15: U.S. Lithium-ion Battery Manufacturing Capacity



Source: 2023 Sustainable Energy in America Factbook.

Note: Manufacturing capacity is based on nameplate capacity and included manufacturing for multiple segments such as electric vehicles, stationary storage, and others.



Green Hydrogen

The spotlight on green hydrogen is growing brighter as a viable solution to achieving net zero:

The clean fuel alternative:

[Green hydrogen](#), which is produced from renewable energy, holds immense potential to decarbonize various industries and sectors, replacing fossil fuels in refining, iron and steel, chemical processes, and transport.

Strategies and investments fueling the hydrogen revolution:

- **The Energy Earthshot Initiative:** Launched by the U.S., it aims to slash clean hydrogen costs by 80 per cent to \$1 per 1kg within a decade, addressing technological and cost challenges through innovation and advancements in climate science.
- **Investment under IRA and IIJA:** Following the passage of the Inflation Reduction Act (IRA) in August 2022, complemented by support from the Infrastructure Investment and Jobs Act (IIJA), the U.S. government is set to invest over \$20 billion in hydrogen activities through 2030.
- **Anticipated cost reductions:** With these investments and international support, the costs of producing renewable hydrogen are predicted to drop significantly by 2030, making the process more affordable and scalable.
- **Hydrogen production tax credit:** Provided under the IRA, it offers \$3 (indexed to inflation) for every kilogram of hydrogen produced in a project's first 10 years. This could enable renewable hydrogen to compete with conventional hydrogen by mid-decade and potentially cover the entire cost of production by 2030.



Green Hydrogen Policy & Practice:

- [National Strategy and Roadmap](#): Released by the Biden-Harris Administration in June 2023, this comprehensive framework accelerates clean hydrogen production, processing, delivery, storage, and use, with an estimated potential to add **100,000 net new direct and indirect jobs by 2030** due to the build-out of new capital projects and clean hydrogen infrastructure. These jobs include both direct jobs like engineering and construction and indirect jobs like manufacturing and raw material supply chains.

- **Industry projects:**
Companies like CF Industries, Air Products, and Florida Power and Light are set to commission electrolyzers in 2023 for a range of applications, including ammonia production and power generation.

Noteworthy projects:

- SoCalGas announced the Angeles Link in 2022, a green hydrogen pipeline serving the Los Angeles region, set to be the nation's largest.

Future prospects: 30

- green hydrogen projects worth \$14bn are slated for the next five years, with Mississippi, California, Louisiana, and Texas leading in sector investment.

Figure 16: Hydrogen Shot & Benefits

Hydrogen shot: reducing the cost of clean hydrogen



1 dollar



1 Kilogram



1 Decade

Clean hydrogen in US could...



Create 100,000 quality jobs by 2030 to support the energy transition.



Reduce U.S. emissions approximately 10% by 2050 relative to 2005.



Promote innovation, domestic manufacturing and supply chain.

Source: U.S. National Clean Hydrogen Strategy & Roadmap



Top 10 Companies Leading the Clean Energy Pipeline

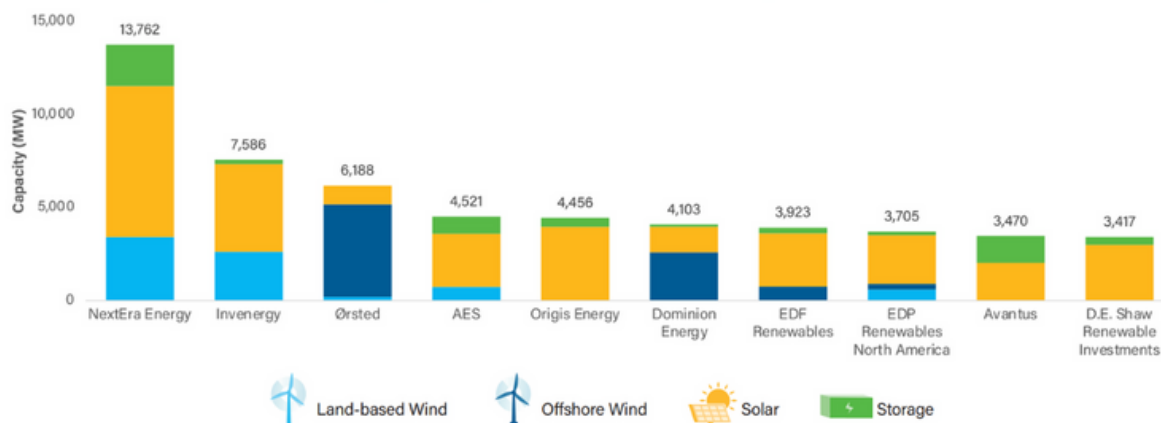
NextEra is the top company building clean energy projects, with 13.8 GW in the works. They make up nearly 10 per cent of all the clean energy projects currently being built. They are the leaders in creating **wind** farms on land, **solar** farms, and big **batteries** to store energy.

Invenergy is the second-biggest, with nearly 7.6 GW of clean energy projects. Most of what they are building is **solar**, but they are also working on **wind** farms and some **energy storage**.

Offshore wind energy is really important for **Ørsted** and **Dominion Energy**, which helps them make the top ten list. Both companies are also building more than one GW of solar projects.

In the top 10 list, eight companies are focused primarily on solar energy projects. None of them have a primary focus on building big batteries for energy storage. However, **Avantus** is unique in that almost half (42 per cent) of its clean energy projects are focused on storing energy.

Figure 17: Top 10 Companies Leading the Clean Energy Pipeline



Source: Clean Power Quarterly Market Report / Q2 2023

airswift
TRUSTED WORLDWIDE

Infrastructure Transmission: Overcoming the Red Tape

As we stand on the precipice of a transformative shift in how we harness and consume energy, it is clear that a modernized, robust, and resilient infrastructure is essential to minimize the destructive impacts of climate change. Currently, the nation is facing a **bottleneck of transmission lines** due to aging infrastructure and space needed for additional power lines.

The infrastructure is the bedrock upon which the U.S. energy transition stands and ensures the continuous delivery of reliable and affordable energy. But this shift is not without its hurdles, one of the most critical being the **delay in securing sign-offs** for potential projects.

There's a palpable sense of urgency as over **1,000 GW** of potential power projects today await access to some segment of the nation's power grid. However, the lamentable reality is that the rate of progress is hamstrung by slow, bureaucratic processes that vary across Independent System Operators (ISOs).

[PJM](#) and [CAISO](#), for instance, have the longest wait times, with projects often on hold for three or more years. Contrastingly, [MISO](#) and [ISO-NE](#) offer a ray of hope with a relatively shorter wait time of less than two years for project approval or denial.

Renewable Sources Dominate the Capacity in U.S. Interconnection Queues

Despite the exponential rise in applications in the past decade, renewables, unfortunately, comprise the bulk of the capacity on hold in the interconnection queue. The process to secure the necessary federal permits for these energy infrastructure projects can be a slow, arduous journey through a labyrinth of red tape.

But this snag is not unique to renewable energy alone. The surge in the development of utility-scale battery energy storage systems has also seen a corresponding rise in the volume of battery capacity seeking interconnection on power grids.

It is a frustrating catch-22: as our collective ambition towards renewables escalates, so too does the backlog of projects awaiting approval.

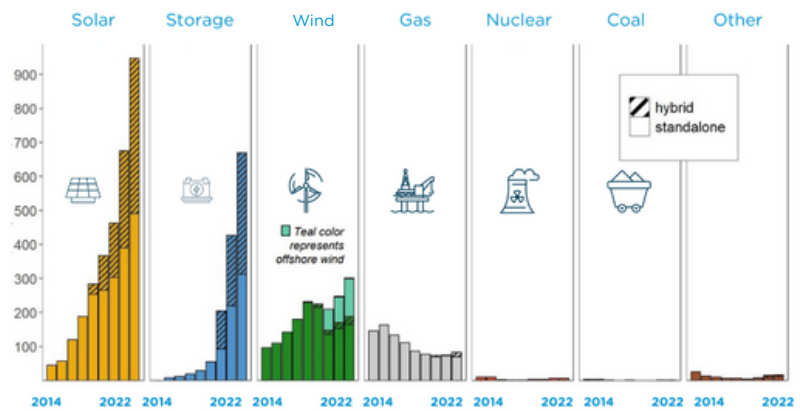
Delving specifically into renewable power projects, a recent study highlights an average time of **2-3 years** to complete National Environmental Protection Act reviews, with a noteworthy number of projects taking up to **six years** to reach completion.

Over 2,000 GW of total generation and storage capacity is now [seeking connection](#) to the grid (**95% of which is for zero-carbon resources** like solar, wind, and battery storage).

- Solar accounts for the largest share of generation capacity in the queues with (947 GW).
- Substantial wind capacity (300 GW) is also seeking interconnection, 38 per cent of which is for offshore projects (113 GW).

These sobering statistics underline a critical challenge, demonstrating that the U.S. energy infrastructure needs reform.

Figure 18: Over 2,00 GW (2 TW's of Generation & Storage Capacity Active in Queues (gigawatts)



Source: Electricity Markets & Policy (EMP)

Note: other includes hydropower, geothermal, biomass/biofuel, landfill gas, solar thermal and oil/diesel.



“

The U.S. urgently needs to upgrade and expand its aging power grid infrastructure by an estimated 25% to accommodate growing renewable energy sources by 2030. Addressing the intermittency of renewables also necessitates advancing energy storage technologies. Despite ongoing efforts, significant progress in innovation, manufacturing, and workforce development is still required to ensure a reliable, 24/7 renewable energy supply to the grid.”

Amanda Duhon

VP & Regional Director, North & Central America (EIC)



The Inflation Reduction Act (IRA): A Game Changer for Decarbonization

The Inflation Reduction Act, or IRA as it is fondly known, is not just another piece of legislation. It is a landmark in the quest for decarbonization and an earnest commitment to mitigate climate change.

Passed in August 2022, this is one of the **largest climate bills** ever to grace the U.S. Congress, embodying around 400 billion dollars in energy and climate funding.

Figure 19: One Year Later: Reaping the Fruits from the Inflation Reduction Act (IRA)

- ✔ **210 clean energy projects, creating more than 70,000 jobs**
- ✔ **83 clean energy manufacturing facilities**
- ✔ **184,850 MW of projects, results in \$4.5 billion in customer savings**
- ✔ **29,780 new manufacturing jobs.**

Source: American Clean Power Association (ACP) and E2



How does this tie in with the broader environmental objectives of the country?

Well, the IRA is a powerful tool in inching the U.S. closer to the Biden Administration's ambitious goal of halving economy-wide CO2 emissions by 2030 (relative to 2005 levels).

But what makes the IRA truly special?

Firstly, the [IRA](#) recognizes that the road to decarbonization isn't paved merely by **falling renewables costs** and **advancing technology**. No, it goes a step further by establishing solid government and legislative backing, thereby creating a favorable ecosystem for green initiatives to flourish.

Secondly, the IRA is far-reaching, with its scope extending to virtually every energy transition sector. Be it a modest raw **material provider** or a large **end-consumer**, the IRA has got them covered, fostering inclusivity in the decarbonization drive.

This expansive act brings with it an astounding **\$369 billion** in support for energy transition technologies, primarily via **tax credits** estimated at a minimum of \$271 billion over the next decade. By integrating this technology-neutral approach, the IRA aims to accelerate the deployment of renewables and further minimize power sector emissions.

Finally, the Inflation Reduction Act is more than just an act; it is a testament to America's commitment to a sustainable future and a powerful enabler of national decarbonization efforts.

Since the IRA was signed into law, its impact has been palpable. After one year, over \$271 billion capital investment has been pledged for utility-scale clean energy projects and manufacturing facilities.

This phenomenal response is equivalent to eight years' worth of American clean energy investment, surpassing the total investment made in U.S. clean power projects commissioned between 2015 and 2022.

Looking at EICDataStream — the EIC’s global project tracking database — project additions in the U.S. have grown in all clean technologies in 1H 2023 compared to 1H 2022.

- **Renewables** have grown by 45 per cent, jumping from 84 new projects to 122 new projects.
- **Hydrogen** has grown by 190 per cent, raising from 13 to 38 project additions.
- **Energy Storage** has grown by 85 per cent, rising from 28 to 52 project additions.
- **Carbon Capture and Storage (CCS)** has grown by 230 per cent, jumping from 10 to 33 project additions.



The IRA boosts the U.S. market and CAPEX activity, supports domestic supply chains, and promotes clean energy. We are definitely seeing more interest in clean energy amongst our members. At the Energy Exports Conference, supply chain companies seek to do business in the U.S. due to IRA’s funding mechanisms.”



Amanda Duhon

VP & Regional Director, North & Central America (EIC)

The Green Employment Boom

The clean energy economy accounts for **3.1 million jobs** across the country and, with continued policy and market support, will expand.

As a basis for comparison, these jobs made up more than **40 per cent** of total energy jobs in 2022.

- The number of U.S. energy sector jobs grew **3.8 per cent** from 2021 to 2022.
- Clean energy jobs grew **3.9 per cent**, outpacing overall U.S. employment, which increased **3.1 per cent** in the same period.
- Clean energy jobs increased in **all 50 states** plus Washington, DC.

About Dan Ortega



Dan started as maintenance supervisor at Vestas. Over the years, he has worked on wind projects, managing maintenance crews, and customer relations for almost six years. Then he moved to the Vestas training center in Portland, OR, as the North American Regional Training Manager for ten years, getting into the education side.

Currently, [Dan Ortega](#) works for the [Global Wind Organisation](#) (GWO) being responsible for growing the training provider network in the U.S. & Canada.

GWO is a non-profit body founded and owned by its members — all of whom are globally leading wind turbine manufacturers and owners or operators. The organisation strives for a safe work environment, setting common international standards for technical training and emergency procedures.

The North American Representative from Global Wind Organisation (GWO), Dan Ortega, speaks about the employment boom and demystifying the wind technician job. Dan joined GWO in July 2021 following a fifteen-year career with Vestas.

“

The wind industry is growing, increasing the need for professionals with appropriate skills. This provides wind technicians with the chance to acquire knowledge in various areas, such as mechanical, electrical, and hydraulic systems. It can also serve as a starting point for a promising career.

As the industry expands, technicians have a wide range of opportunities and could even progress into managerial roles.”

Dan Ortega

North American Representative,
Global Wind Organisation (GWO)

According to the [United States Energy & Employment Report 2023](#), from the U.S. Department of Energy, the sector added nearly **300,000 jobs**, increasing from 7.8 million total energy jobs in 2021 to more than 8.1 million in 2022.

Though women are underrepresented in the U.S. energy sector, they made up more than half of the new net jobs (**149,732**) added, representing a 7.8% increase in 2022 and raising **female participation from 25 per cent to 26 per cent** of the energy workforce.

The representation of women was highest in electric power generation across the different technologies sectors, where they made up 32 per cent of the workforce.

Figure 19: U.S. Clean Energy Jobs in 2022



Source: United States Energy & Employment Report 2023, U.S. Department of Energy



Amanda Duhon also speaks about inequality and bias, pointing to ways for the industry and society to support gender balance.

“

We are making strides. Ten years ago, women were scarce in energy conferences, but today, we see a gradual closure of the gender gap. Nevertheless, there is more work to do.

The industry must empower women, providing equal opportunities for leadership roles and fostering diverse thinking. Women need to support each other through mentorship, networking, and recognition.

Promoting clean energy and STEM education from secondary schools is also crucial. We must eradicate the culture of bias, which encompasses a shift in mindset across government, society, and the corporate world.”



Amanda Duhon

VP & Regional Director, North & Central America (EIC)

What does the future hold for clean energy professionals?

The transformative Inflation Reduction Act (IRA) has set the stage for an **employment revolution** in the sector. A comprehensive analysis by the BlueGreen Alliance and the Political Economy Research Institute (PERI) at the University of Massachusetts Amherst anticipates the creation of over [9 million “climate tech” jobs](#) by 2032.

Predicated on data from the Congressional Budget Office and the bill's text, the study focuses on job opportunities spurred by the climate, energy, and environmental provisions in the legislation.

A projected creation of nearly **900,000 jobs per annum** includes roles in communities affected by the closure of coal-fired plants or mines. Although these roles are traditionally male-dominated, there's a glimmer of hope for increased female representation.

The job creation forecast was arrived at by analyzing sectors such as **electrification, transportation, building, manufacturing, environmental justice, lands, and agriculture programs**. The study delineates between jobs created via direct public funding and those born out of private spending.

The latter category hinges on leveraging public funding and tax incentives, such as those for buying new or used electric vehicles. Additional job creation might spring from the Act's stipulations, like the requirement for eligible vehicles to be largely sourced and assembled in the U.S.



Opportunities for All

The report casts a wide net, encompassing both **degree-requiring** and **non-degree-requiring** roles in science, technology, engineering, and math (STEM). However, it is unclear which specific jobs were tallied — for instance, whether communications, human resources, or finance roles (non-technical roles) were included.

But one certainty is that organizations across the board need diverse expertise to fuel their growth. Also, to advance economic and racial justice, registered apprenticeship programs, targeted investments, and equitable hiring practices should be used to prioritize job access for all workers.


The bill includes support for low-income workers, workers of color, and communities that long-standing fight for clean air or have been affected by climate-related issues.



While innovating, building, and installing a clean economy, the Inflation Reduction Act promises to create jobs through the following policy areas:

Policy Area	Job Creation over 10 years
Clean Energy Investments	5,000,000
Clean Manufacturing Supply Chains	900,000
EV's & Clean Transportation	400,000
Energy Efficiency Improvements for Homes & Offices	900,000
Environmental Justice & Climate Resilience	150,000
Natural Infrastructure	600,000

IN 10 YEARS, OVER



9

MILLION

JOBS CREATED

Source: Potential Economy Research Institute (PERI) at the University of Massachusetts Amherst.



Training & Educational Programs

The present and future workforce needs to arm itself with a combination of in-depth technical knowledge and a wide range of soft skills. There are multiple training and educational programs in the United States to prepare workers for careers in the clean energy sector and to specialize the new talent generation in dealing with environmentally friendly solutions.

Here are some notable ones:



The Cleantech Institute

Located at NASA's Ames Park in San Jose, California, it operates as a research, consulting, and training organization for the renewable energy industry. It is responsible for training and is important for providing certifications for vital jobs relating to emerging [clean technologies](#).



Stanford University

Teaching the new generation of green tech talent and researching the future trends of sustainable development, the [School of Sustainability](#) has been involved in training the workforce in the energy transition.



MIT Energy Initiative

One of the endeavors worth mentioning is the [MIT Energy Initiative](#), an education and research hub of the Massachusetts Institute of Technology. It was created to develop low and no-carbon solutions, thus contributing to the fight against the climate crisis. The hub supports undergraduate, graduate, and postdoctoral scholars with studies in strategic areas in the renewable energy industry.



Interstate Renewable Energy Council (IREC)

[IREC](#) is an independent non-profit organization that offers a wide range of training and credentialing programs for renewable energy professionals. IREC programs are aimed at ensuring that workers have the necessary skills and knowledge to meet industry standards. IREC accredits training providers and certifies instructors in fields such as solar PV installation, energy auditing, and more, helping to ensure quality and standardization across the industry.



Raising Standards. Promoting Confidence.

North American Board of Certified Energy Practitioners (NABCEP)

Specializing in solar energy, [NABCEP](#) offers various certification programs that are considered the "gold standard" for solar professionals. They provide rigorous, competency-based certification programs that cover areas like photovoltaic (PV) system installation, PV technical sales, and solar heating installation. These certifications are recognized across North America and help individuals stand out in the competitive renewable energy job market.



GLOBAL WIND ORGANISATION

Global Wind Organisation (GWO)

The [Global Wind Organisation](#) is a non-profit body founded by leading wind turbine manufacturers and operators. Since launched in Denmark, the GWO has a range of training standards which address the most common safety and technical training needs of the wind industry's largest employers and is present in more than 50 countries, such as the U.S..

The wind industry isn't a new technology but has changed a lot in the last 20 years, and still faces challenges in filling positions with experienced or qualified technicians. Questioned about the certifications required and the educational side of the wind technicians, Dan Ortega explains the industry's level and the importance of the GWO standards:



Despite technological advancements, the industry is still maturing, especially when compared to others with more stable footing and standardized processes. Many companies provide excellent training, while others only cover minimum requirements. The training standards from GWO represent the industry's call for consistent education for incoming professionals. The emphasis is on core safety and technical skills. It is vital because they operate far from oversight, making rescue skills crucial."

Dan Ortega

North American Representative, Global Wind Organisation (GWO)



Green Skills in Demand

The skills shortage is definitely an issue in the clean industry. Demand for green jobs is increasing at a faster clip globally than the supply of talent. According to the [2023 Green Skills Report](#) developed by LinkedIn, the share of green talent in the workforce rose by a median of **12.3 per cent** across the 48 countries examined, while the share of job postings requiring at least one green skill grew nearly twice as quickly — by a median of **22.4 per cent**.

Green skills are essential to build a sustainable economy. These abilities position workers to get the best green jobs and also unlock opportunities for doing all jobs in a more sustainable way. The transition to a greener economy is driving green skills growth across all industries, including the most carbon-intensive. Globally, the green talent concentration in the **oil and gas** industry has steadily increased since 2016, reaching **21 per cent** in 2023.

LinkedIn data shows that renewable energy, solar energy, and power distribution were among the top five skills added by U.S. utilities workers in 2022.

Fastest-growing green skills in the U.S.

The green skills that are growing most quickly in the U.S. are:

- Carbon Accounting
- Sustainable Procurement
- Drinking Water Quality
- Energy Engineering
- Carbon Credits
- Carbon Emissions

However, there are several areas of opportunity for workers seeking to become part of the green transformation. The non-green skills below are critical to move toward a green future.



STEM Skills

Since many green jobs are grounded in science and math fundamentals, STEM skills are at the top of the list.



Digital Skills

As companies develop and deploy tech-enabled solutions to achieve their sustainability objectives, digital skills have become essential.



Utilities, Mining, and Agriculture skills

Expertise in utilities, mining, and agriculture is useful because these industries are greening rapidly. Public administration is another sought-after skill, as employers engage in more elaborate compliance and policy activities related to climate change.

The Resilient & Record-Breaking Surge of Clean Energy

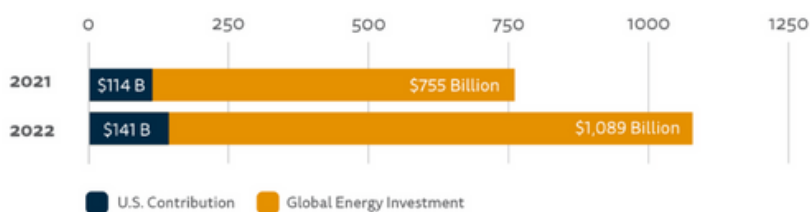
Defying the odds, the year 2022 stands out as an extraordinary period for the clean energy sector, a testament to resilience and innovation in the face of adversity.

The backdrop of **supply chain disruptions** (as seen in the sector's chapters), **an international energy crisis**, and **soaring interest rates** did not have enough to slow the momentum of clean energy in the region.

Instead, the sector experienced an investment surge, breaking previous records and setting new ones in renewable power generation. The U.S. federal government showed its unwavering support for the clean energy revolution, demonstrating its commitment through a historic \$369 billion investment, which came with the enactment of the IRA.

The global private sector responded to the energy transition call with unprecedented enthusiasm, bringing in investments that exceeded a whopping **\$1 trillion**.

Figure 22: Clean Energy Investment (\$billions) in 2021 and 2022



Source: 2023 Sustainable Energy in America Factbook
BloombergNEF



The United States attracted the second-highest investment worldwide, with [\\$141 billion](#), marking an 11 per cent increase from 2021.

This impressive sum was broadly distributed among key energy sectors:

- \$57.3 billion directed towards **electrified transport**.
- \$49.5 billion bolstering **renewable energy**.

Even in the face of economic uncertainty and logistical challenges, **clean energy thrived** in 2022. The record levels of investment in both the U.S. and globally are a powerful testament to the energy transition's robustness.

With the corporate sector's burgeoning demand and the public sector's historic capital injection into U.S. infrastructure, the reach of the clean energy transition is poised for exponential growth.

The Industry Perspective

7.0

Questioning the VP and North & Central America Director from the Energy Industries Council about her perspective on the U.S. clean energy projects and the company's future, Amanda Duhon goes straight to the point:

“

If we get it right with the investments in infrastructure, transmission, and storage, it is promising. Headlines are not enough. Stability and growth potential are key, and although the U.S. is seeking to deliver that, it is unclear if everything currently making the U.S. attractive in a global sense will still be in place in 2 years. Our members need certainty. They go where that is, and while it is currently the U.S., it doesn't have to remain the U.S..”



Amanda Duhon

VP & Regional Director, North & Central America (EIC)

*“Our members need certainty.
They go where that is...”*

”

Besides the political and economic concerns, another topic is on the table, reshaping all the markets: **technology**. The energy industry is eager for tech advances and needs to partner with tech companies and tech talents to fill its gap.

Currently, **Artificial Intelligence, Machine Learning, and Carbon Capture, Use, & Storage (CCUS)** are key resources in the energy sector to capture and absorb CO2.



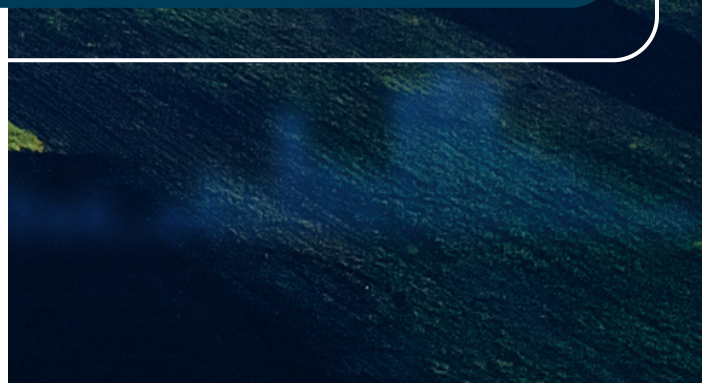
Energy production of all sorts is on the rise as companies return to work. However, the industry needs to embrace digitalization, which is still behind other sectors.

By adopting available technologies, we can improve operations and reduce negative impacts. Collaboration between the tech industry and energy sector will benefit the entire industry.



Matt Evelt

President, Americas (Airswift)



Is Workforce a Force?

The workforce is the backbone of any successful business, and this is particularly true for energy companies, which operate in a sector characterized by rapid **technological advancements, intricate supply chains, and strict regulatory requirements**. Talented and skilled employees bring innovation and efficiency, critical for developing new technologies, optimizing processes, and lowering costs.

Whether it is R&D teams developing groundbreaking renewable energy solutions or field workers maintaining the integrity of power grids, the workforce is instrumental in achieving a company's vision and objectives.

Human capital also plays a key role in navigating the complex regulatory landscape in which energy businesses often find themselves. A knowledgeable team can expedite compliance, secure necessary permits, and engage in productive dialogue with government agencies and local communities. This is essential for **timely project delivery** and **avoiding costly delays** or **legal complications**.

Workforce is the backbone of any successful business.



In addition, the transition to cleaner, more sustainable energy solutions has intensified the **competition for top talent** in fields like renewable energy, energy storage, and smart grid technology. Companies that manage to **attract, develop, and retain** the best minds will secure a significant competitive advantage.

The workforce enables **scalability**, which is often a key determinant of success in the energy sector. As energy companies expand geographically or across different segments of the energy value chain, they need a team that can manage increasingly complex operations.

Employees with **diverse skills** — from project management to data analytics — are crucial for integrating new assets, optimizing workflows, and maintaining quality and safety standards at scale. Without a capable and committed workforce, even the most promising energy businesses would struggle to build, operate, and grow effectively.



“

The workforce is critical for businesses to tackle challenges, whether clean tech, alternative energy, or traditional energy. Economists, geologists, and engineers believe alternative energy is vital but must be supplemented with conventional sources.

The oil and gas industry has great minds and scientists who can help with innovative solutions. We need to bridge this gap.”



Matt Evelt

President, Americas (Airswift)

Hiring Challenges

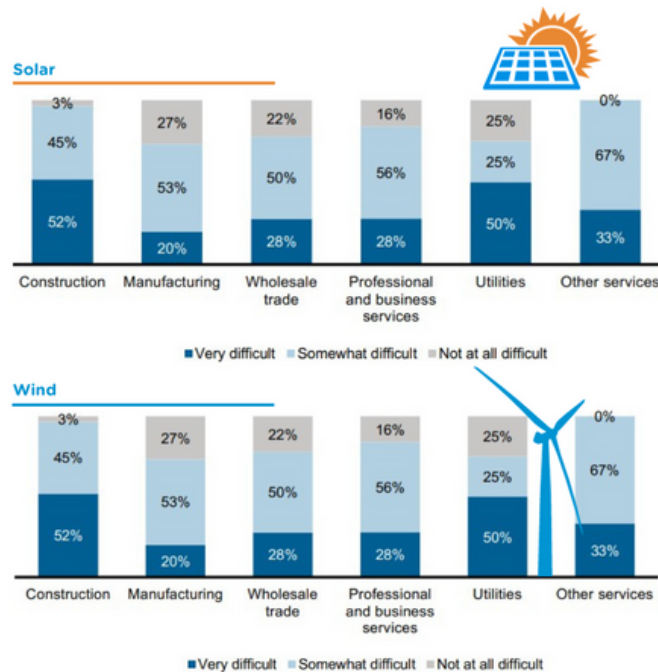
The largest number of solar and wind workers is in the construction industry. But, according to the [United States Energy & Employment Report 2023](#), the industry has faced hiring challenges.

Over **90 per cent** of construction employers reported difficulty finding qualified workers. Manufacturing, wholesale trade, business services, and utilities also noted some difficulties.

- Employers cited competition or a small applicant pool as the most common reason in the utilities, construction, wholesale trade, and other services.
- Employers cited lack of experience, training, or technical skills as the most common reason for professional and business services and manufacturing.

Employers were not asked about the compensation offered to attract talent.

Figure 23: Employers Perspective on Hiring Difficulty



Source: United States Energy & Employment Report 2023 U.S. Department of Energy



“

When it comes to talent, the pickings are slim. Technical and Engineering talent is limited and a highly competitive arena. The future for clean energy talent lies within our graduates, ensuring they are educated on the interworkings between clean energy and energy transformation and providing them pathways to enter the energy sector to bring their talent, commitment, and passion to addressing the climate challenge.”



Amanda Duhon

VP & Regional Director, North & Central America (EIC)

Attracting & Retaining Talent

It is no secret that **pay and benefits** are the top drivers of job satisfaction. But increasingly, we also have a workforce interested in **career progression, relocation, and Environmental, Social & Governance (ESG)** factors.

So, renewable energy firms need to consider the landscape and ensure that their compensation packages are competitive to attract and retain top talent. This includes benefits such as **healthcare, retirement plans, and work-life balance initiatives.**



The energy transition will hinge on our green skills base, yet renewables talent is increasingly restless and in demand from outside sectors. Fossil fuel firms are becoming more popular among renewables workers by improving their ESG performance as well as pay."



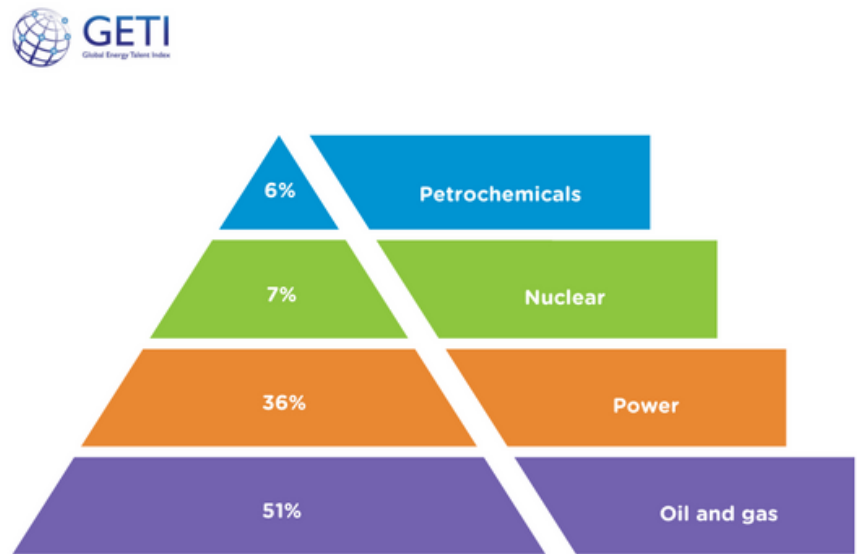
Janette Marx

CEO (Airswift)

According to the seventh annual [Global Energy Talent Index \(GETI\) report](#), over half of the renewable energy employees surveyed have expressed interest in jumping into the **oil and gas** industry due to the **higher salaries**. This is a 14 per cent increase from the previous year.

This shift is raising concerns about its potential impact on the energy transition.

Figure 23: Employers Perspective on Hiring Difficulty



Source: 2023 Global Energy Talent Index (GETI)



“

At a glance, this looks like a significant increase, but the boom-bust nature of oil and gas means that we often see an ebb and flow between sectors. When fossil fuel prices are high, as they have been in 2022, salaries are also positively influenced.”



Janette Marx
CEO (Airswift)

Key Factors to Motivate Employees

When asked what drives job satisfaction, nearly half of GETI renewables respondents point to the feeling that they are **contributing to society** – although this is most true for the under 35s. **Flexible working** is also identified by 39 per cent. Together, this paints the picture of quite a different culture to other sectors.

Remuneration was highlighted as both a source of job satisfaction and dissatisfaction (46 per cent vs 59 per cent). A **lack of a clearly defined career path** was also cited as a source of job dissatisfaction by 47 per cent of respondents.

This suggests several opportunities for alternative energy companies to make improvements to [attract and retain the workforce](#), such as:

- Highlight opportunities for career progression.
- Enhance training and development programmes.
- Review benefits policies
- Offer competitive salaries.
- Encourage open dialogue.



Create buzz around your product and environment to attract young talent. Invest in your product, keep your promises, and continue to evolve it to retain talent and show them a future in the industry. Give employees a clear path to where your product could lead to sustainable growth in the alternative energy industry.”



Matt Evelt

President, Americas (Airsift)

Key Takeaways

For Candidates & Business Leaders

01

Can the U.S. Decarbonize its Power Grid by 2035?

That's a trick question. While the U.S. has made considerable progress in the renewable sector, it is still hard to know if all the efforts will be enough to decarbonize its power grid by 2035 and reach its Paris Agreement targets by 2050. This would signify a pivotal chapter in the nation's drive toward environmental resilience and sustainability, as the country is the second world's largest emitter of greenhouse gases.

However, unless the nation addresses some significant challenges, such as transmission and storage, continued renewable energy generation will be a moot point. Currently, the nation is facing a bottleneck of transmission lines due to aging infrastructure and space needed for additional power lines.

02

Unlocking Clean Energy Projects & Attracting Global Interest

The recent Inflation Reduction Act has unlocked several opportunities for clean energy companies and talent, working as a green light and attracting international interest. Clean technologies — such as renewables, green hydrogen, energy storage, carbon capture use and storage — are leading the project pipeline and are present in all 50 states. However, the upcoming election cycle may be an issue as stability is essential to keep the global attractiveness.

03

General Challenges & Private Investments

The backdrop of supply chain disruptions, the international energy crisis, and soaring interest rates were some of the main industry challenges in the region. But none of them was able to stop the sector. Instead, the sector experienced an investment surge, breaking previous records and setting new ones in renewable power generation.

The global private sector responded to the energy transition call with unprecedented enthusiasm, bringing in investments that exceeded a whopping \$1 trillion. The United States attracted the second-highest investment worldwide, with \$141 billion, marking an 11 per cent increase from 2021.

04

The Green Employment Boom

The energy transition is underway and brings deep structural changes. The number of workers in the clean energy economy is currently 3.1 million and, with the recent Inflation Reduction Act, studies pointed out that the number of jobs can jump to more than 9 million climate tech jobs by 2032.

The workforce plays a central role in supporting the continued acceleration of clean energy generation expected in upcoming years. So, focus on safety skills and be prepared! There are multiple training and educational programs in the United States to specialize in dealing with environmentally friendly solutions, such as The Cleantech Institute, Stanford University, MIT Energy Initiative, Interstate Renewable Energy Council (IREC), North American Board of Certified Energy Practitioners (NABCEP), Global Wind Organisation (GWO).

05

Attracting & Retaining Talent

Renewable talent is increasingly restless and in demand from outside sectors. According to the seventh annual Global Energy Talent Index (GETI) report, over half of the renewable energy employees surveyed have expressed interest in jumping into the oil and gas industry.

For alternative energy companies to attract and retain talent it is essential to offer a competitive benefits package, highlighting career opportunities, enhancing training and development programmes, and keeping open dialogue to hear the team's needs. More and more the workforce is interested in relocation, work-life balance and Environmental, Social and Governance (ESG) factors.



Airswift Americas President, Matt Evelt, offers an extra tip:

“Create buzz around your product and environment to attract young talent. Invest in your product, keep your promises, and continue to evolve it to retain talent and show them a future in the industry. Give employees a clear path to where your product could lead to sustainable growth in the alternative energy industry.”

References

[“Global Green Skills Report 2023.”](#)

LinkedIn (2023)

[“United States Energy & Employment Report 2023.”](#) U.S. Department of Energy (2023)

[“Sustainable Energy in America Factbook.”](#) Business Council for Sustainable Energy (2023)

[“Making Clean Energy Tax Credits Deliver for the Public: A User Guide for Governments, Schools, and Nonprofits.”](#) Bluegreen Alliance (2023)

[“U.S. National Clean Hydrogen Strategy and Roadmap.”](#) U.S. Department of Energy (2023)

[“Employment Impacts of New U.S. Clean Energy, Manufacturing, and Infrastructure Laws.”](#) Political Economy Research Institute (2023)

[“Queued Up: Characteristics of Power Plants Seeking Transmission Interconnection As of the End of 2022.”](#) Lawrence Berkeley National Laboratory (2023)

[“Clean Power Quarterly 2023 Q1 - Market Report.”](#) American Clean Power Association (2023)

[“Clean Power Quarterly 2023 Q2 - Market Report.”](#) American Clean Power Association (2023)

[“Clean Energy Investing in America.”](#)

American Clean Power Association (2023)

[“Offshore Wind Market Report.”](#) American Clean Power Association (2023)

[“Global Energy Talent Index Report.”](#) Airswift (2023)

[“Energy transition in the U.S. - the path to net-zero electricity by 2035.”](#) Statista (2022)

[“U.S. Offshore Wind Power Economic Impact Assessment.”](#) American Wind Energy Association (2020)

[“Employment Impacts of New U.S. Clean Energy, Manufacturing, and Infrastructure Laws.”](#) Political Economy Research Institute at the University of Massachusetts-Amherst (2023)



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