



June. 2023

In this Issue...

▶ Study: Oil & Gas Industry P...

▶ U.S. Solar Market Shines Br...

▶ Floating Solar & Wind Insta...

▶ Join Us In-Person June 21 f...

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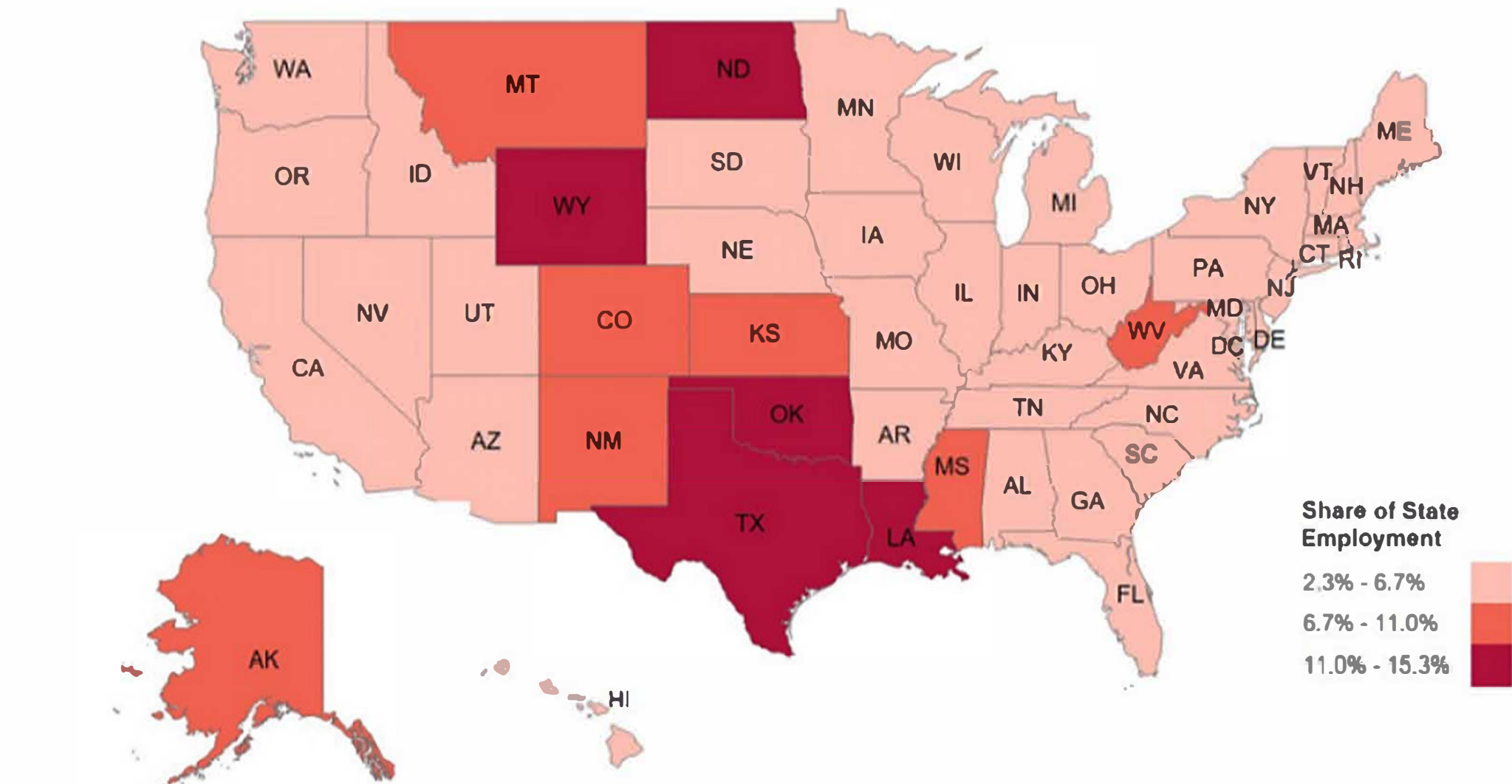
Despite its ups and downs, the oil and gas industry still has a big impact on employment in the U.S., according to an analysis released in May by the [American Petroleum Institute](#) (API) (Washington, D.C.).

The industry supported 10.8 million jobs, or 5.4% of total U.S. employment, and contributed nearly \$1.8 trillion to the U.S. economy in 2021, according to the study by [PricewaterhouseCoopers](#) (PwC) (London, England), based on the latest government data available. The API commissioned PwC to study the industry's economic impact at the national, state and congressional district levels.

"America's economic outlook is brighter when we are leading the world in energy production and this analysis serves as a reminder that we need policies and regulations that encourage investment and enable development," said API President and Chief Executive Officer Mike Sommers in a press release.

Among natural gas and oil jobs, the average wage was 65% greater than the U.S. average, according to the API. The industry also generated 3.7 jobs elsewhere in the U.S. economy for each direct job in the industry, according to the report.

Figure ES-1. Share of Employment Directly and Indirectly Supported by the Oil and Natural Gas Industry, 2021



Source: PwC calculations.

Not too surprisingly, Texas led the way in the amount of money generated by the industry, totaling \$454.5 billion. However, California came in second place at \$217.1 billion, according to the study.

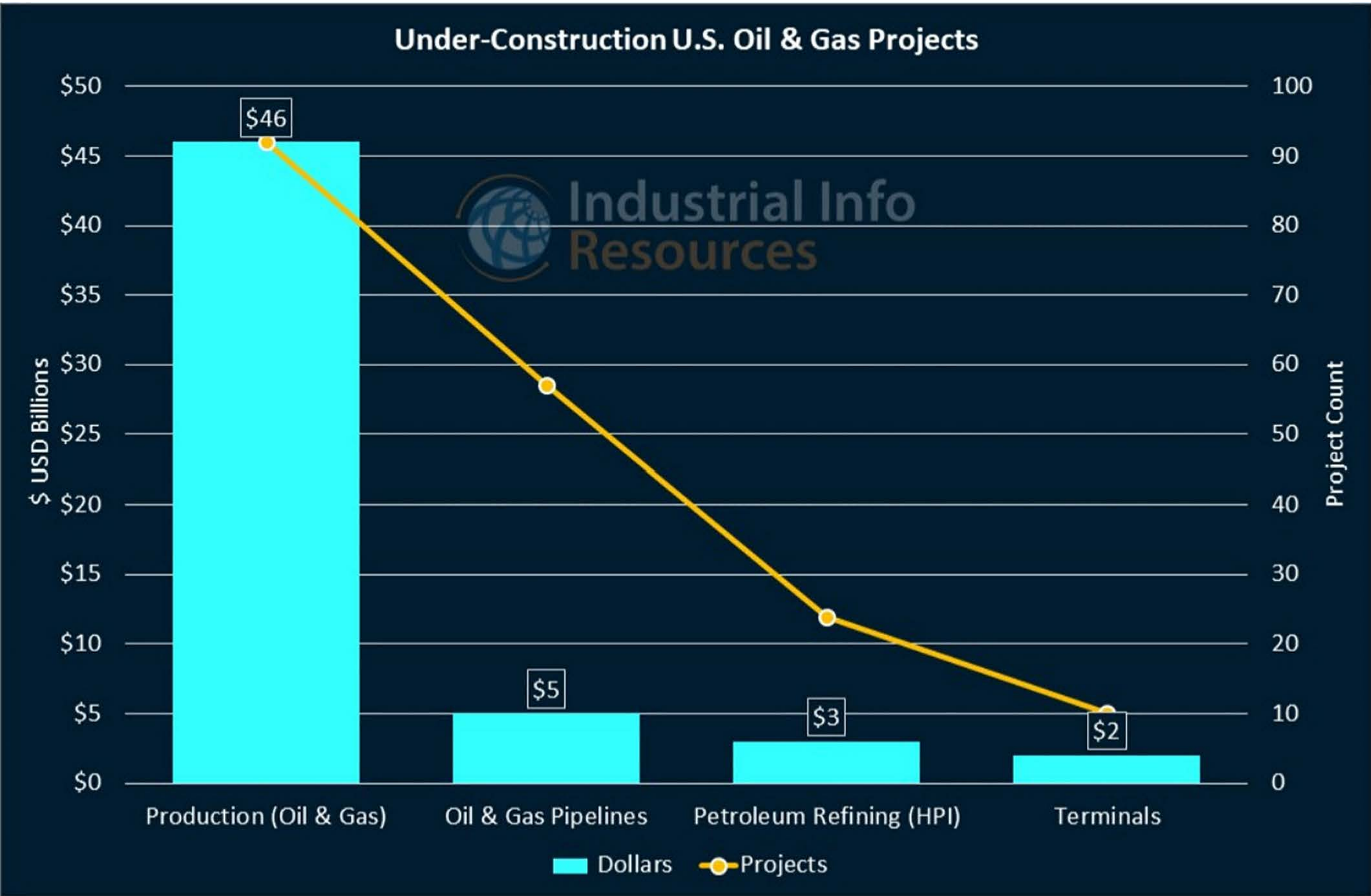
The states with the largest direct oil and gas employment were Texas, California, Oklahoma, Pennsylvania and Louisiana.

States with the largest share of direct and indirect employment from oil and gas included Texas, Oklahoma, Wyoming and North Dakota. Of all states, Oklahoma had the largest share of employment supported by the industry, at 15.3%.

The report included the economic impact of oil and natural gas exploration and production, oil refining, pipeline operations, natural gas distribution and oil marketing.

The report also broke down the data by jobs from operations (9.4 million) and those from capital investment (1.4 million).

Capital spending by the industry totaled \$159 billion in 2021, according to the report. Currently, Industrial Info is tracking more than \$56 billion worth of oil and gas production, terminals, pipelines and petroleum refining projects in the U.S. that are in the construction stage. Subscribers to Industrial Info's Global Market Intelligence (GMI) Project Database can [click here](#) for a list of detailed reports.



At the congressional district level, the number of jobs directly attributable to the oil and natural gas industry was at least 1,000 in all but 11 districts and exceeded 5,000 in 121 congressional districts in 2021, the report said, adding: "Direct employment is especially pronounced in districts in Texas, Oklahoma, and Louisiana with significant oil and gas extraction activities."

Nine of the top 15 congressional districts in terms of the oil and natural gas industry's direct employment were in Texas, home to the Permian Basin and the Eagle Ford Shale. Leading all districts was Texas' 11th Congressional District, which stretches from the Permian Basin to the outer fringes of Dallas-Fort Worth.



- June. 2023In this Issue...
- ▶ Study: Oil & Gas Industry P...

▶ U.S. Solar Market Shines Br...

▶ Floating Solar & Wind Insta...

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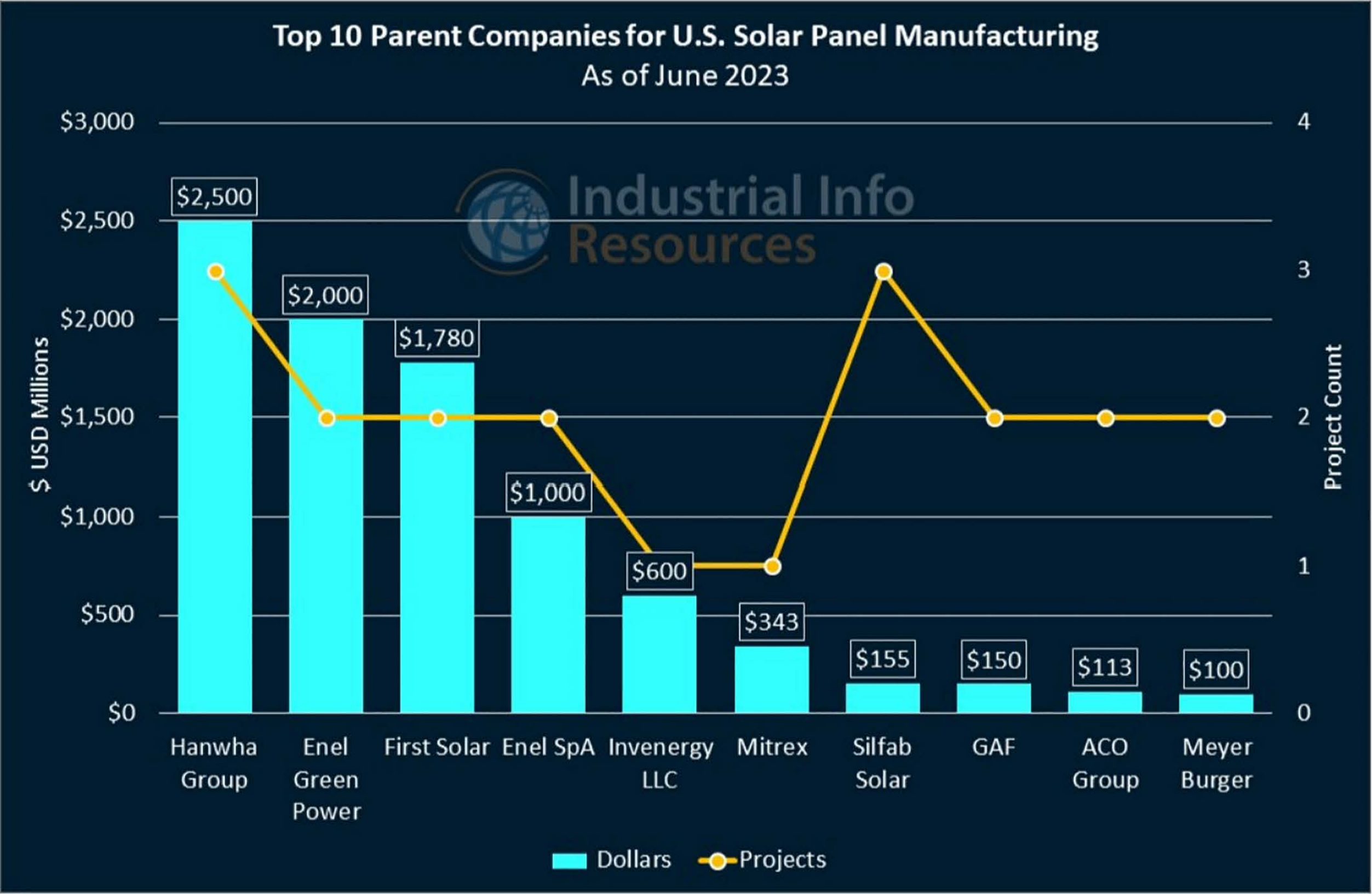
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U.S. Solar Market Shines Bright for Panel, Cell Manufacturing

Players in the U.S. energy market increasingly believe it is not enough simply to generate renewable energy--the nation should do more to build its components, such as solar panels and cells. With China currently producing most of the panels used at U.S. facilities, companies that generate solar power domestically are primed to take advantage of last year's Inflation Reduction Act (IRA), which offers a 10% tax credit to facilities built with panels containing domestically made solar cells. Industrial Info is tracking more than \$7 billion worth of active solar panel- and cell-manufacturing projects across the U.S., nearly \$3 billion of which is attributed to projects already under construction.

But time is of the essence: IRA incentives for domestically made solar cells will begin to phase out at the end of this decade. Construction already started earlier this year on one of the highest-valued projects in the entire U.S. renewable-energy market: **Hanwha Q Cells'** (Seoul, South Korea) **\$1.8 billion solar module-manufacturing plant in Cartersville, Georgia**. Q Cells announced that it would build the plant following the passage of the IRA, with construction kicking off in March. Completion is expected toward the end of 2024.

The Cartersville plant is designed to manufacture 3.3 gigawatts (GW) worth of panels per year. Q Cells also is upping production at one of its existing facilities, with the **\$200 million expansion of its solar module-manufacturing plant in Dalton, Georgia**, about 50 miles north of Cartersville. Subscribers to Industrial Info's Global Market Intelligence (GMI) Industrial Manufacturing Project Database can read detailed reports on the [Cartersville plant](#) and [Dalton expansion](#).



Earlier this year, [Wood Mackenzie](#) (Edinburgh, Scotland) published a report saying the IRA could lead to a 78% increase in investments across the U.S. in low-carbon energy. For more information, see January 20, 2023, article - [Report: U.S. Can Expect Huge Influx in Low-Carbon Investments](#).

[First Solar Incorporated](#) (NASDAQ:FSLR) (Tempe, Arizona), which plans to manufacture more than 10 GW worth of solar cells within the U.S. by 2025, expects to finish construction in the coming months on its **\$680 million factory in Perrysburg, Ohio**. The facility will produce 3.3 GW per year of advanced, thin-film photovoltaic (PV) solar modules. Ohio is expected to see nearly 8.8 GW of mostly utility-scale solar installed over the next five years, according to the [Solar Energy Industries Association](#) (SEIA).

In March, First Solar picked up a multi-year order from EDP Renewables North America LLC, a subsidiary of [Energias de Portugal S.A.](#) (Lisbon, Portugal), for 1.8 GW of thin-film PV modules. In addition to its Ohio project, First Solar is proposing a **thin-film PV plant in Trinity, Alabama**, which the company believes could manufacture up to 3.5 GW per year. The project, announced in November by Alabama's Governor Kay Ivey (R), is expected to be commissioned in 2025. Subscribers can learn more from Industrial Info's reports on the [Perrysburg](#) and [Trinity](#) projects.

Illuminate USA, a recently established joint venture between renewable-energy company [Invenergy](#) (Chicago, Illinois) and solar panel manufacturer [LONGi](#) (Xi'an, China), is preparing to begin construction this summer on a **\$600 million solar panel plant in Pataskala, Ohio**. The company is renovating a 1.1 million-square-foot building to manufacture up to 5 GW of modules per year, which it says represents nearly 50% of total U.S. utility-scale solar installations in 2022. Subscribers can learn more from a detailed [project report](#).

Ohio's strong manufacturing sector has made it a top destination for solar panel producers, both in the utility-scale and residential markets.

Subscribers to Industrial Info's GMI Project Database can [click here](#) for a full list of detailed reports for projects mentioned in this article, and [click here](#) for a full list of related plant profiles.

Subscribers can [click here](#) for a full list of reports for active solar panel- and cell-manufacturing projects across the U.S.



- June. 2023In this Issue...
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Floating Solar & Wind Installations Gain Ground

Floating solar and floating wind installations share one obvious thing in common: They both float on water, not taking up land. However, the locations, purposes and benefits of floating solar and wind differ in many regards. Both provide advantages compared to other types of solar and wind installations and are gaining steam with increasing project activity.

Floating Solar

The main draw of floating solar power installations is that they don't require land on which to build. By utilizing existing bodies of water, such as reservoirs, lakes and dams, floating solar power maximizes land use efficiency without compromising agricultural or ecological areas. The cooling effect of water on floating solar panels can enhance their performance and overall energy generation efficiency. This increased efficiency contributes to higher energy yields and a more cost-effective utilization of solar resources. In addition, floating solar panels can aid in reducing water evaporation by minimizing the body of water's direct exposure to sunlight.

Industrial Info is tracking approximately \$10 billion worth of floating solar projects worldwide. Most of these are in Asia, which is home to 90 projects, while Europe runs a distant second with 45 projects. The floating solar facilities presently under construction vary greatly in size, ranging from a 7.5-megawatt (MW) facility in the Netherlands to a 110-MW installation in Saudi Arabia.

India takes the lead in the value of floating solar projects. Among the projects under construction in the country is the grassroot floating solar installation at the Omkareshwar Dam in Madhya Pradesh. Construction on the project began earlier this year and is expected to be completed by yearend, when the facility will provide 90 MW of renewable energy. Subscribers to Industrial Info's Global Market Intelligence (GMI) Power Project Database can [click here](#) for more details.

Floating solar projects have been slower to evolve in North America. [Duke Energy Corporation \(NYSE:DUK\)](#) (Charlotte, North Carolina) is installing a pilot-scale floating solar project at its cooling pond at the Hines Energy Complex in Bartow, Florida. The two-acre pilot on water will include 1,800 solar modules that can produce nearly 1 megawatt of electricity. At a May groundbreaking ceremony for the project, Shayna White, Duke's Florida project manager, said the small-scale pilot on Duke property will be a test to determine if the technology behind floating solar arrays has better efficiency and capabilities than land-based solar farms. The smallness of the project shows when comparing its less than 1 MW of generation with the more than 2,200 MW provided by the natural gas-fired Hines plant.

There are a few disadvantages to floating solar power installations, the chief of which is that bodies of water for which they are suitable, such as lakes and reservoirs, are limited in number. In addition, construction and maintenance can be more difficult, requiring specialized equipment and skilled personnel. Finally, floating solar installations can affect aquatic ecosystems by disrupting water flows and blocking sunlight into the water body.

Floating Wind

Floating wind installations have their own advantages. Like offshore windfarms fixed to the seabed, floating windfarms can free up terrestrial space for other uses such as agriculture and recreation. Floating windfarms, which are tethered to the ocean floor using mooring lines, can be situated further out than ocean bed-attached wind turbines as well as in areas that have steep coastal shelves. Winds are stronger and more continuous further out to sea, so floating turbines can generate more power than those fixed to the seabed near to shore. The turbines planned for floating windfarms are often larger and able to generate more power than bed-anchored offshore windfarms. Being placed further out minimizes the turbines' visibility from land, potentially leading to greater acceptance from coastal communities.

Floating wind installations are even rarer than floating solar installations. According to a recent Reuters article, there is only a little more than 120 MW of floating wind power in operation throughout the world.

Most of the \$57.5 billion in floating wind projects being tracked by Industrial Info are set to kick off in the future. There are exceptions to this, but most of the floating windfarms presently under construction are much smaller than some of the planned behemoth projects. For example, [TotalEnergies SE \(NYSE:TTE\)](#) (Courbevoie, France) is at work on a 30-MW floating pilot project that will feature three 10-MW turbines in the Mediterranean Sea. Construction kicked off last year and is expected to be completed in the summer of 2024. The pilot project is being built in anticipation of a larger 500-MW project. Subscribers can learn more by viewing the [project report](#).

[Equinor \(NYSE:EQNR\)](#) (Stavanger, Norway) is wrapping up a floating windfarm to provide power to its oil fields in the North Sea. The Hywind Tampen project will feature 11 turbines, each rated at 8 MW, to help supply power to equipment at the Gullfaks and Snorre fields. The project is designed to shave 250,000 tons per year of carbon-dioxide production from the two fields. Subscribers can [click here](#) for the full report.

Larger projects are planned to kick off in the near future. In the South China Sea, for example, [Power Construction Corporation of China](#) (Beijing, China) soon will begin construction on a floating windfarm with 12 tubular towers, each fitted with a 16.7-MW turbine-generator set, to generate about 200 MW of power. Construction is expected to be completed by the end of 2025. Subscribers can [click here](#) for the full report.

Larger undertakings potentially wait in store. Among the largest planned floating wind projects is Equinor's Firefly project, which will be located in water depths of between 200 and 250 meters in the Sea of Japan off the South Korean coast. The floating windfarm would include 50 turbines, each rated at 15 MW, to achieve nameplate generation of 750 MW. Construction could begin in 2025 and would take an estimated two years to complete. Subscribers can [click here](#) for more details.

There are a few disadvantages to the construction of floating windfarms. They have higher initial costs compared to other types of windfarms due to the complexity of the floating structures and installation challenges. Like their floating solar counterparts, maintenance on floating windfarms can be more challenging and costly as well.

Conclusion

While floating solar and wind installations provide distinct advantages, the two technologies are still in their early stages. As costs come down and the technologies become more mainstream, the world may be seeing more floating forms of renewable energy generation in the future.



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During this outlook event, Industrial Info's industry experts will provide a mid-year update on the progression of the capital and maintenance spending trends for 2023 discussed during our January event, as well as insights into next year's market outlook and forecast for the U.S. and Canada.

A growing consensus to invest capital into sustainability and decarbonization efforts is being realized across most industries. While a number of these projects are being financially incentivized, funding projects will become more difficult in light of the bank failures that have taken place and the economic uncertainty that looms. As we look ahead into 2024, what is the outlook for industrial plant maintenance and capital investments?

Each presentation will feature an IIR expert speaking about what's in store for the North American industrial landscape for the rest of this year and next. Presentation subjects will include:

- Global Market Outlook
- Petroleum Refining & Biofuels
- Midstream Gas Market Outlook
- Chemical Processing
- Electric Power
- North America Spending Forecast

Before the presentations, IIR will be offering interactive training workshops for its products, demonstrating the capabilities of our new Market Analytics Engine (MAE) and highlighting new PECWeb enhancements.

After the presentations, a networking session with complimentary drinks and hors d'oeuvres will provide an opportunity to ask questions from our industry experts and mingle with your peers.

We hope you are able to join us for this event! [Click here](#) to learn more and to RSVP.