



The Legal 500 Country Comparative Guides

United States

RENEWABLE ENERGY

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This country-specific Q&A provides an overview of renewable energy laws and regulations applicable in United States.

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UNITED STATES RENEWABLE ENERGY



1. Does your jurisdiction have an established renewable energy industry? What are the main types and sizes of current and planned renewable energy projects? What are the current production levels?

The United States has a strong established renewable energy industry. According to the U.S. Energy Information Administration ("EIA"), in 2022, about 4,243 billion kilowatt-hours ("kWh") of electricity were generated at utility-scale generation facilities. About 60% of this generation was from fossil fuels (coal, natural gas, petroleum, and other gases); about 22% was from renewable energy projects, and 18% was from nuclear power plants. As of December 2021, there were 1,485 wind utility-scale generators; 5,257 solar photovoltaic utility-scale generators; 13 solar thermal utility-scale generators; 2,088 biomass utility-scale generators; 171 utility-scale geothermal generators; and 4,017 hydroelectric conventional utility-scale generators. The EIA estimates that an additional 58 billion kWh of electricity generation was from small-scale solar photovoltaic systems in 2022.

EIA projects that renewable generation will increase from 21% in 2021 to 44% of U.S. electricity by 2050. It also forecasts that new solar and wind projects coming online in 2023 will account for 16% of total generation in 2023, up from 14% in 2022 and 8% in 2018. Solar capacity is expected to grow the most, rising from 3% in 2022 to 5% in 2023 and 6% in 2024. In contrast, EIA expects that the share for generation from coal falls from 20% in 2022 to 18% in 2023, and the share from natural gas declines from 39% to 38%.

Regarding production levels in 2022, renewable energy sources (including wind, conventional hydroelectric, solar, biomass, and geothermal energy) generated 912 billion kWh of electricity. Only natural gas (1,689 billion kWh) produced more electricity than renewables in the United States in 2022. Renewables also surpassed both nuclear (771 kWh) and coal (829 billion kWh).

2. What are your country's net zero/carbon reduction targets? Are they law or an aspiration?

The United States' zero/carbon reduction targets are not codified in law. However, the country has been on track to meet its commitment of reducing carbon emissions by 25% below 2005 levels by 2025. In September 2022, the Biden administration announced its aim to cut emissions between 50 to 52% from 2005 levels in 2030, which was also set as the United States' latest nationally determined contributions ("NDCs") as per the Paris Agreement. As per the NDCs, the United States has set a goal to reach 100% carbon pollution-free electricity by 2035.

The Biden administration rejoined the Paris Agreement in early 2021 and continues its aggressive effort to fulfil its NDCs. Those include the Infrastructure Investment and Jobs Act of 2021 ("IIJA"), the Creating Helpful Incentives to Produce Semiconductors Science Act of 2022 ("CHIPS"), and the Inflation Reduction Act of 2022 ("IRA"). Although the U.S. Supreme Court decision in *West Virginia v. Environmental Protection Agency* raised some questions about the Biden administration's ability to rely on federal regulation to advance its carbon reduction policy goals and objectives in the absence of new federal legislation, the Biden administration proposed controls on greenhouse gas emissions ("GHG") from power plants. If implemented, the proposed regulation will limit emissions for coal and certain gas power plants through caps on pollution rates. The proposal aims at effectively eliminating carbon dioxide emissions from the United States' electricity sector by 2040.

3. Is there a legal definition of 'renewable energy' in your jurisdiction?

Yes, there is a legal definition of renewable energy in the United States set forth in the Renewable Energy Resources Act of 1980. As per 42 U.S. Code § 7372, the term "renewable energy resource" means "any energy

resource which has recently originated in the sun, including direct and indirect solar radiation and intermediate solar energy forms such as wind, ocean thermal gradients, ocean currents and waves, hydropower, photovoltaic energy, products of photosynthetic processes, organic wastes, and others.” Accordingly, the Energy Policy Act of 2005 refers to renewable energy resources as those “including solar, wind, biomass, ocean (including tidal, wave, current, and thermal), geothermal, and hydroelectric energy resources.” This definition is not expressly referenced in the IRA, IJIA, CHIPS or other relevant energy legislation. The term renewable energy is used in those laws without a specific definition.

4. Who are the key political and regulatory influencers for renewables industry in your jurisdiction and who are the key private sector players that are driving the green renewable energy transition in your jurisdiction?

In the United States, jurisdiction over electricity is divided between the federal government and the states. At the national level, the Federal Energy Regulatory Commission (“FERC”) has authority over transmission and wholesale sales of electricity in interstate commerce. The states and territories have jurisdiction over distribution and retail sales. Each state has a public utility commission or similar body, and Puerto Rico has the United States’ largest publicly owned utility as well as a separate regulatory board. Additionally, the U.S. territories of American Samoa, Guam, the Northern Marianas Islands, and the U.S. Virgin Islands each has its own public utility.

The North American Electric Reliability Corporation (“NERC”) helps ensure the reliability of the North American bulk electric system, which is divided into three independent interconnections: Eastern Interconnection, Western Interconnection, and Electricity Reliability Council of Texas (“ERCOT”) Interconnection. FERC regulations also enabled the establishment of independent, nonprofit organizations that serve as regional transmission operators (“RTOs”) or independent system operators (“ISOs”).

NERC assesses the system’s reliability, develops reliability standards, and has the authority to enforce standards. FERC approves proposed standards and directs NERC to develop modifications to reliability standards in an ongoing process that is designed to respond to changing market and transmission system conditions.

At the state level, the permits required and the process for obtaining permits will vary depending on the jurisdiction. Some states have a single agency or siting authority that manages the permitting process for all solar projects and other large utility infrastructure within the state. By contrast, in other states, the developers may have to obtain permits from multiple state and local agencies.

In addition to the applicable energy regulations, federal, state and local environmental and natural resources laws may also apply to projects and require analysis that can shape the development of the project and materially affect timing and cost. Certain projects may be required to prepare detailed environmental impact assessments and obtain certain environmental permits that require retaining experienced environmental consultants and counsel to lead the environmental review process. Determining which regulations apply and which agencies have jurisdiction will depend on factors including the siting of the project, protected species and other impacts, project alternatives, the type of technologies employed, and whether the project will apply for or receive government funding.

For example, the development of a renewable energy project on federal lands requires the involvement of certain federal agencies and also requires the completion of a National Environmental Policy Act (“NEPA”) review. Projects seeking grants or loan guarantees from the U.S. Department of Energy (“DOE”) also require NEPA review. The location and technical details of wind and biomass projects may trigger requirements for air, noise and other environmental permits. Experienced environmental and resources counsel should be engaged early in the development process.

Many private sector participants are joining the energy transition. Investors of all sizes have committed to net zero carbon pledges. Public and private corporations in various industries have also made net-zero commitments. Some of these efforts are discussed in Questions 5, 13, 18, and 19 below.

As in the past, project developers have been at the forefront of developing renewables projects and expanding the range and scale of technologies being deployed across the country, including battery and energy storage (standalone or added to generation projects) and innovative applications combining electric vehicle (“EV”) charging stations and storage, micro grids, demand response, distributed energy resources, and hydrogen production and storage. Those project developers are increasingly tapping equity and debt investments from private equity (“PE”) funds and other

institutional investors to scale up their companies and their ability to complete projects on an increasingly larger scale. We also see more consumer-facing businesses, including retailers, manufacturers, tech companies, and banks, looking to fulfil their net zero commitments through power purchase agreements ("PPAs"), virtual power purchase agreements ("VPPAs"), and other offtake agreements as well as other partnerships and investments with companies developing renewable energy projects. Lastly, we see a continued push by large investment funds, institutional investors and banks to provide equity and debt financing for companies involved in the energy transition space.

5. What are the approaches businesses are taking to access renewable energy? Are some solutions easier to implement than others?

Businesses are continuing to procure energy from renewable sources. We have seen companies outside the energy sector shifting to renewable energy, and even getting involved with development, particularly now with the volatility of the global fuel markets. VPPAs and other corporate power sourcing instruments are increasingly common.

Many big tech companies and other corporate offtakers have adopted plans to measure their carbon footprint and announced the corporate actions and policies necessary to mitigate that footprint, including by committing to power 100% of their operations with renewable energy. Specifically, we have seen a number of large PPAs signed that provide renewable power to data centers. A recent report from the American Clean Power Association found that corporations have offtake agreements for 16% of the U.S. clean power capacity, with 80% of that capacity procured through PPAs. In 2022, companies announced 20 gigawatts ("GW") of new clean power contracts, the most on record.

PE firms in the United States are also adopting net zero initiatives. Many of them have signed up to the Initiative Climat International ("ICI"), a climate initiative for private equity, supported by the Principles for Responsible Investment ("PRI") that has the objective to accelerate the PE industry's drive on climate action.

6. Has the business approach noticeably changed in the last year in its engagement with renewable energy? If it has why is this (e.g. because of ESG, Paris Agreement,

price spikes, political or regulatory change)?

Regarding the variety of businesses looking at renewable energy, many companies and industries are taking a hard look at the IRA to see how they can become more involved in energy transition projects in order to meet their sustainability goals faster. Additionally, the IRA allows for the transfer (*i.e.*, sale) of tax credits from renewable projects which lowers the hurdles for companies to take advantage of the credits without having to develop expertise in often complex tax equity structures. The tax credit and other IRA provisions are discussed in Question 11.

On the other side, there seem to be calls from an increasingly diverse group of stakeholders to resolve transmission constraints. This is in part a result of the growing recognition that such constraints represent a significant hurdle to reaching renewable energy targets.

7. How visible and mature are discussions in business around reducing carbon emissions; and how much support is being given from a political and regulatory perspective to this area (including energy efficiency)?

As described in the examples provided in answers to Questions 5 and 6 above, discussions and initiatives in the U.S. business community about reducing carbon emissions have become mainstream and visible, particularly among public companies and companies in consumer-facing industries. These efforts are increasingly mature and have become more visible. Regarding political and regulatory support to this area, there are both federal and state support measures aimed at increasing reduction emissions across all economic sectors. Given the variety of state programs, this answer will only focus on the federal level.

In the two years since taking office, the Biden administration has advanced and supported public policies to reduce greenhouse gas emissions. In enacting the IRA in 2022, the Biden administration secured the largest investment to date to advance energy security and to combat climate change in the United States. The IRA's key energy and climate provisions include the following:

- Authorizes an additional \$40 billion for the Innovative Clean Energy Loan Guarantee Program (Title 17) run by the DOE Loan Program Office ("LPO") and described in Question 9 below;

- Creates the Energy Infrastructure Reinvestment Program with up to \$5 billion through fiscal year 2026 to support loan guarantees up to \$250 billion for energy infrastructure-related projects;
- Extends and expands federal production tax credits ("PTCs") and investment tax credits ("ITCs") for renewable energy, thermal storage, and other technologies;
- Introduces new federal income tax credits for carbon capture and storage technologies, as well as electric, hybrid and hydrogen fuel cell;
- Provides R&D grants to the DOE's Office of Science to invest in DOE labs;
- Creates an advanced industrial facilities deployment program aimed at reducing emissions from energy intensive industries;
- Allocates over \$20 billion to the Office of Clean Energy Demonstrations ("OCED") to create regional production hubs and to promote the scaling of new technologies;
- Creates a new \$5.8 billion program under the OCED directed to iron, steel, concrete, glass, pulp, paper, ceramics, and chemical production;
- Appropriates \$150 million for the Office of Energy Efficiency and Renewable Energy for infrastructure and general plant projects through 2027.

The IIJA is the second largest investment in climate and energy. It appropriated more than \$62 billion for the DOE in the coming fiscal years and created 60 new programs, including the OCED. The OCED was established to support large-scale pilot projects for clean hydrogen production, carbon capture, grid-scale energy storage, and advanced nuclear reactors. The IIJA also provided the LPO with substantial appropriations for several loan and loan guarantee programs to support the commercial deployment of innovative clean energy and advanced transportation projects. The programs include \$8.5 billion for advanced fossil projects; \$10.9 billion for advanced nuclear projects; up to \$17.7 billion for Advanced Technology Vehicle Manufacturing, and up to \$2.1 billion to Carbon Dioxide Transportation Infrastructure Finance and Innovation Program ("CIFIA") for loan guarantees and grants to support CO2 transportation infrastructure projects. As a result, DOE is able to offer long-term, low-cost financing with interest rates equivalent to Treasury yield curves to eligible projects under the CIFIA program.

The CHIPS Act authorized over \$67 billion for DOE research and development programs including the first-ever comprehensive authorization for the DOE Office of Science. This authorization includes prioritizing research

in fusion energy science, high energy physics, and nuclear physics, among others. It also includes several new DOE programs focused on research and development in emerging technology areas such as steel emissions reduction methods and microelectronics.

More recently, DOE announced approximately \$6 billion in funding under the Industrial Demonstrations Program to accelerate decarbonization projects in energy-intensive industries, including the production of steel, aluminum, chemicals, and concrete.

8. How are rights to explore/set up or transfer renewable energy projects, such as solar or wind farms, granted? How do these differ based on the source of energy, i.e. solar, wind (on and offshore), nuclear, carbon capture, hydrogen, CHP, hydropower, geothermal and biomass?

In addition to the energy and environmental regulatory authorizations and permitting requirements described in Question 4 above, a developer typically starts the development of a new project by securing rights to (i) a project site and (ii) connect the project to the existing electricity grid or transmission system. The selection of the project site often is interrelated to the potential options for interconnection, and those rights may be shaped by the potential options for securing long-term offtake agreements and contracts for the sale of the power or capacity (or even the sale of the project itself in the case of build-transfer agreements).

The process of securing the rights to the project site and the related transmission and interconnection infrastructure can vary depending on the location and counterparty who can grant the rights. Rights in a site are typically obtained through long-term leases, easements, rights-of-way, licenses or permits, and counterparties can range from private landowners and leaseholders to federal, state, local, and tribal government entities, agencies and other bodies. For example, when developers propose to build renewable energy projects on federal land managed by the U.S. Bureau of Land Management ("BLM"), the BLM, in coordination with other agencies such as the U.S. Fish and Wildlife Service and state and local authorities, is authorized to permit development of solar and other energy projects. Permits and rights-of-way are typically awarded after the completion of any NEPA review. The Bureau of Ocean Energy Management ("BOEM") oversees the leasing process for offshore wind. The process of securing interconnection agreements can vary depending on the party that owns or operates the

transmission or distribution system where the project wishes to interconnect. Those parties can range from utilities to independent and regional systems operators. In any case, the developer will need to negotiate some form of interconnection agreement based on the forms used by those parties, which may be based on a form specifically used by that party and may require a certain commitment by the project to complete certain network upgrades. Those interconnection agreements may require additional approval by the relevant regulatory authority.

In addition, certain types of renewable energy projects also require special licensing, authorizations and permits related to their development, construction, and operation which can turn on the location of the project. Geothermal projects may require special permits to use the geothermal resources. For example, the State of California requires a geothermal resources prospecting permit. Non-federal hydropower projects require specific licensing and permitting from the FERC under the Federal Power Act and certifications and authorizations from other government agencies pursuant to other statutes regulating hydropower, including, but not limited to, NEPA, the Clean Water Act, the Coastal Zone Management Act, the Endangered Species Act, the Fish and Wildlife Coordination Act, and the National Historic Preservation Act. Again, the siting of the hydropower project impacts which agencies, statutes and requirements may apply.

Beyond the generally applicable permits that most projects will need, there are additional technology-specific permits. For example, nuclear power plants require permits from the Nuclear Regulatory Commission ("NRC"). Historically, the NRC required that plants obtain separate construction and operating licenses. In 1989, the NRC introduced a combined licensing application. However, only two nuclear units have come online in the past two decades. As discussed in Question 19, the NRC is considering revising its permitting process.

Carbon capture projects also require Class VI permits from the Environmental Protection Agency ("EPA") in order to drill the wells necessary for storing carbon underground. Currently, there are three dozen permit applications pending before the EPA. Projects will also need to obtain the rights to inject and store carbon underground.

Projects producing hydrogen require a variety of permits for construction. There are about 1,600 miles of hydrogen pipeline in the United States. Currently, regulation of their siting, commercial service, security, and safety is divided among federal agencies and the states.

9. Is the government directly involved with the renewables industry? Is there a government-owned renewables company or are there plans for one?

The federal government owns and operates significant hydropower assets. At the state level, some local governments (typically cities) operate utilities. Otherwise, while federal, state, and local governments have enacted policies to encourage the renewables sector for decades, there is no direct involvement through a government-owned renewables company.

However, a number of offices within the DOE focus specifically in supporting grant, loan, and financing programs for the renewables sector, including for research and development. The DOE's Office of Energy and Efficiency and Renewable Energy ("EERE") supports the clean energy transition with a number of initiatives, as well as the OCED. In addition to supporting grants and financing supporting research, the DOE has the LPO, which has several programs intended to provide access to debt capital for first-of-their-kind projects and other high-impact related ventures. LPO programs include:

- Innovative Clean Energy Loan Guarantee Program;
- Advanced Technology Vehicle Manufacturing Direct Loan Program;
- Energy Infrastructure Reinvestment Program (created by IRA);
- Carbon Dioxide Transportation Infrastructure Program-CIFIA (created by IIJA); and
- Tribal Energy Loan Guarantee Program.

Each LPO program has its own eligibility criteria, application process, and funding limits. As mentioned in our answer to Question 7 above, the IRA and IIJA each authorized new funding for several LPO programs.

The DOE loan guarantee and direct lending facilities may be attractive financing options for borrowers who are developing infrastructure and innovative energy-related technologies and projects, such as offshore wind, transmission, hydrogen, carbon capture, critical minerals, and advanced technology vehicles, among others.

In addition to federal programs, some states and the District of Columbia have created special government agencies referred to as "green banks" to support the deployment of renewable energy projects through a variety of financial products and technical support. For example, state green banks can offer loans supporting the installation of residential solar units, provide credit enhancements to financing agreements, and

warehousing portfolios of smaller loans.

10. What are the government's plans and strategies in terms of the renewables industry? Please also provide a brief overview of key legislation and regulation in the renewable energy sector, including any anticipated legislative proposals?

The United States' carbon reduction targets are not codified in law. However, the federal government has adopted a "whole of government" approach to climate change, including renewable energy.

As discussed in Question 2, there are commitments under the Paris Climate Accord, and President Biden has committed to achieving 100% clean power in the electricity sector by 2035. The plan to achieve this milestone includes legislation as well as executive branch actions, from procurement to new regulations. The response to Question 7 discusses many of these initiatives. The various federal programs operate alongside a mix of state and local laws and policies.

By far the biggest piece of new federal legislation is the IRA. This is a significant bill overall, and especially as it relates to energy and climate funding. The bill is part of the federal commitment to reduce national GHG emissions by 50% to 52% below 2005 levels by 2030. In furtherance of that goal, the IRA provides \$394 billion for energy initiatives, including corporate and consumer tax incentives, grants, and loans. Those incentives will be available across the energy, manufacturing, environment, transportation, and agricultural sectors.

In order to maximize incentives under the IRA, eligible projects must meet certain domestic production, prevailing wage, and apprentice requirements. Another interesting aspect of the IRA is that it will phase in technology-neutral credits, available to all projects with a GHG emissions rate that is not greater than zero.

Beyond energy-producing projects, the IRA also seeks to support domestic production of the critical minerals and components necessary to build renewable energy projects. Also, FERC's efforts to resolve transmission and interconnection issues discussed in Question 14 would have a significant impact on the renewable energy development.

11. Are there any government incentive schemes promoting renewable energy (direct or indirect)? For example, are there

any special tax deductions or subsidies offered? Equally, are there any disincentives?

As discussed in Questions 7, 9, and 10, there are significant governmental policies at the federal and state level promoting renewable energy and the transition from fossil fuels to reduce greenhouse emissions. These policies provide significant support to the expansion of renewable energy businesses in the United States.

At the federal level, agencies and departments including the DOE and the Departments of Agriculture, Commerce, Defense, Treasury, and the Interior have implemented a slew of renewable energy-related initiatives that benefit investors, project developers, and energy producers. At the state level, several jurisdictions have encouraged project development and created robust state and regional markets for renewable energy credits. The first regional carbon market initiative in the country is the Regional Greenhouse Gas Initiative ("RGGI"), which is a market-based effort among the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Virginia to cap and reduce carbon emissions from the power sector.

Key federal initiatives include:

- **Federal Income Tax Credits:** PTCs and ITCs reduce the tax liability of renewable project owners. Legislation extending PTCs and ITCs and expanding their availability was introduced in late 2021 and further expanded in 2022 by means of the IRA. Under the provisions of the IRA, PTCs and ITCs would both be extended for projects placed in service during or after 2022. The IRA extends and modifies the ITC and PTC for certain energy projects that begin construction before January 1, 2025. However, in order to receive the full amount of the credit, certain wage and apprenticeship requirements must be met. The IRA also provides a new ITC and PTC for projects generating electricity that are placed in service after December 31, 2024, and have a greenhouse gas emission rate of zero or less. In addition, the IRA provides for specified "bonus" credits if certain "domestic content" requirements are met or the project is in certain identified "low-income" or "energy communities."
- **Loan Guarantees:** As fully described in answer to Question 7 above, the DOE has a guarantee program for different types of clean energy and energy transition projects that fall into

the Innovative Clean Energy category. Those include renewable energy projects, hydrogen projects, carbon capture projects, efficient electrical projects, energy storage projects, and others that comply with the following requirements: (i) utilize a new or significantly improved technology; (ii) avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases; (iii) are located in the United States; and (iv) have a reasonable prospect of repayment. In addition, the Department of Agriculture loan guarantee program is available for the development of biofuels, renewable chemicals, and bio-based products.

- Research and development: federal agencies, including the OCED, issue grants and other support for research efforts focused on renewable technologies and applications. As further detailed in other answers, recent legislation increased available funding for R&D, including thorough the creation of the new OCED.

There are no disincentives to renewable energy at the federal level.

12. Has your Government had to help with the basic cost of energy over the last year and has that led to any discussion about de-linking the gas price and renewables prices?

One major action was the sale of 180 million barrels of oil from the federal Strategic Petroleum Reserve. The sale was intended to reduce gasoline prices in response to a ~28% rise in gas prices in the first quarter of 2022. On a longer time horizon, there are a number of provisions in the IRA that are intended to reduce energy prices for consumers. Those provisions include funding for clean energy, energy efficiency upgrades that reduce demand, and additional tax benefits for projects located in low-income communities. The IRA also provides funding to expedite environmental permitting in order to bring energy projects online faster.

13. If there was one emerging example of how businesses are engaging in renewable energy, what would that be? For example, purchasing green power from a supplier, direct corporate PPAs or use of assets like roofs to generate solar or wind?

Increasing the incentives set forth in new legislation has boosted the economic attractiveness of renewables in the United States across investment portfolios of various organizations and businesses. One particular incentive allows the transferability of certain tax credits, which can be sold to unrelated parties for cash. Prior to IRA, tax equity transactions (i.e., transactions to monetize tax credits) required extensive legal structuring in order to include the participation of a tax equity investor (i.e., an investor whose principal investment focus is on acquiring and utilizing the tax credits) in a project. Under the IRA, transferability is intended to encourage investments in the clean energy space and provide a broader range of taxpayers with access to tax benefits associated with clean energy projects.

The IRA contains a transferability provision pursuant to which a taxpayer can make a one-time election to transfer all (or any portion specified in the election) of an eligible credit to an unrelated taxpayer. However, the transfer must be for cash and is not included in the income of the seller and is not deductible by the buyer.” Eligible credits include:

- production tax credits for capturing carbon emissions, generating renewable or nuclear electricity, and producing clean hydrogen and clean transportation;
- tax credits for building new factories and re-equipping existing assembly lines to make or recycle products for the green economy and reduce greenhouse gas emissions at existing factories by at least 20%;
- tax credits for manufacturing wind, solar, and storage components or processing, refining or recycling critical minerals; and
- tax credits for installing electric vehicle and other clean fuel charging stations in low-income and rural areas.

Prior to the IRA, tax credits for renewable energy required periodic renewal/extension and resetting of the size of the credits by Congress on an almost annual basis, which created uncertainty for developers and investors. Having tax credits established for longer periods under the IRA provides more predictability and clarity, allowing asset managers and other stakeholders to plan further in advance.

The US Treasury is expected to issue guidance about direct sales of federal tax credits under the IRA during 2023. Sales are moving forward regardless of the lack of guidance, representing an emerging example of how businesses are engaging in the renewable energy sector.

14. What are the significant barriers that impede both the renewables industry and businesses' access to renewable energy? For example, permitting, grid delays, credit worthiness of counterparties, restrictions on foreign investment.

Lack of transmission remains a significant barrier to the development of renewable energy. In the last year, the total capacity of projects in interconnection queues grew ~40%. There are now more than 1,350 GW of generation and 680 GW of storage waiting to connect to the grid. One analysis found that more than 95 percent of the generation capacity in interconnection queues was carbon free.

Recently, the DOE released a draft of the National Transmission Needs Study ("Needs Study") which estimates that the United States will need a 57% increase in transmission by 2035 to support new clean energy generation. The Needs Study found that increasing interregional transmission would be the most effective means of alleviating transmission constraints and bringing renewable generators online. Resolving interconnection issues would also be helpful. Currently, FERC is examining the issue on two fronts, with one rulemaking looking at interconnection policy and a second focusing on transmission planning.

In addition to long interconnection queues, the installation of offshore wind projects requires a specialized workforce and the availability of specialized vessels. Currently, it is estimated that a \$6 billion dollar investment is needed in ports, and specialized vessels to ensure installation of 30 GW of offshore wind by 2030.

15. What are the key contracts you typically expect to see in a new-build renewable energy project?

- Construction Contracts (e.g., EPC (engineering, procurement and construction) and BOP (balance-of-plant) contracts).
- Interconnection and Transmission Contracts and Energy Management/Scheduling Services Agreements.
- Investment Documentation (e.g., tax equity investment agreements, including equity contribution agreements and LLC agreements: joint venture agreements; parents' guaranties and other credit support agreements).
- Off-take Agreements (e.g., power purchase agreements, power hedges, and sale agreements for Renewable Energy Certificates ("RECs"), carbon offsets and similar

- environmental attribute instruments).
- Project finance agreements (e.g., loan agreements or other guarantee agreements).
- Leases, easements and other site-control instruments.
- Asset Management, Operation and Maintenance and other operating-stage services agreements.

16. Are there any restrictions on the export of renewable energy, local content obligations or domestic supply obligations?

The \$1.2 trillion IIJA includes major domestic procurement requirements for infrastructure materials. The law permits federal funding for infrastructure only if the iron and steel, manufactured products, and construction materials used in the project are produced in the United States, though there are several exceptions. One exception is when the inclusion of domestic products would increase the overall cost of the project by more than 25%.

Further, President Biden authorized the use of the Defense Production Act ("DPA") to accelerate domestic production of clean energy technologies. Specifically, the President authorized the DOE to use the DPA to rapidly expand American manufacturing of five critical clean energy technologies:

- solar panel parts like photovoltaic modules and modules components;
- building insulation;
- heating pumps, which heat and cool buildings more efficiently;
- equipment for making and using clean electricity-generated fuels (such as green hydrogen), including electrolyzers, fuel cells, and related platinum group metals; and
- critical power grid infrastructure like transformers.

17. Has deployment of renewables been impacted in the last year by any non-country specific factors: For example, financing costs, supply chain or Covid 19?

On June 6, 2022, the Biden administration instituted a two-year hiatus in the countervailing, antidumping or other duties being imposed on solar cell and module imports from Cambodia, Malaysia, and Vietnam. The declaration temporarily ended contentious trade disputes brought to protect domestic producers from alleged unfair trade practices. Together with the limit on

tariffs, President Biden authorized the DOE to assist the solar industry with scaling up manufacturing, employment and deployment of solar technology across the United States.

Similarly, solar inverters faced supply chain issues. As a result, manufacturers may seek to take advantage of manufacturing tax credits under the IRA and increase domestic production. Under the IRA, inverters manufactured in the United States will be eligible for a \$0.11/watt of capacity PTC. Recently, inverter manufacturers have announced increases in U.S. manufacturing in response to increased demand and the availability of credits under the IRA.

18. Could you provide a brief overview of the major projects that are currently happening in your jurisdiction?

There are a variety of large capacity projects under development. There is a 3.5 GW onshore wind project under construction which includes more than 500 miles of transmission lines. There are also a number of large offshore wind projects which require new transmission to connect to the onshore grid. These are examples of the increasing size of projects under development.

Additionally, there is increasing movement towards operationalizing newer technology. For example, there are significant projects under development that will produce and store green hydrogen. Because of the hydrogen incentives in the IRA, more projects are expected to be announced. The IIJA also authorized the creation of regional hydrogen hubs. Recently, the largest direct air capture project was announced outside of Midland, Texas. When completed, the project is expected to remove 500,000 tons of carbon from the air each year. A number of advanced nuclear projects have also been announced and the NRC has announced a proposal for new permitting requirements, which could simplify the process for new advanced nuclear projects.

19. How confident are you that your jurisdiction can become a leader in newer areas like offshore wind or hydrogen?

The United States is positioned to become a leader in developing energy technologies. There are currently two operating offshore wind projects, with a pipeline of projects scheduled to come online. The South Fork Wind facility recently received approval to start turbine construction and is projected to come online this summer. Vineyard Wind, another Atlantic coast project, is scheduled to come online at the end of 2023. The

pipeline will continue to grow, as states have a total offshore wind target of 81,000 MWs. Additionally, almost all of the current projects under development are off the East Coast of the United States. There is also an opportunity to develop offshore wind projects in the Gulf of Mexico, the Great Lakes, and the Pacific Ocean. In fact, the winners of the first offshore wind auctions off the coast of California were announced in December of 2022.

Hydrogen has become another area of increasing attention and focus for the public and private sectors in the United States. The Biden administration's "Hydrogen Shot" project was launched with the goal of reducing the cost of producing clean hydrogen to \$1 per 1 kilogram by 2031. Part of the initiative will focus on developing regional hydrogen networks which would co-locate hydrogen producers and consumers in an effort to jumpstart local hydrogen economies. With the IRA providing significant resources for "clean" hydrogen development, the United States should continue to see projects develop throughout the hydrogen supply chain, especially in manufacturing electrolyzers which can be exported.

There is also an opportunity to deploy advanced nuclear reactors. As discussed in Question 18, the NRC is revising permitting rules which would allow new technologies like small modular reactors to come online and demonstrate their operational capabilities.

20. How are renewables projects commonly financed in your jurisdiction?

Renewable energy projects in the United States are commonly financed through project finance schemes including a mix of debt and equity. The most common structure is bank debt financing during construction with tax equity financing providing the long-term financing solution for the project once construction has been completed. Financing sources vary depending on the specific stage of the project cycle: development, construction, or operation. During the development phase, which represents the most speculative phase in which funds invested are at risk of total loss, projects are mostly financed through equity. Most of the equity comes from the developer or other equity investors expecting a high return. This phase ends when the project is ready to build ("RTB"). During the construction phase, the project is financed with debt to be refinanced by tax equity prior to the commercial operation date ("COD"). Interest rates are lower than in the development phase but still higher than in the refinance phase due to the risk that the project may not reach its COD. During the operation phase, the re-finance or

permanent financing takes place. Bank debt is typically replaced by tax equity although the developer may procure bank debt at a corporate level above the operating level as “back-leverage.” The impact of interest rate increases over the past year on the cost of capital and financing of renewable energy projects is yet to be determined.

Under a project finance structure, the project developer creates a project company that holds all of the project’s interests, rights, and assets. The equity interest in the project company will usually be held by a limited liability

company created for pledging the equity to the lenders in the project financing.

DOE grants and loan programs are also a financing option for those projects viewed as having difficulty accessing capital. As mentioned in previous answers, new funding for DOE LPO programs and grants was authorized by the IIJA and the IRA.

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