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India

RENEWABLE ENERGY

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

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INDIA 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?

India's renewable energy industry is well established and diverse. With a total installed capacity (inclusive of large hydro) of 191.67 GW as of April 2024, globally India ranks 4th in renewable energy installed capacity (inclusive of large hydro), 4th in wind power installed capacity and 5th in solar power installed capacity as of end of 2023.

The total installed capacity of renewable energy sources is also well distributed. Wind power constitutes 46 GW of total installed capacity while solar power constitutes 82.6 GW. Large and small hydro contribute 46.9 GW and 5 GW respectively to the total installed capacity. Newer sources such as biomass bagasse cogeneration form 9.4 GW of installed capacity, while biomass non-bagasse cogeneration contributes 0.92 GW to the total installed capacity. Other contributors include waste to power (0.24 GW installed capacity) and off-grid waste to energy (0.34 GW installed capacity).

Solar, wind, and large hydro are among the primary sources of renewable energy in India. In line with the Government of India's announcement at 26th Conference of Parties of UNFCCC (**COP26**), the Ministry of New and Renewable Energy (**MNRE**) is working towards achieving 500 GW of non-fossil based electricity generation capacity by 2030. Additionally, India has also enacted policies to enable production of 5 million tonnes of green hydrogen by 2030, and to have solar parks with an aggregate capacity of 40 GW by 2025-26. The Government of India has also identified sites for setting up of 30 GW off-shore wind projects by 2030.

The total generation from renewable energy sources for the financial year 2023-24 was 359,888.74 million kWh. The energy generated from wind power constituted 83,385.35 million kWh, and solar power constituted

115,975.11 million kWh. Small and large hydro generated 9,485.04 million kWh and 134,053.92 million kWh respectively. Further, generation from biomass constituted 3,417.19 million kWh, and from bagasse 10,825.59 million kWh. Other sources of renewable energy constituted 2,746.55 million kWh of the total generation mix.

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

India's net zero/carbon reduction targets are not codified in law. However, India has been pro-active in setting for itself targets for net zero and decarbonization. Under the Paris Agreement, 2015 (**Paris Agreement**), India submitted its nationally determined contributions (**NDCs**), which were both quantitative and qualitative in nature. The quantitative targets were: (a) reduction of emission intensity of the gross domestic product by 33% - 35% by 2030 from 2005 level; (b) achieving about 40% cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030; and (c) creating an additional carbon sink of 2.5 to 3 billion tonnes of CO₂e through additional forest and tree cover by 2030.

While not codified, India has consistently been on track to meet its targets. At the COP26, India set forth its updated targets, aiming to intensify its climate action. The updated NDCs, referred commonly to as '**Panchamrit**' are set forth below:

- a. Reaching 500 GW of non-fossil energy capacity by 2030.
- b. Meeting 50% of energy requirement from renewable energy sources by 2030.
- c. Reducing the carbon intensity of the economy by 45% below 2005 levels by 2030.
- d. Reducing total projected carbon emissions by 1 billion tonnes by 2030.
- e. Achieving the target of net-zero emissions by

2070.

To achieve the said targets, India has been overhauling its policies in the renewable energy sector and its regulatory framework governing the electricity sector. Steps such as introduction of framework for carbon credit trading, energy conservation codes, penalty for non-conformity with the energy consumption standards through an amendment to the Energy Conservation Act, 2001 (**EC Act**) in 2022 outline India's efforts in this direction. The EC Act also provides for establishment of statutory authority by the name of Bureau of Energy Efficiency (**BEE**) and confers upon the Central Government, State Governments and the BEE certain powers to enforce the measures for efficient use of energy and its conservation.

Despite not being codified in a specific legislation per se, India's NDCs permeate the entire fabric of policy making. Some of these policy initiatives have been outlined in the subsequent questions in this guide.

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

Under the Electricity Rules, 2005, the term renewable energy has been defined as electricity generated from renewable energy sources. Further, the term 'renewable energy sources' has been defined to mean hydro, wind, solar, bio-mass, bio-fuel, bio-gas, waste including municipal and solid waste, geothermal, tidal, forms of oceanic energy, or combination thereof, with or without storage, and such other sources as may be notified by the Government of India from time to time.

The concept of renewable energy has further evolved in India to 'green energy' which has been defined under the Electricity (Promoting Renewable Energy Through Green Energy Open Access) Rules, 2022, to mean the electrical energy from renewable sources of energy including hydro and storage (if the storage uses renewable energy) or any other technology as may be notified by the Government of India from time to time and also includes any mechanism that utilizes green energy to replace fossil fuels, including production of green hydrogen or green ammonia.

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?

The Constitution of India distributes the legislative powers by dividing the heads of legislations between the Union and the States into three lists: the Union list (includes matters on which the Union has the exclusive power to legislate); the State list (includes matters on which the States have the exclusive power to legislate); and the Concurrent list (includes matters on which, both the Union and the States can legislate). In the event of conflict between Union and State legislations, the legislation enacted by the Union prevails over the State legislations.

'Electricity' is included in the Concurrent list, and therefore both the Union Parliament and State legislatures are competent to enact laws on this subject. Consequently, the power to legislate on electricity (including renewable energy) is also shared between the Union and the respective States.

The Electricity Act, 2003 (**Electricity Act**), enacted by the Union Parliament, read with its rules, lays down the end to end framework for regulation of all aspects of energy (including renewable energy) i.e., from generation, transmission, distribution, trading, to the use of electricity. Pursuant to the Electricity Act, regulatory commissions have been established. Section 76 of the Electricity Act provides for constitution of the Central Electricity Regulatory Commission (**CERC**), while Section 82 provides for constitution of the State Electricity Regulatory Commissions (**SERCs**). These commissions are responsible for regulating electricity procurement, setting tariffs, and resolving disputes. CERC, by virtue of section 79 of the Electricity Act regulates, *inter alia*, issues relating to inter-state transmission of power and determination of tariff and the SERCs pursuant to section 86 of Electricity Act regulate issues relating to intra-state transmission of power and determination of tariff.

The Ministry of Power (**MoP**) is primarily responsible for the development of electrical energy in the country. The MoP is concerned with perspective planning, policy formulation, processing of projects for investment decision, monitoring of the implementation of power projects, training and manpower development and the administration of the legislations in regard to thermal, hydro power generation, transmission, and distribution.

The MNRE is the nodal ministry of the Government of India for all matters relating to new and renewable energy, for both grid-connected and off-grid projects. The broad aim of MNRE is to develop and deploy new and renewable energy to supplement the energy requirements of the country. It facilitates research, design, development, manufacture, and deployment of new and renewable energy systems/devices for transportation, portable, and stationary applications in

rural, urban, industrial, and commercial sectors.

At the state level, the schemes of MNRE are implemented in coordination with nodal agencies and renewable energy departments of the respective States such as, Gujarat Energy Development Agency in Gujarat and Maharashtra Energy Development Agency in Maharashtra etc.

The electricity sector has witnessed participation from private players across verticals. Investment funds, financing institutions, developers and original equipment manufacturers have penetrated across the value chain including in generation, transmission, distribution, storage, and trading of electricity. In addition, the private players have also worked in tandem with the public sector for the development of the sector.

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

India's commercial and industrial (C&I) enterprises are crucial to the energy landscape, forming 52% of the country's total installed capacity, as of December 31, 2023. Some of the key approaches adopted by businesses to access renewable energy in India are as follows:

- a. Rooftop/Onsite Solar: Rooftop solar installations enable energy production at the point of consumption, reducing reliance on external power sources. Any energy generated from such projects are consumed by the developer at the site and the excess can be supplied to the grid based on the net metering/gross metering arrangement in the relevant
- b. Captive Model: In the captive model, a company establishes a power plant to generate electricity for its own consumption. The Electricity Act, along with the Electricity Rules, 2005, provides a set criterion for a plant to qualify as captive power plant upon which it is eligible for exemption from payment of certain Captive arrangements tend to be a cheaper source of power, given the subsidies provided under the Electricity Act and therefore, are preferred by many industry players to source renewable energy.
- c. Third Party Open Access Power Purchase Agreements: Third party open access power purchase agreements (PPA) have become increasingly popular as a flexible and

accessible means for businesses to shift towards sustainable energy. These agreements allow commercial and industrial entities to purchase electricity directly from renewable energy producers without the need to own the generation infrastructure themselves.

- d. Energy Trading: Businesses consuming renewable energy can also procure it on country's power exchanges, i.e., Indian Energy Exchange Limited, Hindustan Power Exchange Limited, and Power Exchange of India Limited. A power exchange is a platform on which power is transacted i.e., bought and sold. These power exchanges are approved and regulated by CERC. The exchanges are also assisting in accelerating deployment of renewable energy by enabling transactions in Renewable Energy Certificates. With Green Day Ahead Market, a marketplace for trading energy on a day-ahead basis, any renewable energy generating company can sell renewable energy on the exchange.

While each model offers its advantages, third party PPAs and captive projects stand out for their simplicity in execution and financial adaptability.

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)?

Indeed, the approach of businesses towards renewable energy development has evolved over the past year. Corporates have shown greater consciousness in reducing their carbon emissions. There is greater amenability towards either: setting up renewable energy plants; or fulfilling the energy needs by sourcing it from clean energy sources. Multiple Indian companies have set for themselves 100% renewable electricity consumption targets by undertaking active participation in RE-100 initiative, a joint initiative by the Climate Group and the CDP.

The evolving approach has been fueled by the multiple events including:

- a. commitments undertaken by the Government of India at Paris Agreement and at COP26 have led to a variety of policy and regulatory measures to nudge corporates by way of introducing framework for trading of carbon

- credits, obligating certain industries to source portion of their energy from renewable sources, providing concessions on inter-state transmission charges, and granting concessions by State Governments for setting up renewable energy plants;
- b. global rise in coal prices making thermal energy prone to tariff fluctuations;
 - c. introduction of environment sustainability as one of the avenues for corporate social responsibility framework;
 - d. incentives provided by State Governments, such as, 'Saurya Uttar Pradesh Yojna' which offers subsidies for the installation of rooftop solar systems in private residential buildings, or exemption of 50 paisa per kWh on electricity duty to captive / open access consumers on consumption of energy from renewable energy projects set up in the state of Odisha;
 - e. specifications of energy conservation and sustainable building code for green buildings and measures such as energy audit; and
 - f. imposition of mandate on the top 1000 publicly listed entities (by market capitalization) to report on the environmental, social, and governing disclosure as part of their annual disclosures.

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)?

There have been demonstrably ambitious steps taken by businesses in the areas of sustainability including that of carbon emission reduction. Businesses have participated by way of trading of energy certificates, complying with renewable purchase obligations, investing in emerging technologies such as CCUS (carbon capture, utilisation, and storage) and energy storage systems.

The politico-regulatory nudge to support the decarbonisation efforts is evident from the multitude of steps undertaken by the Union and State Governments, some of which have been set out in brief below:

- a. Waivers and concessions: Concession on surcharges for renewable projects set up under captive. Additionally, benefits such as accelerated depreciation under Income Tax Act, 1962 have also been provided.
- b. Steps to encourage private investment: It

- includes steps such as easier access to foreign direct investment by reducing regulatory hurdles in obtaining investment and simplifying the land acquisition process by granting exemption from land conversion
- c. Must-run status: Wind and solar power facilities have been granted must-run status, which means they are not susceptible to unjustified backdown or curtailment by distribution
 - d. Renewable purchase obligations: As a demand side incentive, the electricity regulatory commissions require distribution licensees and other entities such as captive consumers and open access consumers to purchase a certain amount of renewable. Permitting trading of the renewable energy certificates has also given a push to renewable energy sector.
 - e. Incentive schemes: As a supply side incentive, there has been focus on improving the manufacturing capacity for solar photovoltaic. This has the capacity to reduce dependence on import of solar cells and modules.
 - f. Accelerated push towards green hydrogen: The National Green Hydrogen Mission has been introduced with an initial outlay of approximately USD 2.3 billion to focus on decarbonisation and ramping up capacity for green hydrogen and its
 - g. Revamp of Carbon Credit Trading Scheme: The scheme now allows non-obligated entities to participate in the tradable carbon credits market, which means companies and individuals can voluntarily register the projects and obtain tradable carbon credit certificates.

The politico-regulatory nudge for decarbonisation efforts has been undertaken with a multi-pronged approach, aiming to holistically assist the corporates and businesses by tackling the bottlenecks at different levels in the supply chain.

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 India, power generation is a delicensed activity under the Electricity Act. There are different modes of

implementation available to any interested party to set up solar or wind power. Mentioned herein are some of the modes:

- a. Projects implemented through competitive bidding: Tenders to develop large scale projects are invited by distribution utilities and state run enterprises like Solar Energy Corporation of India, NTPC Limited etc. The tenders are governed by a model bidding guidelines prescribed by the The tenders are awarded based on the per unit price of power quoted by the developer. The state run utilities operate as intermediaries and sell power to various distribution utilities or customers.
- b. Independent power producers: Projects can be independently set up by renewable energy developers who then sell power to the various commercial users at a negotiated tariff under the PPAs. The commercial user and the developer can also enter into a captive arrangement to develop the project and procure power.

The project development is generally dependent on the source of the renewable energy. However, generally, it commences with acquisition of the land and execution of various agreements to secure the financing and supply of equipment. The developer also has to obtain various consents and approvals including:

- a. approvals from revenue and other local authorities for usage of the land for installation of the project (including local level approvals from town and country planning authority and the local panchayat);
- b. depending on the State and the nature of renewable energy sources, such as hydro projects, the developer may have to undertake an environmental impact assessment and obtain approvals for the project;
- c. obtaining connectivity approvals to connect to the grid, based on the procedure set out by the Government which has the jurisdiction on the grid sub-station to which the project is connected;
- d. obtaining open access from the relevant authority for access to the grid to wheel the power from the project to the consumer, and executing agreements as required for this purpose;
- e. having and maintaining adequate metering arrangements at the delivery point and the consumption point for energy accounting; and

- f. certain safety approvals like synchronization/evacuation approval from the chief inspector of electricity general, for commissioning of the project and connection to the grid.

While there are no restrictions on transfer of a project under the Electricity Act, the transfer may be restricted, or a prior permission may be required under the: (a) approvals obtained for the project; (b) PPAs and financing agreements executed for the project; and (c) depending on the nature of renewable energy source, the specific policy or regulatory measures governing the project.

Further, under the Guidelines for Tariff Based Competitive Bidding Process for Procurement of Power from Grid Connected Solar PV Power Projects, 2023 the concessionaire is required to ensure that its shareholding in the special purpose vehicle/project company executing the PPA does not fall below 51% (in case of consortium held projects the shareholding of the consortium cannot fall below 51%) at any time prior to 1 (one) year from the scheduled date of commencement of supply, except with the prior approval of the tendering authority. Change in shareholding after completion of 1 (one) year from the scheduled date of commencement of supply can be made upon intimation to the tendering authority.

Additionally, if the transfer of the project is from a person resident outside India to a person resident in India or vice versa, the transfer will also be subject to the restrictions prescribed under India's foreign direct investment policies.

In addition to the aforementioned framework, other sources such as nuclear projects in India are strictly regulated under the Atomic Energy Act, 1962, and the setting up, operation and transfer of such projects is regulated by the Government of India.

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

Government of India is directly involved with renewables industry as discussed in our response to Question 4 above. MoP and MNRE are engaged in the policy formulation and administration of legislations. Further, CERC and SERCs, depending on their respective jurisdiction, have been designated with the responsibility to regulate the sector.

While generation of electricity in India is a de-licensed activity under the Electricity Act, the transmission, distribution, and trading of electricity are licensed activities under section 14 of the Electricity Act. The Government is involved across all verticals, such as generation, transmission, and distribution of electricity. In case of generation, there are dedicated entities involved for renewable energy, however for transmission and distribution, by virtue of the nature of such activities, the Government entities are involved in renewable as well as non-renewable energy. Some of the examples include:

- a. Generation: National Hydroelectric Power Corporation (NHPC), Andhra Pradesh Power Generation Corporation Limited (APPGCL).
- b. Transmission: Maharashtra State Electricity Transmission Ltd. (MSETCL), Transmission Corporation of Telangana Limited (TGTRANSCO).
- c. Distribution: Paschimanchal Vidyut Vitaran Nigam Limited (PVVNL), Ajmer Vidyut Vitaran Nigam Limited.

There are various state owned enterprises like Solar Energy Corporation of India Limited, NTPC Limited, NHPC Limited, SJVN Limited which undertake renewable energy project development either by themselves or by engaging private parties through competitive bidding process.

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?

As discussed in our response to Question 2 above, the Government of India as part of its updated NDCs, has set for itself a target of: (a) achieving 500 GW of renewable energy capacity by 2030; and (b) to meet 50% of the total energy requirement from renewable sources by 2030.

In pursuance of these targets, the Government of India has implemented multiple schemes and policies for development of renewable energy in India. Some of the key schemes include:

- a. Production Linked Incentive scheme 'National Programme on High Efficiency Solar PV Modules': It aims to achieve manufacturing capacity of gigawatt scale in high efficiency solar photovoltaic modules;

- b. Bio-Energy Programme: It is further subdivided into 3 components, i.e., Waste to Energy Programme, Biomass Programme, and Biogas. The Waste to Energy Programme aims at setting up of large biogas, bioCNG and power plants (excluding MSW to power projects). The Biomass Programme aims at manufacturing of raw materials such as briquets and pellets required for power generation. The Biogas Programme focuses on supporting setting up of family and medium size biogas plants in rural areas;
- c. National Green Hydrogen Mission: With a proposed outlay of USD 2 billion (approximately), it offers financial mechanisms up to 2029-30 to incentivize the manufacturing of electrolyzers and the production of green hydrogen. It aims to make India a global hub for production, utilization and export of green hydrogen and its derivatives; and
- d. Green Credit Programme notified under the Environment (Protection) Act, 1986: It aims at encouraging behavioral. It puts in place a mechanism to encourage voluntary environmental positive actions resulting in issuance of tradable green credits.

Additionally, certain schemes such as Scheme for Development of Solar Parks and Ultra-mega Solar Power Projects, and Green Energy Corridors have been discussed in the response to Question 11.

Further, certain pre-existing policies like National Wind-Solar Hybrid Policy, 2018, National Offshore Wind Energy Policy, 2015, regulations on renewable purchase obligations and renewable energy certificates provide the roadmap for development of renewable energy sector in India. To complement the policies of the Union Government, various States have come up with solar and wind policies to incentivize development of renewable energy projects.

The strategies set out above find their sanction in the legal framework established for regulation of electricity and specifically those for renewable energy. The Electricity Act is the parent legislation governing the electricity sector in India (other than nuclear energy which is governed by the Atomic Energy Act, 1962).

From a regulatory perspective, as discussed above in response to Question 4, while the Electricity Act is the overarching law, the laws governing inter-state supply of power is regulated by CERC, and the intrastate supply of power is regulated by SERCs.

Considering this, the regulatory framework differ from

State to State and also on the type of the project.

However, both the State Governments and the Union Government have generally introduced renewable energy source specific policies governing the development of the renewable energy projects.

Generally, the development of a project follows the process set out in our response to Question 8. However, some of the pertinent regulations by the Union Government, regulating the renewable energy sector are:

- a. CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2020, for determination of tariff for a grid connected generating station or a unit thereof commissioned based on renewable energy sources, where such tariff is to be determined by the appropriate commission under the Electricity Act;
- b. CERC (Terms and Conditions for Renewable Energy Certificates for Renewable Energy Generation) Regulations, 2022 for the development of market in renewable energy through renewable energy certificates; and
- c. the Green Open Access Rules, 2022 were notified in June 2022 for promoting generation, purchase and consumption of green energy including the energy from waste-to-energy plants through open Green Open Access Registry is a transparent platform through which long term, medium term and short-term open access transactions will be managed for inter-state transmission system and intra state transmission system.

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?

In addition to the incentive schemes mentioned under response to Question 7 and Question 10, there are also incentive schemes for promotion of renewable energy:

- a. Development of Solar Parks and Ultra Mega Solar Power Projects: Aims to support the States and Union Territories in setting up solar parks at various locations in the country with a view to create required infrastructure for setting up of solar power projects. It provides milestone based central financial assistance

to the developers;

- b. PM-KUSUM scheme: It involves: (a) setting up of decentralized grid connected renewable power plants on barren lands; (b) installation of standalone solar agriculture pumps; and (c) solarization of grid connected agriculture pumps. These are supported by the Government by way of financial assistance;
- c. Green Energy Corridor Scheme (for development of inter-state and intra-state transmission system for renewable energy projects): It provides for a mix of central financial assistance and financing support from financial institutions, to develop the power evacuation and transmission infrastructure;
- d. Waste to Energy Programme: provides central financial assistance to project developers and service charges to implementing/inspection agencies in respect of successful commissioning of Waste to Energy plants for generation of: (a) Biogas; (b) Bio-CNG/enriched Biogas/Compressed Biogas; and (c) Power/ generation of producer gas or syngas;
- e. accelerated depreciation of cost of project under the Income Tax Act, 1962;
- f. exemption from payment of surcharges related to electricity provided by certain States;
- g. steps such as imposition of basic custom duty on import of solar modules and solar cells have been undertaken to help the domestic original equipment manufacturers.

12. Has your Government had to continue 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?

Pricing of energy for the final consumer is determined by the Government. The State Governments have ought to reduce the energy prices by way of following steps:

- a. subsidizing consumption of electricity by residential consumers up to certain units;
- b. cross-subsidization: Levying higher rates on consumption by the industrial and commercial consumers in order to enhance the accessibility of electricity to residential and agricultural consumers; and
- c. exempting the levy of cross subsidy surcharge and additional surcharge on commercial and industrial captive consumers.

On a longer timeline, steps such as mandating energy efficiency ratings and increasing support from Government through various schemes for renewable energy are likely to reduce the cost of energy generation and consequently reduce the cost of energy for the consumers.

Rising price of gas, along with other conventional energy sources due to reasons such as instability in supply chain, has propelled the conversation in the direction of self-reliance in energy. Ethanol blending and focus on ramping up renewable capacity are some of the major steps in this direction.

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?

Over the course of past years, there has been a growing impetus of businesses engaging with renewable energy. The engagement is contingent upon factors such as: (a) nature of business; (b) quantum of energy required by the business; and (c) area of operation of the entity.

One of the dominant mechanisms for C&I users is entering into captive arrangements. The total installed capacity of captive power plants has grown from 587.85 MW in 1950, to a resounding 76,732.43 MW at the end of the financial year 2022-23.

The push for captive arrangements is arising out of flexibility in setting price, which is generally lesser compared to sourcing electricity from the distribution utilities, owing to subsidies in the form of exemptions from surcharges. Further, captive arrangements also provide flexibility in structuring the transfer of renewable energy certificates.

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.

India has made significant strides in renewable energy, however, there are several impediments to the development of the sector. Some of these impediments stem from:

- a. Policy uncertainty: Due to the quasi-federal

structure of India, the sector suffers from over-legislation and policy overlaps. Further, frequent changes in government policies and regulations, such as the confusion created by repeated changes to the Approved Models and Manufacturers of Solar Photovoltaic Modules (Requirements for Compulsory Registration) Order, 2019 ("**ALMM Order**"), create uncertainty for investors and

- b. Lack of grid infrastructure: While there has been a major push towards upgrading the grid infrastructure in India, given the renewable energy targets set by India, the grid system is not apace with the renewable energy project. The average time for construction of transmission infrastructure is around 3 years, which has the potential to delay the grant of connectivity.
- c. Land acquisition and issues in obtaining permit: Lengthy and complicated land acquisition processes, coupled with bureaucratic hurdles in obtaining permits and clearances, delay project development and increase. These issues include improperly developed and managed single window clearance platform for obtaining permits, and poor maintenance of land records.
- d. Infirm nature of RE power and high cost of storage solutions: The infirm nature of renewable energy sources such as solar, and wind, impacts grid stability and reliability. Alternatives such as energy storage system, have high cost implications. Further, due to lack of policy support towards banking of power, sourcing of energy from renewable sources is an unreliable option for many C&I consumers.

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

Multiple entities are involved across the life cycle of a newly built project. In order to regulate the relationship of all such entities, there is a web of contracts forming part of any newly built renewable project. Broadly, these can be segregated into three stages, i.e., pre-development stage, development stage, and post-development and operations stage.

During the pre-development stage of a renewable energy project the key contracts include financing agreements with the lenders, land acquisition agreements (sale deed, lease deed, right to use etc.) with the landholders, connectivity agreements with the

utilities/regulators for access to transmission system executed pursuant to connectivity approvals.

In the development phase of the project, the key contracts executed include engineering procurement and construction agreement for the development of the project and the open access agreement for grant of open access.

Post development of the renewable energy project, major contracts include operation and maintenance agreement and wheeling and banking agreement.

Further, in addition to the aforementioned agreements, the developer is also required to enter into PPAs, which may be entered into at any point in the life cycle of the project depending on the contemplated transaction. In the event the project is contemplated as a captive arrangement, there is also a requirement arising out of Electricity Act to enter into a shareholders' agreement with the offtaker.

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

Certain restrictions have been imposed in the renewable energy sector, some of which have been set out below:

- a. **Export of Renewable Energy:** Export of renewable energy from India is governed by the provisions of CERC (Cross Border Trade of Electricity) Regulations, 2019 ("**Cross Border Regulation**"). The said regulation lays down, *inter alia*, the institutional framework, tariff determination mechanism and grant of connectivity. At present, India has signed memorandums of understanding for export of power with Bhutan, Bangladesh, Nepal, and Myanmar. **Local Content Obligations:** There are local content obligations imposed on manufacturers to promote the local manufacturing of solar panels and ancillaries. The domestic content requirement has been imposed under some of the MNRE schemes, such as Phase-II of CPSU Scheme (Government Producer Scheme), Component B and C of PM-KUSUM, and Phase II of Grid-connected Rooftop Solar Programme. In the aforementioned schemes, wherein the government subsidy is provided, it has been mandated to source solar photovoltaic cells and modules from domestic producers. Additionally, through implementation of Public Procurement (Preference to Make in India)

Order, 2017, procurement and use of domestically manufactured solar photovoltaic modules and solar inverters have been mandated for Government/government entities.

- b. **Domestic Supply Obligation:** India currently doesn't have any explicit domestic supply obligation mandating renewable energy developers to prioritize supplying the domestic grid before considering exports, however, such supply is subject to grant approvals under Cross Border Regulation.

17. Has deployment of renewables been impacted in the last year by any non-country specific factors: For example, financing costs, supply chain or taxes or subsidies (like the US's Inflation Reduction Act)?

Multiple issues plaguing the world economy have impacted the deployment of renewable energy sources in India. Some of these have been set out below:

- a. **Disruptions arising out of Red Sea crisis:** The impact on the shipping routes in Suez Canal has led to increased freight rates which has led to increase in costs of solar modules imports.
- b. **Impact of Covid-19 pandemic:** It has led to global supply chain disruptions leading to increase in prices of essential raw materials such polysilicon, steel copper and aluminium due to supply shortage.
- c. **Impact of Inflation Reduction Act of USA:** The tax credits being given to the domestic producers of ammonia in USA has the potential of turning USA to be the most cost-effective supplier of ammonia to the Asian. This development poses a challenge to India's ambitions of being a pioneer in global green hydrogen market.
- d. **Geopolitical instability:** The Russia-Ukraine conflict has led to derailment of the progress of the sector by increasing the landed cost of imported panels due to higher raw material cost.

The aforementioned are some of the challenges that have hurt the progress of deployment of renewable energy by causing delays in project implementation and increasing the tariffs.

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, both qualitatively and quantitatively under development. Some of them have been captured hereinbelow:

- a. Floating Solar Projects: One of the largest floating solar power plants in the world, with capacity of 600 MW, is being constructed in Khandwa district of Madhya Pradesh. It has the carbon offsetting capacity of nearly 1,200,000 tCO₂.
- b. Pump Storage Projects: Some of the largest pump storage projects in the world are being constructed in India. One of the primary examples is the Tehri pump storage project with capacity of 1,000 MW on river Bhagirathi.
- c. Offshore Wind: As per studies conducted by MNRE and the National Institute of Wind Energy, India has a potential of around 14 GW of installed offshore wind capacity. Recently, bids have been invited for development of offshore wind of a total capacity of 4 GW (4*1GW) off the coast of Tamil Nadu, India.
- d. PM KUSUM: Aims at creating 10,000 MW of decentralized grid connected renewable energy power plants. Further, it also aims at installation of 1,750,000 standalone solar agriculture pumps and solarization of 1,000,000 grid connected agriculture pumps.
- e. National Green Hydrogen Mission: There has also been a concrete push towards development of infrastructure for green The National Green Hydrogen Mission aims at annual production of 5,000,000 tonnes of green hydrogen.

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

India is poised to become one of the global leaders in developing accessible renewable energy solutions. MNRE is the dedicated institution focusing on the emerging renewable energy technologies.

India has a coastline of approximately 7,600 km and a large maritime zone. The policy focus on offshore wind

commenced as early as 2015 with the promulgation of National Offshore Wind Policy, 2015. Recently, India has announced a tender for a 4 GW (4*1GW) offshore wind projects off the coast of Tamil Nadu, through international competitive bidding.

Aiming at becoming energy independent by 2047 and achieving net zero status by 2070, India has recognized the critical role of green hydrogen in the energy mix.

Introduction of measures such as compliance monitoring, competitive bidding for procurement framework, data backed review of pilot programmes, phased approach towards implementation are encouraging steps towards propelling the development of green hydrogen supply chain. The National Green Hydrogen Mission is a stepping-stone in developing an integrated green hydrogen value chain with not only domestic demand but also export potential.

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

In India, renewable energy project companies are incorporated and constituted as special purpose vehicles (SPVs) for undertaking the implementation of a project. All the assets, rights, and interests in the project are held by the SPV. Broadly, these SPVs may be financed by equity, debt, or most commonly, a combination of both. These sources include both domestic financing and overseas financing, since 100% of foreign direct investment is permitted in the renewable energy space in India.

The sources available for equity financing include, private equity funds, venture capital, or in some cases, self-financing. The sources for debt financing include either commercial banks or financing institutions such as IREDA, PFC, REC, SIDBI, Exim Bank. Further, multilateral development agencies such as World Bank, ADB, kfW, etc. are also active in this area. In recent times, financing by way of issuance of 'green bonds' has also been preferred by some developers.

Green bonds are a type of debt instrument focused on financing projects which have a positive impact on the environment. The Government of India has also chosen this route for funding of renewable energy projects. In the 2022-2023 financial year, a total of USD 1.8 billion (approximately) was issued, out of which USD 730 million (approximately) were dedicated for renewable energy.

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