

**ENERGY  
CATALYST**

# Country Guide: India

June 2020



## Country Guide: India

India is located in South Asia. It is the seventh-largest country by area, the second-most populous country, and the most populous democracy in the world. Bounded by the Indian Ocean on the south, the Arabian Sea on the southwest, and the Bay of Bengal on the southeast, it shares land borders with Pakistan to the west, China, Nepal, and Bhutan to the north, and Bangladesh and Myanmar to the east. India is in the vicinity of Sri Lanka and the Maldives, and Indian islands Andaman and Nicobar share a maritime border with Thailand and Indonesia.



### Government

India is the world's most populous democracy, and is a parliamentary republic with a multi-party system. Federalism in India defines the power distribution between the union or central government and the states. It is mainly composed of 28 states and nine Union territories. It is a member of the South Asian Association for Regional Cooperation (SAARC), the United Nations, the Commonwealth Nations, BRICS and G20, among other global platforms.

### Geography and climate

The climate of India is comprised of a wide range of weather conditions across a vast geographic scale and varied topography. The climate in south India is generally warmer than north India. The country's meteorological department follows the international standard of four climatological seasons with some local adjustments: winter (January and February), summer (March, April and May), monsoon season (June to September), and a post-monsoon period (October to December).

### Economy

India is the world's fifth-largest economy by nominal GDP and the third-largest by purchasing power parity. The country aspires to become a high-middle income country by 2030. Its GDP grew at an average rate of 7% between 2017 and 2018, but growth has decelerated in the past two years, primarily due to a decline in growth in the manufacturing and construction sectors. Over the last decade, India's strong economic growth has been accompanied by considerable improvements in living standards in India. Since the 2000s, India has made progress in reducing absolute poverty. Between FY 2012 and 2015, poverty declined from 21.6% to an estimated 13.4% at the international poverty line (2011 PPP \$1.90 per person per day). Between 1990 and 2018, India's HDI value increased by 50% with an increase in the country's life expectancy at birth by 11.6 years, mean years of schooling by 3.5 years and expected years of schooling by 4.7 years.

In the annual World Bank survey on “Doing Business”, a comparison of business regulations in 190 economies, India came 63rd in 2020, jumping 14 places from the previous year. This was mainly due to the business reforms introduced by the country in the areas of starting a business, dealing with construction permits, trading across borders and resolving insolvency. The study ranks India as 136 out of the 190 countries, with a score of 81.6 out of 100 for the ease of starting a business. Figure 2 provides a comparison of India to similar economies for starting a business.



Figure 2: Doing Business 2020 score for starting a business. Data from: World Bank Group, 2020

## The energy sector in India

India is the world's third-largest producer and third-largest consumer of electricity. Factors like economic growth, increasing prosperity, a growing rate of urbanisation, and rising per capita energy consumption have contributed to increasing demand for energy in the country. India reached 100% village electrification in 2018 and by March 2019, GoI declared electrification of more than 99% of households.

Achieving universal energy access at affordable prices and for 24 hours a day by 2022 continues to be a top priority of the government and the states. The [Saubhagya](#) and the [Deen Dayal Upadhyaya Gram Jyoti Yojana \(DDUGJY\)](#) schemes are the main government policies to ensure electricity access for villages and rural households in India.

As of January 2020, the installed power generation capacity in India was 368GW. This constitutes 230GW of thermal power generated from coal, lignite, gas or diesel, 45.4GW from hydropower, 6.8GW from nuclear power, 4.7GW from small hydropower, 37. GW from wind power, 9.8GW from biopower and 34GW from solar power. The Government of India has a target to install 175GW of grid-connected renewable energy (RE) power projects by 2022, which includes 100GW from solar power,

Table 1: India at a glance

Capital	New Delhi
Total Area	3.287 million km <sup>2</sup>
Population	1.35 billion (2018)
Official languages	English; Hindi
Rural Population	66% (2018)
GDP	USD 2.7 trillion (2018)
GDP Per Capita	USD 2,010 (2018)
Currency	INR (Indian Rupee)
Exchange rate 01/03/2020	1 USD= 72.18 INR
Exchange rate 01/03/2018	1 USD= 65.19 INR
Access to Electricity	99.93% households (2019)

60GW from wind power, 5GW from small hydropower, and 10GW from biopower. Out of this, a capacity of 85.90 GW was set up by December 2019, equivalent to 23% of the total installed power generation capacity. The most rapid rise has been in the solar power capacity. India aims to increase this share to 40% by 2030. This will also help the country meet its commitment towards reducing its GHG emissions intensity per unit GDP by 33%-35% below 2005 levels by 2030, as per the Intended Nationally Determined Contribution (INDC) that India has submitted to UNFCCC, which outlines its post-2020 climate action plans.

India's central bank, the Reserve Bank of India, has included RE projects under priority sector lending, for which bank loans of up to INR 15 crore (USD 2 Mn) will be available for RE projects, including grid connected solar rooftop systems. In addition to this, FDI of up to 100% is permitted in the RE sector under the automatic route and no prior Government approval is required for this.

## Solar power

India is endowed with a solar radiation intensity of approximately 4-7 kWh per sq. m per day and average peak sun hours of "5 hours/day". About 5,000 trillion kWh per year energy is incident over India. Until March 2020, total solar on-grid installed capacity and solar off-grid installed capacity in India was 34 GW and 0.98 GW respectively. India stands 5<sup>th</sup> in solar power installed capacity globally. Solar power capacity in India increased by more than 14 times in the past five years, from 2.6 GW to 37.5 GW in December 2019. The country's solar potential is estimated to be about 748.98 GW, assuming 3% of the wasteland area is covered by Solar PV modules. Among the states, Rajasthan and Jammu and Kashmir have the highest solar potential, of 142.3 GWp and 111 GWp respectively.

Launched in 2010, National Solar Mission (NSM) is a major initiative of the Government of India which has a target to install 100 GW grid-connected solar power plants by 2022. The target for off-grid solar PV applications is 2000MWp. In line with these targets, various policies have been introduced including Renewable Purchase Obligation (RPO), Accelerated Depreciation (AD), and waiver of interstate transmission system (ISTS) charges and losses for sale of solar and wind projects. The Government of India has also launched various schemes to encourage the generation of solar power in the country, including Solar Park Scheme, Viability Gap funding (VGF) Scheme, Central Public Sector Unit (CPSU) Scheme, Defence Scheme, Canal Bank & Canal Top Scheme, Bundling Scheme, Grid Connected Solar Rooftop Scheme, KUSUM Scheme, and SRISTI Scheme. The details of the schemes and policies are available on [MNRE's Annual report 2019-20](#), which is also suggested in the Further Reading section. A few relevant schemes are explained below.

**Solar parks:** MNRE's solar park scheme aims to develop at least 50 solar parks with an installed capacity of 40,000 MW of solar power by 2021-22. Some of the larger solar parks in India include Bhadla (2245 MW)

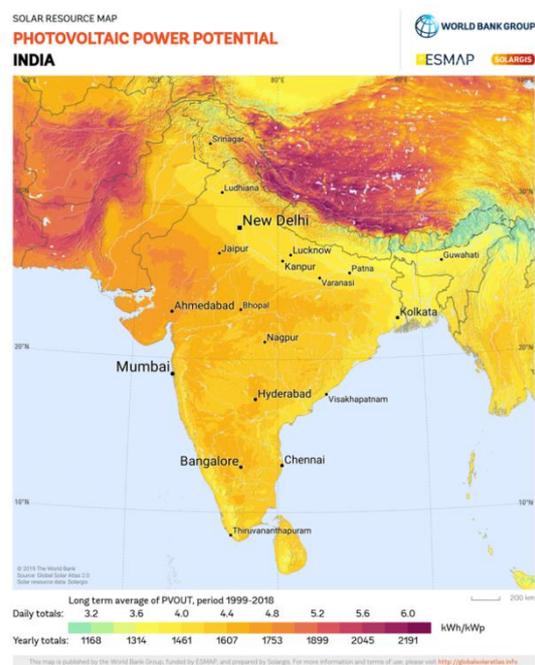


Figure 3: Solar Resource India. Solar Resource Zimbabwe. (2019 The World Bank, Source: Global Solar Atlas 2.0, Solar resource data: Solargis)

in Rajasthan, developed by multiple entities including a JV between Government of Rajasthan (GoR) and [IL&FS Energy Development Company](#), a JV between GoR and [Adani Renewable Energy Park](#), and [Rajasthan Solar Park Development Company Limited \(RSPDCL\)](#); and Pavagada (2000 MW) in Karnataka developed by the [Karnataka Solar Power Development Corporation Ltd. \(KSPDCL\)](#), a JV between [Karnataka Renewable Energy Development Ltd. \(KREDL\)](#) and the [Solar Energy Corporation of India \(SECI\)](#). Some of the large players in the utility-scale solar segment include [Azure Power](#), [Adani Solar](#), [Softbank Energy](#), [Acme Solar](#), [Greenko Energy holdings](#), [NTPC](#) etc.

**Solar rooftop:** Under the grid-connected solar programme, the ministry plans to launch 40,000MW Rooftop Solar (RTS) Projects by 2022. Organisations such as ADB, World Bank, USAID, GIZ and EU have also provided multilateral grants for India's solar rooftop programme. Some of the prominent solar rooftop players in India include [Azure Power](#), [Tata Power Solar](#), [CleanMax Solar](#), [Fourth Partner Energy](#), etc.

**Off-grid solar:** Under its Off-Grid and Decentralized Solar PV Applications Programme, implemented by State Nodal Agencies, MNRE provides Central Financial Assistance (CFA) for the deployment of solar street lights, solar lamps, standalone solar pumps, solar power packs etc to meet the electricity, lighting and water pumping needs of local rural communities. In addition to this, the PM-KUSUM Scheme also has a component to install 1.75 million stand-alone solar agriculture pumps in India by 2022. The component attracts a CFA of 30% of the tender cost or benchmark cost, whichever is lower, and a state subsidy of 30%. MNRE's scheme for 'Off-Grid and Decentralized Concentrated Solar Thermal (CST) Technologies for Community Cooking, Process Heat and Space Heating and Cooling Applications in Industrial, Institutional and Commercial Establishments' provides a 20% subsidy on the benchmark cost or actual cost, whichever is lower.

The Global Off-Grid Lighting Association (GOGLA) estimates the Indian off-grid solar market will reach USD 206 to 327 million by 2023, led by solar lanterns (including services like mobile charging, radio, etc) and solar home systems (ranging from 100Wp to 400Wp). It anticipates the growth to come mainly in the states of Jammu and Kashmir, Chhattisgarh, Bihar, Jharkhand, Arunachal Pradesh, Uttar Pradesh and Mizoram.

Some of the prominent private sector companies in the off-grid solar sector in India include [Simpa Energy India Private Limited](#), [Greenlight planet](#), [d.light](#), [Cygni Energy Private Ltd.](#) and last mile distributors like [Frontier markets](#) and [Dharma Life](#).

Presently, the solar tariff in India, determined through a competitive bidding process involving reverse e-auction, is very competitive and has achieved grid parity. However, the sector faces various challenges. Large utility-scale solar projects grapple with risks such as the adverse impact of a 15% safeguard duty (valid until July 2020) on the import of solar panels from China and Malaysia; delayed payment by DISCOMs especially in case of state government-run and privately-owned plants; delays in signing, renegotiations and cancellation of Purchase Power Agreements (PPAs); and a mismatch in the commissioning times of the RE projects and the transmission infrastructure due to inadequate planning. Rooftop solar, on the other hand, is characterised by challenges such as lack of awareness among consumers about the government's rooftop solar schemes and the process of obtaining a net metering connection; reluctance among DISCOMs to support rooftop solar adoption especially in the Commercial and Industrial (C&I) segment that pays their highest tariff; and poor bankability of the smaller projects due to their disaggregated nature which increases transaction costs for banks. For the off-grid sector, servicing consumers in grid-connected areas with unreliable power supply and uncertain demand patterns are a challenge, coupled with the high distribution and transaction costs of providing services in remote rural areas.

### Small hydropower (SHP)

In India, the MNRE is responsible for developing small hydropower projects with a capacity of less than 25MW. The estimated potential of small/mini/micro hydro projects in the country is ~21GW from 7,133 sites located in different states of India. The hilly states of Arunachal Pradesh, Himachal Pradesh, Karnataka, Uttarakhand, Punjab and Andhra Pradesh constitute over half of this potential. The current installed capacity is highest in the state of Himachal Pradesh with 195 SHP projects followed by Karnataka with 170 SHP project. The national target

for SHP is to achieve a cumulative capacity of 5GW by 2022. Against this target, an aggregate capacity of 4.67GW was achieved by 31 December 2019 through 1,127 SHP projects. In addition, 109 projects of about 529.24MW are under implementation. A detailed list of potential sites, installed projects, key developers, and ongoing projects in the SHP sector is provided in MNRE's Annual Report 2019-20, also referenced in the section on Further Reading.

To promote SHP projects in India, MNRE offered the SHP scheme that provides CFA/Grant/Subsidy for the following sub-heads:

- Setting up new SHP Projects in the private/co-operative/joint sector
- Setting up new SHP Projects in the Government sector, including support for site identification and Detailed Project Report (DPR) preparation
- Renovation and Modernisation of existing SHP projects in the Government sector
- Support for development/upgradation of Water Mills and setting up Micro Hydro Projects (up to 100 KW capacity).
- Research and Development and Human Resource Development

Several other initiatives have been taken by the MNRE for the promotion of small hydro including a UNDP-GEF assisted technical assistance project called "Optimising Development of Small Hydro Resources" in hilly regions of India. Another initiative is the India Renewable Resources Development Project, supported by an IDA credit line that has a small hydro development component with a target of developing 100MW canal-based small hydropower projects through private sector participation. The Ministry also aims to promote efficient designs of water mills for mechanical as well as electrical generation and set up 100KW micro hydro projects for electrification of remote villages. Several associations, NGOs, cooperative societies, village energy cooperatives and State Nodal Agencies are involved in such projects.

A few public sector organisations actively working towards developing SHP projects in their respective states include [Uttarakhand Jal Vidyut Nigam Limited](#), [Sardar Sarovar Narmada Nigam Ltd.](#) And the [Ladakh Renewable Energy Development Agency](#).

Lack of hydrological data, remoteness from the grid or the nearest transmission point, and very sparse population in remote areas, are a few factors that inhibit the development of SHP projects in India.

## Bio power

The current installed bio-mass power capacity is less than half of the estimated potential available in India. According to MNRE, the surplus biomass availability of about 120-150 million metric tonnes annually (mainly agricultural and forest residues) corresponds to a potential of 18GW. In addition to this, 7GW of additional power could be generated through bagasse-based cogeneration in the 550 sugar mills in the country. Over 500 biomass power and bagasse cogeneration projects aggregating to 9.8 GW capacity have been installed in India for feeding power to the grid. Of this capacity, 9,131MW is from grid-connected projects and 675 MW is from off-grid projects. The leading states for biomass power projects are Chhattisgarh, Gujarat, Madhya Pradesh, Rajasthan and Tamil Nadu.

India also presents a significant potential for setting up biogas plants, considering it has a livestock population of 512.06 million. In this regard, the government offers the following central sector schemes under off-grid/distributed and decentralised renewable power:

- a. New National Biogas and Organic Manure Programme (NNBOMP), for biogas plant size ranging from 1 m<sup>3</sup> to 25 m<sup>3</sup> per day
- b. Biogas Power Generation (Off-grid) and Thermal energy application Programme (BPGTP), for setting up biogas plants in the size range of 30 m<sup>3</sup> to 2,500 m<sup>3</sup> per day, for power generation capacity range of 3 kW to 250 kW from biogas or raw biogas, for thermal energy and/or cooling applications

In addition, family/small size biogas plants mainly for rural and semi-urban households have been set up under the National Biogas and Manure Management Programme (NBMMP).

A few organisations working in the biomass sector in India are [Husk Power Systems](#), [Avani Bio Energy](#) and [Decentralised Energy Systems \(India\) Pvt. Ltd.](#), among others.

Some of the key challenges encountered by enterprises operating in the biomass market in India include the high cost of storing and transporting biomass; ensuring a regular supply of biomass at reasonable rates, especially in light of various competing uses of biomass resources; and operating in a largely informal and unorganised biomass market represented by small and marginal farmers, and fragmented landholdings.

## Wind power

India is ranked 4th in the world in wind power generation after China, the US and Germany, with a total installed capacity of 37.5GW as of 31 December 2019. The estimated potential of wind energy in India is about 302.25GW, with the most promising potential in the states of Gujarat, Maharashtra, Rajasthan, Karnataka, Tamil Nadu, Andhra Pradesh, and Madhya Pradesh.

The Government of India is promoting wind power projects through private sector investments by providing various fiscal and financial incentives such as Accelerated Depreciation benefits, and concessional custom duty exemption on certain components of wind electric generators. In addition to the fiscal incentives, the following support mechanisms have been put in place to promote wind power on a large scale:

- a. Technical support, including wind resource assessment and identification of potential sites through the National Institute of Wind Energy, Chennai.
- b. Waiving off of inter-state transmission charges and losses for wind and solar projects to be commissioned by March 2022.

India has a long coastline of about 7,600km, it is surrounded by water on three sides, and has a high potential for harnessing offshore wind energy. In this regard, “National offshore wind energy policy” has been notified by the Government of India for the development of offshore wind energy in the Indian exclusive economic zone (EEZ). MNRE set a target to install 5GW of offshore wind plants by 2022 and 30GW by 2030.

Some of the largest onshore wind farms in India are Muppandal Windfarm in Kanyakumari, Tamil Nadu (1,500MW) developed by the [Tamil Nadu Energy Development Agency](#), and the Jaisalmer wind park in Rajasthan (1,064MW) developed by [Suzlon Energy](#). The prominent players in the sector are [Renew Power](#), [Greenko Energy Holdings](#), [Tata Power](#) and [Mytrah Energy](#).

The main impediments to the growth of the wind sector in India include difficulty in procuring land in a timely manner, the poor financial health of discoms leading to delays of 12-24 months in payments to independent power producers (IPP), lack of an effective mechanism for regional cooperation that would enable the power exchange between power surplus and power deficit regions, and sluggish expansion of transmission lines.

## RE mini grids

Until March 2020, about 214MW of solar power in India was generated from micro and mini solar PV grids. According to the 2016 national draft policy on RE-based mini and micro grids, MNRE has a target to deploy at least 10,000 RE based micro and mini-grid projects in India with an estimated capacity of 500MW by the year 2022.

The sector benefits from various policies such as The Ministry of Power's Tariff Policy of 2016 which allows DISCOMs to purchase mini-grid electricity and provides relevant guidelines, although only a few states have adopted these guidelines. The Central Electricity Authority (CEA), through its Technical Standards for Connectivity of Distributed Generation Resources Regulations, 2013, allows distributed energy sources to be connected to the central grid in all states. States like UP and Bihar also provide subsidies to mini grid developers.

One of the more active players in the mini grid market is [Smart Power India](#), a subsidiary of the Rockefeller Foundation, which has supported 12 developers in building a portfolio of 241 mini grids in the states of Uttar Pradesh, Bihar, and Jharkhand, serving 0.2 million customers as of November 2019. [The Mlinda Foundation](#) has also installed over 310 micro and pico grids in the States of West Bengal and Jharkhand, of up to 8 KWp. Other mini-grid developers in the market include [Naturetech Infra](#), [OMC power](#), [Tara Urja](#), [Husk Power Systems](#) and [Mera Gao Power](#). The prominent government developers include The West Bengal Renewable Energy Development Agency (WBREDA), which has installed 23 mini grids providing electricity to 10,000 customers throughout West Bengal, and CREDA in Chhattisgarh, which serves 35,000 households.

The mini grid sector in India faces an existential threat in light of the intensification of grid supply in the country. It is therefore important for developers to select states which have guidelines to interconnect mini grids to the main grid. Other risks include delays in land acquisition for the projects, shortage of skilled manpower in rural areas, load intermittency and limited demand leading to sub-optimal plan utilisation and risk of electricity theft.

## Key government institutions

Institution	Role
<b>Ministry of New and Renewable Energy (MNRE)</b>	The institution formulates policies to facilitate research, design, development, manufacture, and deployment of new and renewable energy systems, applicable in transportation, portable and stationary applications in rural, urban, industrial and commercial sectors.  <b>Website:</b> <a href="https://mnre.gov.in/">https://mnre.gov.in/</a>
<b>Ministry of Power (MoP)</b>	The institution deals with planning, policy formulation, administration and enactment of legislation related to thermal and hydropower generation, transmission and distribution. It also monitors the implementation of projects along with their investment decisions.  <b>Website:</b> <a href="https://powermin.nic.in/">https://powermin.nic.in/</a>

<b>Central Electricity Authority (CEA)</b>	CEA advises the government and commissions on technical matters relating to generation, transmission and distribution of electricity. It also sets technical standards for setting up electricity plants, electricity lines and connectivity to grids.
	<b>Website:</b> <a href="http://cea.nic.in/">http://cea.nic.in/</a>
<b>Regulatory bodies</b>	Central Electricity Regulatory Commission (CERC) and State Electricity Regulatory Commission (SERC) set the tariff and provide licenses to the power generating companies, power transmission companies and power distribution companies. They also regulate the Renewable Purchase Obligations (RPO) to be carried out by power generation and distribution companies and also issue RE certificates (REC).
	<b>Website:</b> <a href="http://www.cercind.gov.in/">http://www.cercind.gov.in/</a>
<b>Indian Renewable Energy Development Agency Limited (IREDA)</b>	IREDA is a Public Limited Government Company established as a Non-Banking Financial Institution. It is engaged in promoting, developing and extending financial assistance for setting up projects relating to new and renewable sources of energy and energy efficiency/conservation.
	<b>Website:</b> <a href="https://www.ireda.in/">https://www.ireda.in/</a>
<b>Solar Energy Corporation of India Ltd (SECI)</b>	Solar Energy Corporation of India Ltd. is a Central Public Sector Undertaking under the MNRE and facilitates the implementation of the National Solar Mission and achievement of targets set therein.
	<b>Website:</b> <a href="https://seci.co.in/">https://seci.co.in/</a>
<b>National Institution for Transforming India, NITI Aayog</b>	It is a policy think tank of the Government of India that designs strategic and long term policies and programmes for the Government and provides technical advice to the Centre and States.
	<b>Website:</b> <a href="https://niti.gov.in/">https://niti.gov.in/</a>
<b>Ministry of Environment Forests and Climate Change (MoEFCC)</b>	MoEFCC is India's nodal agency for planning, coordination, promotion, and overseeing the implementation of India's environmental and forestry policies and programmes.
	<b>Website:</b> <a href="http://moef.gov.in/">http://moef.gov.in/</a>
<b>Department of Economic Affairs (DEA)</b>	The DEA, within the Ministry of Finance, is responsible for advising the Ministry on economic issues have a bearing on various aspects including inflation, price control, foreign exchange management, Official Development Assistance in domestic finance and preparation of the Union Budget, and bilateral development assistance from all G8
	countries, in the form of grants, loans, and other concessional finance into the relevant sectors.
	<b>Website:</b> <a href="https://dea.gov.in/">https://dea.gov.in/</a>
<b>Power system Operation Corporation Ltd. (POSOCO)</b>	It administers the load despatch centres (Regional load despatch centres and State load despatch centres) and implements the framework on forecasting, scheduling and imbalance handling of renewable energy generating stations.
	<b>Website:</b> <a href="https://posoco.in/">https://posoco.in/</a>

---

**Indian Energy Exchange (IEX)**

It manages the platform for power trading exchanges including Renewable Energy Certificates (REC) regulated by CERC.

**Website:** <https://www.iexindia.com/>

---

**National Institute of Solar Energy (NISE)**

It is an autonomous institution under MNRE that assists the Ministry in implementing the National Solar Mission and coordinates research, technology and other related works in the sphere of solar energy

**Website:** <https://nise.res.in/>

---

**National Institute of Wind Energy (NIWE)**

It is an autonomous institution under MNRE which coordinates research, technology and other related works in wind power within the energy sector.

**Website:** <https://niwe.res.in/>

---

## Industry associations

Industry Association	Features
<b>Renewable Energy Promotion Agency (REPA)</b>	<p>REPA is India's first public-private not-for-profit body and umbrella association for the promotion of renewable energy. It works closely with MNRE and its nodal agencies IREDA and SECI.</p> <p><b>Website:</b> <a href="http://www.repaglobal.org/">http://www.repaglobal.org/</a></p>
<b>Federation of Indian Chambers of Commerce and Industry (FICCI)</b>	<p>It is a non-governmental, not for profit organisation that provides a platform for networking and consensus building within and across sectors by connecting Indian industry, policy makers and the international business committee.</p> <p><b>Website:</b> <a href="http://fikki.in/">http://fikki.in/</a></p>
<b>Associated Chambers of Commerce and Industry of India (ASSOCHAM)</b>	<p>The organisation represents the interests of trade and commerce in India, and acts as an interface between issues and initiatives. Its goal is to promote both domestic and international trade, and reduce trade barriers while fostering a conducive environment for the growth of trade and industry of India.</p> <p><b>Website:</b> <a href="https://www.assochem.org/">https://www.assochem.org/</a></p>
<b>Clean Energy Access Network (CLEAN)</b>	<p>CLEAN is a pan India organisation that supports the growth of the decentralised clean energy sector in India, by bringing together diverse stakeholders working towards improving energy access for the rural and urban poor.</p> <p><b>Website:</b> <a href="https://www.thecleannetwork.org/">https://www.thecleannetwork.org/</a></p>

## References and further reading

### **MNRE Annual Report 2019-2020**

[https://mnre.gov.in/img/documents/uploads/file\\_f-1585710569965.pdf](https://mnre.gov.in/img/documents/uploads/file_f-1585710569965.pdf)

### **MNRE Portal for Renewable Energy**

<https://mnre.gov.in/>

### **National Power Portal**

<https://npp.gov.in/publishedReports>

### **Central Electricity Authority Monthly Reports**

<http://cea.nic.in/monthlyexesummary.html>

### **India 2020, Energy Policy Review, IEA**

[https://webstore.iea.org/download/direct/2933?fileName=India\\_2020-Policy\\_Energy\\_Review.pdf](https://webstore.iea.org/download/direct/2933?fileName=India_2020-Policy_Energy_Review.pdf)

### **State of the Indian Renewable Energy Sector: Drivers, Risks, and Opportunities, CEEW, 2018**

[https://www.ceew.in/sites/default/files/CEEW\\_State\\_of\\_the\\_Indian\\_Renewable\\_Energy\\_Sector\\_report\\_31Oct18.pdf](https://www.ceew.in/sites/default/files/CEEW_State_of_the_Indian_Renewable_Energy_Sector_report_31Oct18.pdf)

### **India's RE companies**

<https://mercomindia.com/india-solar-market-leaders-unveiled-1h-2019/>

<https://energy.economictimes.indiatimes.com/news/renewable/indias-largest-renewable-energy-companies-acme-adani-and-greenko-top-the-list/70429534>

### **Peering into the future, India and the distributed standalone solar products market, C-Kinetics and GOGLA, 2019**

[https://www.gogla.org/sites/default/files/resource\\_docs/report\\_india\\_and\\_the\\_solar\\_standalone\\_market\\_sizing\\_in\\_india\\_web\\_opt.pdf](https://www.gogla.org/sites/default/files/resource_docs/report_india_and_the_solar_standalone_market_sizing_in_india_web_opt.pdf)

### **Mini-grid handbook, a business guide for developers and investors, November 2019**

[https://smartpowerindia.org/Media/1140/MGH%20Hand%20Book\\_V3%2022%20Nov%20Final%20Edited%20or%20web%20use%201.pdf](https://smartpowerindia.org/Media/1140/MGH%20Hand%20Book_V3%2022%20Nov%20Final%20Edited%20or%20web%20use%201.pdf)

### **Renewable energy-based rural electrification: The mini-grid experience from India, Global Network on Energy for Sustainable Development (GNESD), 2014**

[https://www.thecleannetwork.org/wp-content/uploads/2014/01/GNESD-publication\\_Mini-grids-India\\_web.pdf](https://www.thecleannetwork.org/wp-content/uploads/2014/01/GNESD-publication_Mini-grids-India_web.pdf)

### **A Second Wind for India's Wind Energy Sector Pathways to Achieve 60 GW, CEEW, 2019**

<https://www.ceew.in/sites/default/files/CEEW-A-Second-Wind-for-India-Wind-Energy-Sector-17July19.pdf>

### **Ease of Doing Business**

<https://openknowledge.worldbank.org/bitstream/handle/10986/32436/9781464814402.pdf>

### **Surya Mitra programme**

<https://suryamitra.nise.res.in/>

**Make in India programme**

<https://www.makeinindia.com/sector/renewable-energy>

**India's Nationally Determined Contribution**

<http://moef.gov.in/wp-content/uploads/2018/04/revised-PPT-Press-Conference-INDC-v5.pdf>

**Compendium of policies, regulations, technical standards & financing norms for solar power projects**

<https://www.ireda.in/writereaddata/CompendiumSolar2016/Program.htm>

**Village and household electrification status in India**

<https://saubhagya.gov.in/>

**Official UK Government travel advice for India**

<https://www.gov.uk/foreign-travel-advice/india>

## Useful contacts

### Ministry of New and Renewable Energy (MNRE)

New and Renewable Energy, Block 14, Ministry of,  
Lodhi Rd, CGO Complex, New Delhi,  
Delhi 110003

### Ministry of Power

Joint Secretary, Ministry of Power  
Room No. 415, 4th Floor  
Shram Shakti Bhawan  
Rafi Marg, New Delhi-110001

### British High Commission New Delhi

Shantipath, Chanakyapuri  
New Delhi 110021

### India High Commission, UK

India House, Aldwych,  
London WC2B 4NA  
United Kingdom

### Department of Economic Affairs (DEA)

#### Shri K Rajaraman

Additional Secretary  
Ministry of Finance  
Room No. 129-B  
New Delhi – 110001 (India)

### Central Electricity Regulatory Commission

3rd & 4th Floor, Chanderlok Building,  
36, Janpath,  
New Delhi- 110001

### Central Electricity Authority(CEA)

Prakash S Mhaske  
Sewa Bhawan, R. K. Puram, Sector-1,  
New Delhi - 110 066

### FICCI (Federation of Indian Chambers of Commerce and Industry)

Federation House. Tansen Marg,  
New Delhi 110001

### ASSOCHAM

5, Sardar Patel Marg,  
Diplomatic Enclave, Chanakyapuri,  
New Delhi, Delhi 110021

### REPA (Renewable Energy Promotion Agency)

No. 323, 'A' Wing, Shantaram Tower,  
Shivaji Path, Ganesh Nagar, Dombivli (W), Thane -  
421 202  
Mumbai Metropolitan Region (MMR),  
Maharashtra

Please contact your Client Relationship Manager if you want help with introductions to specific individuals with these institutions.