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Energy Sector

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INDUSTRY OVERVIEW

- The energy sector is a large and all-encompassing term that describes a complex and inter-related network of companies, directly and indirectly, involved in the production and distribution of energy needed to power the economy and facilitate the means of production and transportation. The energy industry also includes secondary sources such as electricity. Energy prices—along with the earnings performance of energy-producers—are largely driven by the supply and demand for worldwide energy.

- India's power sector is one of the most diversified in the world. Sources of power generation range from conventional sources such as coal, lignite, natural gas, oil, hydro and nuclear power to viable non-conventional sources such as wind, solar, and agricultural and domestic waste. Electricity demand in the country has increased rapidly and is expected to rise further in the years to come. In order to meet the increasing demand for electricity in the country, massive addition to the installed generating capacity is required.

- In May 2018, India ranked fourth in the Asia Pacific region out of 25 nations on an index that measured their overall power. India was ranked fourth in wind power, fifth in solar power and fifth in renewable power installed capacity as of 2018. India ranked sixth in the list of countries to make significant investments in clean energy at US$ 90 billion. India is the only country among the G20 nations that is on track to achieve the targets under the Paris Agreement.

POWER SECTOR IN INDIA – PRESENT SCENARIO

INSTALLED CAPACITY AS ON 30-04-2021 (Source: Central Electricity Authority ,Power Sector at a Glance)		
FUEL	**INSTALLED CAPACITY IN MW**	**% OF TOTAL**
COAL	2,02,675	53.0%
LIGNITE	6,620	1.7%
GAS	24,924	6.5%
DIESEL	510	0.1%
TOTAL THERMAL	**2,34,729**	61.3%
HYDRO	**46,209**	12.1%
NUCLEAR	**6,780**	1.8%
SMALL HYDRO	4,760	1.2%
SOLAR	38,790	10.1%
WIND	38,680	10.1%
BIOENERGY	10,310	2.7%
OTHERS	2,473	0.6%
TOTAL RENEWABLE	**95,013**	24.8%
TOTAL INSTALLED CAPACITY	**3,82,731**	

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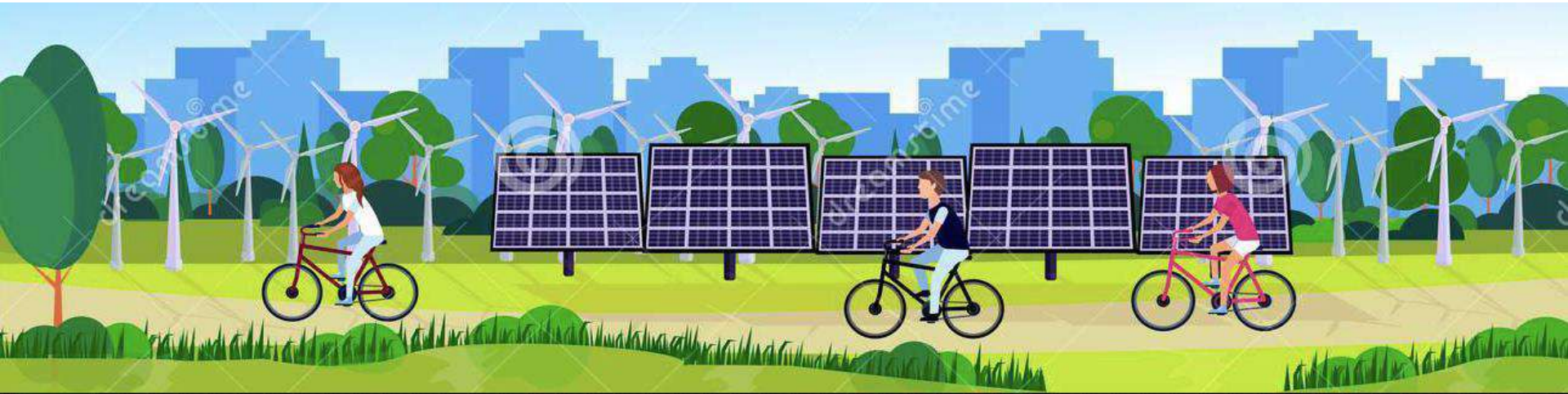
MARKET SIZE

Indian power sector is undergoing a significant change that has redefined the industry outlook. Sustained economic growth continues to drive electricity demand in India. The Government of India's focus on attaining 'Power for all' has accelerated capacity addition in the country. At the same time, the competitive intensity is increasing at both the market and supply sides (fuel, logistics, finances, and manpower).

By 2022, solar energy is estimated to contribute 114 GW, followed by 67 GW from wind power and 15 GW from biomass and hydropower. The target for renewable energy has been increased to 227 GW by 2022.

In FY22*, the total thermal installed capacity in the country stood at 234.72 GW. Installed capacity of renewable, hydro and nuclear energy totalled 95.01 GW, 46.20 GW and 6.78 GW, respectively.



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MARKET EVOLUTION IN COMING YEARS

PROJECTED ELECTRICITY DEMAND		
(As per Electric Power Survey, Published by CEA, 2019)		
YEAR	ELECTRIC ENERGY REQUIREMENT (BU)	PEAK ELECTRICITY DEMAND IN MW
2021-22	1566	2,25,751
2026-27	2047	2,98,774
2029-30	2325	3,39,973

WIND POWER PLANT

FAVOURABLES:

- Expansion from 60 GW to 140GW, which means huge volume of business.
- Considering 70MINR/MW, it is worth Rs5,600 Bn. which means Rs.560 Bn/year.
- 7-8% share indicates nearly Rs 4000 to 4500Crores/year

CHALLENGES:

- New Technology is involved
- Different Product/ components to be manufactured
- New set of equipment will be required
- Capital investment
- Entirely New Skill Set

Solar power

FAVOURABLES:

- Giant Leap from 100 GW to 280GW, which means huge volume of business.
- Considering 40-50MINR/MW, it is worth Rs7,200Bn. to 9,000Bn., which means Rs.720 to 900Bn/year.
- 5% share indicates Rs 3600 to 4500Crores/year

Solar

CHALLENGES:

- New Technology is involved
- Different Product/ components to be manufactured
- Entirely New set of equipment will be required
- Capital Investment will be required
- Entirely New Skill Set

COAL AND LIGNITE POWER PLANTS

FAVOURABLES:

- Although new build is restricted, still there will be an expansion from 215 GW to 267 GW, and additional 30GW for replacement of retired ones (to sustain the peak load) which means opportunity for the business to cater nearly 80GW or 8 GW/year.
- Considering 4.5MINR/MW, it is worth Rs3,50 Bn. which means Rs.35 Bn/year.
- 40-50% share indicates nearly Rs 1500 to 1700Crores/year

CHALLENGES:

- Huge competition
- Cost cutting in regular products
- New set of Environmental controls
- New Products to be included to meet emission standards

NUCLEAR POWER PLANTS

FAVOURABLES:

- Although new build is restricted still there will be an expansion from 6.7 GW to 19 GW, which means opportunity for the business to cater nearly 12GW
- After the trial of ITER (planned in 2025), this market is going to expand, either due to the success of Fusion technology, or due to the failure, people will go for the old one with additional safety measures.
- Considering 12MINR/MW, it is worth Rs150 Bn. which means Rs.15 Bn/year.
- 20% share indicates nearly Rs 300 Crores/year
- Less Competition in Indian Market

CHALLENGES:

- New Technology
- Capital Investment
- New set of Environmental controls
- New Products to be developed.

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MAJOR AREAS OF FOCUS

- SOLAR POWER (From 100GW to 280GW Capacity)
- WIND ENERGY (From 60GW to 140GW Capacity)
- COAL & LIGNITE FIRED POWER PLANTS (From 215GW to 267GW Capacity enhancement)
- NUCLEAR POWER (From 6.7GW to 18.9GW)

CAPACITY UPGRADATION IN PROGRESS

PROJECTED INSTALLED CAPACITY BY END OF 2021-22	
(Source: Report on Optimal generation Capacity Mix , CEA, Govt. of India,Jan 2020)	
TECHNOLOGY	**CAPACITY (MW)**
HYDRO	44,989
PUMPED STORAGE	5,246
COAL & LIGNITE	**2,15,773**
GAS	25,343
NUCLEAR	**10,080**
SOLAR	1,00,000
WIND	**60,000**
BIOENERGY	10,000
SMALL HYDRO	5,000
TOTAL BY 2021-22	**4,76,431**

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TYPES OF ENERGY SECTOR COMPANIES

1 OIL & GAS DRILLING AND PRODUCTION

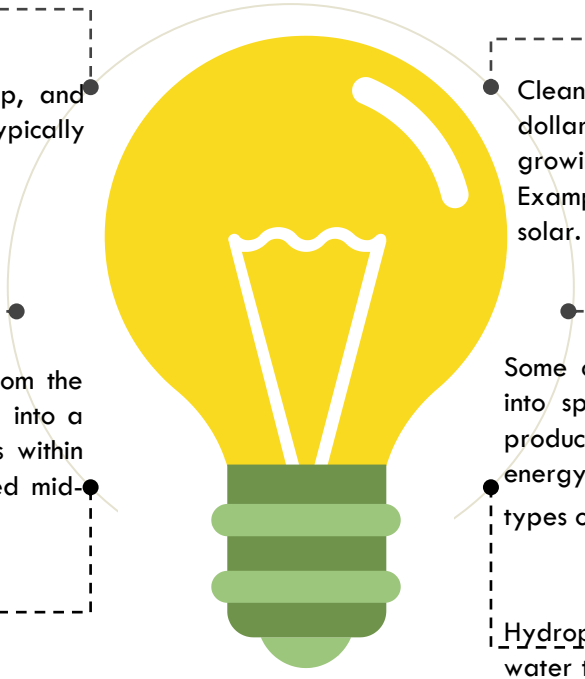
These are the companies that drill, pump, and produce oil and natural gas. Production typically involves pulling oil out of the ground.

2 PIPELINE & REFINING

Oil and natural gas must be delivered from the production site to a refinery to be refined into a final product such as gasoline. Companies within this portion of the energy sector are called mid-stream providers.

3 MINING COMPANIES

Coal companies could be classified as energy companies since coal is used to power plants, including nuclear.



4 RENEWABLE ENERGY

Clean energy has gained traction and investment dollars over the years and is likely to be a growing part of the energy sector in the future. Examples of renewable energy include wind and solar.

5 CHEMICALS

Some companies specialize in refining oil and gas into specialty chemicals, although many larger oil producers such as Exxon Mobil are integrated energy producers, meaning they produce multiple types of energy and control the entire process.

6 HYDROPOWER COMPANIES

Hydropower plants capture the energy of falling water to generate electricity. A turbine converts the kinetic energy of falling water into mechanical energy. Then a generator converts the mechanical energy from the turbine into electrical energy.

EXPECTED DISTRIBUTION OF SHARES IN NEXT TEN YEARS

PROJECTED INSTALLED CAPACITY BY END OF 2021-22

(Source: Report on Optimal generation Capacity Mix , CEA, Govt. of India,Jan 2020)

TECHNOLOGY	CAPACITY (MW)
HYDRO	44,989
PUMPED STORAGE	5,246
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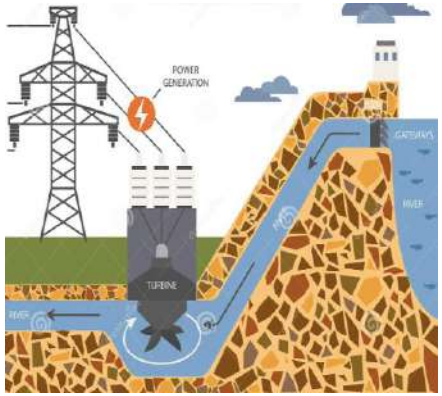
TYPES OF RENEWABLE ENERGY

Wind energy

Wind energy (or wind power) describes the process by which wind is used to generate electricity. Wind turbines convert the kinetic energy in the wind into mechanical power. Mechanical power can also be utilized directly for specific tasks such as pumping water.

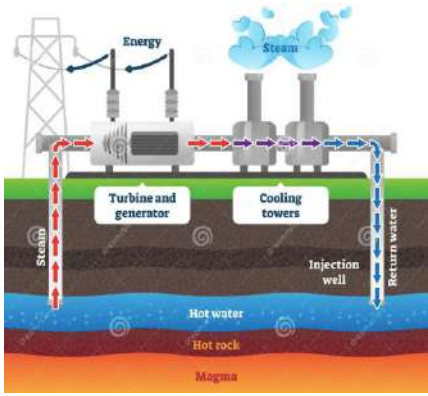
Solar energy

Solar power is energy from the sun that is converted into thermal or electrical energy. Solar technologies can harness this energy for a variety of uses, including generating electricity, providing light or a comfortable interior environment



Hydro energy

Hydro Energy is the use of falling or fast-running water to produce electricity or to power machines. This is achieved by converting the gravitational potential or kinetic energy of a water source to produce electrical or mechanical power.



Geothermal energy

Geothermal energy is heat within the earth Geothermal energy is a renewable energy source because heat is continuously produced inside the earth. People use geothermal heat for bathing, to heat buildings, and to generate electricity.

GOVERNMENT INITIATIVES

The Government of India has identified power sector as a key sector of focus to promote sustained industrial growth. Some initiatives by the Government to boost the Indian power sector are as below:

•In April 2021, the Ministry of Power (MoP) released the draft National Electricity Policy (NEP) 2021. The MoP has created an expert committee including members from state governments, the Ministry of New and Renewable Energy (MNRE), NITI Aayog and the Central Electricity Authority (CEA).

•As per the Central Electricity Authority (CEA) estimates, by 2029-30 the share of renewable energy generation would increase from 18% to 44%, while that of thermal is expected to reduce from 78% to 52%.

•On November 17, 2020, Energy Efficiency Services Limited (EESL), a joint venture of PSUs under the Ministry of Power and Department of New & Renewable Energy (DNRE), Goa, signed a memorandum of understanding to discuss roll-out of India's first Convergence Project in the state.

•In October 2020, the government announced a plan to set up an inter-ministerial committee under NITI Aayog to forefront research and study on energy modelling. This, along with a steering committee, will serve the India Energy Modelling Forum (IEMF) jointly launched by NITI Aayog and the United States Agency for International Development (USAID)

•The Government of India has allocated Rs. 111 lakh crore (US$ 1.4 trillion) under the National Infrastructure Pipeline for FY 2019-25. The energy sector is likely to account for 24% capital expenditure over FY 2019-25.

•Government plans to establish renewable energy capacity of 500 GW by 2030.

•Pradhan Mantri Sahaj Bijli Har Ghar Yojana-Saubhagya was launched by Government of India with an aim to achieve universal household electrification by March 2019.

•In September 2018, a draft amendment to Electricity Act, 2003 was introduced. It discussed separation of content & carriage, direct benefit transfer of subsidy, 24*7 power supply as an obligation, penalisation on violation of PPA, setting up smart meter and prepaid peters along with regulations related to the same.

•Ujwal Discoms Assurance Yojana (UDAY) was launched by the Government to encourage operational and financial turnaround of State-owned Power Distribution Companies (DISCOMS) with an aim to reduce Aggregate Technical & Commercial (AT&C) losses to 15% by FY19.

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GROWING DEMAND

- India ranked sixth in the list of countries to make significant investment in clean energy by allotting US $90 million in between 2010-2019.
- Growing population along with increasing electrification and per capita usage will provide further impetus.
- Power consumption is estimated to reach 1894.7 TWh in 2022

Increased Energy Demand

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ATTRACTIVE OPPORTUNITIES

1. Under the union budget 2021-2022, the government allocated 305,984 crore for a revamped, reforms based and result linked new power distribution sector scheme over the next five years.

2. In June 2019 government launched US $5 billion of transmission - line tenders in phases to reach 175 GW target by 2022.

POLICY SUPPORT

1. 100% FDI allowed in the power sector has boosted FDI inflow in this sector.

2. Schemes such as Deen Dayal Upadhyay Gram Jyoti Yojana (DDUGJY) and Integrated Power Development Scheme (IPDS) are expected to argument electrification across the country.

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OBTAINING LICENSE

(1) The Commission may on an application made in such form and on payment of such fee, as may be prescribed, grant a licence authorising any person to,-

(a) transmit electricity in a specified area of transmission; or
(b) supply electricity in a specified area of supply including bulk supply to licensees or any person.

(2) In respect of the grant of any such licence the following procedure shall be followed namely: -

(a) any person applying for a licence shall publish a notice of his application in such manner, and with such particulars as may be prescribed by the Commission within 14 days after making the application.

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ASSOCIATIONS

- ✓ Indian Captive Power Producers Association (ICPPA)
- ✓ Federation of Electricity Undertakings of India
- ✓ Indian Association for Hydrogen Energy and Advanced Materials (IAHEAM)
- ✓ Association of Power Producers (APP)
- ✓ Independent Power Producers Association of India (IPPAI)
- ✓ Indian Renewable Energy Federation (IREF)
- ✓ Indian Solar Manufacturer's Association (ISMA)
- ✓ Solar Energy Developers Association (SEDA-India)
- ✓ Indian Wind Power Association (IWPA)
- ✓ National Solar Energy Federation of India (NSEFI)
- ✓ Indian Wind Energy Association (INWEA)
- ✓ Solar Energy Society of India (SESI)

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ENERGY ENGINEERING COLLEGES

1. Anna University
2. Rajiv Gandhi Proudyogiki Vishwavidyalaya
3. Indian Institute of Technology
4. Thapar Institute of Engineering and Technology


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Power


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GUJARAT INDUSTRIES
POWER COMPANY LTD.


TATA POWER


CESC
LIMITED


NPCIL
Nuclear Power Corporation
of India Limited Mumbai


एन एच पी सी
NHPC
NHPC Limited
(A Government of India Enterprise)
India's Premier Hydro Power Utility


एनटीपीसी
NTPC


पावरग्रिड
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Renewables

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