Solar Energy Market Landscape in India & Outlook till 2030

A detailed study identifying investment potential of Indian solar market with key focus – mapping industry competitiveness, region wise opportune pockets identification for solar capacity, indexation of state's ease of doing solar policies & regulations, track of upcoming projects, potential assets for M&A

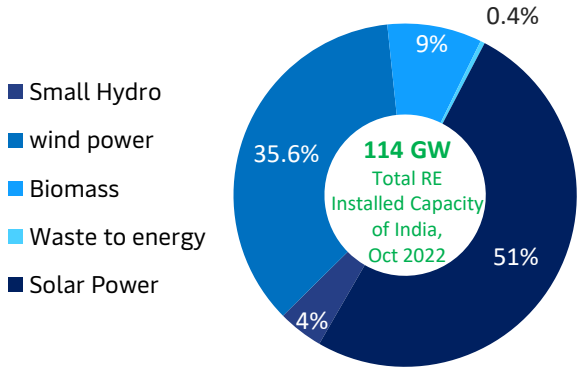
Solar Energy Landscape in India 2022, A Know How

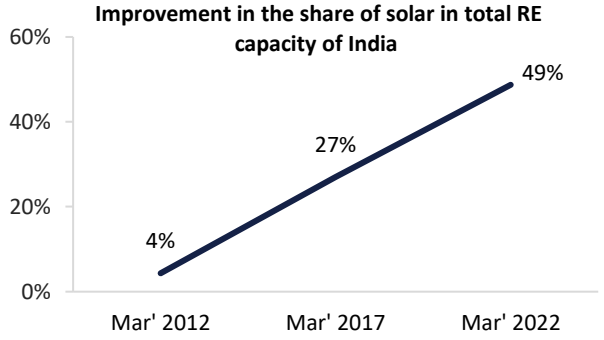
Solar energy in India - an exemplary rise of 30 times in the installed capacity over the last decade

India renewable energy (RE) sector has encountered a growth rate of 14% in five years, from FY 2017 to FY 2022.This growth takes India to achieve milestone of 114 GW of RE capacity as of Sept 2022. Of this total recorded capacity contribution of solar stands to be approx. 51%.The share of solar installed capacity in India has increased at a CAGR of 29% over the last decade from FY 2012, making it to rise from 4% to 51% (as of Sept. 22). Presently, the solar installed capacity of India is 57 GW. Some of the key contributing states to this capacity are -**Rajasthan (15 GW), Gujarat (8 GW), Karnataka (7.7 GW), Tamil Nadu (5.8 GW) and Telangana (4.6 GW).** Cumulatively these states drive nearly 69% of overall solar installation in the country.

The transformation that solar energy sector has witnessed in India over the last decade has been purely due to the impetus given by government of India (GOI) with aggressive capacity targets, dedicated policies and regulatory support. For example, the ambitious target of 280 GW of solar capacity has been set to be achieved till 2030, which means 5 times growth in the solar installed capacity in coming seven years from now. This anticipated growth in capacity addition clearly indicates an expansive upcoming business opportunity for the entire solar value chain in India, especially manufacturing. GOI has already initiated the steps to boost the domestic solar manufacturing in the form of Production Link Scheme (PLI).

Exhibit 1: Share of solar energy in total RE Installed capacity of India in FY 2022





Source: Eninrac Research, MNRE

To establish a larger manufacturing base for solar PV modules, an allocation of INR 19,500 crore (Tranche II) for PLI for manufacturing of high efficiency modules, with priority to fully integrated manufacturing units from polysilicon to solar PV modules, has been announced in the Union Budget 2022-23, on 1st Feb 22.

Lately in Sept. 22, SECI has also floated a proposal for inviting the bids under the desired scheme. It is anticipated that the PLI scheme shall lead to an installed manufacturing capacity of 65 GW per annum (Tranche II) in India. It is important to note that the total domestic capacity for manufacturing solar modules in India is about 20 GW, of which 13.3 GW has been enlisted in ALLMM. The current capacity of manufacturing solar cells in the country is around 4 GW.

B. Top 5 Solar PV manufacturing states with the no. of manufacturing units as of FY 2022

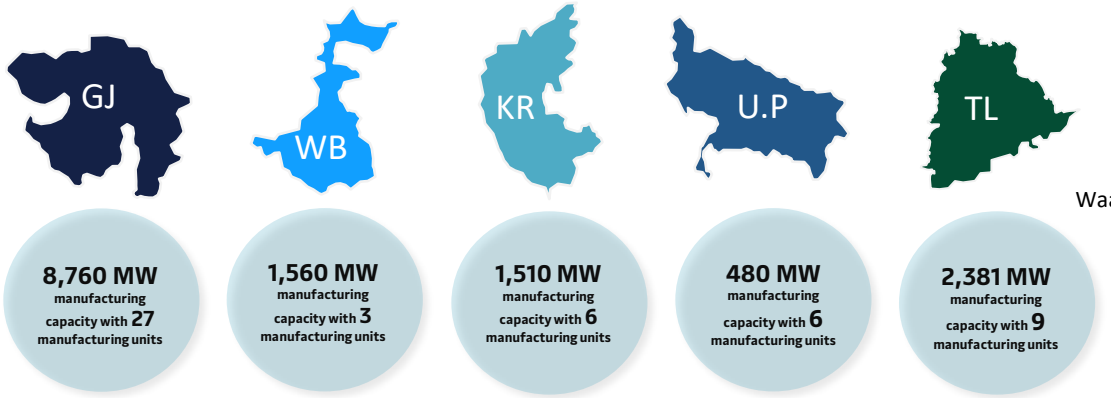
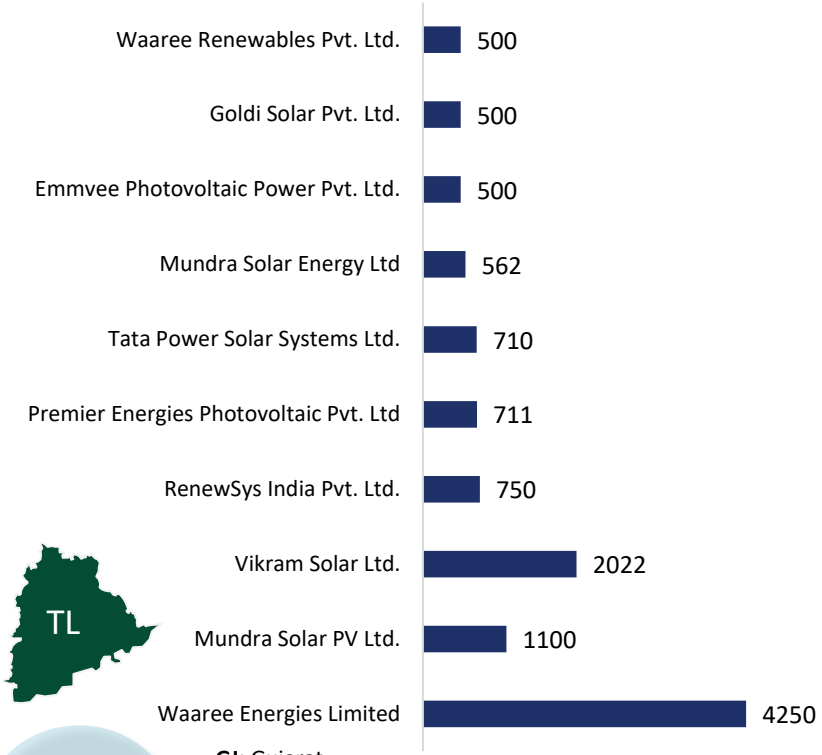


Exhibit 2: Manufacturing Landscape across the Solar Segment in India – Leading Players & Top States with Manufacturing Capabilities

A. Top Solar module manufacturing companies and their manufacturing capacity (in MW)



GJ: Gujarat
WB: West Bengal
KR: Karnataka
U.P: Uttar Pradesh
TL: Telangana

Source: Eninrac Research, MNRE, Channel Checks

Why Indian solar sector is catching eye-balls?

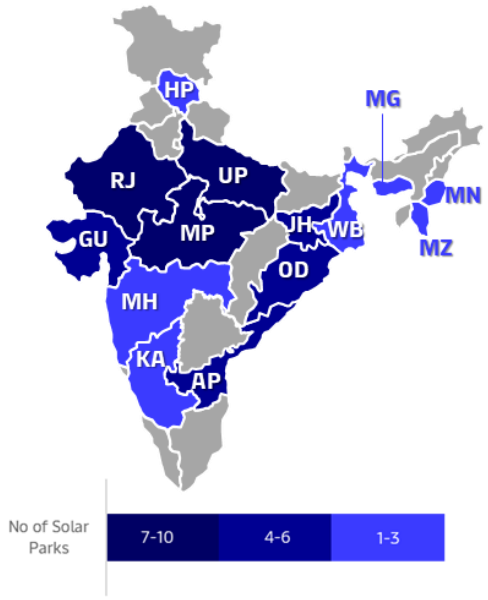
Abundance of solar resource potential (784 GW ground mounted), advancement in solar modules technology globally, falling solar power tariff and supportive government policies etc. can be seen as some of the key factors that have gained attraction from the industry players time to time in India. Having said that some of the major reasons that have transformed India's solar energy space within a time frame of 5-6 years are **–(1) More focus on large solar capacities**, in the form of developing solar parks and solar UMPPs- an ambitious target to setup 40 GW of Utility scale solar power projects by end of FY 2022. Of this total targeted capacity, nearly 10 GW has been commissioned so far. This scheme attracted investment from industry giants such as Adani. It is significant to note that of the total awarded solar park capacity in India, 1750 MW has been allotted to Adani, of which 849 MW has been already commissioned in the Rajasthan**. (2) Grid Connected Solar Rooftop Programme**– under this scheme a cumulative capacity of 40 GW from solar rooftop projects was set to be achieved by end of 2022, which has now been extended to be achieved by 2026. **(3) Green Open Access regulation-** Under this scheme, The reduction of Open Access Transaction limit from 1 MW to 100 kW and appropriate provisions for cross-subsidy surcharge, additional surcharge, standby charge, will incentivize the common consumers to get green power at reasonable rates. **(4) Increased target of solar RPO-** A significant jump in the solar RPO targets has also pushed the development of solar energy across the Indian states. It is important to note that the solar RPO target increased from 2.7% in 2016-17 to 10% in 2021-22. For year 2022-23 it is fixated at 23.4% and is further anticipated to increase to 33.5% by year 2029-30. **(5) Integrating solar with new energy transition/other modes** such as hybrid RE plants, Battery energy storage (BESS), Green hydrogen, floating solar etc. Presently about 2.9 GW of solar wind hybrid projects have been commissioned in India with a good chunk of opportunity in pipeline. The solar wind hybrid segment is catching up in India owing to the participation seen by players like TATA Power, Azure Power, Adani Renewables etc. Recently Amazon has also announced to commission two solar wind hybrid projects of 300 MW in the state of M.P and Karnataka within a time frame of 2-3 years. Decent development has also been seen on the BESS front in India over past 3-4 years. In Oct 2021 GOI invited expression of interest for installing 1000 MWh of BESS as a pilot project in India. It is significant to note that India is targeting to achieve BESS installed capacity of 108 GWh/27 GW (4 hour storage) by 2029-30. **(6) PLI Scheme-To establish a larger manufacturing base for solar PV modules**, an allocation of INR 24,000 crore (Tranche I & II) under PLI for manufacturing of high efficiency modules, with priority to fully integrated manufacturing units from polysilicon to solar PV modules, has been announced in the Union Budget 2022-23, on 1st Feb 22. It is anticipated that the PLI scheme shall lead to an installed manufacturing capacity of 65 GW per annum (Tranche II) in India.

Why Indian solar sector is catching eye-balls (contd.) ?

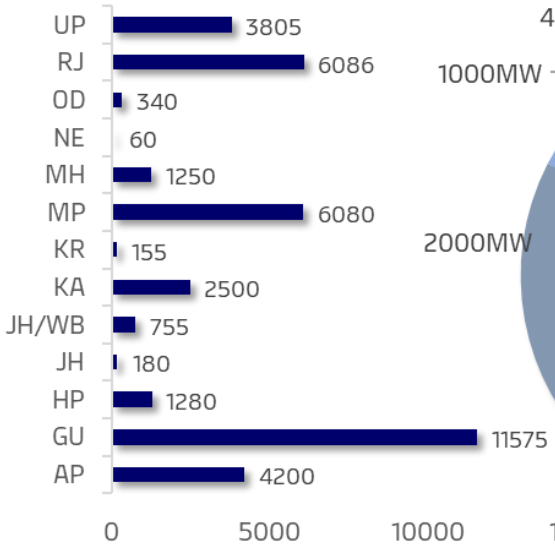
7) High participation from private players- The Indian solar energy space is also gaining attraction from the side of private players promising massive tune of investments across the solar value chain. For instance, Reliance shall be investing INR 60,000 crores for setting up manufacturing facility for solar modules and fuel cells. The company has also been quite active over the past two years in acquiring stakes in many RE companies, like- RIL Acquired REC Solar Holdings REC Group at US$ 771 million. The acquisition will help Reliance in its vision to become a global scale PV manufacturing player with industry-leading heterojunction (HJT) cell technology, 40% stake in Sterling & Wilson Renewable Energy which is the largest EPC and O&M providers globally, Faradion Limited at US$ 100 million which is one of the leading global battery technology company and its dream for a fully integrated energy storage giga-factory as part of the DAGEGC project at Jamnagar. **(8) Strategic International partnerships of India-** India has also partnered with many other countries across the fields of climate, energy, environment, mobility and transportation. Strategic co-operations has been done with countries such as Germany, Australia, Japan, Middle East etc. for technology development, knowledge exchange, resource development etc. across clean energy space, opening gates for many foreign companies/investors **(9) Green energy transition Corridor-** This is a comprehensive scheme for evacuation and integration of RE capacity. It has been developed under 2 phases . Phase 2 of the scheme was approved in Jan 2022, with a transmission capacity of 10750 circuit kilometers (ckm) and 27500 MVA capacity of substation for evacuating approximately 20 GW of RE power in 7 states, namely Gujarat, Himanchal Pradesh, Karnataka, Kerala, Rajasthan, Tamil Nadu and Uttar Pradesh.

Exhibit 3: State Wise Solar Parks in India- Approved Capacity & Existing Opportunity

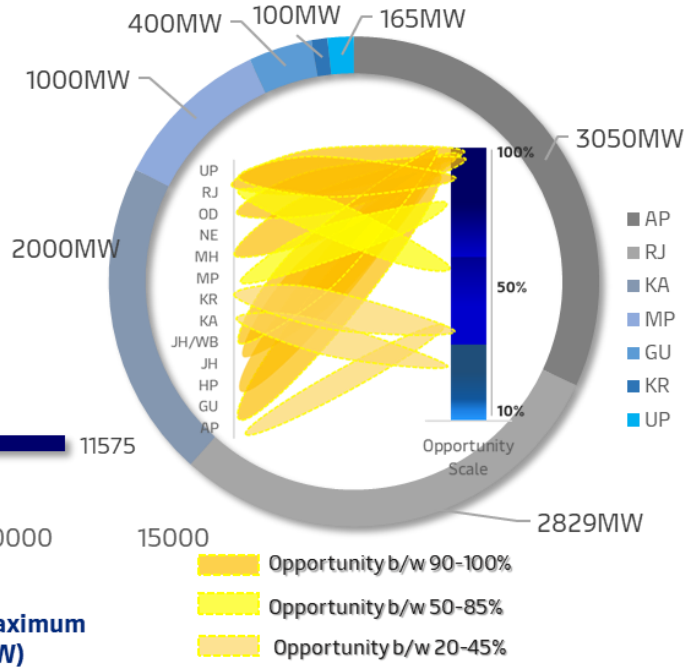
State wise allocation of solar power parks in India



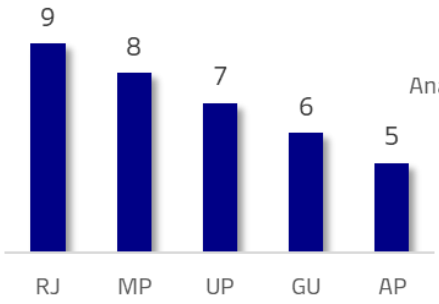
State wise approved capacity (MW) of solar parks



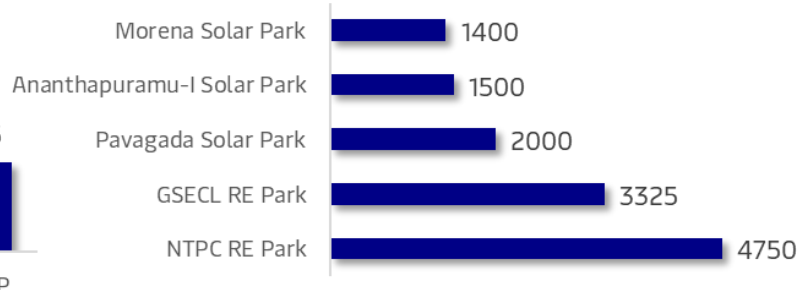
State wise installed capacity (MW) of solar parks & remaining opportunity (Percentage)



Top five states with maximum number of announced solar parks



Top five solar parks with maximum approved capacity (MW)

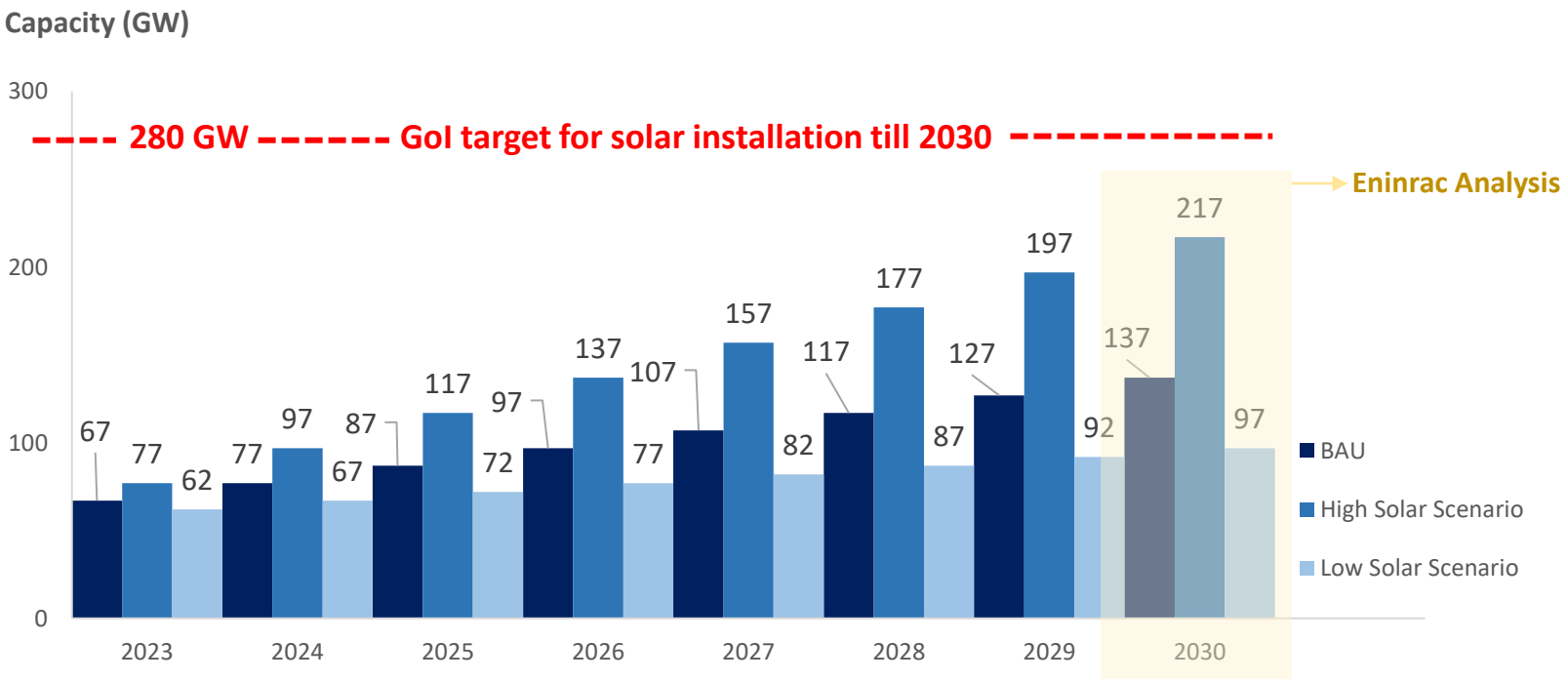


Source: eninrac research & analysis, MNRE, channel checks

Anticipated solar installed capacity outlook in India by 2030

GOI has set an ambitious target of 280 GW by 2030 which means the solar energy capacity has to grow at a CAGR of 22% from now till 2030. Further it also indicates that solar installed capacity in India must see a capacity addition of approx. 28 GW each year from now till 2030. Given the capacity additions witnessed in the solar installation over past 3 years (2019-22) i.e. 29 GW (approx. 9.6 GW per annum), it seems the road would be still tough for India. Looking into the trend of capacity addition over past 3 years, solar installation in India by 2030 would hover around 137 GW under the BAU Scenario Eninrac as per analysis.

Exhibit 4: Anticipated Solar Installed Capacity in India by 2030



Source: Eninrac Analysis

Key Signpost- How India's solar segment is witnessing a turnaround ?

What's our difference margin for market research?

The Indian solar market prospect looks promising with an annual CAGR of 14.6 % between 2019 and 2022. India's focus is on green energy transition for which the production cost of solar power is also reducing with supportive policy framework , which is, in turn, increasing the scope for solar power. Government of India is actively promoting development of domestic solar cell and module manufacturing capacity through various schemes under the Make in India initiative. Reduction in solar tariff was also one of the main reason for the growth in Indian solar sector which is reduced by approx. 72% in last decade to 2 INR/kWh till FY 2022. Also, the Solar Industry keens interest of players involved in this sector from 2-3 years. Other Industry players are also showing the interest by Joint venture, acquisition of small industry. For e.g. JSW which is steel industry mammoth has installed 10 GW of solar so far and their 225 MW of solar projects are under construction. As per our analysis in BAU scenario the 137 GW of solar is likely to be installed by 2030, while in the high solar scenario , India there is a possibility to achieve 217 GW by 2030 . Hence there lies a serious potential business case across the Indian solar segment that needs to be presented but lack of credible market information is a challenge that needs to be addressed. At eninrac our focus is to study the markets at multi-layer and unearth the opportunities & challenges for each core segment of industry be it input, process or output with credible data feeds. Therefore, we are channelizing our resources to deliver a dossier of its kind for assessment of solar industry outlook in India till 2030 for a wide spectrum of value chain with factored market accelerators required in the country.

1 Our Market Research Coverage Range

- Capability examination, Competition landscaping & benchmarking of solar power OEMs in India
- Capability examination, Competition landscaping & benchmarking of solar power developers - utility scale, rooftop, new solar energy transition (such as – energy storage)
- State wise indexation of existing solar power capacity, policies & regulatory landscape
- State wise track of upcoming solar power capacities – zoning the potential opportunity regions
- Development status track of announced/planned/shovel ready solar power projects
- Track of solar assets that hold M&A potential
- Examining business potential of solar industry vis-à-vis : solar utility scale, solar rooftop, off grid installation, solar-wind hybrid, BESS, hydrogen segment
- Identifying opportunities for international investment banking/portfolio management/financial institutions
- Solar industry outlook of India till 2030

2 Our Market Research DNA & Team of Domain Specialists

We boast a highly qualified and experienced team of market research professionals having experience of working in top companies across different domains
Our focus on nurturing industry connect is paramount which helps us generate high quality robust market feed which is filtered and sourced through from different levels

Any market research report follows strict turn-around-time procedures with cross-vetting from our Knowledge Grid Experts which adds immense value to our research credentials for the deemed subject

3 Our Satisfied Patrons and Retention rate of over 97.6% on yoy basis

We have been bestowed with a phenomenal client retention rate and many satisfied clientele. Our client's have been from wide variety of industry domains and from different geographic locations across the globe. Eninrac consulting is a trusted market research partner and an objective resource augmenting value for more than 327+ group companies & 852+ market research delivered

Must Buy for

- Solar Project Developers
- Solar Rooftop Developers
- Other RE Developers & OEMs
- Independent Power Producers
- EPC companies
- Distribution Companies
- Open Access consumers
- Logistics Companies
- Large Industrial Consumers
- Consulting Agencies
- Government Agencies
- Regulatory Authorities
- Investment Banks
- Funding Bodies

Companies Mentioned

- Waaree Energies Limited
- Mundra Solar PV Ltd.
- Vikram Solar Ltd.
- RenewSys India Pvt. Ltd.
- Premier Energies Photovoltaic Pvt. Ltd
- Tata Power Solar Systems Ltd.
- Mundra Solar Energy Ltd
- Emmvee Photovoltaic Power Pvt. Ltd.
- Goldi Solar Pvt. Ltd.
- Waaree Renewables Pvt. Ltd.
- Reliance New Energy
- Adani Power
- REC Solar
- Faradion Limited
- JSW Energy

For Queries

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> There is no energy in matter
> The beauty and the scent of roses
> can be used as a medicine and the
> sun rays as a food
>
> **- Nikola Tesla**

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