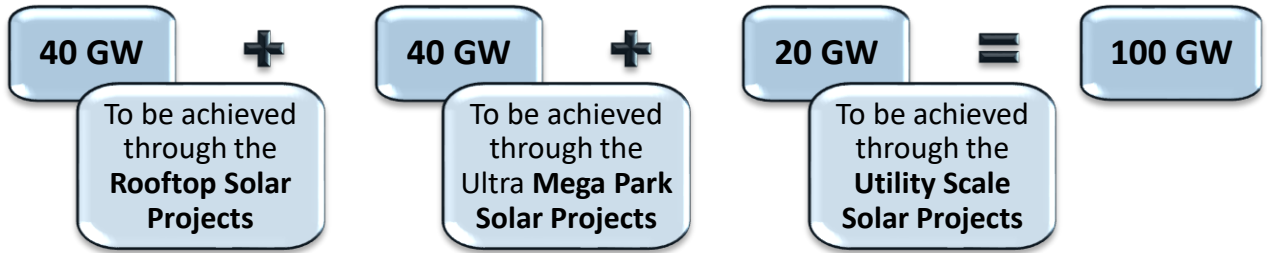


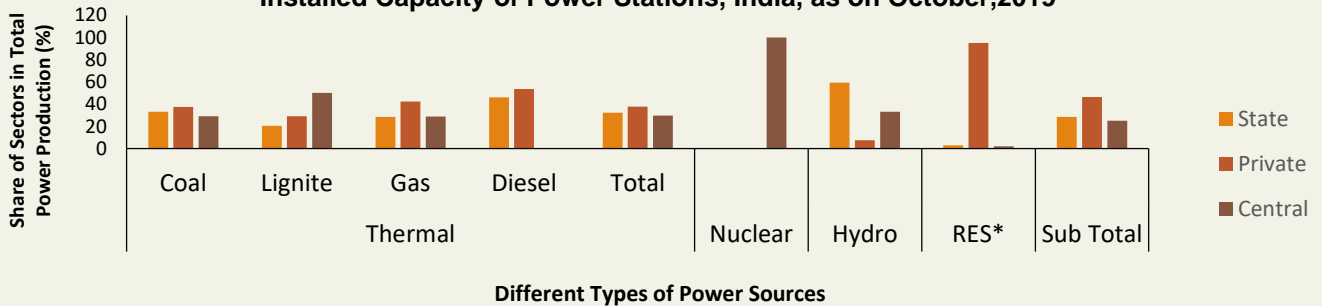
Industry Review: Indian Solar Energy, 2019

- The Indian Solar Energy Industry is one of the most promising and faster growing industry in the world.
- Government of India fixed an ambitious target of achieving 175 GW of Renewable Energy Capacity in the country by 2022 to satisfy the commitments of the Paris Climate Change Conference held in 2015. The plan of reaching 175 GW of establishing the capacity of Renewable Energy sources also includes 100 GW of solar capacity addition.
- As on June'19, India's solar industry has crossed 29.55 GW of capacity.

Breakdown of 100 GW of Solar Energy, India



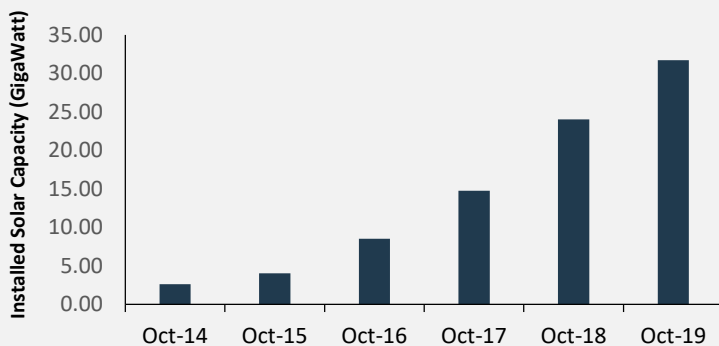
Installed Capacity of Power Stations, India, as on October, 2019



RES*: Renewable Energy Sources

- Between Oct'14 to Oct'19, the overall power installation process in India has increased at a CAGR of **7.46%**.
- Coal has been the major source for power production in India so far. However, with the emerging need of renewable energy, the share of coal in the overall power production has decreased from **60.31%** to **54.17%** between Oct'14 to Oct'19, whereas, the share of renewable energy has increased from **12.45%** to **22.85%** between that same time period.
- The installation of all types of renewable energy sources has also grown at a CAGR of **21.34%** between that same time period.

Installed Solar Capacity, India, October'14 to October'19



- The installed solar capacity has increased at a CAGR of **64.49%** in India between Oct'14 to Oct'19.
- The solar capacity addition has been maximum with an installation of **9.25 GW** between Oct'17 to Oct'18 across the country.
- The Year on Year growth rate has been maximum in Oct'16, with **109.65%** greater range of installation than the previous year.

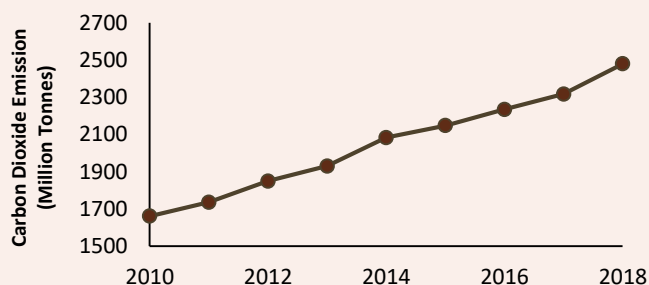
Reasons behind the Rising Need of Solar Energy

- India is regarded as one of the leading carbon emitters in the world. In 2018, India was among the top 5 countries at the global level for its huge range of carbon emission.
- A crucial reason behind such level of emission is greater use of coal during the power production process.
- The produced coal in India is not of best quality to generate power efficiently. It makes the country to depend more on the imported coals which ultimately raises its import bills.
- Besides, increasing population, urbanization and overall infrastructural development of the country cause huge demand of power which many a times not get satisfied due to the shortage of coal and other sources of power production.
- Hence, dependence of renewable energy sources like solar power will not only meet the overall power demand of the country but also in eco-friendly manner.

Top 5 Carbon dioxide Emitting Countries, Global, 2018



Carbon Dioxide Emission, India, 2010 to 2018



- Between 2010 to 2018, the carbon emission has increased at a CAGR of **5.13%** in India, which is the highest rate of growth among the other countries in the top 5 positions between that same time period.
- The share of India's carbon emission among the Asian countries and at the global level both have increased over the years.
- Between 2010 to 2018, the carbon emission of all the Asian and the global countries have grown at a CAGR of **2.27%** and **1.1%** respectively.
- The share of India's carbon emission among the Asian countries, which was **11.87%** in 2010 had risen to **14.81%** in 2018; whereas at the global level, the share of India which was **5.35%** in 2010 had also increased to **7.31%** in 2018.

Power Supply condition, India, FY10 to FY19



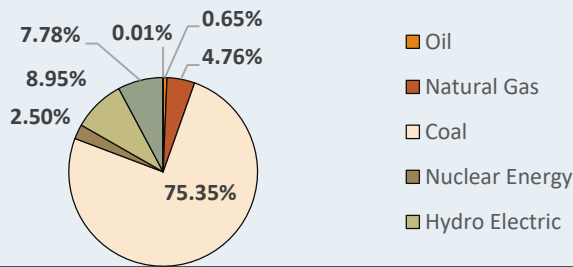
Import Value, India, 2010 to 2018



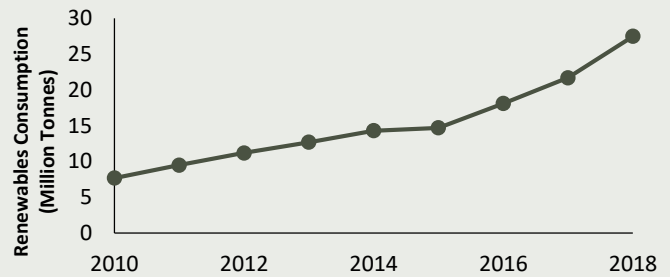
- The power deficit condition which used to be **83,950 Megawatt** in FY10 has reduced to **7070 Megawatt** in FY19, still the deficit sustains.
- To manage the rising demand of power, the import value of coal and related products have also increased at a CAGR of **11.75%** between 2010 to 2018 in India.

Status of Solar Industry in India

Share of Different Types of Fuels in Energy Generation, India, 2018

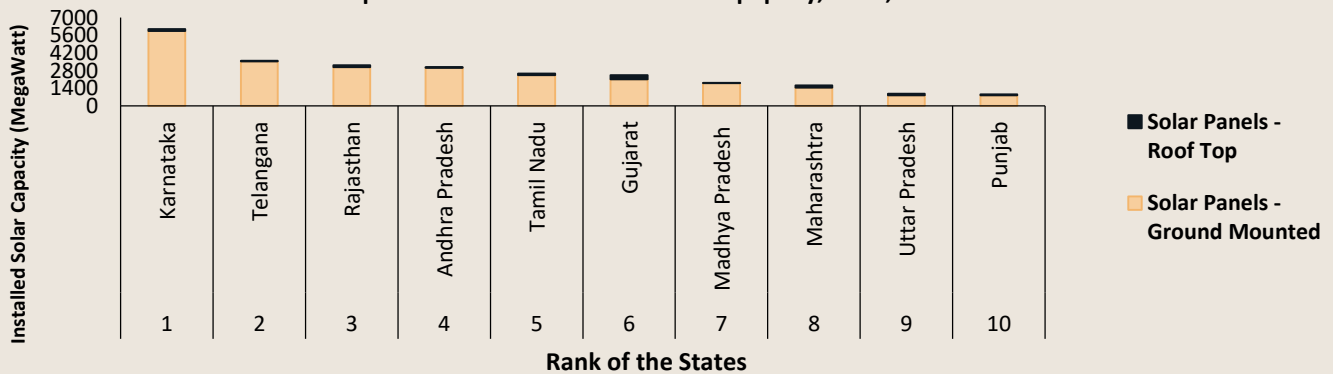


Renewables Consumption, India, 2010 to 2018

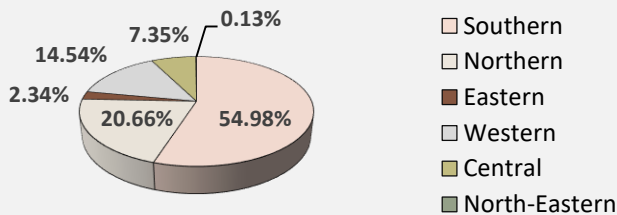


- Globally India was in the 3rd position in 2018 as a major user of coal in the power generation process. The share of coal in the overall power generation was **75.35%** in 2018. South Africa and Poland were in 1st and 2nd position with the shares of **87.86%** and **79.14%** respectively.
- The share of renewable energy in the overall power generation in India was **7.78%** in 2018. Countries like Germany, United Kingdom, Spain, Italy had the shares of **32.25%**, **31.62%**, **25.71%** and **22.7%** respectively which is quite encouraging.
- The renewable energy consumption has increased at a CAGR of **17.25%** between 2010 to 2018 in India.
- Just like India, the performances of Romania, South Korea, China have been significant as their renewables consumption level had grown at a CAGR of **45.42%**, **33.35%** and **31.65%** respectively.

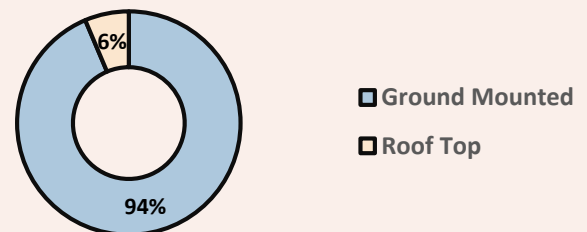
Top 10 States with Installed Solar Capacity, India, as on FY19



Share of Different Regions in the Solar Power Installation, India, as on FY19



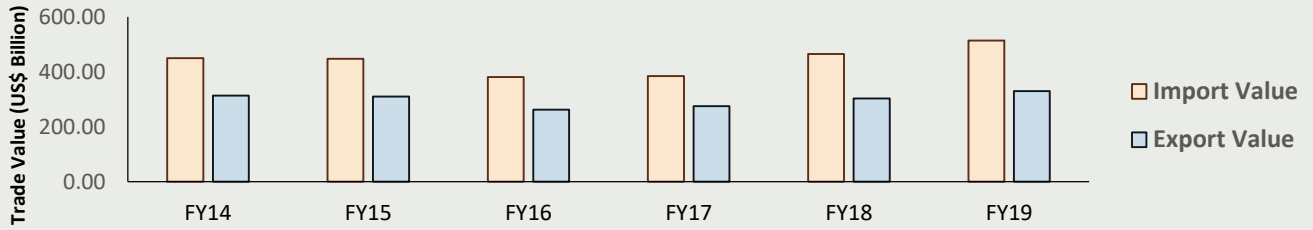
Share of Sources in Solar Power Generation, India, as on FY19



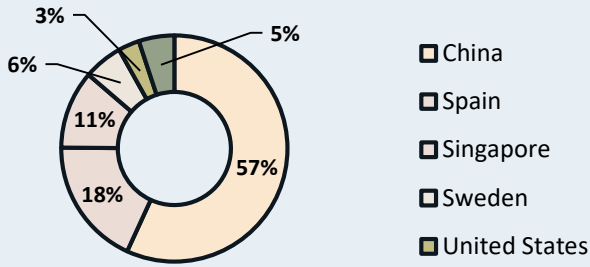
- As on FY2019, the cumulative installed solar capacity has become **28.2 Gigawatt** in India in which the ground mounted solar panels are capable to create **26.4 Gigawatt** of solar power.
- The share of southern region in the overall solar power installation in India has been maximum with the outstanding performances by the states like Karnataka, Telangana, Tamilnadu and Andhra Pradesh.
- The installation of ground mounted and rooftop solar panels have been maximum in Karnataka and Gujarat with the capacity of **5936.06 Megawatt** and **326.67 Megawatt** respectively.

Trade Activities

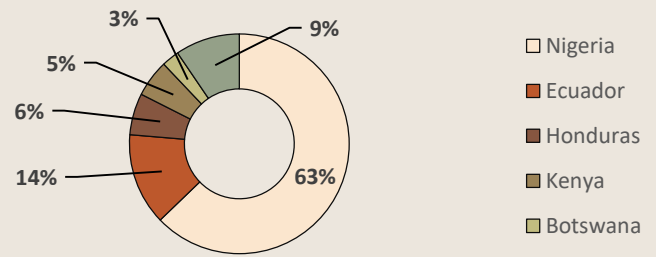
Trade Value of Equipment or Gadgets based on Solar Energy, India, FY14 to FY19



Top 5 Exporters of Equipments or Gadgets based on Solar Energy to India, FY19

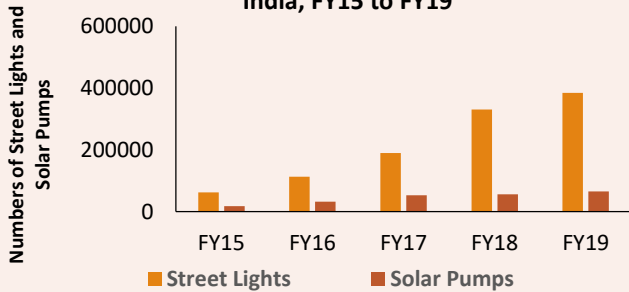


Top 5 Importers of Equipments or Gadgets based on Solar Energy of India, FY19

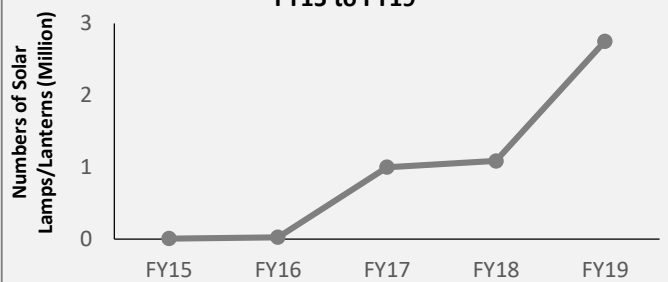


- In stead of being a leading country for solar power generation, India depends on other countries for importing solar products or raw materials for developing any large or small scale projects.
- The domestic Indian market for solar products and intermediary goods are also there but the cheap and subsidised solar products of China have influenced the solar project developers over the years to import more from them.
- Between FY14 to FY19, the import and export value of solar equipments and gadgets have increased at a CAGR of **2.69%** and **0.98%** respectively in India. The share of China as an solar products importer to India has been maximum in FY19.
- Products like Solar cells, lamps, lanterns are imported primarily from China, Malaysia, Singapore and Taiwan. Between FY15 to FY19, the installation of Street lights and pumps have increased at a CAGR of **57.2%** and **38.24%** respectively in India. Besides, the distribution of Solar lamps or lanterns have grown at a CAGR of 307.22% during that same time period.

Installation of Street Lights and Solar Pumps, India, FY15 to FY19



Distribution of Solar Lamps or Lanterns, India, FY15 to FY19



- The greater import of Chinese solar products not only increases the overall import value of India but also discourages the growth of domestic solar goods manufacturers.
- For protecting the domestic solar industry, India had imposed 25% safeguard duty on solar cells for July 30, 2018 to July 29, 2019 period. Now it has come down to 20 % for July 30, 2019 to January 29, 2020. It will further come down to 15 % during January 30, 2020 to July 29, 2020.
- Though, between FY14 to FY19, the Chinese import value has declined at a CAGR of 7.6% in India, still the Indian solar manufacturers needs to get proper facilities to expand their businesses.

Tariff

The tariff rate of solar energy has been roaming between **INR 2.50/Kilowatt - Hour** to **INR 3.02/Kilowatt - Hour** as on September,2019.

Recently, National Solar Energy Federation has urged for 'One Nation, One Grid, One Renewable, One Price' concept by fixing a solar tariff of **INR 3/Kilowatt – Hour**.

Foreign Direct Investment (FDI)

Non conventional energy sector in India has received the FDI worth of **US\$ 7.83 billion** between April 2000 and March 2019.

100 per cent FDI is allowed under automatic route for projects of renewable power generation and distribution subject to provisions of The Electricity Act, 2003 in India.

Government Initiatives

In the Union **Budget 2019-20**, a declaration called “New Ujala-type scheme” was made to promote solar stoves and battery chargers for focussing on rural energy access and farmers.

A plan of launching a scheme has also been announced to invite global companies through competitive bidding to set up mega-manufacturing plants in advanced technology areas, including solar PV cells, lithium storage batteries, solar electric charging infrastructure etc.

Besides, extension have recently been approved for some projects of solar parks and ultra mega solar parks which were about to be completed by 2019.

Based on the current performance of the whole renewable energy sector in India including the solar industry, it can be expected that by the year 2040, around 49% of the total electricity will be generated by the renewable energy. It will lead to the cost cutting of around 66% of the solar energy compared to the current ones. Moreover, use of renewables in place of coal is expected to save around US\$ 8.43 billion/year for the Indian economy.



Source: Central Electricity Authority of India, Ministry of Power, BP Statistical Review of World Energy 2019, Intracen, Ministry of New and Renewable Energy, Ministry of Commerce and Industry, LSI Research