

Trends in Renewable Energy: An Overview 2020

Monali Patil¹, Anushka Patil², Nikhita Chougale³, Ashlesha Patil⁴

^{1,2,3,4}Student, Department of Electrical Engineering,
KIT's college of engineering Kolhapur

Abstract: - India is now one of the countries with large production of energy from renewable sources. The renewable energy system represents a unique opportunity for creating new employment with climate goals and increasing economic growth, and enhancing human welfare. Hence the role of renewable energy is very important and has been assuming increasing significance in recent times with the growing concern for energy security. This paper represents the current trends of renewable energy particularly in India as well as their growth and issues.

Keywords— Renewable energy, economic growth, India

I. INTRODUCTION

India was the first country in the world to set up a ministry of renewable energy (Ministry of New and Renewable Energy (MNRE)), in the early 1980s, due to public sector undertakings the Solar Energy Corporation of India development of solar energy industry in India, is possible. Hydroelectricity is administered separately by the Ministry of Power and it is not included in MNRE targets.

India ranks second position in terms of population which is 18% of world's overall population. As the population increases in India, it makes India to rank fourth place in consumption of energy in the globe. As fossil fuels are decreasing and creating more pollution due to which global warming causes and also energy demand is increasing day by day, energy production from renewable energy resources becomes the best solution in the present condition as renewable energy resources are clean, green and not exhaustible energy.

India has a strong manufacturing base in wind power with 20 manufactures of 53 different wind turbine models of international quality which are up to 3 MW in size with exports to Europe, the United States and other countries. Wind or Solar PV paired with four-hour battery storage systems is already cheap in cost as compared to other. And most importantly it is without subsidy and as a source of dispatchable generation as compared to new coal and new gas plants in India.

II. SCENARIO:

- In 2019 India was on rank fourth for most attractive renewable energy market in the world. The India has set an ambitious target of 450 GW of renewable energy by 2030. This is the world's largest expansion plan in renewable energy.

Up to 30 April 2020, the total installed capacity for Renewable energy is 87+ GW with the following details:

- Wind power: 38 GW
- Solar Power: 35 GW
- Biopower: 10 GW

- Small Hydro Power: 5 GW

In the last 4 years wind energy capacity in India has increased by 1.7 times. Then further it is increased continuously with the record 100 bn+ units of renewable electricity generating last year.

- In March 2019 Solar power capacity has increased by more than 11 times in the last five years from 2.6 GW to 28.18 GW. In 17 states up to March 2019 42 solar parks of aggregate capacity 23,499 MW have been approved.
- fully operational Solar Parks are Kurnool (1,000 MW) and Bhadla-II (648 MW) in Pavgada. Largest Solar Park of 2,000 MW is under installation.
- According to survey till 31 March 2020, 35.86% of India's installed electricity generation capacity is from renewable sources. It is generating 21.22% of total utility electricity in the country, from renewable energy sources.
- According to October 2019 survey, 175 GW is the target, 83 GW is already operational, 29 GW is under installation, 30 GW is under bidding, and remaining 43 GW is under planning. 175 GW interim target is 100 GW of solar, 60 GW of wind, 10 GW of bio mass and 5 GW of small hydro.
- According to 2019, 35% total power production get from renewable energy, 13% or 45.399 GW of the total from all sources comes from large hydro projects, 10% or 36,686.82 GW of the total from all sources from wind power which is fourth-largest in the world, 8% or 9.1 GW of total power from all sources from Biomass power from biomass combustion, biomass_gasification and bagasse cogeneration.

The government set the target of installing 20 GW of solar power by 2022. But it was achieved four years ahead of schedule in January 2018, which are through both solar parks as well as roof-top solar panels. After that India set a new target of achieving 100 GW of solar power, 60GW of wind power, 10GW of bio mass and 5GW of small hydro power by 2022. India has three of the top Five largest solar parks in the world. It also includes the second-largest solar park in the world at Kurnool, Andhra Pradesh, with a capacity of 1000 MW. In Rajasthan the world's largest solar power plant, Bhadla Solar Park exist with a capacity of 2255 MW.

The government has announced that no any new coal-based capacity addition is required beyond the 50 GW under different stages of construction which are to come online between 2017 and 2022. With the expansion of renewable power generation capacity, due to the weak purchasing capacity.

the outstanding payment dues from the power purchasers are also increasing rapidly.

Source	Total Installed Capacity (MW)	2022 target (MW)
Wind power	37,693.75	60,000
Solar power	34,627.82	100,000
Biomass power (Biomass & Gasification and Bagasse Cogeneration)	9,875.31	*10,000
Waste-to-Power	147.64	
Small hydropower	4,683.16	5,000
TOTAL	87,027.68	175,000

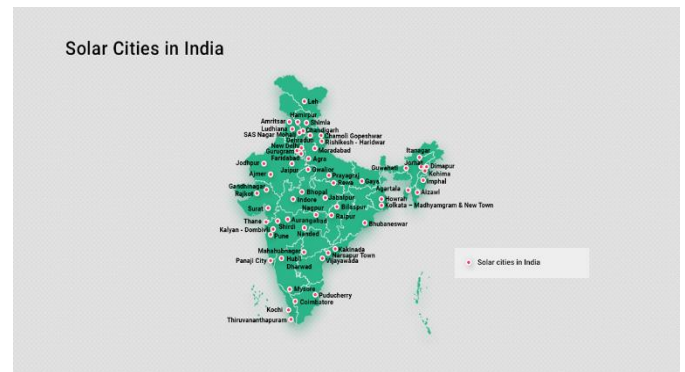
Grid connected installed capacity from all sources according to 31 March 2020

Source	Installed Capacity (MW)	Share
Coal	205,134.50	55.43%
Large hydro	45,699.22	12.35%
Other renewables	87,027.68	23.51%
Gas	24,955.36	6.74%
Diesel	509.71	0.14%
Nuclear	6,780.00	1.83%
Total	370,106.46	100.00%

In India during the year 2017–18 total renewable energy which includes large hydro with pumped storage generation, is nearly 17.5% of total utility electricity generation. Solar, wind and hydro are the important and trending power generation and it is environment friendly. Base load coal fired power is transforming into following sources of power generation. In addition, renewable energy sources peaking hydro power capacity and also caters peak load demand on daily basis.

Source	2014-15	2015-16	2016-17	2017-18	2018-19	2019-2020
Large Hydro	129,244	121,377	122,313	126,134	135,040	155,970
Small Hydro	8,060	8,355	7,673	5,056	8,703	9,366
Solar	4,600	7,450	12,086	25,871	39,268	50,103
Wind	28,214	28,604	46,011	52,666	62,036	64,639
Bio mass	14,944	16,681	14,159	15,252	16,325	13,843
Other	414	269	213	358	425	366
Total	191,025	187,158	204,182	227,973	261,797	294,288
Total utilization power	1,105,446	1,168,359	1,236,392	1,302,904	1,371,517	1,385,114
% Renewable power	17.28%	16.02%	16.52%	17.50%	19.1%	21.25%

III. SOLAR CITIES IN INDIA:



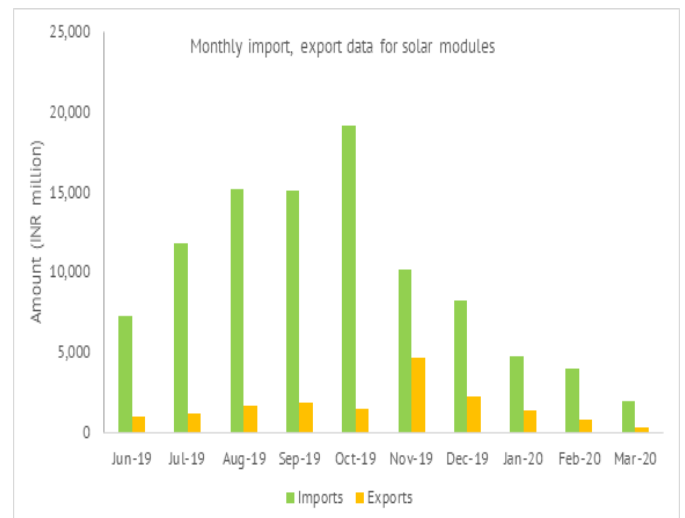
IV. TENDERS OF SOLAR PANELS:

- In May 2020, about 649 MW of renewable tenders are issued out of which 623 MW of utility scale solar tenders, 23.5 MW of floating solar tenders and 1.57 MW of rooftop solar tenders.
- Supply tender of 400 MW capacity auction is completed for SECI's RTC.
- Due to Covid Lockdown, deadline of bid submission about 22 GW tenders is extended to June and July.

V. MONTHLY IMPORT- EXPORT STATISTICS

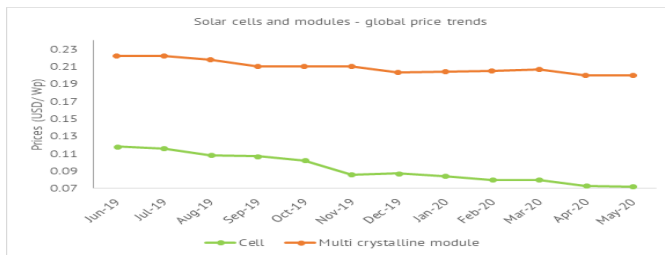
Monthly imports and exports for solar modules in Q1 2020 (Jan-Mar) have fallen substantially by about 70% compared to previous quarter.

Monthly import and export data of solar modules are as follows:



Source: Ministry of Commerce, JMK Research

VI. GLOBAL PRICE TRENDS:



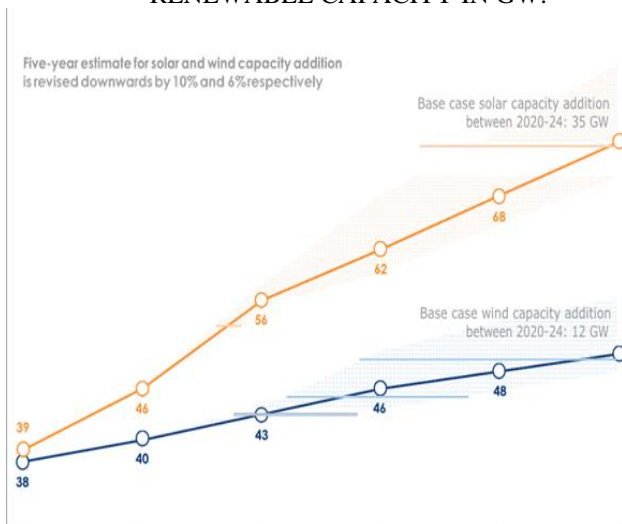
Source: Energy Trend, JMK Research

As we see in the graph prices of cell gradually decreases up to May 2020 and of multicrystalline module approximately remains same. (This price rate is globally.)

VI. INDIA'S LARGEST RENEWABLE ENERGY COMPANIES:



VII. REVISED FIVE-YEAR OUTLOOK FOR RENEWABLE CAPACITY IN GW:



As we are seeing in the graph orange line shows the capacity of solar which is 35 GW in between 2020-2024 while blue line shows the wind capacity which is 12 GW in between 2020-2024.

VIII. OVERALL IMPACT OF COVID 19 ON RENEWABLE SECTOR:

Short term	Medium term	Long term
<ul style="list-style-type: none"> Loss of 2-3 GW capacity addition in 2020 Higher working capital and operational costs for developers and contractors 	<ul style="list-style-type: none"> Lower capacity addition due to sustained weakness in power demand Higher DISCOM offtake risk Reduced appetite of lenders Greater policy uncertainty risks for rooftop solar Push for local manufacturing 	<ul style="list-style-type: none"> Accelerated transition to clean energy Easier availability of equity capital

Negative impact on renewable energy sector:

With number of infections in India still rising rapidly, so there is considerable uncertainty over economic outlook. The energy sector has been hit by multiple increasing demand and supply shocks. Short-term impact on the renewable power sector has been relatively harmful following a series of necessary relief measures announced by the government. But outlook over the next few years appears gloomier due to weakening power demand growth, deteriorating financial condition of DISCOMs and further constraints in debt financing. We have accordingly revised our base case solar and wind power capacity addition estimate over 2020-2024 to 35 and 12 GW, down from our previous estimate of 43 GW and 15 GW respectively.

Positive impact of renewable energy sector:

On a positive note, there is huge optimism about future prospects of renewable energy. The crisis has refocused attention of governments and policy makers worldwide to fight climate change and localise energy supply. So these are the advantages which gives the priority to the renewable energy sources.

IX. CONCLUSION

As we are facing the concerns about climate change have made renewable energy sources an important component of the world energy consumption. Renewable energy technologies could reduce CO₂ emissions by replacing fossil fuels which are now limited in nature in the power generation industry and the transportation sector. Because of some negative externalities in conventional energy production, i.e. cost and pollution, it is necessary to develop and promote renewable energy sources, technologies and demand for renewable energy. Power generation using renewable energy sources must be increased in order to decrease the unit cost of generation. Energy consumption depends on some important factors including economic progress, population, energy prices, weather, and technology.

X. FUTURE SCOPE:

The immense opportunities in power generation, transmission, distribution and equipment will be available over the next four to five years, by the Indian power sector which has an investment of Rs. 15 trillion. While on the other hand plenty of capital chasing the opportunities in the renewable sector, there are several risks that need to be kept in view, including counterparty risks both in terms of developers and producers. India is among the top-five clean-energy producers globally and is well on course to achieve its original target. In fact, it is now set the target of 225 GW from renewables by 2022 and a target of 40% clean energy by 2030. India looks set to remain an attractive destination for investors with clean energy, with the government setting ambitious targets and pursuing several reforms to boost investor confidence.

According to study, India's share of total global primary energy demand is set to approximately double to around 11% by 2040. India will need to double its electricity output by 2030 to meet this large increase in demand, while also honouring its commitment to reduce its carbon footprint by 35% from 2005 levels. This would require roughly half of the additional output to come from renewables, which translates to adding 25 GW of renewable capacity annually until 2030. An expansion of this magnitude will require funding of around \$76 billion upto 2022, growing to \$250 billion which will during 2023-30, as per India's Economic Survey 2018-19. Therefore, on per year basis, investment opportunities of over \$30 billion are expected to emerge in the next decade and beyond, around three times current levels - clearly indicating a huge investment potential.

XI. REFERENCES

- [1] https://en.m.wikipedia.org/wiki/Renewable_energy_in_India
- [2] <https://www.investindia.gov.in/sector/renewable-energy>
- [3] JMK Research and analysis report
- [4] energyworld.com
- [5] <https://www.cnbc.com>