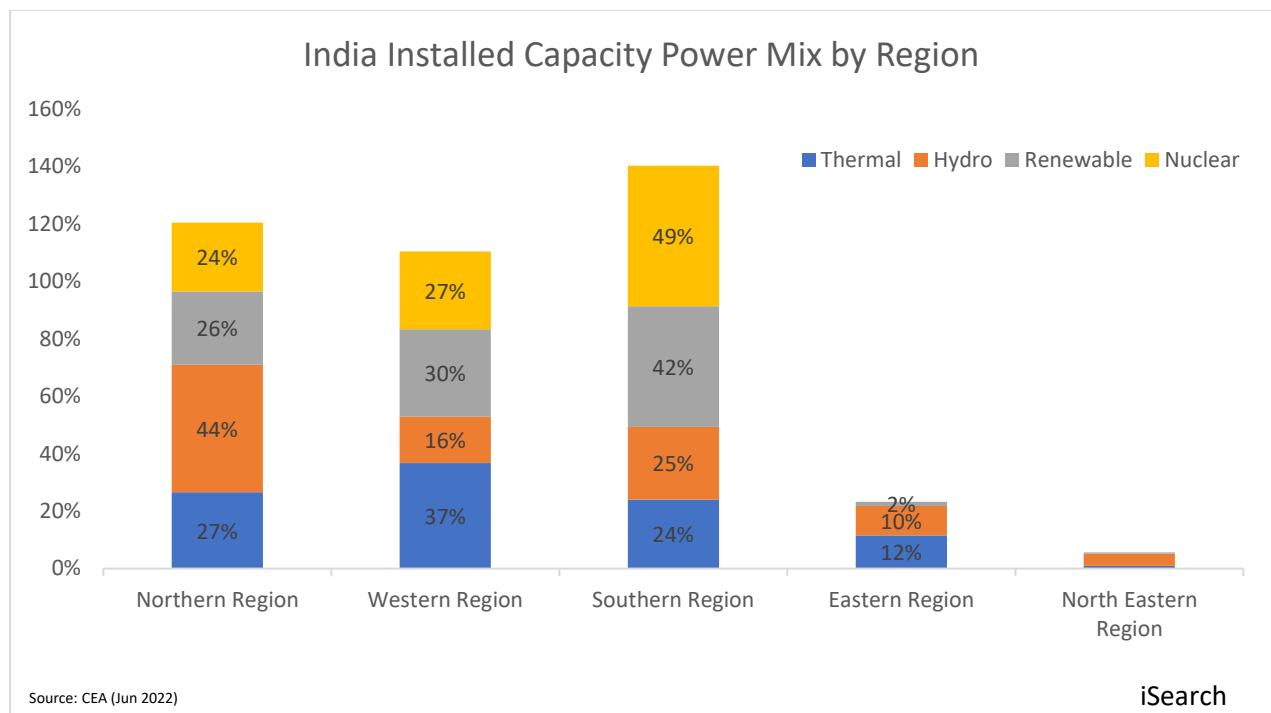


Solar power accounted for approximately 57.7 GW of installations, which is 14.29 percent of the total installed power capacity. The share of Solar power in the installation mix grew by 6.9 percent quarter over quarter, with a 14.3 percent share in June 2022. Among the renewables (excluding Hydro), Solar accounted for approximately 50.6 percent of the installed capacity. Wind accounted for 10.1 percent of the total installed capacity and 35.8 percent of the renewable mix capacity as of June 2022. As the restrictions across the country have been uplifted, the overall installed capacity in the country has been increased by 1.07 percent which is 403.75 GW quarter over quarter from Q2 2022 over Q1 2022.

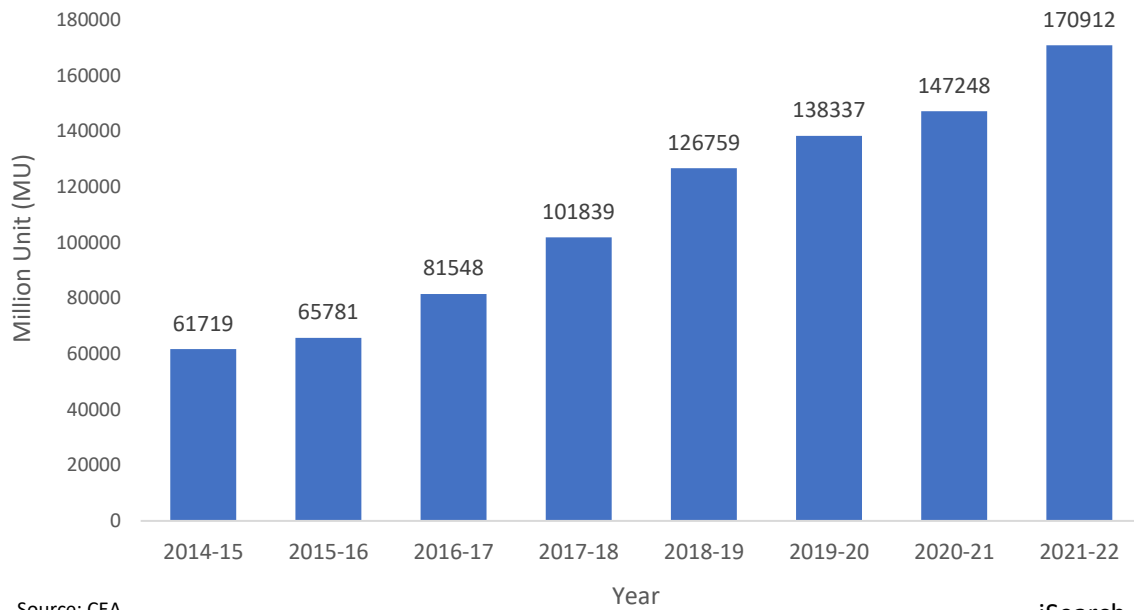
Among the renewable, Solar Power has shown the highest growth quarter-over-quarter at 6.9 percent, while Wind Power has grown by 1.07 percent, Hydro power's cumulative installations stood at 46.85 GW, making up 11.6 percent of India's total installed power capacity.



Small hydro had installed over 4.88 GW and represented 1.2 percent of the overall power mix capacity at the end of June 2022. The share of nuclear remains constant during the second quarter of 2022 which represents 1.7 percent of the total power mix installed capacity by June 2021, with no capacity added since the second quarter of 2021. Nuclear power is not only clean and environmentally friendly, but it is also a source of base load power available 24x7 like thermal power.

Thermal power (which includes coal, lignite, gas, and diesel) is still the significant source of energy in the country - with its cumulative installations reaching 236 GW, representing 58.5 percent of the total installed power capacity. Coal accounted for a dominant share of the mix, with 50.5 percent of the total installed power capacity, followed by natural gas at 6.2 percent, lignite at 1.6 percent, and diesel with a 0.13 percent share. However, thermal power's share in the overall power mix is gradually declining as the government is shutting down old thermal plants, especially coal, and moving toward a non-conventional source of energy. But in the recent past, the country suffers outages across the country due to a shortage of coal in the thermal power coal unit, it's a long way when renewable power generation will be able to dominate the country's electricity demand as mainstream renewable energy is intermittent.

Year Wise generation of RE

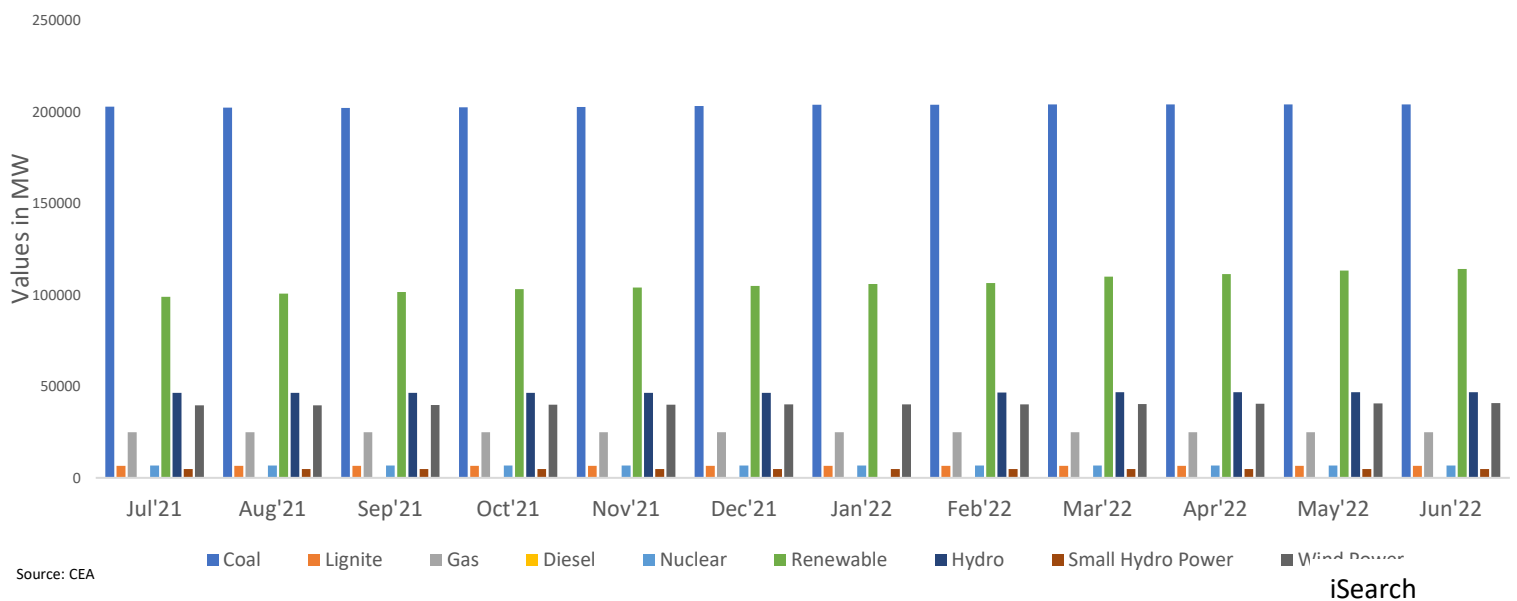


Source: CEA

iSearch

Installed Capacity

Resource-wise Installed Capacity of All India



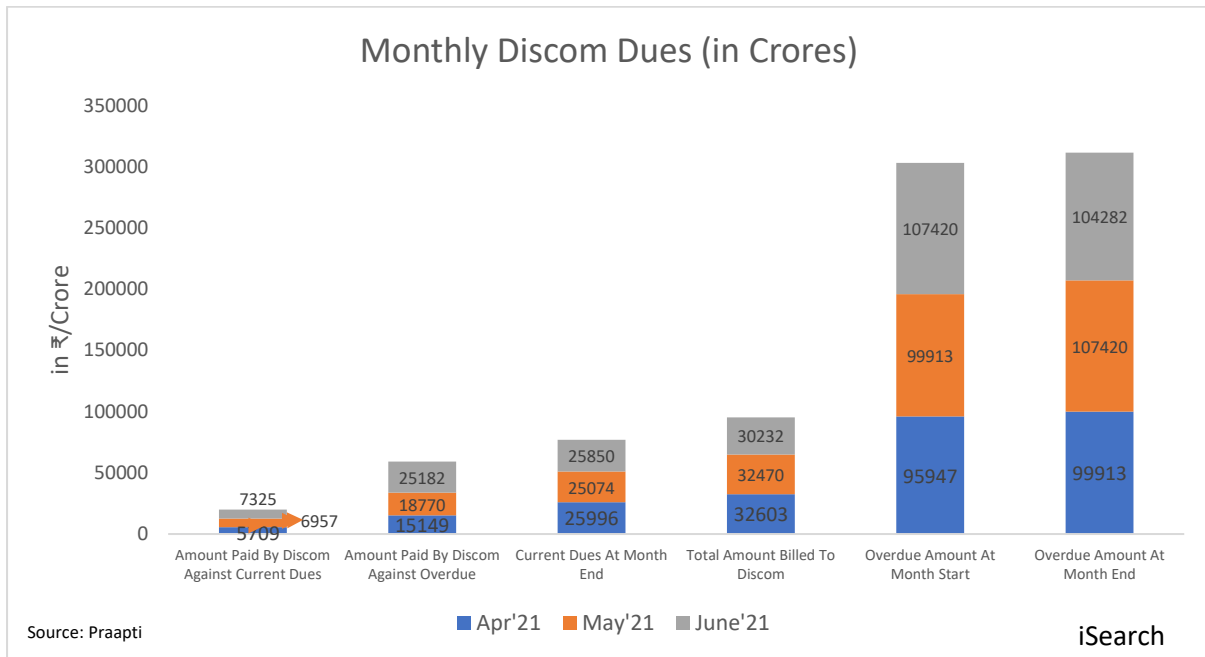
Source: CEA

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Discom Dues to Power Generator

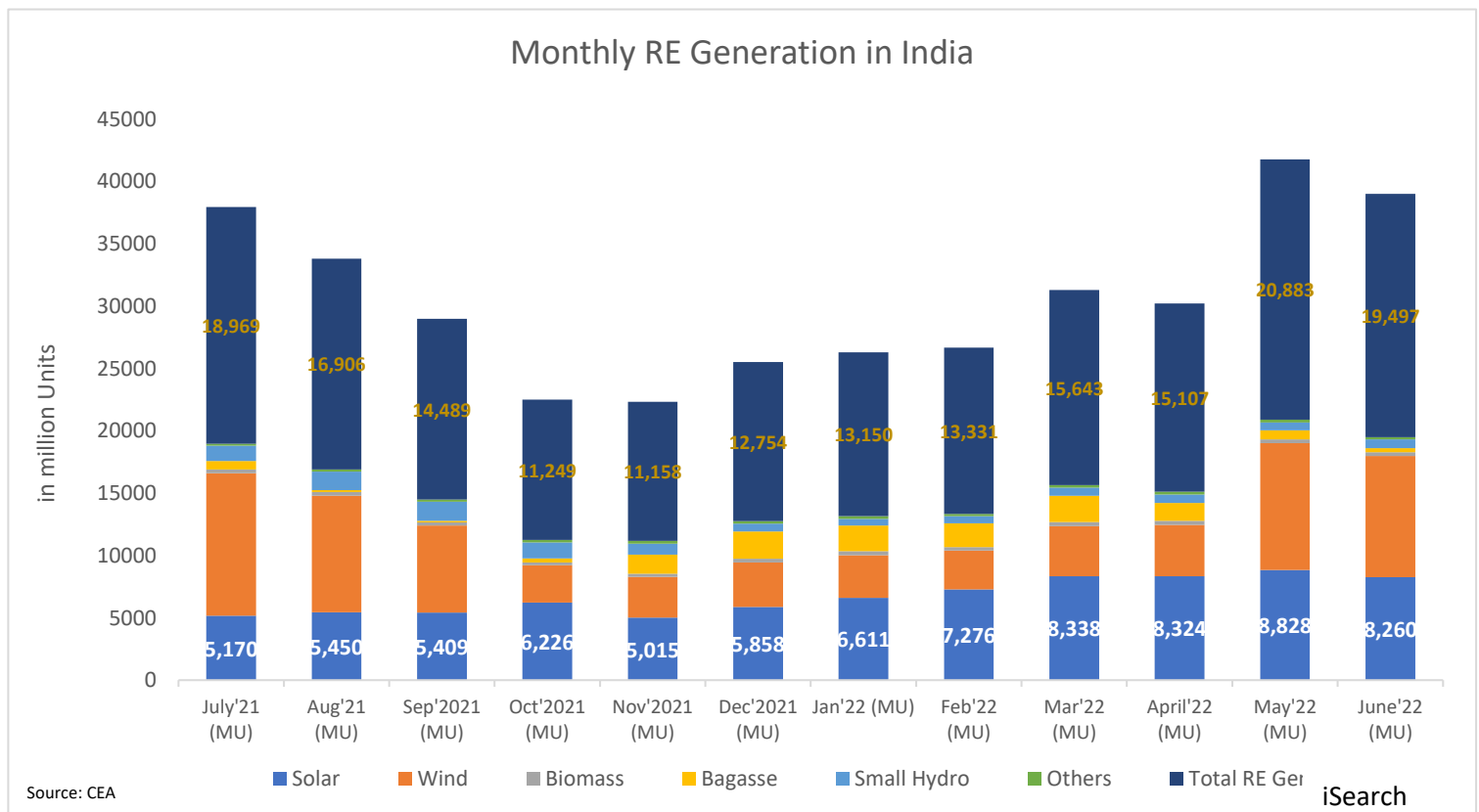
There was an overdue amount that needs to be paid by discoms at the start of June 2022 was ₹ 107,420 crore (\$13.6194 billion), which was ₹4,747 crore (\$601.853 million) higher than March 2022 and ₹22,621 crore (\$2.868 billion) higher by June 2021. In June 2022, the total amount billed to discoms was ₹30,232 crore (\$3.832 billion). Discom paid around ₹79,092 crore (\$10.0278 billion) in Q2 2022 for both current and overdue. The Power System Operation Corporation (Posoco)

instructed the three power exchanges in the country to restrict 27 distribution companies across 13 States from trading on their platforms on account of non-payment of outstanding dues.



RE Generation in India

Total renewable energy generations in June 2022 reach 19,496.96 million units, there is an increase of RE generators by 24.6 percent over March 2022, where the RE generations were 15,643.06 million units, also there is an increase of over 31.7 percent quarter over quarter from Q1 2022 to Q2 2022 where the generation from RE was 42.12 billion units in Q1 2022 to 55.48 billion units in Q2 2022.



Solar Power generation is having the largest percentage in terms of the generation behind Wind Power with 8,259.91 million units and contributes 42.37 percent of the total renewable generation share in June 2022, Wind Power with 49.8 percent market by generating 9,708.52 million units in June 2022. Other sources such as Bagasse, small Hydro, and Biomass contribute 1.7 percent, 3.58 percent, and 1.55 percent respectively. Solar and Wind Power together contributed 92.16 percent of the total renewable energy generation in June 2022.

There is a growth of around 14.1 percent in the total renewable generation from June 2021 to June 2022. While there is an exponential growth of 37.5 percent in Solar power generation from June 2021, Wind Power has declined by 0.17 percent in generation in the same period due to the monsoon season.

Solar Power Generation by State

Rajasthan overtake Gujarat and shows the largest Solar Power installed capacity among the top Solar PV installed states by June 2022, While Rajasthan also overtook Karnataka to become the largest Solar PV generation state and shows a tremendous growth rate of 152 percent year over year comparison for Solar generation as the state has installed a huge amount of Solar power projects since March 2021, also many Solar parks in Rajasthan got commissioned such as Bhadla, Phalodi-Pokaran, Fatehgarh with a total capacity of 2.901 GW as per Lok Sabha update.

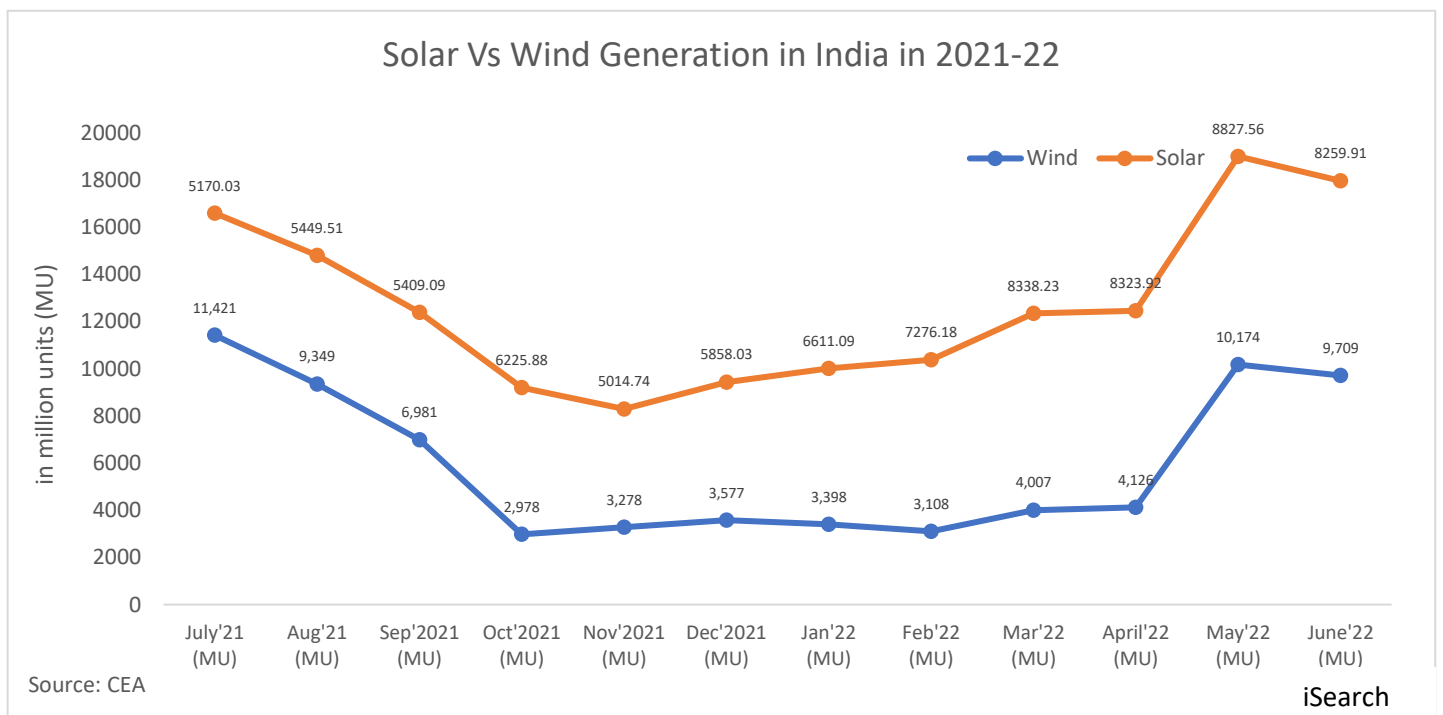
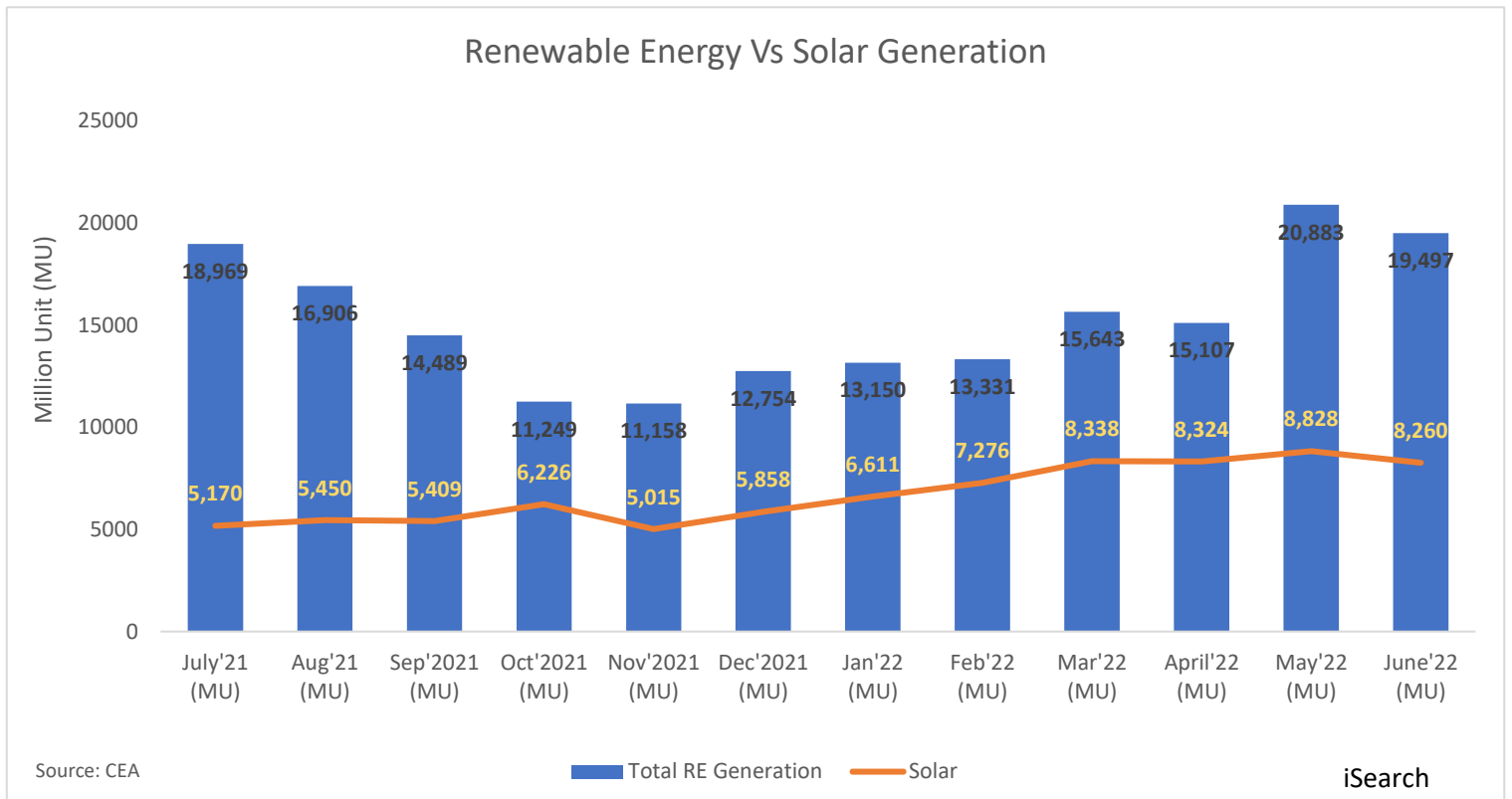
Name of State/UT	Solar Power Generation (MU) June'2022	Solar Power Generation (MU) June'2021	Growth (%)
Rajasthan	2822.97	1119.77	152%
Karnataka	1133.93	1170.75	-3%
Gujarat	838.77	529.38	58%
Tamil Nadu	728.6	609.73	19%
Andhra Pradesh	710.95	731.04	-3%
Telangana	559.28	522.44	7%
Madhya Pradesh	340.79	336.52	1%
Maharashtra	314.57	420.51	-25%
Uttar Pradesh	307.57	195.61	57%
Punjab	198.87	137.92	44%
Haryana	63.04	33.66	87%
Odisha	51.5	41.48	24%
Kerala	43.32	43.02	1%
Chhattisgarh	39.36	29.12	35%
Uttarakhand	27.65	24.63	12%

Source CEA

iSearch

Rajasthan has crossed over 2,800 million units of Solar power generation as the state has installed 14.06 GW followed by Karnataka crossed 1,100 million units with 7.59 GW of Solar PV installation as of June 2022 as per MNRE monthly updates. Even though Gujarat has installed more than Karnataka, but by generation through Solar projects, Karnataka has more generations in terms of million units which shows the quality of generations and the irradiation level in southern states, as per the June

2022 data, Tamil Nadu and Andhra Pradesh were in the fourth and fifth position in terms of Solar power generation as of June 2022.



Annual Growth in Power Generation

The Overall generation (Including generation from grid-connected renewable sources) in the country has increased from 1,110.458 BU during 2014-15 to 1,173.603 BU during the year 2015-16, 1,241.689 BU during 2016-17, 1,308.146 BU during 2017-18, 1,376.095 BU during 2018-19, 1389.121 BU during 2019-20, 1,381.855 BU during 2020-21 and 1,491.859 BU during 2021-22. The performance of Category wise generation during the years 2021-22 was as follows:-

Thermal Increased by 7.96 %

Hydro Increased by 0.88 %

Nuclear Increased by 9.49 %

Bhutan Import Reduced by 14.51 %

Solar, Wind & Other RES Increased by 7.96 %

YEAR	GROWTH (%)			
	Growth in Fossil Fuel Generation	Renewable Generation (Including Hydro)	Non-Fossil Fuel (RE + Nuclear) Generation	Total Generation
2011-12	6.6	17.5	18.3	9.14
2012-13	7.3	-5.9	-4.78	4.46
2013-14	4.2	10	9.05	5.23
2014-15	10.8	1.3	1.91	8.84
2015-16	7.5	-1.8	0.97	5.69
2016-17	5.3	8.9	7.68	5.8
2017-18	4.3	11.1	9.55	5.35
2018-19	3.4	14.3	12.09	5.19
2019-20	-2.7	12.7	13.99	0.95
2020-21	-1	2.1	0.86	-0.52
2021-21	7.96	7.74	7.96	7.96
2021-22*	17.17	16.47	14.04	16.79

Source: Ministry of Power (*Provisional (upto June 2022))

State-Wise Solar Energy Generation

Solar energy production has increased from 39.27 BU (billion units) in 2018-19 to 73.48 BU in 2021-22 registering an increase of 87 percent or 34.21 BU. There is tremendous growth in different regions of the country from 2018-19 to 2021-22, such as the North Eastern Region showed a growth of 479 percent, followed Northern Region by 176 percent, Western by 82 percent, Southern by 56 percent, and Eastern Region by 75 percent in the same period.

North Eastern Region has improved in recent years as the growth of Solar installations is increasing year after year due to the imposition of Solar RPO in those states which was not there earlier, from 2019-20 to 2020-22, this region had shown a growth of 176 percent, which is quite positive for the country as a whole.

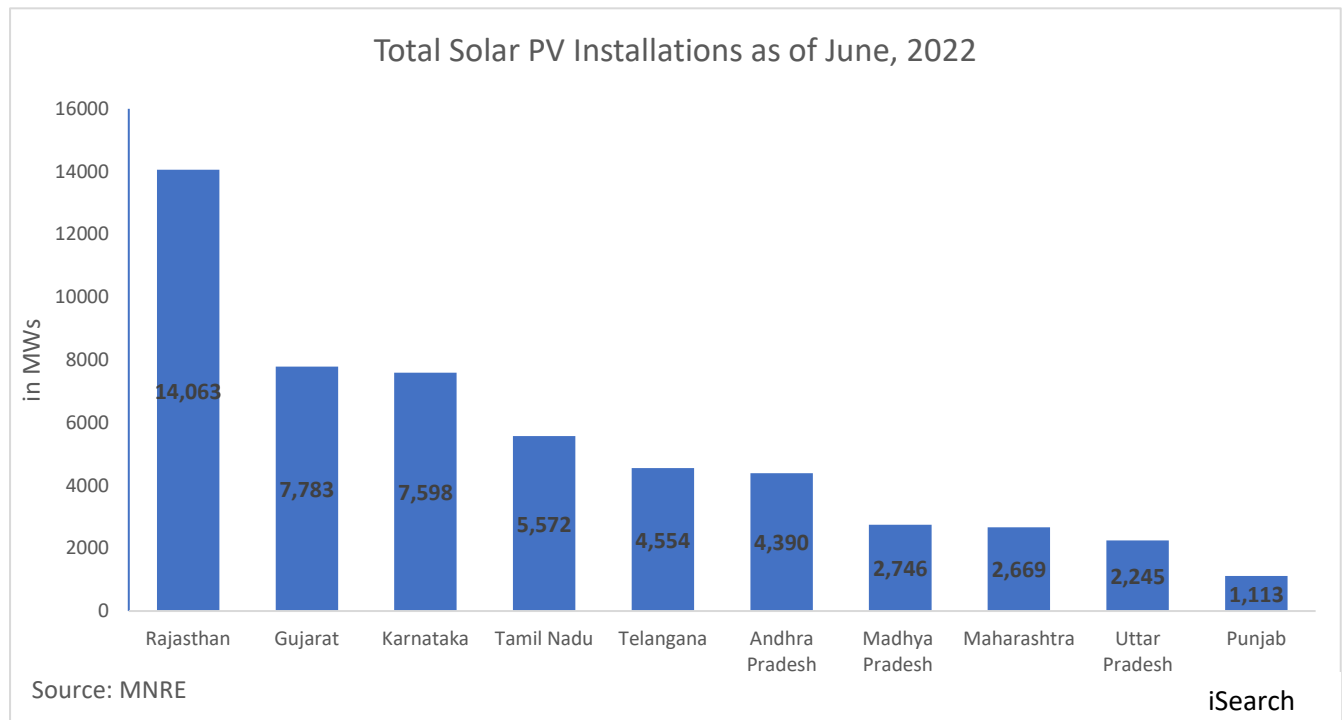
In 2021-22, Northern Region has gained market share in terms of power generation of the country which shows 31 percent, while the Western Region has 20 percent, but the maximum shares still come from the Southern region which has more than 48 percent of the total Solar power generation in the country in 2021-22. Eastern Region is still the neglected region in the country where the share of power generation was just 1 percent followed by the North Eastern Region by 0.13 percent share.

State-Wise and Year-Wise Solar Energy Generation Installed (in MU)					
Name of State/UT	2018-19	2019-20	2020-21	2021-22	2022-23 (upto May-2022)
Chandigarh	13.51	13.33	10.16	14.19	3.04
Delhi	10.83	136.3	189.99	225.84	42.68
Haryana	72.47	125.14	162.95	572.85	126.08
HP	0	11.66	36.52	44.29	11.66
J&K	0	0	9.42	1.71	0
Ladakh	0	0	0	0	0
Punjab	1492.9	1358.22	1356.48	1473.41	353.64
Rajasthan	5109.35	7776.56	10384.24	17219.88	5509.88
Uttar Pradesh	1235.08	1447.05	1856.19	2900.41	663.99
Uttarakhand	318.29	341.51	329.64	301.6	55.3
Northern Region	8252.45	11209.77	14335.59	22754.17	6766.28
Chhattisgarh	335.15	326.42	370.8	436.56	89.6
Gujarat	2410.32	3631.86	4633.81	6774.5	1767.58
Madhya Pradesh	2982.29	3496.23	4202.03	4006.7	841.85
Maharashtra	2206.62	2372.68	3089.46	3187.18	665.26
Dadra and Nagar Haveli	5.76	6.19	11.96	49.16	6.72
Daman & Diu	18.94	21.83	29.52	35.35	4.87
Goa	0	0.82	1.46	15.93	0.84
Western Region	7959.08	9856.02	12339.03	14505.37	3376.72
Andhra Pradesh	4965.96	5855.11	6956.1	7832.51	1459.91
Telangana	6312.26	6263.92	6351.04	6536.94	1229.99
Karnataka	7575.83	11221.2	13238.86	13169.43	2551.03
Kerala	110.84	143.59	275.44	496.93	103.63
Tamil Nadu	3554.5	4946.63	6115.48	7172.88	1431.92
Lakshadweep	1.11	0.66	0.45	0.3	0.03
Puducherry	2.58	4.15	6.39	12.24	2.04
Southern Region	22523.09	28435.26	32943.75	35221.23	6778.54
Andaman Nicobar	13.86	11.6	24.82	21.51	5.38
Bihar	179.89	160.16	160.63	163.08	32.28
Jharkhand	19.15	17.47	17.16	18.21	3.73
Orissa	263.03	362.29	476.26	603.71	129.01
Sikkim	0	0	0	0	0
West Bengal	40.65	64.29	73.89	98.24	21.96
Eastern Region	516.58	615.81	752.78	904.75	192.35
Arunachal Pradesh	1.2	1.6	1.54	1.72	8.38
Assam	6.67	6.14	13.37	81.64	26.09
Manipur	1.88	2.63	7.71	6.72	1.35
Meghalaya	0	0	0	0.47	0
Mizoram	0.12	0.44	2.45	1.68	0.66
Nagaland	0	0	0	0	0
Tripura	7.14	3.43	6.04	6.18	1.12
North Eastern Region	17	14.24	31.11	98.41	37.6
All India Total	39268.2	50131.1	60402.25	73483.94	17151.49

Source: Lok Sabha Update, CEA, iSearch

Solar PV Installation by State

India installed around 57.7 GW of Solar PV installations as of June 2022 as per the MNRE update. Rajasthan, Gujarat, Karnataka, Tamil Nadu, Telangana, and Andhra Pradesh, were the top state who have installed grid-connected utility-scale Solar projects of above 4 GW and cover 77 percent of the total installed capacity. The top ten states installed a cumulative Solar PV capacity of around 52 GW (utility-scale, rooftop & off-grid) and cover a market share of 93 percent by the end of June 2021. Rajasthan installed Solar capacity by the end of June 2022 has crossed 14 GW, out of that around 2.9 GW has been installed through Solar Park.



By the end of Q2 2022, India installed over 7 GW of grid-connected Solar rooftop installations and had a market share of 13 percent, while the rest 87 percent comes from the utility-scale project.

The top Solar rooftop installations states were Gujarat, and Maharashtra, followed by Rajasthan. The maximum number of utility-scale projects were installed, in the first quarter of 2022, as BCD on Solar PV modules and cells was imposed from 1st April 2022, and many developers were in a rush to execute the project before 31st March 2022. So, the installation in Q2 2022 was lower compared to Q1 2022 by 22 percent. For rooftop Solar installation, many C&I consumers who want to go for Solar to reduce their electricity cost were also moving forward and commissioned the projects before Q2 2022, as the C&I consumers go for tier-I modules to get maximum generation from the projects, installers don't want to pay 40 percent duty on modules to reduce their profit margin.

Rajasthan become the largest Solar installer (utility, rooftop & off-grid) across the country with an installed capacity of 14.062 GW, followed by Gujarat with 7.782 GW. The installations in Rajasthan are picking up as there are GWs of under-construction projects which are commissioning in the second half of the financial year 2021-22.

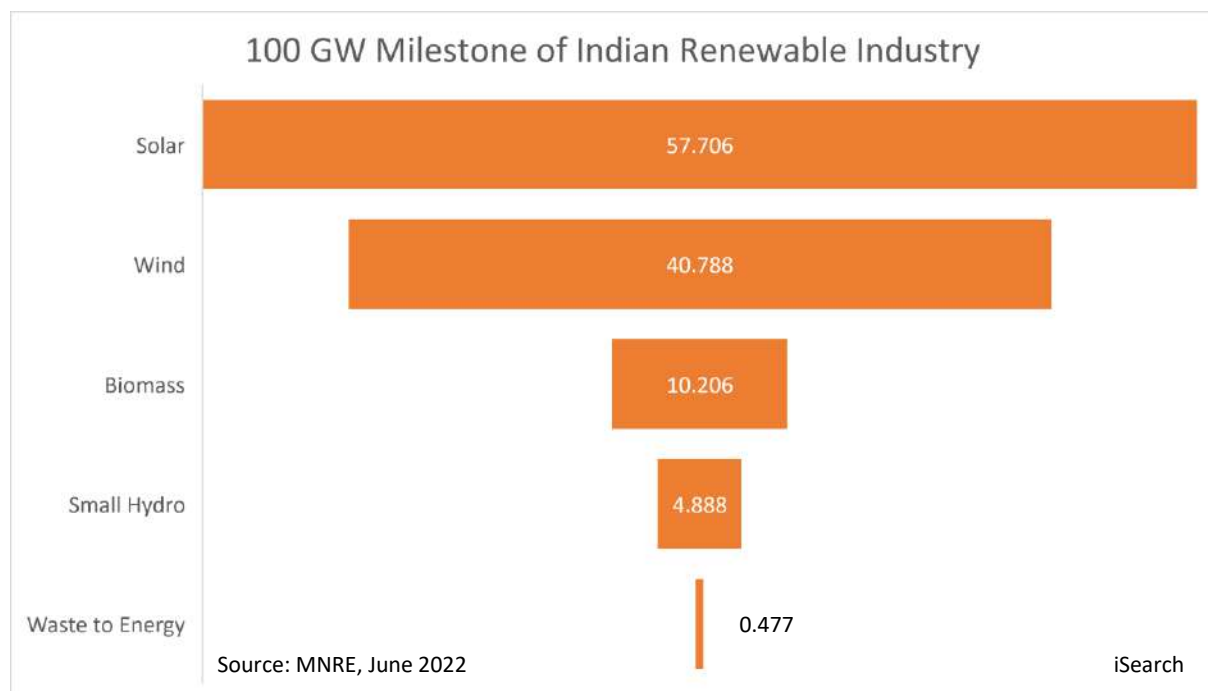
India achieves 100 GW Milestone

The total installed renewable energy capacity in India, excluding large hydro, has crossed the milestone of 114.064 GW by the end of June 2022. India has set an ambitious target for itself in the area of Renewable Energy, which the Ministry of New and Renewable Energy is committed to achieving.

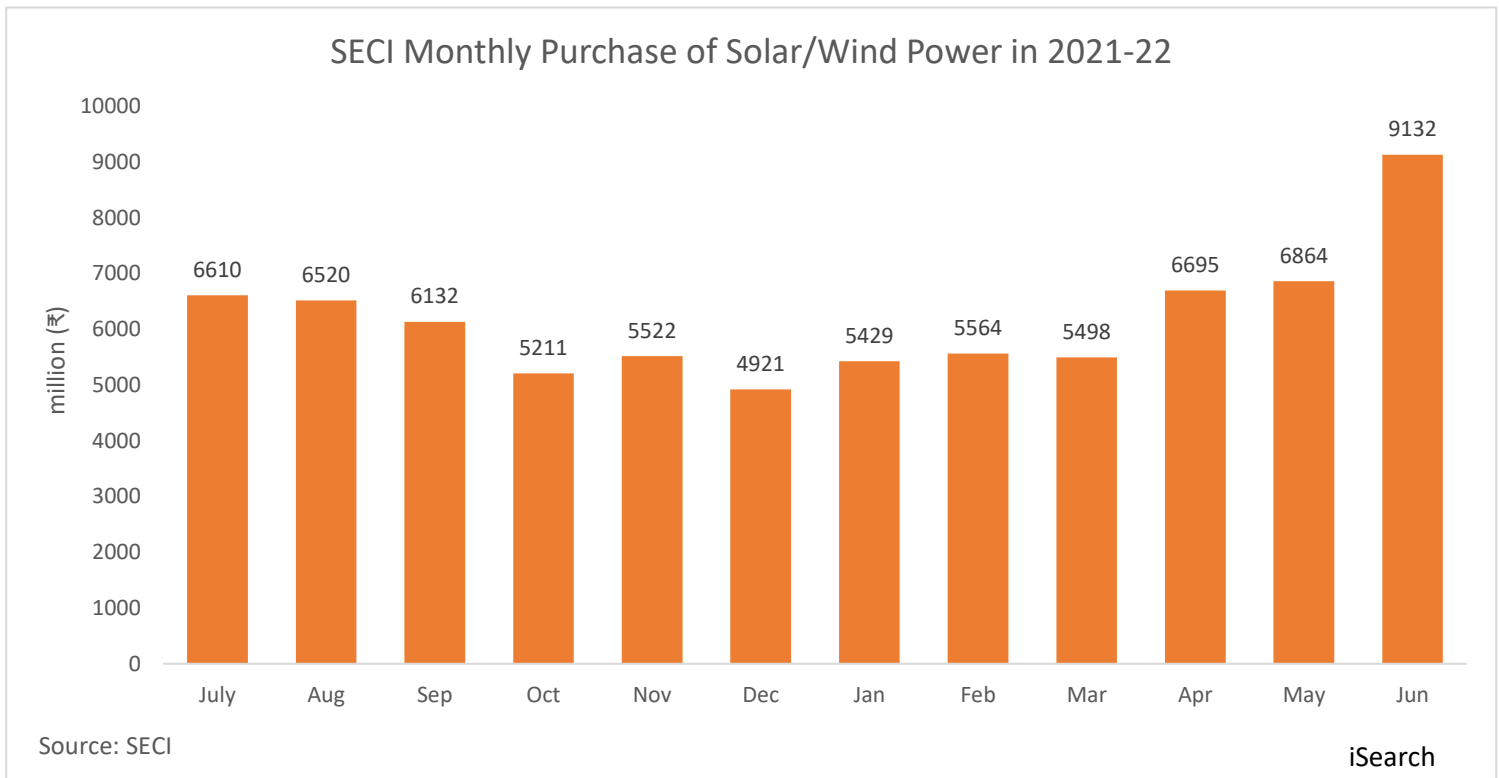
India has also enhanced its ambition to install 450 GW of Renewable Energy capacity by 2030 of that 280 GW comes from Solar. If large hydro is included the installed RE capacity increases to 160.9 GW by the end of June 2022.

India had committed to achieving 40.1% of its installed electricity capacity from non-fossil energy sources by 2030. The country has achieved around 39.85 percent of the total installed power capacity. The country's installed Renewable Energy capacity stands over 160 GW while its nuclear energy-based installed electricity capacity stands at 6.78 GW. The Government is committed to achieving 500 GW of installed power capacity from non-fossil fuel sources by the year 2030.

ICRA estimates the outlook for the capacity addition in the renewable energy sector remains strong with a large project pipeline of over 55 GW and the highly competitive tariffs offered by these projects. The commitment to climate change goals announced by the Prime Minister at the recent COP26 summit, including increasing the non-fossil power capacity to 500 GW and meeting 50% of energy requirement from renewable sources by 2030, further strengthens the investment prospects in the renewable energy sector.



SECI Monthly Payment



Solar Energy Corporation of India (SECI) paid ₹22.691 billion (~\$287.69 million) for Solar and Wind power purchased in the second quarter of 2022 from ₹16.491 billion (~\$218.005 million) in Q1 2022, there is an increase of over 38 percent over the previous quarter. The disbursed amount was highest in the second quarter of 2022 since the quarter third of 2021. There were many ups and down in the payment to generators from July 2021 to June 2022.

During the first half of 2022, SECI made a payment of around ₹39.182 billion (\$496.77 Million). The payment to Solar and wind generators started increasing in 2022, as lots many projects are coming online in the coming quarters. SECI is the major power purchaser for Solar in the country, and monthly payments to power generators are increasing year on year basis.

Recently, Posoco, in a letter to the Indian Energy Exchange (IEX), Power Exchange India Limited (PXIL), and Hindustan Power Exchange (HPX), said buy and sell transactions in all products of the power market for discoms shall be entirely restricted till further notice from the power delivery date of August 19. The action is likely under the Electricity (late payment surcharge and related matters) Rules, 2022, notified in June. The total dues are around ₹5,085 crores (\$644.71 million), of which those from Telangana, Tamil Nadu, Rajasthan, Jammu, and Kashmir, Andhra Pradesh, Maharashtra, and Karnataka total upto ₹4,761 crores (\$603.63 million).

Solar Energy Electricity Potential and Achievements by State