

INDIA'S SOLAR GENERATION INCREASES BY 24% IN 2020

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The electricity generation from Solar plants in India has registered an increase of 24.38% in 2020 than the previous year. This steep hike in solar generation is achieved while the yearly total Generation of Electricity in our country was decreased by 2.2% in 2020. The Total Installed Capacity of Solar plants in India registered an increase of 11.07% in 2020. Even though the installed capacity of Renewable sources of power generation in our country has increased by 6.11% in 2020, the generation from this segment recorded a growth of 4.69% only during this period. Tables showing details of All India monthly Solar and Wind Generation and Growth of Installed Capacity of various R.E.S for 2019 & 2020 are given below.

Table :1

ALL INDIA MONTHLY SOLAR & WIND GENERATION 2019 vs 2020 (in MU)				
MONTH	SOLAR		WIND	
	2019	2020	2019	2020
JAN	3375	4222	2769	2845.1
FEB	3379	4522	3017	3017.1
MAR	4063	4904	2903	2989.5
APR	4060	4772	3422	3020.3
MAY	4270	4810	6007	5353.2
JUN	3779	4003	7940	6793.3
JUL	3288	4542	10312	6574
AUG	3234	4112	8595	9006
SEP	3254	4255	4933	4530
OCT	3486	4690	1913.3	3588
NOV	3578	4389	2386.6	3081
DEC	3582	4695	3445	3516
TOTAL	43348	53916	57642.9	54313.5
% Change		24.38		-5.78

Source : InSDES compilation of data available at <https://posoco.in/reports/monthly-reports/>

Table :2

ALL INDIA GROWTH OF VARIOUS SOURCES OF R.E.S. 2019 vs 2020 (Installed Capacity in MW)			
SOURCE	AS ON 31.12.2019	AS ON 31.12.2020	% CHANGE
SHEP	4671.56	4750.46	1.69
WIND	37505.18	38624.15	2.98
BIO MASS / COGEN	9861.31	10145.92	2.89
WASTE TO ENERGY	139.8	168.64	20.63
SOLAR	33730.56	37464.64	11.07
TOTAL	85908.41	91153.81	6.11

Source : InSDES compilation of data available at <https://cea.nic.in/installed-capacity-report>

Referring to the tables above, it is seen that the Negative growth of Wind Generation (-5.78%) has pulled down the overall growth of R.E.S Generation to 4.69%. The Installed capacity of Wind Generators has grown by less than 3% only in 2020 which is due to slow down of Manufacturing Sector due to Covid-19 as per key players in this field.

Tables showing All India Yearly Total Source wise generation, Growth of Installed Capacity and Source wise share based on Installed capacity and Total generation for 2019 & 2020 are given below.

Table : 3

ALL INDIA YEARLY TOTAL SOURCE WISE GENERATION (in MU)			
SOURCE	2019	2020	% CHANGE
Coal	922641	880122	-4.61
Lignite	29314	25356	-13.50
Gas, Naphtha & Diesel	44695	49217	10.12
Nuclear	37246	39602	6.33
Hydro	159759	164440	2.93
R.E.S. (Wind, Solar, Biomass & Others)	124902	130754	4.69
TOTAL	1318557	1289491	-2.20
TOTAL FOSSIL FUELS	996650	954695	-4.21
FOSSIL FUELS AS % TOTAL	75.87	74.03	
NUCLEAR FUELS AS % OF TOTAL	2.84	3.07	
HYDRO AS % OF TOTAL	12.16	12.75	
R.E.S. AS % OF TOTAL	9.51	10.14	

Source : InSDES compilation of data available at <https://posoco.in/reports/daily-reports/>

Table : 4

GROWTH OF ALL INDIA SOURCE WISE INSTALLED CAPACITY 2019 vs 2020 (in MW)								
PERIOD	COAL	LIGNITE	GAS	DIESEL	NUCLEAR	HYDRO	R.E.S	TOTAL
AS ON 31.12.2019	198495	6760	24937	510	6780	45399	85908	368788
AS ON 31.12.2020	199865	6260	24957	510	6780	45798	91153	375322
% CHANGE	0.69	-7.40	0.08	0.00	0.00	0.88	6.11	1.77

Source : InSDES compilation of data available at <https://posoco.in/reports/monthly-reports/>

Table : 5

ALL INDIA SOURCE WISE SHARE in %				
SOURCE	Based on INSTALLED CAPACITY		Based on GENERATION	
	2019	2020	2019	2020
Coal	53.82	53.25	69.97	68.25
Lignite	1.83	1.67	2.22	1.97
Gas, Naphtha & Diesel	6.76	6.65	3.39	3.82
Nuclear	1.84	1.81	2.82	3.07
Hydro	12.31	12.20	12.12	12.75
R.E.S. (Wind, Solar, Biomass & Others)	23.29	24.29	9.47	10.14

Source : InSDES compilation of data available at <https://posoco.in/reports/monthly-reports/>

The reduction in electricity consumption during nation wide lock down declared in connection with Covid-19 pandemic caused reduction in total electricity generation in our country. This has resulted changes in the generation from various sources of electricity generation. Generation from fossil fuel sources in our country has reduced by 4.21% in 2020. Generation from coal fired plants reduced by 4.61% and that from Lignite plants reduced by 13.5%. But the generation from Gas plants increased by 10.12%. There was a 7.4% decline in the installed capacity of Lignite fired plants in 2020.

The reduction in generation during the lock down period from March to May was 9.6%, 23.81% and 14.89% respectively. The generation from fossil fuel sourced dropped by 13.87%, 29.79% and 20.83% during the same period. Even though unlock process started in June, the decline in generation continued till August and the generation picked up from September onwards. The drop in generation during the month of June to August was 6.68%, 1.8% and 0.9% and the reduction in fossil fuel generation during this months are 13.91%, 1.66% and 1.80% respectively. The generation showed positive growth from September onwards and the monthly increase from September to December are 8.02%, 12.83%, 3.67% and 5.28% respectively compared to same months in the previous year. Power generation from fossil fuels also increased during this period. The percentage increase during the months from September to December are 8.73, 16.15, 4.74, 4.78 respectively.

Pie charts showing the share of source wise generation for 2019 & 2020 are given below.

Chart : 1

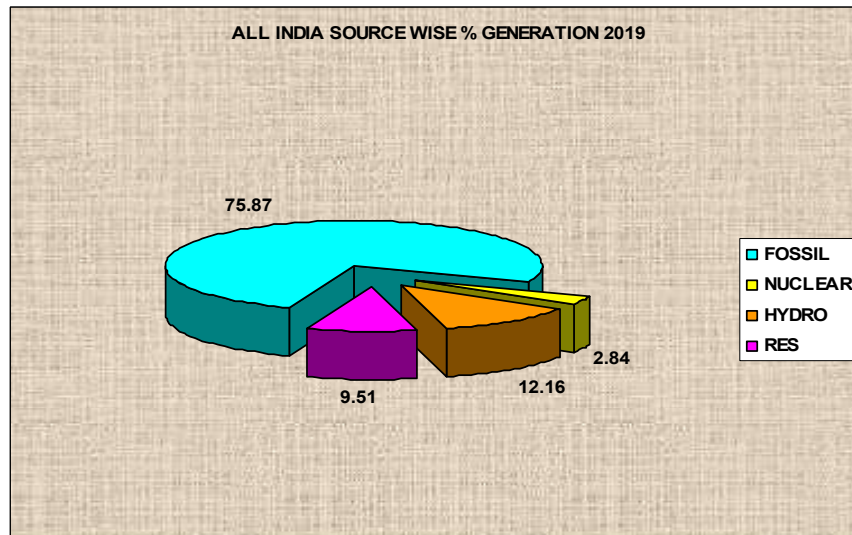
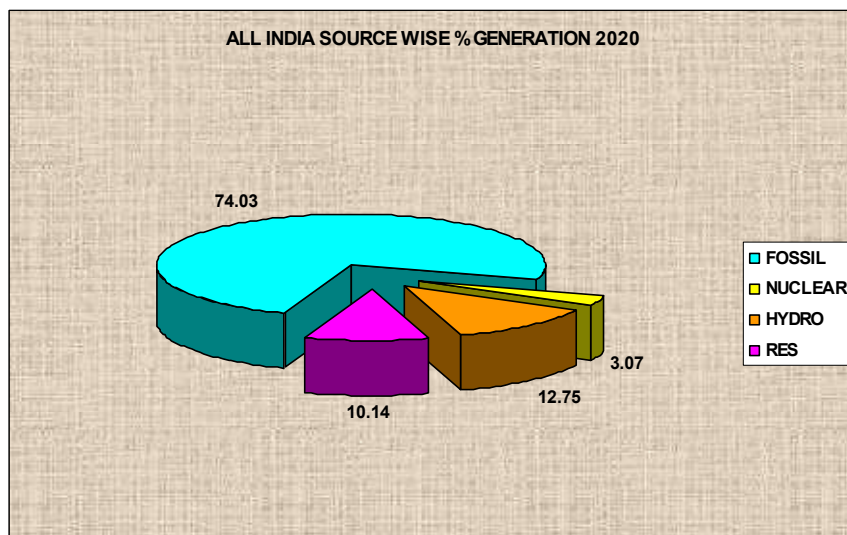


Chart : 2



Source : InSDES compilation of data available at <https://posoco.in/reports/daily-reports/>

CO₂ emission due to Electricity generation from Fossil fuels:

From Table : 3 above it can be seen that there is 4.21% reduction in electricity generation from fossil fuel combustion in our country during 2020 compared to the previous year. The reduction in CO₂ emission due to this is 43.2 Million Tonnes. Month wise details of CO₂ emission for 2019 and 2020 are given below (For more details refer Appendix -2).

Table : 6

CO ₂ EMISSION DUE TO GENERATION FROM FOSSIL FUELS 2019 vs 2020 (in Million Ton) *				
MONTH	CO ₂ EMISSION		DIFFERENCE	
	2019	2020	QTY	%
JAN	82.0	81.9	0.1	0.12
FEB	74.0	80.5	6.5	8.81
MAR	86.8	74.3	-12.5	-14.43
APR	85.4	59.3	-26.1	-30.58
MAY	88.7	69.7	-19.0	-21.42
JUN	81.1	69.3	-11.8	-14.53
JUL	77.8	75.9	-1.9	-2.45
AUG	71.8	70.1	-1.7	-2.37
SEP	70.1	76.1	6.0	8.62
OCT	69.8	79.9	10.1	14.48
NOV	70.9	73.9	3.0	4.22
DEC	78.1	82.1	4.0	5.18
TOTAL	936.4	893.2	-43.2	-4.61

Source : InSDES compilation of data available at <https://posoco.in/reports/daily-reports/>

* With Weighted Average Specific Emission for fossil fuel fired stations in kg CO₂ / kWh @ 0.95 for COAL, 1.28 for LIGNITE and 0.5 for GAS

From the Table it can be seen that decrease in CO₂ emission is maximum in April 2020 (26.1 Million Tonnes ie: 30.59% less compared to 2019). This reduction in emission continued only up to August 2020 and further it exceeded the 2019 levels when generation started increasing.

Among Fossil Fuels, Coal and Lignite based generation have recorded considerable decrease (Coal : 4.61% & Lignite 13.5%) in 2020. Though the generation from Gas (as Naphtha & Diesel based plants are operated only in emergencies) based stations has registered an increase of 10.12%, since the emission from them are very less compared to Coal and Lignite, the net emission got reduced. As per an analysis by Centre for Research on Energy and Clean Air (CREA) published in Carbon Brief in May 2020, The Economic slow down, Renewable Energy growth and the impact of Covid-19 have led to first year on year reduction in India's CO₂ emission in four decades. According to that analysis emissions fell by around 1% in the financial year ending 31st March 2020, as coal consumption fell and oil consumption flat lined.

In its publication “ Global Energy and CO₂ Status Report 2018”, IEA for the first time assessed the impact of fossil fuel use on global temperature increase. It found that CO₂ emitted from coal combustion was responsible for over 0.3°C of the 1°C increase in global average annual surface temperatures above pre-industrial levels. This makes coal the single largest source of global temperature increase.

Kerala : Solar Electricity Generation Increases 14%:

Total Electricity requirement of our state during 2020 was 25125.4 MU compared to 26019.5 MU during 2019. There was a decrease of 3.7%. The decrease in requirement of electricity is mainly due to the nation wide Lock-down declared in March 2020 to contain the spread of Covid-19 pandemic and the consequent slow down in economic activities. The climatic conditions also have contributed to this decrease. In spite of this decrease in the requirement, the internal generation of Kerala increased by 10.8% in 2020. The Electricity Generation from Various Sources is given below.

Table : 7

SOURCE WISE GENERATION DETAILS OF KERALA FOR 2019 & 2020 (in MU)			
SOURCE	2019	2020	% CHANGE
HYDEL	5973.0206	6629.8934	11.00
THERMAL	54.4691	48.152	-11.60
WIND	121.4063	131.0324	7.93
SOLAR	118.7049	135.743	14.35
TOTAL	6267.6009	6944.8208	10.81

Source: InSDES compilation of data available at [http:// www.sldckerala.com/System Statistics/Generation](http://www.sldckerala.com/System Statistics/Generation)

Compared to 2019, the Generation from Solar increased by 14.35% and that from Wind increased by 7.93% in 2020. While Generation from Hydro sources increased by 11% , Thermal generation dropped by 11.6%. The increase in Wind and Solar generation is mainly due to the Capacity addition from these sources during this period. The installed capacity of the state is given in the Table below.

Table : 8

KERALA INSTALLED CAPACITY in MW		
SOURCE	AS ON 31.03.2019	AS ON 31.03.2020
HYDEL	2129.42	2129.42
THERMAL	676.54	676.54
WIND	60.275	70.275
SOLAR	134.12	185.13
TOTAL	3000.355	3061.365

Source: InSDES compilation of data available at <https://spb.kerala.gov.in/sites/default/files/2021-01/English-Vol-2.pdf>

The details of Total Electricity Requirement, Internal Generation and Net Import from Outside during the year 2019 and 2020 are shown below.

Table : 9

KERALA - INTERNAL GENERATION AND IMPORT FOR 2019 & 2020				
PARTICULARS	MU		SHARE %	
	2019	2020	2019	2020
INTERNAL GENERATION	6267.6	6944.8	24.1	27.6
IMPORT	19751.9	18180.6	75.9	72.4
TOTAL ENERGY REQUIREMENT	26019.5	25125.4	100	100

Source: InSDES compilation of data available at [http:// www.sldckerala.com/System Statistics/Generation](http://www.sldckerala.com/System Statistics/Generation)

Kerala had to import 19751.9 MU during 2019 and 18180.6 MU during 2020 to meet the Electricity requirement. There was a decrease of 8% in the import of Electricity during 2020 compared to the previous year. Still more than 70% of the Electricity requirement of the state had to be met by import.

Chart : 3

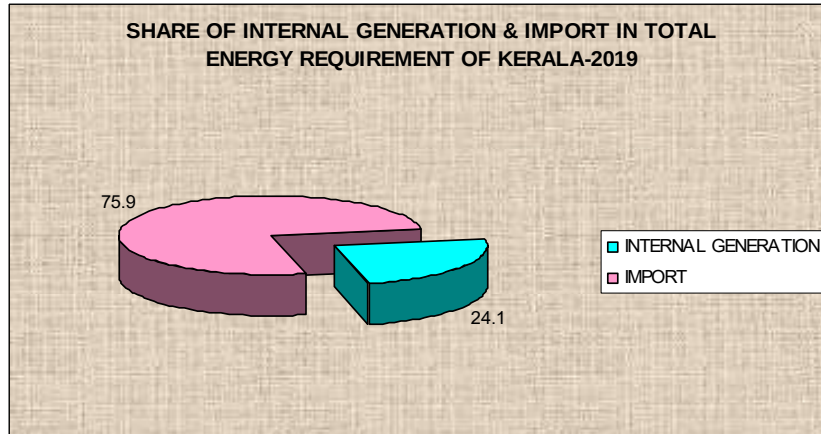
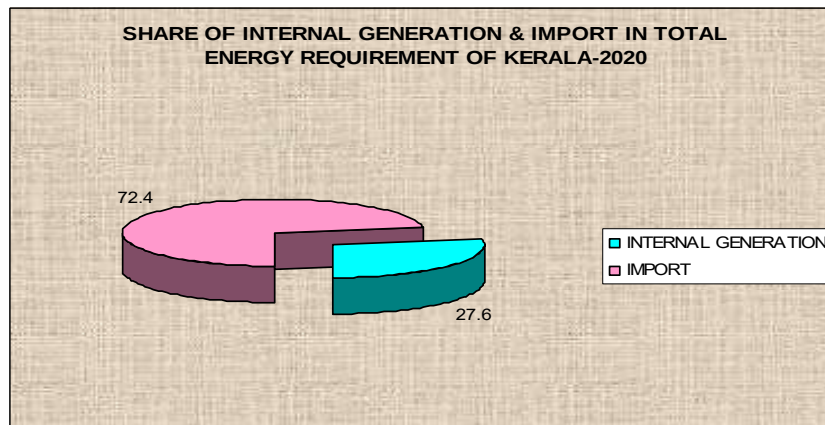


Chart : 4



Source: InSDES compilation of data available at [http:// www.sldkerala.com/System Statistics/Generation](http://www.sldkerala.com/System Statistics/Generation)

The share of various sources of Power generation based on installed capacity and actual generation is shown below.

Table : 10

SHARE in %				
SOURCE	Installed Capacity		Generation	
	2019	2020	2019	2020
HYDRO	70.97	69.56	95.3	95.5
THERMAL	22.55	22.1	0.9	0.7
WIND	2.02	2.3	1.94	1.89
SOLAR	4.47	6.05	1.89	1.95

Source: InSDES compilation of data available at [http:// www.sldckerala.com/System Statistics](http://www.sldckerala.com/System Statistics)

Even though the share of Thermal Capacity in total installed capacity of Kerala is 22%, the share of electricity generation from this source is less than 1% only. Due to high cost of Electricity generated from the Naphtha and Diesel stations in Kerala, KSEBL is not procuring electricity from these plants except during emergency situations. This is the reason for idling of Thermal Plants in the state.

More than 95% of the Internal generation of Kerala is from Hydel Stations (The Capacity wise share of Hydel is 70% only). The generation from Solar and Wind sources are less than 2% of the Total Internal Generation. The share of installed capacity of Solar Plants increased from 4.47% to 6.05% and that of Wind increased from 2.02% to 2.3% during 2020.

Chart : 5

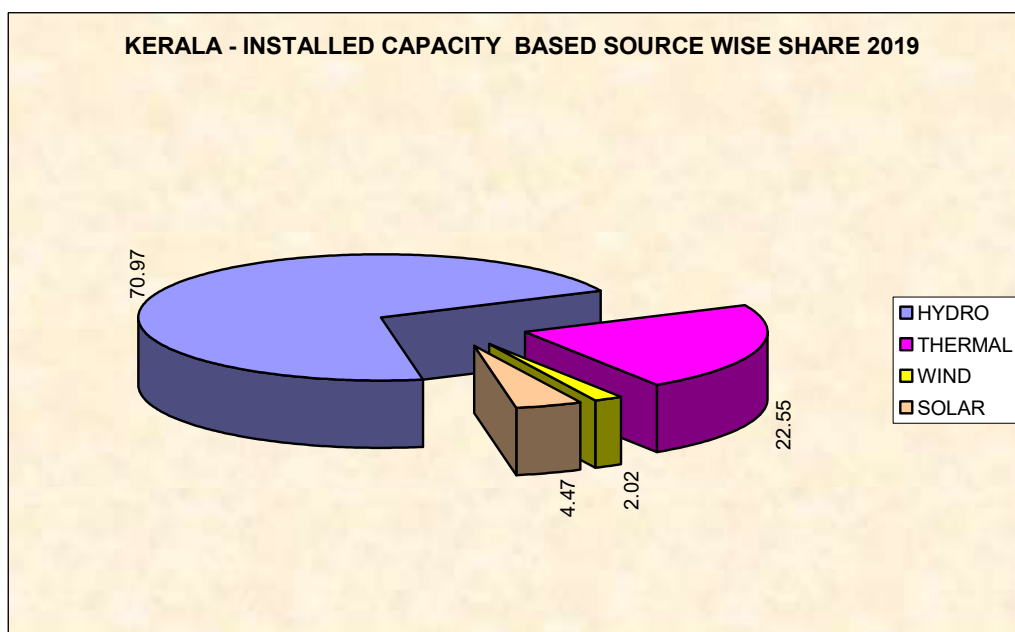


Chart : 6

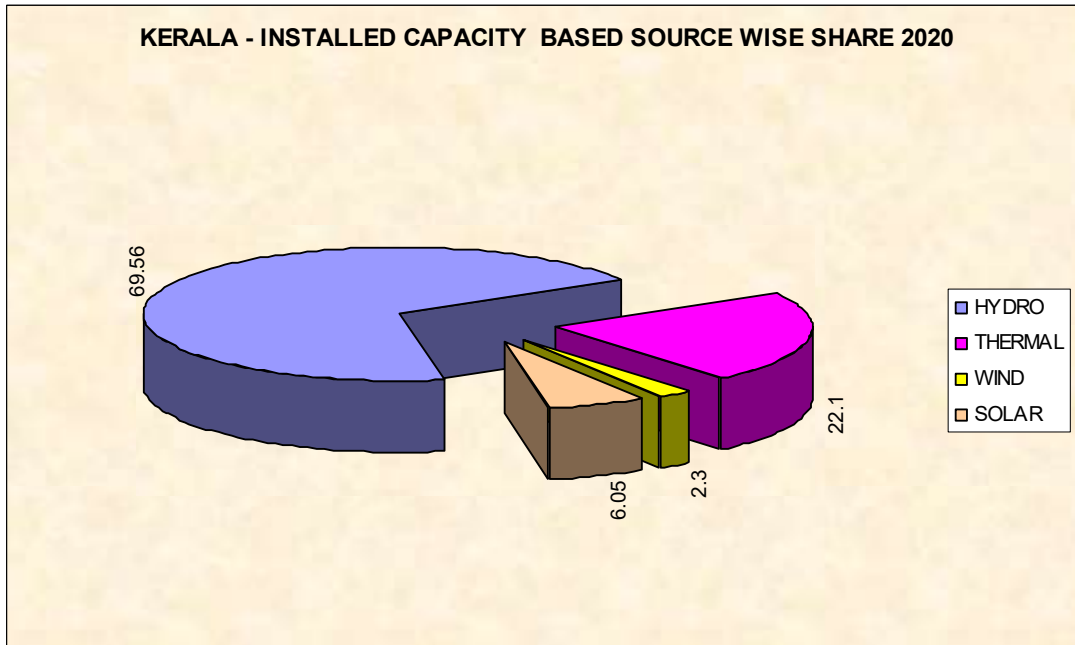


Chart : 7

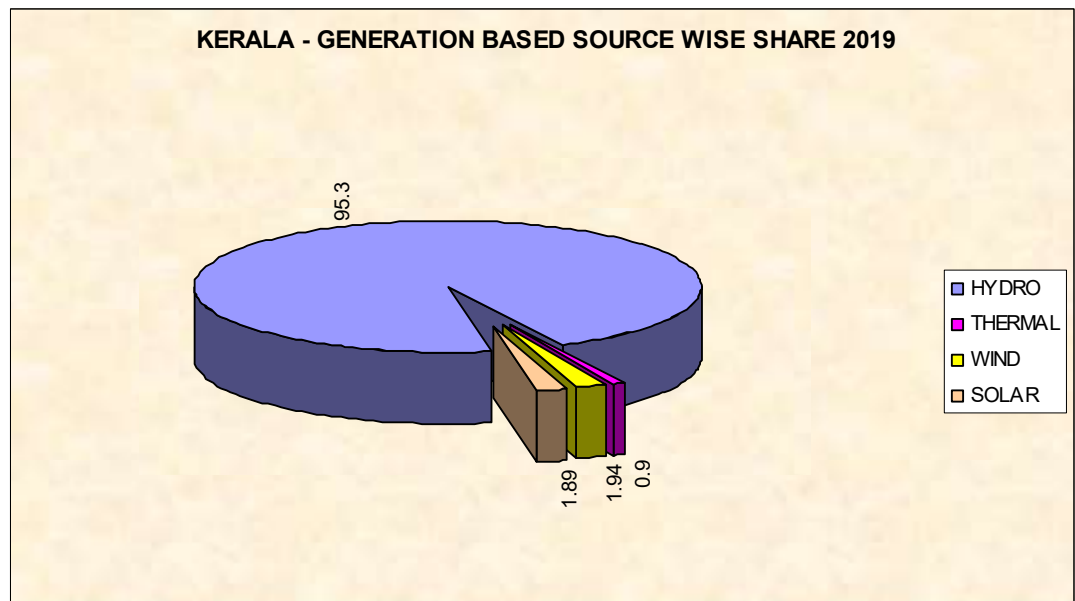
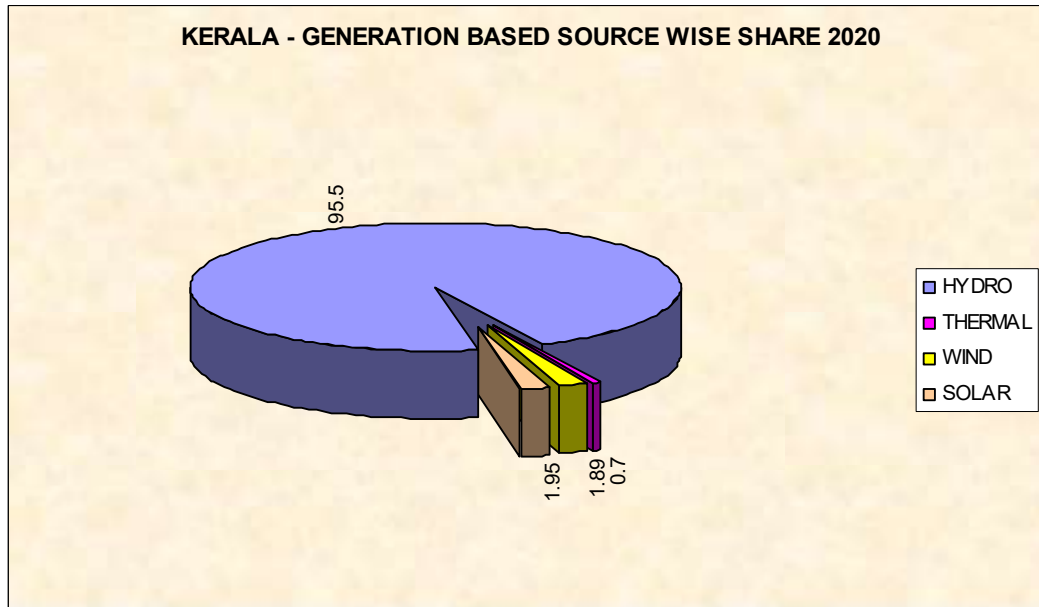


Chart : 8



Source: InSDES compilation of data available at: [http:// www.sldkerala.com/System Statistics](http://www.sldkerala.com/System Statistics)

Appendix -1

ALL INDIA MONTHLY SOURCE WISE GENERATION 2019 vs 2020				
MONTH	SOURCE	GENERATION in MU		% CHANGE
		2019	2020	
JAN	Coal	80550	81170	0.77
	Lignite	2801	2519	-10.07
	Gas, Naphtha & Diesel	3699	3171	-14.27
	Nuclear	2639	2994	13.45
	Hydro	7526	9010	19.72
	R.E.S. (Wind, Solar,Biomass & Others)	8325	9631	15.69
	TOTAL	105537	108491	2.80
	TOTAL FOSSIL FUELS	87050	86860	-0.22
	FOSSIL FUELS AS % TOTAL	82.48	80.06	-2.94
	NUCLEAR FUELS AS % OF TOTAL	2.50	2.76	10.36
	HYDRO AS % OF TOTAL	7.13	8.30	16.46
R.E.S. AS % OF TOTAL	7.89	8.88	12.54	
FEB	Coal	73186	79507	8.64
	Lignite	2377	2569	8.08
	Gas, Naphtha & Diesel	2914	3453	18.50
	Nuclear	2424	2742	13.12
	Hydro	7189	8618	19.88
	R.E.S. (Wind, Solar,Biomass & Others)	8554	9605	12.29
	TOTAL	96645	106671	10.37
	TOTAL FOSSIL FUELS	78477	85529	8.99
	FOSSIL FUELS AS % TOTAL	81.20	80.18	-1.26
	NUCLEAR FUELS AS % OF TOTAL	2.51	2.57	2.49
	HYDRO AS % OF TOTAL	7.44	8.08	8.61
R.E.S. AS % OF TOTAL	8.85	9.00	1.73	
MAR	Coal	85917	72713	-15.37
	Lignite	2769	2502	-9.64
	Gas, Naphtha & Diesel	3357	4066	21.12
	Nuclear	2781	3555	27.83
	Hydro	8872	9423	6.21
	R.E.S. (Wind, Solar,Biomass & Others)	9324	9917	6.36
	TOTAL	113027	102177	-9.60
	TOTAL FOSSIL FUELS	92043	79281	-13.87
	FOSSIL FUELS AS % TOTAL	81.43	77.59	-4.72
	NUCLEAR FUELS AS % OF TOTAL	2.46	3.48	41.41
	HYDRO AS % OF TOTAL	7.85	9.22	17.49
R.E.S. AS % OF TOTAL	8.25	9.71	17.65	
APR	Coal	84350	57149	-32.25
	Lignite	2635	2292	-13.02
	Gas, Naphtha & Diesel	3712	4239	14.20
	Nuclear	2711	3376	24.53
	Hydro	11431	10573	-7.51
	R.E.S. (Wind, Solar,Biomass & Others)	9660	9603	-0.59
	TOTAL	114496	87232	-23.81
	TOTAL FOSSIL FUELS	90697	63680	-29.79
	FOSSIL FUELS AS % TOTAL	79.21	73.00	-7.84
	NUCLEAR FUELS AS % OF TOTAL	2.37	3.87	63.45
	HYDRO AS % OF TOTAL	9.98	12.12	21.40
R.E.S. AS % OF TOTAL	8.44	11.01	30.48	

MONTH	SOURCE	2019	2020	%Change
MAY	Coal	87828	67793	-22.81
	Lignite	2504	2318	-7.43
	Gas, Naphtha & Diesel	4058	4619	13.82
	Nuclear	3203	3316	3.53
	Hydro	14483	15008	3.62
	R.E.S. (Wind, Solar,Biomass & Others)	12630	12617	-0.10
	TOTAL	124162	105671	-14.89
	TOTAL FOSSIL FUELS	94390	74730	-20.83
	FOSSIL FUELS AS % TOTAL	76.02	70.72	-6.97
	NUCLEAR FUELS AS % OF TOTAL	2.58	3.14	21.64
	HYDRO AS % OF TOTAL	11.66	14.20	21.76
	R.E.S. AS % OF TOTAL	10.17	11.94	17.38
JUN	Coal	80412	67254	-16.36
	Lignite	2200	2382	8.27
	Gas, Naphtha & Diesel	3815	4770	25.03
	Nuclear	3100	3325	7.26
	Hydro	14294	18400	28.73
	R.E.S. (Wind, Solar,Biomass & Others)	13074	13035	-0.30
	TOTAL	116987	109168	-6.68
	TOTAL FOSSIL FUELS	86427	74406	-13.91
	FOSSIL FUELS AS % TOTAL	73.88	68.16	-7.74
	NUCLEAR FUELS AS % OF TOTAL	2.65	3.05	14.94
	HYDRO AS % OF TOTAL	12.22	16.85	37.95
	R.E.S. AS % OF TOTAL	11.18	11.94	6.84
JUL	Coal	76858	75238	-2.11
	Lignite	2289	1661	-27.44
	Gas, Naphtha & Diesel	3673	4550	23.88
	Nuclear	3508	3004	-14.37
	Hydro	16925	19663	16.18
	R.E.S. (Wind, Solar,Biomass & Others)	15421	12414	-19.50
	TOTAL	118670	116532	-1.80
	TOTAL FOSSIL FUELS	82820	81449	-1.66
	FOSSIL FUELS AS % TOTAL	69.79	69.89	0.15
	NUCLEAR FUELS AS % OF TOTAL	2.96	2.58	-12.80
	HYDRO AS % OF TOTAL	14.26	16.87	18.31
	R.E.S. AS % OF TOTAL	12.99	10.65	-18.02
AUG	Coal	70631	69329	-1.84
	Lignite	2211	1745	-21.08
	Gas, Naphtha & Diesel	3691	4080	10.54
	Nuclear	3479	3224	-7.33
	Hydro	21135	20854	-1.33
	R.E.S. (Wind, Solar,Biomass & Others)	13728	14578	6.19
	TOTAL	114875	113805	-0.93
	TOTAL FOSSIL FUELS	76533	75154	-1.80
	FOSSIL FUELS AS % TOTAL	66.62	66.04	-0.88
	NUCLEAR FUELS AS % OF TOTAL	3.03	2.83	-6.46
	HYDRO AS % OF TOTAL	18.40	18.32	-0.40
	R.E.S. AS % OF TOTAL	11.95	12.81	7.19

MONTH	SOURCE	2019	2020	%Change
SEP	Coal	68686	75492	9.91
	Lignite	2178	1806	-17.08
	Gas, Naphtha & Diesel	4092	4201	2.66
	Nuclear	3412	3506	2.75
	Hydro	22225	20689	-6.91
	R.E.S. (Wind, Solar,Biomass & Others)	9910	10213	3.06
	TOTAL	107297	115905	8.02
	TOTAL FOSSIL FUELS	74956	81499	8.73
	FOSSIL FUELS AS % TOTAL	69.86	70.32	0.65
	NUCLEAR FUELS AS % OF TOTAL	3.18	3.02	-4.88
	HYDRO AS % OF TOTAL	20.71	17.85	-13.82
	R.E.S. AS % OF TOTAL	9.24	8.81	-4.60
OCT	Coal	68146	79237	16.28
	Lignite	2410	1734	-28.05
	Gas, Naphtha & Diesel	3957	4829	22.04
	Nuclear	3485	3580	2.73
	Hydro	15724	14462	-8.03
	R.E.S. (Wind, Solar,Biomass & Others)	6884	9688	40.73
	TOTAL	100601	113512	12.83
	TOTAL FOSSIL FUELS	74513	85800	15.15
	FOSSIL FUELS AS % TOTAL	74.07	75.59	2.05
	NUCLEAR FUELS AS % OF TOTAL	3.46	3.15	-8.96
	HYDRO AS % OF TOTAL	15.63	12.74	-18.49
	R.E.S. AS % OF TOTAL	6.84	8.53	24.73
NOV	Coal	69655	73255	5.17
	Lignite	2393	1863	-22.15
	Gas, Naphtha & Diesel	3322	3827	15.20
	Nuclear	3321	3467	4.40
	Hydro	10611	9072	-14.50
	R.E.S. (Wind, Solar,Biomass & Others)	7786	9171	17.79
	TOTAL	97087	100649	3.67
	TOTAL FOSSIL FUELS	75370	78945	4.74
	FOSSIL FUELS AS % TOTAL	77.63	78.44	1.04
	NUCLEAR FUELS AS % OF TOTAL	3.42	3.44	0.70
	HYDRO AS % OF TOTAL	10.93	9.01	-17.53
	R.E.S. AS % OF TOTAL	8.02	9.11	13.62
DEC	Coal	76422	81985	7.28
	Lignite	2547	1965	-22.85
	Gas, Naphtha & Diesel	4405	3412	-22.54
	Nuclear	3183	3513	10.37
	Hydro	9344	8668	-7.23
	R.E.S. (Wind, Solar,Biomass & Others)	9606	10282	7.04
	TOTAL	104311	109817	5.28
	TOTAL FOSSIL FUELS	83374	87362	4.78
	FOSSIL FUELS AS % TOTAL	79.93	79.55	-0.47
	NUCLEAR FUELS AS % OF TOTAL	3.05	3.20	4.83
	HYDRO AS % OF TOTAL	8.96	7.89	-11.89
	R.E.S. AS % OF TOTAL	9.21	9.36	1.67

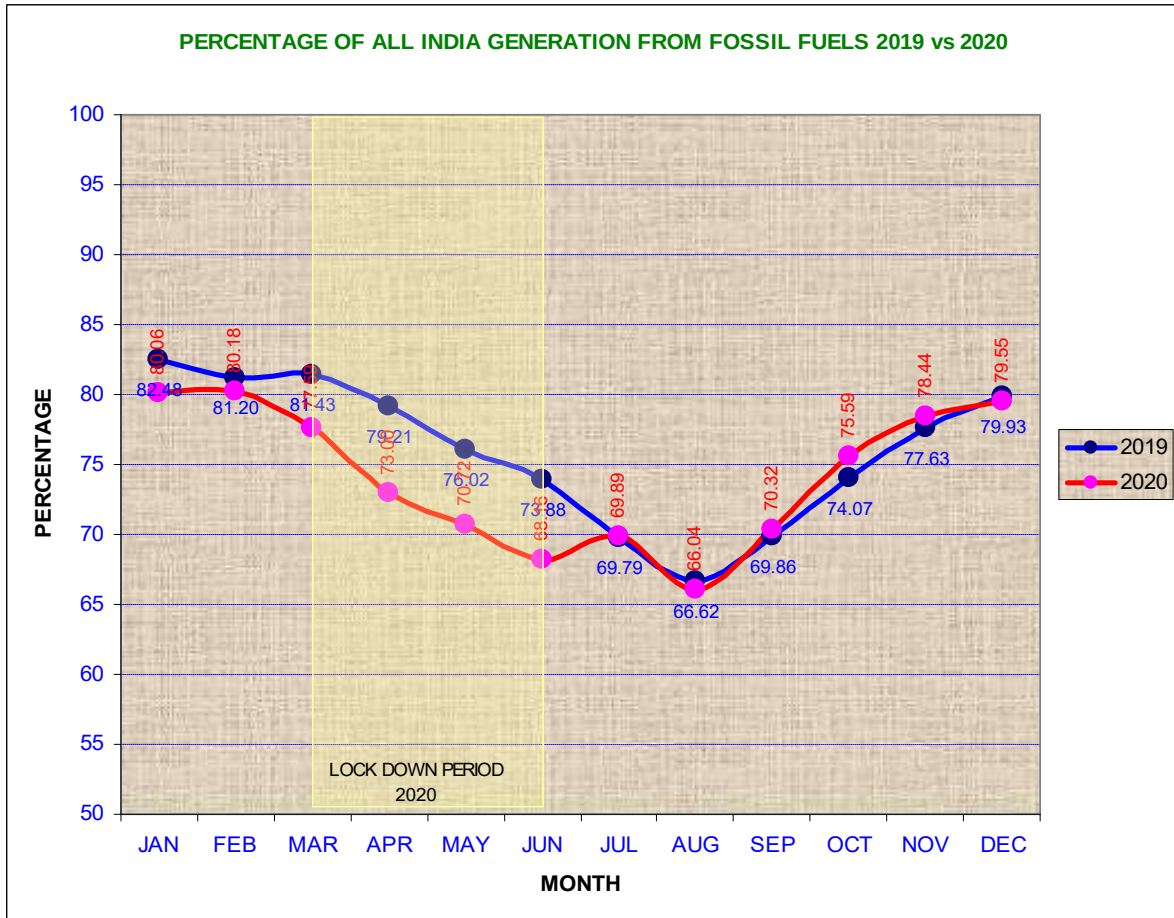
Source : InSDES compilation of data available at <https://posoco.in/reports/daily-reports/>

Appendix-2

ALL INDIA CARBON DI OXIDE EMISSION DUE TO FOSSIL FUELS 2019 vs 2020 (in Million Ton)*								
MONTH	2019				2020			
	COAL	LIGNITE	GAS	TOTAL	COAL	LIGNITE	GAS	TOTAL
JAN	76.5	3.6	1.8	82.0	77.1	3.2	1.6	81.9
FEB	69.5	3.0	1.5	74.0	75.5	3.3	1.7	80.5
MAR	81.6	3.5	1.7	86.8	69.1	3.2	2.0	74.3
APR	80.1	3.4	1.9	85.4	54.3	2.9	2.1	59.3
MAY	83.4	3.2	2.0	88.7	64.4	3.0	2.3	69.7
JUN	76.4	2.8	1.9	81.1	63.9	3.0	2.4	69.3
JUL	73.0	2.9	1.8	77.8	71.5	2.1	2.3	75.9
AUG	67.1	2.8	1.8	71.8	65.9	2.2	2.0	70.1
SEP	65.3	2.8	2.0	70.1	71.7	2.3	2.1	76.1
OCT	64.7	3.1	2.0	69.8	75.3	2.2	2.4	79.9
NOV	66.2	3.1	1.7	70.9	69.6	2.4	1.9	73.9
DEC	72.6	3.3	2.2	78.1	77.9	2.5	1.7	82.1
TOTAL	876.5	37.5	22.3	936.4	836.1	32.5	24.6	893.2
Decrease in Carbon Di Oxide emission in 2020 compared to 2019 = 43.2 Million Ton (4.6%)								
* With Weighted Average Specific Emission for fossil fuel fired stations in kg CO ₂ / kWh @ 0.95 for COAL, 1.28 for LIGNITE and 0.5 for GAS.								

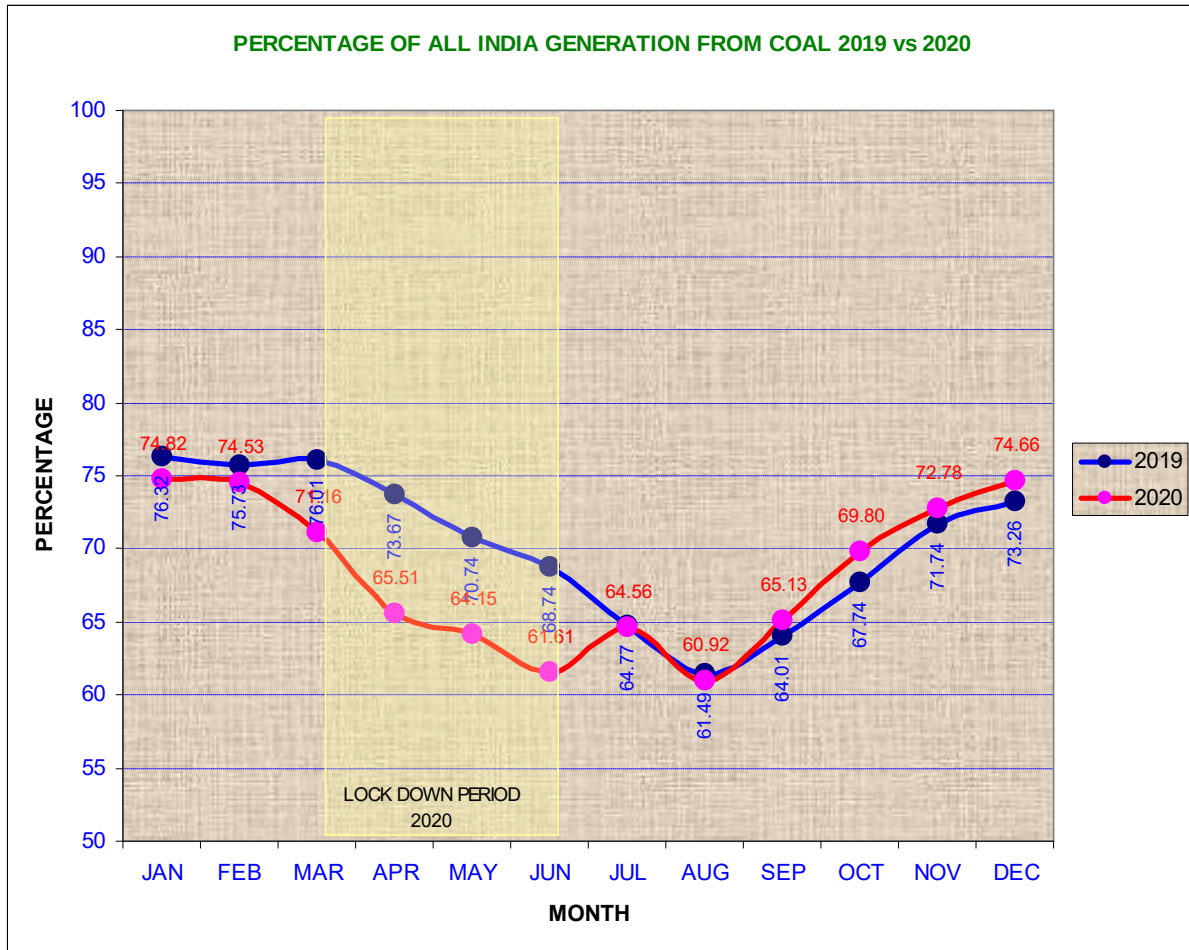
Source : InSDES compilation of data available at <https://posoco.in/reports/daily-reports/>

Appendix-3



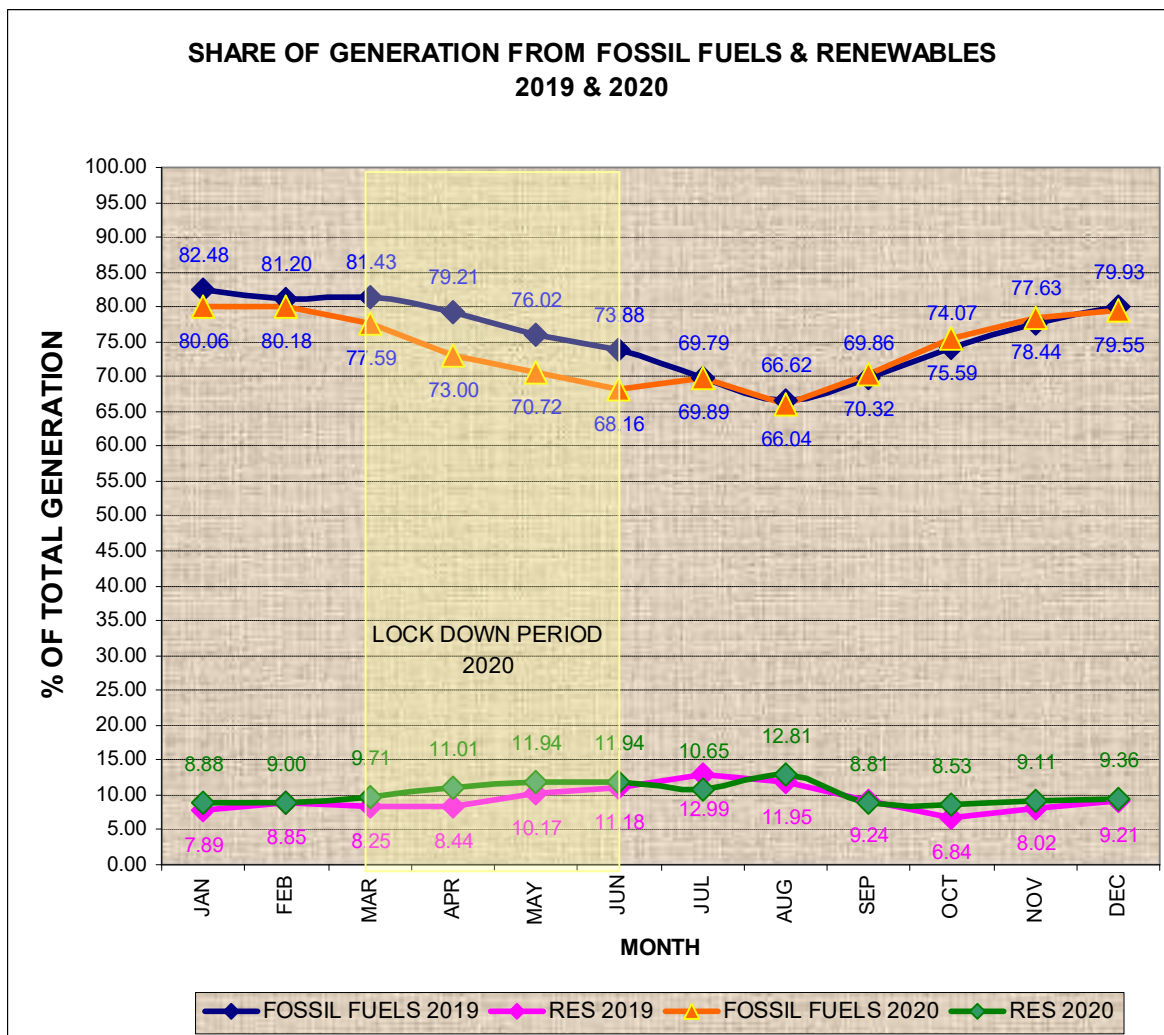
Source : InSDES compilation of data available at <https://posoco.in/reports/daily-reports/>

Appendix-4



Source : InSDES compilation of data available at <https://posoco.in/reports/daily-reports/>

Appendix-5



Source : InSDES compilation of data available at <https://posoco.in/reports/daily-reports/>

Appendix-6

KERALA INTERNAL GENERATION 2019 & 2020 (in MU)						
MONTH	HYDRO			THERMAL		
	2019	2020	% CHANGE	2019	2020	% CHANGE
JANUARY	358.8562	445.748	24.21	3.6168	3.8674	6.93
FEBRUARY	432.5464	408.6598	-5.52	1.9469	3.6108	85.46
MARCH	614.121	477.2319	-22.29	6.8781	3.1638	-54.00
APRIL	627.8601	535.0142	-14.79	9.4169	1.6291	-82.70
MAY	707.8069	676.9755	-4.36	10.087	4.1834	-58.53
JUNE	383.3618	535.6329	39.72	3.0264	4.1897	38.44
JULY	330.5648	439.0992	32.83	4.2133	4.1488	-1.53
AUGUST	476.6208	627.3999	31.64	4.247	4.2785	0.74
SEPTEMBER	573.7541	669.2453	16.64	4.1206	3.9269	-4.70
OCTOBER	573.063	778.5181	35.85	3.904	4.0756	4.40
NOVEMBER	492.7033	537.7037	9.13	1.6544	4.09	147.22
DECEMBER	401.7622	498.6649	24.12	1.3577	6.988	414.69
TOTAL	5973.0206	6629.8934	11.00	54.4691	48.152	-11.60

Appendix : 7

KERALA SOLAR GENERATION 2019 & 2020 in MU			
MONTH	2019	2020	% CHANGE
JANUARY	11.162	12.7352	14.09
FEBRUARY	10.6633	12.5918	18.09
MARCH	12.159	14.3526	18.04
APRIL	10.9092	13.1875	20.88
MAY	10.3366	12.1798	17.83
JUNE	7.9912	9.4876	18.73
JULY	6.7167	9.493	41.33
AUGUST	7.5254	8.9988	19.58
SEPTEMBER	10.0567	8.213	-18.33
OCTOBER	10.5397	10.6592	1.13
NOVEMBER	11.1134	11.6736	5.04
DECEMBER	9.5317	12.1709	27.69
TOTAL	118.7049	135.743	14.35

Appendix-8

KERALA WIND GENERATION 2019 & 2020 in MU			
MONTH	2019	2020	% CHANGE
JANUARY	6.7254	7.9477	18.17
FEBRUARY	5.702	8.1553	43.03
MARCH	4.5382	4.15	-8.55
APRIL	4.8365	4.1613	-13.96
MAY	13.7969	11.975	-13.21
JUNE	16.8991	18.2266	7.86
JULY	17.7907	16.3084	-8.33
AUGUST	16.3711	16.6517	1.71
SEPTEMBER	13.1192	15.3058	16.67
OCTOBER	5.1563	13.7202	166.09
NOVEMBER	6.6387	6.4044	-3.53
DECEMBER	9.8322	8.026	-18.37
TOTAL	121.4063	131.0324	7.93

Source:[http:// www.slcdkerala.com/System Statistics](http://www.slcdkerala.com/System Statistics)

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