RIGHT TO INFORMATION

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.

MAHARASHTRA STATE ELECTRICITY TRANSMISSION CO.LTD.
CIN NO. U40109MH2005SGC153646
Maharashtra State Load Dispatch Center

Tele :91- 022-27602937 (P)
91-022-27601937 (O) Extn.1001
Email : edsldc@mahasldc.in
website : www.mahasldc.in

Executive Director
Maharashtra State Load Dispatch Center
Thane-Belapur Road, P.O. Airoli
Navi Mumbai Pin – 400 708.

Ref. MSLDC/Tech/SO/No. No 02105 Date: 16 OCT 2025

To,
The Secretary,
Maharashtra Electricity Regulatory Commission (MERC)
Centre No.1, 13th Floor, Cuffe Parade,
Mumbai-400005.

Sub: Submission of the state-aggregated capacity shortfall in compliance to Resource Adequacy regulation 2024 for FY 2026-27 to 2031.

Ref:- 1) Maharashtra Electricity Regulatory Commission (Framework for Resource Adequacy) Regulations, 2024.

Respected Sir,

Please find enclosed herewith Resource adequacy study for state of Maharashtra for FY 2026-27 to 2031 in compliance with Maharashtra Electricity Regulatory Commission (Framework for Resource Adequacy) Regulations, 2024. Clause no. 19.1. Monitoring and Reporting.

Thanking you.

ENCL: 1) RA study
2) Annexures I to III in soft form

Yours faithfully,

(Shashank Jewalikar)
Executive Director
MSLDC, Kalwa

Copy s. w. r to:
1) The Director (Operations), MSETCL, Mumbai.

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Resource Adequacy Study for the state of Maharashtra FY 2026-27 to FY 2030-31

Preamble:

With reference to Maharashtra Electricity Regulatory Commission (Framework for Resource Adequacy) Regulations, 2024. Clause no. 19.1. Monitoring and Reporting, based on the MT-DRAP and ST-DRAP, STU and MSLDC shall communicate the state-aggregated capacity shortfall to the Commission by 15th September of each year for the ensuring year(s).

As per the request letters submitted to the Hon'ble Commission, with copies to the Maharashtra State Load Despatch Centre (MSLDC), received from the Maharashtra State Electricity Distribution Company Limited (MSEDCL) vide Letter No. CE/PP/RA/28152 dated 29.08.2025, and from the Maharashtra Industrial Township Limited (MITL) vide Letter No. MITL/Electrical/MERC/MT & ST/DRAP/2025-26/384 dated 03.09.2025, an extension of 15 days beyond the original stipulated deadline of 31st August 2025 was sought from the Hon'ble Commission for submission of the Distribution Resource Adequacy Plans (DRAPs).

Subsequently, upon receipt of these requests, the Maharashtra State Load Despatch Centre (MSLDC) also submitted a request to the Hon'ble Commission, seeking a 15-days extension from the date of receipt of data from the utilities, in order to facilitate the preparation and submission of the State Resource Adequacy Plan (SRAP) for FY 2026–27.

Accordingly, nine distribution licensees have submitted their respective Short-Term Distribution Resource Adequacy Plans (ST-DRAPs) and Medium-Term Distribution Resource Adequacy Plans (MT-DRAPs) to this office, along with the requisite data. Status of data receipt is attached herewith in the Annex. 1

While preparing the SRAP, MSLDC has primarily considered the DRAP submissions from the major distribution licensees in the state, namely:

- Maharashtra State Electricity Distribution Company Limited (MSEDCL)
- Adani Electricity Mumbai Limited – Distribution (AEML-D)
- Tata Power Company Limited – Distribution (TPC-D)
- Brihanmumbai Electric Supply and Transport (BEST)
- Indian Railways

However, it is to be noted that Indian Railways has not submitted its ST-DRAP for the current financial year. It is further observed that the ST-DRAP for the previous financial year was also not submitted by Indian Railways.

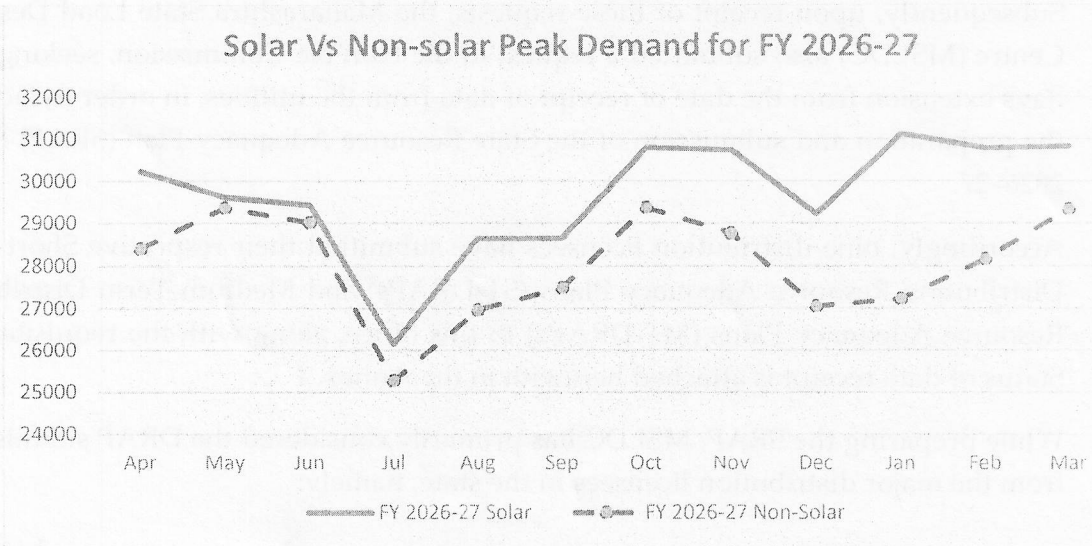
Based on the data submitted by distribution licensees and historical data available with MSLDC the Resource Adequacy study carried out by MSLDC as below: -

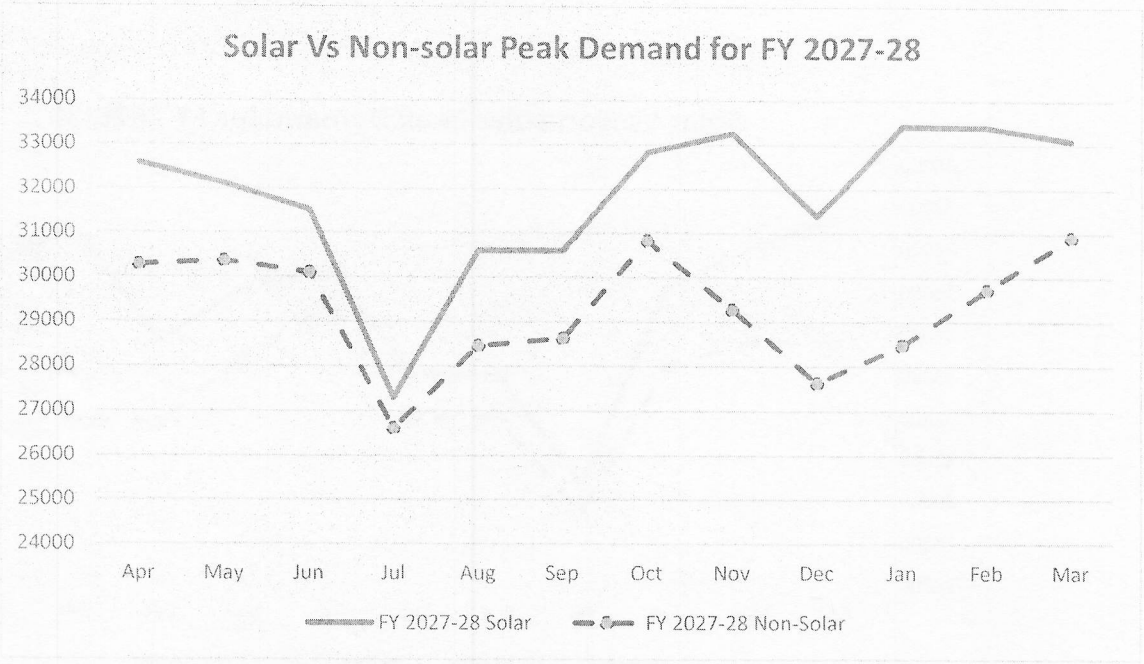
1) **State Level aggregated demand Assessment: -**

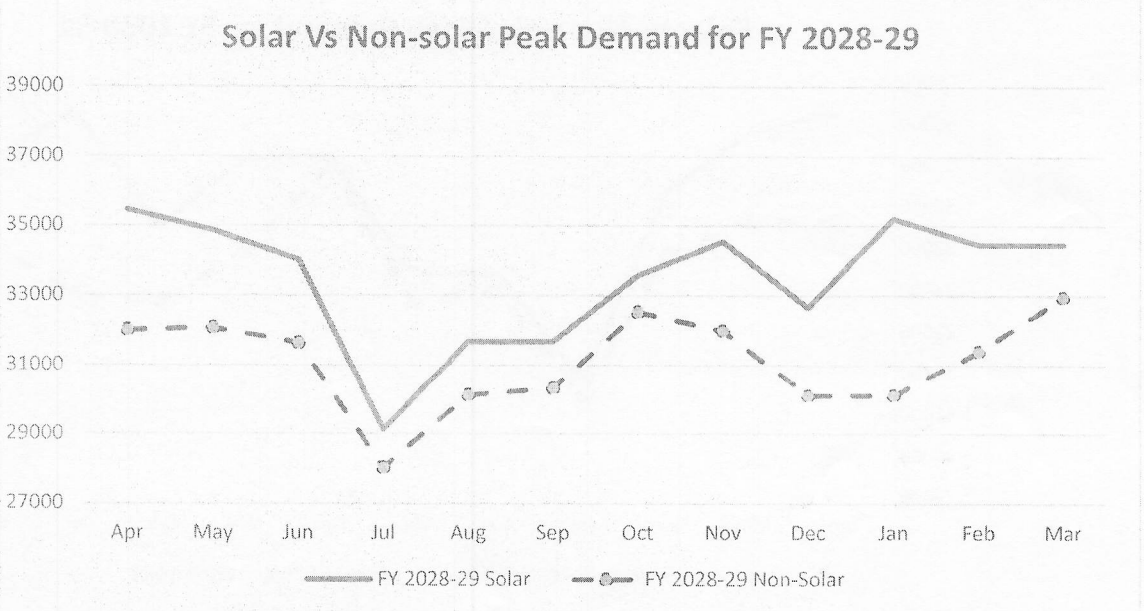
   All distribution licensees submitted hourly forecasted demand for next 5 years, accordingly MSLDC aggregated this hourly forecasted demand of all distribution licensees by addition of block wise demand of each distribution licensees and calculated solar hrs peak demand and non-solar hrs peak demand for the state on monthly basis.

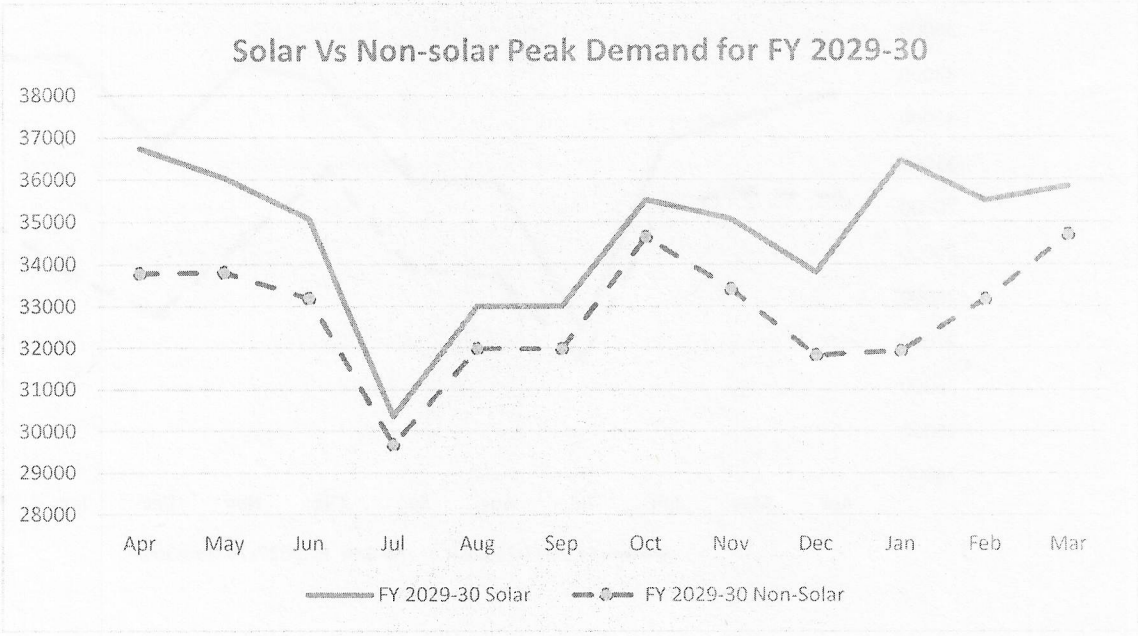
   For calculation of solar-hrs peak demand the duration of 06:00 hrs to 18:00 hrs are considered whereas for non-solar hrs peak demand the 18:00 hrs to 06:00 hrs of next day are considered.

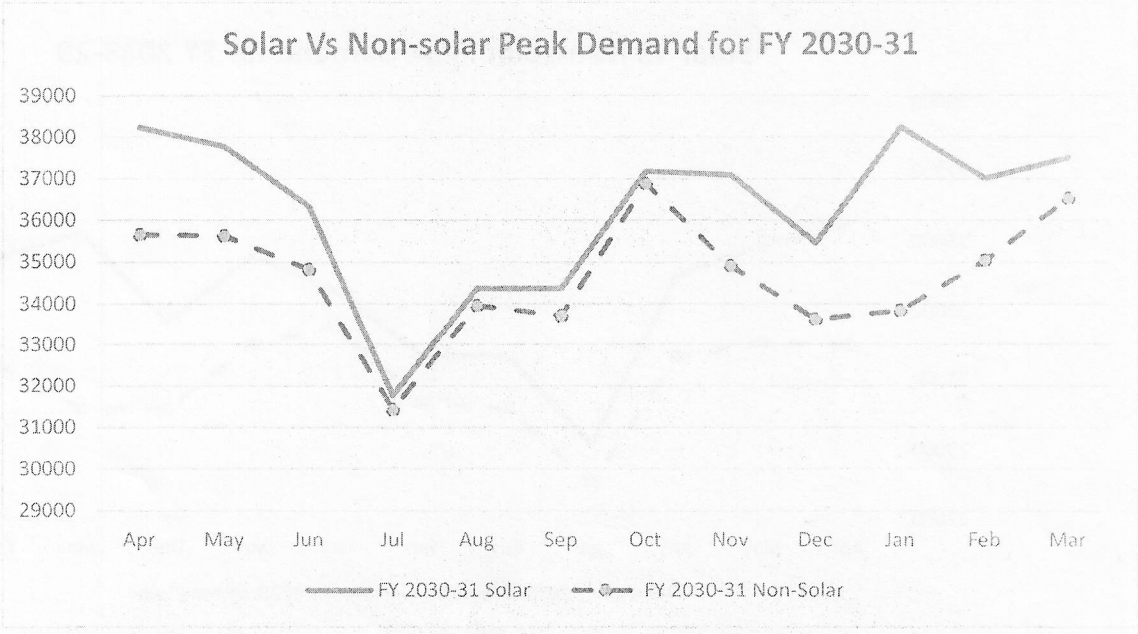
   The plots for peak demand solar hrs and peak demand non-solar hrs are as below: -




Solar Vs Non-solar Peak Demand for FY 2027-28
34000
33000
32000
31000
30000
29000
28000
27000
26000
25000
24000
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
FY 2027-28 Solar
FY 2027-28 Non-Solar


Solar Vs Non-solar Peak Demand for FY 2028-29
39000
37000
35000
33000
31000
29000
27000
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
FY 2028-29 Solar
FY 2028-29 Non-Solar





2) Capacity Credit Calculations: -

(The Capacity credits calculated by MSLDC for thermal generation resources attached in **Annex-1**)

2.1) The capacity credit calculation for thermal, Nuclear, Gas plants: -

As per available Discussion paper on Methodology for CC generation resources by Ministry of Power, CEA, Conventional Sources such as coal, gas,

and nuclear are reliable and dispatchable sources of power and can be made available during the high demand period. As such the capacity credit of these sources can be estimated as

Capacity Credit of Conventional Sources (Coal, Gas, Nuclear) = Installed Capacity *(1- Auxiliary Power) *Availability

Accordingly, the capacity credit for conventional based generating sources calculated by MSLDC based on the DC of each thermal plant available for last 4 years i.e. 2021-2025, the plant is considered as not available during planned and forced outages for CC calculation. Further 3 groups are prepared for thermal plants i.e. MSPGCL, IPP, Mumbai embedded generators and CC for all these three groups calculated separately considering their different operational behaviour. For new and upcoming resources CC factors are considered as provided by distribution licensees. Total 8 groups are considered for RA calculations.

2.2) The capacity credit calculation for solar and Wind: -

As per clause 10.2 of RA regulation, the Net Load based approach/methodology for determination of Capacity Credit (CC) factors for wind, solar, and wind-solar hybrid generation resources is used

The process for CC factor determination undertaken for each year for duration of past five years i.e. FY: 2020-21 to FY: 2024-25 and the resultant CC is the average of CC values of past 5 years data available with MSLDC. As the injection pattern of Wind & Solar generation changes majorly during Monsoon & non-Monsoon months and during Solar & Non-Solar hours, CC factors are calculated separately for Monsoon & Non-Monsoon period for Solar & Non-Solar hours. Monsoon months considered for calculation are June to sept. The solar hrs considered for calculation as 06:00 hrs to 18:00 hrs.

The resultant CC factors for Solar and Wind generating resources is enclosed in Annex -2

2.3) The capacity credit calculation for Hydro plant: -

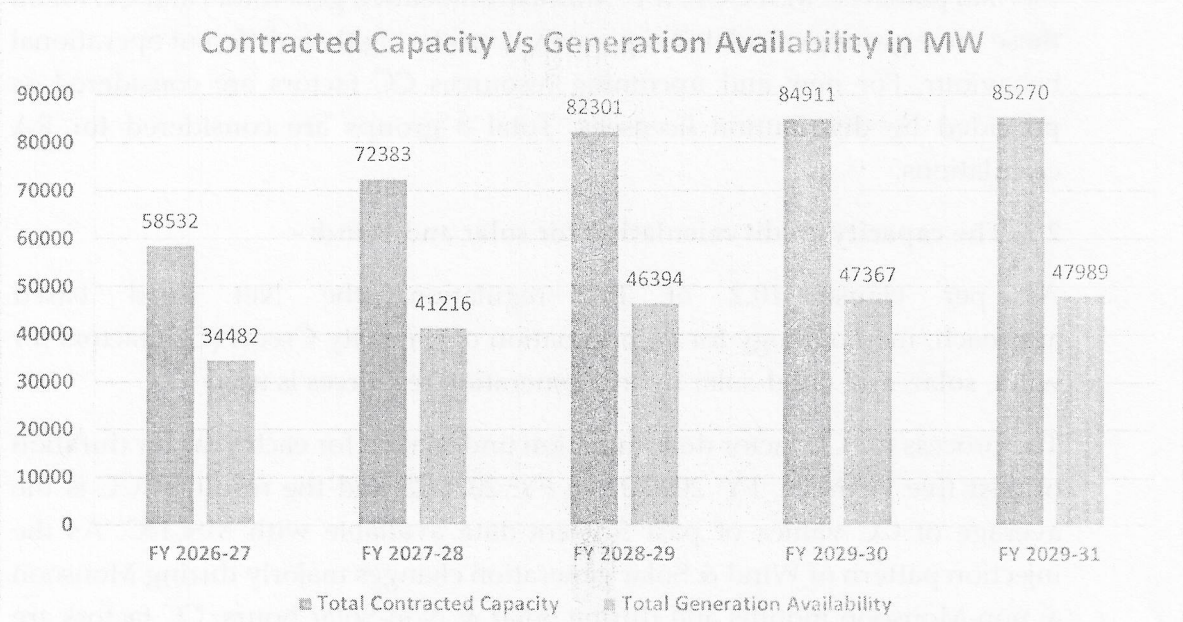
In Maharashtra major Konya generating plants, tata hydro generating plants availability is considered while calculation of Capacity credits for hydro plants.

The Capacity credits of all generating resourced is attached in Annex-1

3)The aggregated Generation Resources Availability for state: -

The all-distribution licensees except the Indian railways had submitted their contracted resources to the MSLDC for FY2027 to 2031

3.1) The state level contracted capacity is calculated by summation of all the contracted capacities submitted by all distribution licenses separately for each financial year. The year wise contracted capacity addition is as below:



3.2) The generation availability for each resource is calculated by multiplying the fuel wise contracted capacities by corresponding Capacity credit calculated in 2.1, 2.2,2.3 as above

3.3) Further total generation resources available for state is calculated by addition of all generation availability of each resource

4) **MSLDC's Submissions on shortfall in state: -**

The consolidated RA study including Shortfall/surplus for the state is attached in Annex-3 for FY 2026-2031 (5 excel sheets in soft form),

Note:-

1) Indian Railways Discom not submitted the MT-DRAP and ST-DRAP plan to MSLDC, hence it is contracted capacities for medium term and long term not considered in generation availability, however the demand is considered as per hourly demand data submitted by IR to MSLDC.
2) Other Deemed discoms in Maharashtra have contracted capacities are majorly through, MTOA, STOA and PX hence not included in total state contracted capacities. Further load of these discoms is approx. up to

100MW which is negligible compare to total state demand and hence not considered.

While preparing demand projections, utilities have included the Planning Reserve Margin (PRM) by grossing up the demand for resource adequacy calculations. The PRM considered is 5% by MSEDCL and AEML-D, 15% by BEST, and 3% by TPC-D.

3) Capacity credits for thermal generating resources are calculated based on last 4 years of data and for wind solar for last 4 years of data available at MSLDC.
4) The capacity credits considered by distribution licensees for their resources differ from the calculated values due to the use of different calculation methodologies.
5) Capacity credits for PSP (Pumped Storage Plants), BESS (Battery Energy Storage Systems), Hybrid, and FDRE (Flexible Demand Response-Enabled) resources are considered based on submissions from the respective utilities to the MSLDC.
6) Utilities have not included the PSP/BESS pumping or charging load in their demand projections during solar hours.
7) Pumping load (for PSPs), charging load (for BESS) is deducted from the surplus generation available in the state during solar hours, assuming that pumping/charging operations are carried out during this period.
8) During solar hours, if sufficient downward regulation (margin) is not available from thermal generation, there is a higher likelihood of Renewable Energy (RE) curtailment.
9) During solar hours, the state often experiences surplus power, with all intra-state thermal units operating at their technical minimum limit of 55%. With increasing RE penetration especially solar, such surplus scenarios are expected to recur more frequently. Therefore, it is necessary to explore reducing the technical minimum operating limit of intra-state thermal units below 55% to allow greater RE integration and reduce curtailment.
10) With higher solar generation during daytime, thermal generation may need to be ramped up during non-solar hours (especially evening peaks) to meet demand. To manage this dynamic requirement, two-shift operation of intra-state thermal units may be explored for enhanced flexibility and grid reliability.

11) Maximum shortfall in state is observed as below: -

Sr.No.	Financial Year	Months in which Max. short fall observed	Approx. Max Quantum of shortfall# in MW	Remark if any
1	2026-27	Oct-26	4893	During non- solar hrs only
2	2027-28	Oct -27	2246	During non- solar hrs only
3	2028-29	Mar-29	520	During non- solar hrs only
4	2030-31	Oct-30	974	During non- solar hrs only

 # The shortfall is subject to change as per contracted capacity addition proposed by Discoms.

12) The shortfall is observed only during non-solar hours.

13) BEST has considered short-term power procurement through STOA/PX to the tune of 200 MW over the five-year span, which is more than 10% of the peak demand of 1012 MW for FY 2026-27.

14) For FY 2026–27, AEML-D has planned power procurement through a medium-term contract to the tune of 375 MW. MSLDC has considered the capacity credit factor of 92% for this source, which is equal to the capacity factor of ADTPS.

15) AEML-D has considered short-term thermal power procurement of 450 MW for FY 2026–27 and short-term wind power procurement of up to 1,000 MW over the five-year period, which is more than 10% of the peak demand of 1787 MW for FY 2026-27.

Submitted for your further needful please.

Encl:- Annex 1 to 3 as above in soft form

(Shashank Jewalikar),
Executive Director,
MSLDC, Airoli

Annexure -1 The Capacity credits calculated by MSLDC for thermal generation resources

CC Factor for RA FY 26-27						
Sr No.	Generator Unit	CC Factor October-2021- December-2023 (822 Days)	CC Factor Januray- 2024-March-2025 (456 Days)	Average	Group CC	Remark
MSPGCL Thermal						
1	BHUSAWAL_U3	55%	74%	62%	66%	MSPGCL Thermal Group
2	BHUSAWAL_U4	76%	81%	78%		
3	BHUSAWAL_U5	76%	86%	79%		
4	CHANDRAPUR_U3	56%	69%	61%		
5	CHANDRAPUR_U4	54%	67%	59%		
6	CHANDRAPUR_U5	48%	76%	58%		
7	CHANDRAPUR_U6	58%	57%	58%		
8	CHANDRAPUR_U7	51%	69%	57%		
9	CHANDRAPUR_U8	82%	76%	80%		
10	CHANDRAPUR_U9	83%	62%	76%		
11	KHAPERKHEDA_U1	54%	72%	60%		
12	KHAPERKHEDA_U2	52%	74%	60%		
13	KHAPERKHEDA_U3	74%	66%	72%		
14	KHAPERKHEDA_U4	68%	79%	72%		
15	KHAPERKHEDA_U5	83%	87%	85%		
16	KORADI_U6	74%	76%	75%		
17	KORADI_U8	70%	74%	72%		
18	KORADI_U9	64%	74%	67%		
19	KORADI_U10	64%	74%	68%		
20	NASHIK_U3	41%	53%	45%		
21	NASHIK_U4	57%	70%	62%		
22	NASHIK_U5	57%	59%	58%		
23	PARAS_U3	77%	76%	77%		
24	PARAS_U4	74%	85%	78%		
25	PARLI_U6	78%	88%	81%		
26	PARLI_U7	77%	90%	82%		
27	PARLI_U8	63%	88%	72%		
28	URAN_STG_2	31%	42%	35%		
29	URAN_WHRP	21%	40%	28%		

CC Factor for RA FY 26-27						
Sr No.	Generator Unit	CC Factor October- 2021- December- 2023 (822 Days)	CC Factor Januray- 2024- March- 2025 (456 Days)	Average	Group CC	Remark
MSPGCL Hydro /SHP						
1	BHIRA_U12	20%	8%	16%	30%	MSPGCLHydro / SHP
2	DODSON HYDRO_1	7%	10%	8%		
3	KDPH	82%	86%	83%		
4	TILLARI	16%	20%	17%		
5	VAITARNA	28%	21%	26%		
6	GHATGHAR_1	4%	53%	21%	26%	
7	GHATGHAR_2	38%	18%	31%		
8	MSPGCL_KOYNAHYDRO	90%	95%	92%	93%	
IPP						
1	APML_U1	89%	94%	91%	79%	IPP Group
2	APML_U2	86%	85%	85%		
3	APML_U3	87%	85%	86%		
4	APML_U4	84%	94%	87%		
5	APML_U5	88%	86%	87%		
6	IEPL	37%	73%	50%		
7	RIPL_U1	84%	86%	85%		
8	RIPL_U2	79%	92%	83%		
9	RIPL_U3	75%	61%	70%		
10	RIPL_U4	81%	92%	85%		
11	RIPL_U5	82%	81%	82%		
12	JSWEL_U1	55%	83%	65%		
13	JSWEL_U234	86%	95%	89%		
14	SWPGL_U1234	62%	75%	66%		
Mumbai embedded Thermal/ Hydro generator group						
1	ADTPS_U1	94%	92%	93%	92%	Mumbai Thermal Group
2	ADTPS_U2	92%	91%	91%		
3	TPCL_U5	92%	65%	82%	68%	
4	TPCL_U7APM	50%	92%	65%		
5	TPCL_U7NAPM	47%	6%	32%		
6	TPCL_U8	96%	92%	94%		
1	TPCL_HYDRO	99%	99%	99%	99%	Mumbai Hydro

CC Factor for RA FY 26-27			
New Upcoming Resources CC factors considered by MSLDC			
PSP			
1	MSEDCL	100%	During Non-Solar Hours
2	AEML-D	100%	During Non-Solar Hours
3	TPC -D	90%	During Non-Solar Hours
4	BEST	90%	During Solar - Non-Solar
BESS			
1	MSEDCL	100%	During Non-Solar Hours
2	AEML-D	100%	During Solar - Non-Solar Hours
3	TPC -D	100%	During Non-Solar Hours
FDRE			
1	MSEDCL	80%	During Solar Hours
		90%	During Non-Solar Hours
2	TPC -D	90%	During Non-Solar Hours
3	BEST	37%	During Solar - Non-Solar Hours
Hybrid			
1	MSEDCL	55%	During Solar Hours
		7%	During Non-Solar Hours
2	BEST	80%	During Solar - Non-Solar Hours
RE RTC			
1	AEML-D	80%	During Solar - Non-Solar Hours

Annex-2 The resultant CC factors for Solar and Wind generating resources

RE CC Factors Monsson / Non-Monsson hours & Solar / Non-Solar Hrs.								
	Wind				Solar			
	Monsoon		Non-Monsoon		Monsoon		Non-Monsoon	
Year	Solar Hrs	Non-Solar Hrs	Solar Hrs	Non-Solar Hrs	Solar Hrs	Non-Solar Hrs	Solar Hrs	Non-Solar Hrs
2020-21	6.73	11.06	4.3	9.91	40.66	0	51.78	0
2021-22	13.29	18.7	6.13	12.25	34.54	0	47.88	0
2022-23	13.98	28.29	6.46	16.28	41.26	0	58.47	0
2023-24	18.04	32.2	5.39	12.27	50.72	0	51.34	0
2024-25	11.17	23.61	5.42	11.69	31.87	0	50.31	0
Average	**12.64**	**22.77**	**5.54**	**12.48**	**39.81**	**0.00**	**51.96**	0.00

Solar Hrs: 06:00 (25TB) to 18:00 hrs (72TB)

Monsoon: June to Sept

Annex-3 The consolidated RA study including Shortfall/surplus for the state for FY 2025-2030 (5 sheets in excel soft form)