



BEFORE

**THE UTTAR PRADESH ELECTRICITY REGULATORY
COMMISSION**

LUCNOW

Date of Order: 23.06.2023

**Suo-Moto Order for long-term procurement plan of UPDISCOMS for
FY 2028-to FY 40**

1. UPPCL had earlier filed Petition No. 1478/2019 for approval of Long -Term Power Procurement Plan of UP Distribution companies for the period 2019-30. The following salient points were made during the presentation before the Commission:
 - a. Contracted PPA capacity from all sources as on March 2019 supplying power was around 18134 MW, which comprised of 14161 MW of Thermal, Gas & Nuclear power, 3016 MW of Hydro and 958 MW of renewable power, thus totaling to 18134 MW. In addition to this, PPA capacity under implementation till year 2030 was around 27843 MW comprising 11999 MW of thermal, 1594 MW of Hydro, 1250 MW of Wind and 13000 MW of Solar & other renewable power. In the same period, 1325 MW of thermal capacity was projected to be retiring.
 - b. UPPCL & its Discoms would have an average demand surplus till FY 2027- 28, however, during last two years in FY 2028-29 and 2029-30, there could be a shortfall in availability vis-a-vis the expected demand.
 - c. The average load and peak load demand were expected to rise from existing level of 13000 MW & 22000 MW respectively (SLDC figures) to around 23720 MW and 32450 MW respectively by FY26, which was projected to be met from the existing portfolio of PPAs comprising of both Commissioned as well as under Commissioning projects.

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2. The Commission, after due analysis, keeping in view sub-optimal PLF of TPPS, higher stranded capacity charge burden on Discoms and future RPO, had observed that sufficient long-term capacity PPAs had already been contracted with coal based TPPs to meet the projected demand till 2027.

3. The Commission, thus, keeping in view 54 months gestation period, vide its earlier Order dated 09.07.2019, had decided to review the load demand balance in Dec 22 while granting liberty to procure short term seasonal peak power from power exchanges or Govt. of India DEEP portal or through bilateral banking arrangement with other States' Discoms. Relevant extract of the Order is reproduced below:

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- a. *Procure/contract long term renewable power through competitive bidding process to meet their renewable power obligations keeping in view the lead time in setting up different types of renewable power plants. If there is any unmet load demand even after meeting the RPO, it should be met preferably from Large Hydro sources, if available.*
- b. *In case the economics justifies and when the battery prices fall below per MW cost of setting up a new TPP with evacuation system. Discoms may consider contracting some capacity from the battery storage- based power plants located near load centers to meet their short duration peak demand.*
- c. *Since sufficient long -term capacity PPAs have already been contracted with coal based TPPs to meet the projected demand till FY2027. no new long term PPA with coal based thermal power plant should be contracted till Dec. 2022 by UPPCL or its Discerns. Commission will review the capacity & energy demand; and its availability status in Dec.2022 to re- assess the need for any new long term PPA with coal based thermal power plant keeping in view 54 months' gestation period required.*
- d. *Petitioner will have full liberty to procure short term seasonal peak power from power exchanges or Govt. of India DEEP portal or through bilateral banking arrangement with other States' Discoms.”*

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4. During the intervening period, the Commission also approved /adopted tariff for about 2565 MW solar, 2380 MW wind power and about 220 MW from other renewable projects. The Commission, while approving long term power procurement of 400 MW hydro power with RFP for another 500 MW hydro power, allowed relinquishment of 84 MW from Dadri Project.
5. Post December 22, now the Commission has suo moto decided to review the load demand situation in the state for long term power procurement from FY 2028 to FY 2040 to provide clear direction on long-term perspective based on optimal utilization of resources such as coal, natural gas, nuclear substances or materials, hydro and renewable sources of energy.
6. The ex-bus power purchase by UPPCL in energy and MW terms, average & peak demand recorded by UPSLDC, during last five years are as follows:

Year	As per UPPCL Tariff Order		As recorded by UPSLDC	
	Demand in MUs	Average Demand in MW	Average Demand in MW	Peak Demand in MW
2018-19	1,11,238	12,698	13842	20062
2019-20	1,09,328	12,480	14317	21632
2020-21	1,20,530	13,759	14763	23867
2021-22	1,23,406	14,087	15338	24795
2022-23 (APR)	1,36,951	15,634	17096	26589
2023-24 (ARR)	1,40,955	16,091	17471*	27611**

* Figures for 2023-24 are till May 2023
** Figure for 2023-24 is till 19th June 2023

7. The commissioned capacity as on 31.03.2019, projected capacity as on 31.03.2023 and actual commissioned capacity as on 31.03.2023 is as follows:

Source	Commissioned Capacity as on 31.03.2019	Projected Capacity as on 31.03.2019	Commissioned Capacity as on 31.03.2023
Gas			548
Thermal			20410
(Gas + Thermal)	14161	21842	20958
Hydro	3016	4228	3774
Other (Cogen, Solar, Wind,)	958	7408	6079
Total	18135	33478	30811

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8. It is, however, observed that the peak deficit has started to widen from FY 2022-23 owing to a strong revival in demand post COVID-19 pandemic and delayed execution of scheduled projects. It is to be further noted that the reduced capacity addition and increasing demand has resulted in increased plant load factors for existing thermal capacities, thereby reducing burden of stranded capacity charges.

9. The following capacities are expected to be commissioned from 2023-24 onwards:

Upcoming Capacity	Thermal	Hydro	Others	
			Solar	Wind
2023-24	4818	340	184	474
2024-25	957	268	1675	710
2025-26		234	2210	
2026-27			1600	
2027-28	800		1600	
2028-29			1600	
Total	6575	842	8869	1184

10. Thus, the total capacity available for supply is projected as follows:

Source	Commissioned Capacity as on 31.03.2023	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29
Gas	548						
Thermal	20410						
(Gas + Thermal)	20958	4818	957			800	
Hydro	3774	340	268	234			
Other (Cogen, Solar, Wind,)	6079	658	1675	2920	1600	1600	1600
Total	30811	5816	2900	3154	1600	2400	1600
Cumulative		36627	39527	42681	44281	46681	48281

11. Considering following PLF of thermal, hydro, Solar, wind, Cogen, Battery Storage and pumped hydro as shown in table (A), the available supply from

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all sources, on average basis during 00-24 hrs and maximum supply during peak hours (19-24 hrs) is as shown in table (B):

Table (A)

Load factor assumptions for supply	
Thermal	85%
Solar	23.31%
Hydro	48.67%
Wind	27.60%
Cogen	22.43%
Battery Storage	85%
Pumped Hydro	80%

Table (B)

Years	Average supply available (MW)	Peak supply available (MW)
2023-24	23380	23666
2024-25	26575	27175
2025-26	27675	28296
2026-27	28089	28327
2027-28	28915	28327
2028-29	29515	29009
2029-30	29515	29009
2030-31	29515	29009
2031-32	29515	29009
2032-33	29515	29009
2033-34	29515	29009
2034-35	29515	29009
2035-36	29515	29009
2036-37	29515	29009
2037-38	29515	29009
2038-39	29515	29009
2039-40	29515	29009

12. The load profile of state of U.P. is such that peak demand occurs during late evening on account of highest contribution of domestic load. As it is evident from above details that projected thermal and hydro capacity addition till 2028-29 is around 7,500 MW, whereas projected Solar capacity addition is about 9000 MW, which would not contribute to generation during peak hours. Therefore, maximum supply available during peak hours from 2028-29 onwards is projected to be lesser than average supply.



13. On the other hand on demand side, the average and peak demand growth over past few years, FY 18-19 to FY 22-23, is about 5.5% and 7.3% respectively, whereas, over past years i.e., FY 21-22 to 22-23, it is 11.5% and 7.2% respectively. Therefore, the Commission that varying and tapering growth rates for a period of 5-year slot would be more appropriate as considered in CEA EPS'20 report dated 16.11.2022. On the above basis, scenario emerging out for FY 24 to FY 40 is projected to be as following:


Growth rate	Years	Average supply available (MW)	Peak supply available (MW)	Average demand (MW)	Peak demand (MW)	RTC deficit (MW)	Peak deficit (MW)
9%	2023-24	23380	23666	18635	28982	4745	-5316
	2024-25	26575	27175	20312	31590	6263	-4415
	2025-26	27675	28296	22140	34434	5535	-6138
	2026-27	28089	28327	24132	37533	3957	-9206
8%	2027-28	28915	28327	26063	40535	2852	-12208
	2028-29	29515	29009	28148	43778	1367	-14769
	2029-30	29515	29009	30400	47280	-885	-18271
	2030-31	29515	29009	32832	51063	-3317	-22054
	2031-32	29515	29009	35458	55148	-5943	-26139
7%	2032-33	29515	29009	37941	59008	-8426	-29999
	2033-34	29515	29009	40596	63139	-11081	-34130
	2034-35	29515	29009	43438	67558	-13923	-38549
	2035-36	29515	29009	46479	72287	-16964	-43278
	2036-37	29515	29009	49732	77347	-20217	-48338
6%	2037-38	29515	29009	52716	81988	-23201	-52979
	2038-39	29515	29009	55879	86908	-26364	-57899
	2039-40	29515	29009	59232	92122	-29717	-63113

14. It can be clearly seen from the above that though there is an existing deficit in peak demand, it can always be met through exchange/bilateral/banking. Besides, energy storage integration would be key as surplus energy during daytime can be utilized during peak hours without purchasing additional power. However, from 2029 onwards, deficit on RTC basis will require a considerable enhancement in installed capacity, though a major part of this requirement can be met through RE sources.



15. The RE based generation is inherently intermittent and non-dispatchable in nature. This would in turn require balancing by the conventional power generators to manage the variable RE based generation. As coal-based generation is inherently inflexible in nature, multipronged approach including use of pumped storage plant and battery storage, cyclical operation of Gas based generation, optimization of hydro generation, etc. would be needed to ensure secure and reliable operation of the grid. Nonetheless, in order to meet the target, it would also be important that the old generating stations that are still operating economically, are utilized reliably and efficiently.
16. Therefore, upon review of the Power supply demand position and keeping in view the above analysis, the Commission allows UPPCL to tie-up long term power through coal, hydro, nuclear and gas, depending upon fuel source availability, in line with UPERC (Modalities of tariff Determination) Regulations 2023, to meet its Power demand on round the clock basis from 2029 onwards and the tie up should be considered keeping in view the lead time required for setting up and commissioning such generating plant so that RTC deficit from 2029 onwards is effectively met.


(Sanjay Kumar Singh)
Member


(Vinod Kumar Srivastava)
Member (Law)


(Raj Pratap Singh)
Chairman

Place: Lucknow
Dated: 23.06.2023

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