Before the
MAHARASHTRA ELECTRICITY REGULATORY COMMISSION
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Case No. 240 of 2022

Case of Brihanmumbai Electric Supply and Transport Undertaking for approval of Power Procurement plan for 7 years period from FY 2023-24 to FY 2029-30

Coram
Sanjay Kumar, Chairperson
I.M.Bohari, Member
Mukesh Khullar, Member

Brihanmumbai Electric Supply and Transport Undertaking: - ..... Petitioner

Vs

1	Maharashtra State Transmission Utility	Respondent No. 1
2	Maharashtra State Load Despatch Centre	Respondent No. 2
3	The Tata Power Company Limited- Generation	Respondent No. 3
4	Manikaran Power Ltd,	Respondent No. 4
5	Sai Wardha Power Generation Pvt Ltd.	Respondent No. 5
6	Indian Railways,	Respondent No. 6
7	Adani Electricity Mumbai Limited – Generation	Respondent No. 7
8	Adani Electricity Mumbai Limited– Distribution	Respondent No. 8
9	The Tata Power Company-Distribution	Respondent No. 9
10	Maharashtra State Electricity Distribution Co. Ltd.	Respondent No. 10
11	EON Kharadi Infrastructure Private Limited (EON SEZ Phase I)	Respondent No. 11
12	EON Kharadi Infrastructure Private Limited (EON SEZ Phase II)	Respondent No. 12
13	Laxmipati Balaji Supply Chain Management Limited	Respondent No. 13
14	Jawaharlal Nehru Port Trust	Respondent No. 14
15	KRC Infrastructure and Projects Private Limited	Respondent No. 15
16	Gigaplex Estate Private Limited	Respondent No. 16
17	Nidar Utilities Panvel Limited Liability Partnership,	Respondent No. 17
18	Maharashtra Airport Development Company	Respondent No. 18

Appearance

For Petitioner: -		Shri. N.N Chougule (Rep.) Shri. Ajit Pandit
For Respondents:		
1	Respondent No. 1	Shri. Peeyush Sharma (Rep.)
2	Respondent No. 2	Shri. M.B.Bhagwat (Rep.)
3	Respondent No. 3	Shri. Girish Pednekar (Rep.)
4	Respondent No. 4	Not appeared
5	Respondent No. 5	Smt. Kriti Soni (Adv.)
6	Respondent No. 6	Not appeared
7	Respondent No. 7	Shri. Anupam Patra (Rep.)
8	Respondent No. 8	Shri. Sanjay Sen (Sr Adv.)
9	Respondent No. 9	Shri. Prashant Kumar (Rep.)
10	Respondent No. 10	Shri. Dinesh Agarwal (Rep.)
11	Respondent No. 11	Smt. Shruti Radkar (Rep.)
12	Respondent No. 12	Smt. Shruti Radkar (Rep.)
13	Respondent No. 13	Shri. Suhas Ambade (Rep.)
14	Respondent No. 14	Shri. Suhas Ambade (Rep.)
15	Respondent No. 15	Not appeared
16	Respondent No. 16	Not appeared
17	Respondent No. 17	Not appeared
18	Respondent No. 18	Shri. Ashish Nagarkar (Rep.)

ORDER

Date: 15 March, 2023

1. Brihanmumbai Electric Supply and Transport Undertaking (**BEST**) has filed this Case on 20 December 2022 for approval of its Power Procurement Plan for the period from FY 2023-24 to FY 2029-30 under Sections 62 and 63 of the Electricity Act 2003 (**EA, 2003**) read with Section 86 (1) (b) of the Electricity Act 2003 and under Regulations 20.1 of the MERC (Multi-Year Tariff) Regulations, 2019 (**MYT Regulations, 2019**)

2. **BEST's main prayers are as under:**

   a. *To approve the power procurement plan.*

   b. *To allow BEST to initiate the tender process for power procurement (Long term/ Medium term/ Short term) as per standard guidelines issued by the Ministry of Power and enter into agreements/ arrangements for power procurement in line with the power procurement plan.*

   c. *Direct STU/MSLDC to allot transmission corridor based on Transmission Capacity Rights of Mumbai utilities.*

3. **BEST in its Petition has stated as follows:**

3.1 The Commission vide its Order in Case No 25 of 2017 dated 23 September, 2017 has approved the Power Procurement Plan for FY 2018-19 to FY 2027-28 and further modified in Case No 249 of 2018 dated 2 January, 2019 to the extent of extension of PPA with TPC-D till March, 2024.

3.2 The energy charges of TPC-G generators except for Hydro generation have increased significantly in the recent past (of the order of Rs. 8.0 to Rs. 11.0 per unit) as compared to other generators in Maharashtra/Country. This results in a higher Average Power Purchase Cost (APPC) for BEST consumers.

3.3 BEST has arrived at the most optimal Power Procurement Plan for the next 7 years from FY 2023-24 to FY 2029-30 based on its operational experience, limitations of availability of corridor and considering the availability of cheaper resources and other market developments at the national level.

3.4 BEST has analysed historical demand and energy sales in past 10 years from FY 2012-13 to FY 2021-22. The historical demand is assessed based on maximum demand and minimum demand in past 10 years, consumer category wise trend of energy sales, load curves and load duration curves and pre-covid & post-covid demand and energy sales analysis.

3.5 The historical trend of energy sales of BEST has been analysed based on the Trued-Up Orders of BEST till FY 2018-19. Further 10-year, 7-year, 5-year, and 3-year CAGR for Total energy Sales has been computed till FY 2019-20 as shown below.

Table 1: Historical Energy Sales from FY 2010-11 to FY 2018-19 as approved by the Commission (MUs)

	Case no. 26 of 2013		Case no. 33 of 2016			Case no. 203 of 2017		Case no. 324 of 2019		Actual sales of BEST		
	FY 10-11	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22
HT	598	610	621	652	686	712	708	687	681	681	541	582
LT	3,669	3,676	3,771	3,698	3,733	3,865	3,695	3,857	3,891	3,889	3,298	3,497
Total	4,267	4,286	4,393	4,350	4,419	4,577	4,403	4,544	4,572	4,569	3,838	4,078
Total Energy Sales CAGR (w.r.t. FY 2019-20)									**10 years**	**7 years**	**5 years**	**3 years**
									0.76%	**0.82%**	**0.86%**	**0.28%**

3.6 BEST has also analysed the CAGR of energy sales of other distribution licensees in Mumbai and co- related with the data published by CEA on the growth of energy sales in Maharashtra.

3.7 BEST has observed no significant change in the load shape across the years, except during the COVID period. Also, no significant growth in sales and demand is observed. However, Post COVID growth of 6.3% in energy sales is observed. For demand and energy sales forecast from FY 2022-23 up to FY 2029-30, BEST has

considered the base year as FY 2019-20. Further energy sales forecast of Mumbai City and Maharashtra are observed in the range of 2.5- 3.5 % as per the calculations of 5 years and 9 years CAGR.

3.8 BEST has projected the demand and energy sales from FY 2022-23 to FY 2029-30 based on the following methods:

a. Trend based method.
b. Trend based + new load method.

a. Trend Based Method: -

3.9 BEST in this method has analysed the past trend of demand and energy sales. Further, with the anticipation of new load developments and probable reduction in load in future, demand and sales projections are done.

Table 2:-Base load and peak load forecast (T<>D) from FY 2022-23 to FY 2029-30 as per Trend based Method (MW)

Particulars	FY 19-20	FY 22-23	FY 23-24	FY 24-25	FY 25-26	FY 26-27	FY 27-28	FY 28-29	FY 29-30
Base Load (MW)	385	393	401	409	417	425	434	442	451
Peak Demand (MW)	888	905	923	942	961	980	999	1,019	1,040

Table 3: Energy sales forecast from FY 2022-23 to FY 2029-30as per Trend based Method (MUs)

Particulars	FY 2019-20	FY 2022-23	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27	FY 2027-28	FY 2028-29	FY 2029-30
Energy Sales(MU)	4,569	4,661	4,754	4,849	4,946	5,045	5,146	5,249	5,354

b. Trend Based + New Load Method

3.10 Under this method the demand and energy sales are projected with the historical CAGR. Further, new load avenues are taken considering BEST development plans and background survey.

Table 4: Base load and peak load forecast(T<>D) by BEST from FY 2022-23 to FY 2029-30as per Trend Based + New Load Growth Method (MW)

Sr. No.	Particulars	FY 2019-20	FY 2022-23	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27	FY 2027-28	FY 2028-29	FY 2029-30
1	Base Load (MW)	385	391	397	403	409	415	421	427	434
2	Peak Demand (MW)	888	901	914	928	942	956	970	985	1,000

3.11 The Energy sales have been projected with 1.5 % CAGR from FY 2022-23 to FY 2031-32 taking base year of FY 2019-20 along with considering new load growth and reduction in sales as follows:

Table 5: Projected Energy Sales form FY 2022-23 to FY 2029-30 in Trend + New Load Growth (MUs)

Particulars	FY 2022-23	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27	FY 2027-28	FY 2028-29	FY 2029-30
Energy Sales with 1.5% CAGR (A)	4,637.88	4,707.45	4,778.06	4,849.73	4,922.48	4,996.32	5,071.26	5,147.33
Energy Sales w.r.t. additional load (B)	137.85	265.31	402.40	521.97	569.68	656.14	741.38	827.84
Reduction in energy sales w.r.t. RTPV, PL, DSM & EE (C)	204.62	245.44	290.94	341.18	396.27	456.31	464.93	474.67
Net Energy Sales (D=A+B-C)	**4,571.11**	**4,727.31**	**4,889.52**	**5,030.52**	**5,095.89**	**5,196.14**	**5,347.71**	**5,500.50**

3.12 BEST has observed that the CAGR under Trend based + New load analysis for the same period has come out to be 2.6% which is on the higher side considering the present historical growth of energy sales for the period of FY 2012-13 to FY 2019-20 and the uncertainty of commencement of the future new loads. Hence, the CAGR of 2% under Trend based method is considered more suitable for power procurement analysis. BEST's distribution losses are at most efficient levels and further BEST has considered reduction in the present loss level of FY 2021-22 (4.63%) by 0.1% Y-o-Y from FY 2022-23 up to FY 2029-30. Further BEST has considered the transmission losses as approved in MYT Order of InSTs.

3.13 Accordingly, Energy sales G<>T periphery are as below:

Table 6: Energy Balance from FY 2022-23 to FY 2029-30 (MUs)

Particulars	Unit	FY 22-23	FY 23-24	FY 24-25	FY 25-26	FY 26-27	FY 27-28	FY 28-29	FY 29-30
Energy Sales to consumers	MUs	4,661	4,754	4,849	4,946	5,045	5,146	5,249	5,354
Distribution Losses	%	4.53%	4.43%	4.33%	4.23%	4.13%	4.03%	3.93%	3.83%
Energy input at distribution periphery (T<>D periphery)	MUs	4,882	4,974	5,068	5,164	5,262	5,362	5,463	5,567
InSTS losses	%	3.18%	3.18%	3.18%	3.18%	3.18%	3.18%	3.18%	3.18%
Power Purchase at G<>T Periphery	MUs	5,042	5,138	5,235	5,334	5,435	5,538	5,643	5,750

Supply forecast:

3.14 BEST has considered the power procurement planning based on the Demand and Energy sales forecast. Further, the existing PPAs of BEST were reviewed to derive the power purchase strategy for BEST in the short term, medium term and long term.

3.15 Summary of existing PPAs of BEST is as follows:

Sr. No	Power Project / Agency	Type of Source	BEST's Contracted Capacity (MW)	Rate (Rs. /kWh)	Period
PPA-1	TPC-G	Hydro	228.73	Under Sec. 62	FY 2019-20 to FY 2023-24
	TPC-G Unit No-5	Thermal	255.85		
	TPC-G Unit No- 7	Thermal	92.11		
	TPC-G Unit No-8	Thermal	100		
PPA-2	Welspun Energy Maharashtra Ltd.	Solar PV	20	8.56	Oct 2013- Sep 2038
PPA-3	Manikaran Power	Thermal	100	2 Part Tariff: Base FC and EC is revised Y-O-Y (as per Clause 11 & 12 of PPA)	Mar 2020 to Feb 2025
PPA-4	SECI Hybrid	Solar	269.55	2.48	FY 2024-25 to FY 2049-50
		Wind	103.45	2.48	
PPA-5 (In process)	SECI Solar	Solar	234	2.71	FY 2025-26 to FY 2050-51

a. Power Purchase Agreement with TPC-G

3.16 BEST has signed a PPA with TPC-G for 676.69 MW which is expiring on 31 March, 2024. BEST has proposed to discontinue (not renew) the existing PPA with TPC-G for Unit5, Unit 7 and Unit 8 due to significantly higher cost in the recent past (Rs 8 to Rs 11 per unit) in comparison with the recent market trend and intended to bring cheaper power from outside Mumbai. Considering the views expressed by various Committees formed on the backdrop of grid disturbance in October 2020, for need of embedded generation within Mumbai, BEST has proposed to continue its share from TPC-G Hydro generating stations for capacity of 228.73 MW on long term basis with mutual consent of the parties for requirement of optimal power purchase as per clause 3.2 of the existing PPA. The relevant clause is reproduced as below: -

"The power will be purchased by BEST under Sec. 62 of Electricity Act 2003 with tariff being determined by MERC.

...

3.2 On the background that the 100 year old Hydro power plants have been supplying power to the Mumbai city consumers who have in a way contributed to the cost realization of the plants through BEST and Tata Power and that now the energy is available at a cheap rate and likely to be cheaper in the future years also, BEST proposed that they would like to continue Hydro Power generation capacity tie up on a continual basis beyond year FY2023-24 in order to give benefit of the cheaper power to Mumbai city consumers of BEST and Tata Power while ensuring capex required for reliability and up gradation necessary for hydro plants.

Tata Power expressed that beyond the present extension of 5 years, the tie up of Hydro power and power from the operational thermal Unit 7 and Unit 8 of Trombay can be continued in the same ratio (51.17% of Hydro & Unit 7 and 40% of Unit 8) for blocks of 5 years each based on approval of cost of Life extensions of Unit 7 as approved by MERC and APM gas availability, which are reviewed every 5 years. ***Hydro power tie-up with BEST to continue even after completion***

of life of unit 7 and 8 through first right to avail *Hydro power to be given to BEST and Tata Power on equitable basis from all the three hydro power plants mentioned in the above table. The extensions will be subject to applicable statutory approval as per the Electricity Act, 2003."*

b. Power Purchase Agreement with Manikaran Power Ltd (MPL)

3.17 BEST has executed PPA with MPL from 1 March, 2020 to 28 February, 2025 for 100 MW at Rs 3.94 per kWh as per the Orders of the Commission in Case No 249 of 2018 and in Case No 61 of 2021. Further, PPA can be extended for one year as per the Article 3.1:

"3.1 The Procurement Contract

...

Provided that at any time 3 (three) months, prior to the expiry of the Contract Period specified hereinabove. the Parties may with mutual agreement extend the Contract Period for such further period as they may determine, but not exceeding the lower of 25% (twenty-five per cent) of initial contract period or one year whichever is lower."

At present, BEST is procuring 100 MW electricity from MPL at Rs 4.26 per unit, the applicable tariff for financial year 2022-23.

3.18 During a meeting held on 12 September, 2022, Sai Wardha Power Generation Private Limited (SWPGPL) offered to provide an additional 100 – 130 MW power to BEST over and above the existing 100 MW power, on the same terms and conditions as that of the existing PPA. SWPGPL also offered to extend the terms of the PPA up to 20 years post expiry of the current PPA up to 31 March 2045, by way of an amendment and augmentation to be carried out to the existing PPA. SWPGPL has proposed the commercial impact of installation and commissioning of FGD separately on BEST.

3.19 In the past such extension of PPA was approved in the case of M/s KSK Mahanadi Power Company Ltd and Southern Power Distribution Company of Andhra Pradesh Ltd and Eastern Power Distribution Company of Andhra Pradesh Ltd as per Andhra Pradesh Electricity Regulatory Commission (APERC) Order O.P. No. 3 of 2015 dated 19 August 2015.

3.20 The present proposal submitted by SWPGPL to BEST Undertaking is similar to APERC O.P No. 3 of 2015 about the extension of PPA between AP Discoms and KSK Mahanandi Power Company Ltd.

3.21 The power purchase cost of MPL/ SWPGPL is competitive compared to the market trend and therefore the proposal is under consideration. BEST will approach Commission for approval of extension of PPA separately with detailed clauses to be amended and with approach of BEST to extend the PPA.

3.22 In view of above, BEST has considered additional power of 100 MW from SWPGPL in FY 2024-25 over and above the existing power of 100 MW from MPL and from FY 2025-26 to FY 2029-30, BEST has considered 200 MW from SWPGPL.

c. Renewable Purchase Obligations: -

3.23 The RPO targets are notified by the Commission till FY 2024-25. To determine RPO targets for the next control period, BEST has considered a 1.5 % rise every year in Solar RPO and a 0.5 % increase in Non-Solar RPO, and RE energy procurement is planned accordingly.

d. Power Purchase Agreement with Welspun/ Walwhan Solar:

3.24 BEST has considered solar power from M/s Welspun Energy Maharashtra Pvt. Ltd. for 20 MW Solar Power as per PPA signed on 27 May 2013 for a period of 25 years at the flat rate of Rs. 8.56/ Unit

e. Power Purchase Agreement with SECI Solar + Wind Hybrid Power Plant

3.25 The Commission in Case No. 16 of 2021 dated 26 April, 2021 has approved the procurement of 400 MW Wind-Solar Hybrid Power from SECI at tariff of Rs. 2.41/unit plus trading margin of 7 paise/unit for 25 years. SECI has informed BEST that there could be a delay due to delay in SCOD of transmission system and power will be available from December 2024. Therefore, BEST has considered this power from FY 2024-25 in its proposal.

f. Power Purchase Agreement with SECI Solar:-

3.26 BEST has signed long-term PSA for 25 years executed between BEST and SECI for procurement of 234 MW Solar Power for a tariff of Rs.2.71/kWh (including trading margin of Rs. 0.07/kWh for the entire term of the agreement and additional risk premium of Rs. 0.10 per unit due to not covered under State Government) on 09 December, 2022. Further, as per recent communication from SECI, transmission projects associated with Solar Power may get delayed and hence, power will be available from SECI Solar from FY 2025-26 onwards. BEST has considered this power from FY 2025-26 in its proposal.

g. Additional Power: -

3.27 As per demand forecast in trend-based scenario, available PPAs in short term, medium term &long term and availability of power from new sources as per SECI bids, additional power procurement required w.r.t. demand and energy sales forecast apart from power availability from existing PPAs is computed as below.

Table 7: Additional capacity required w.r.t. the Peak demand (MW) and energy sales projection (MUs)

Particulars	Unit	FY 2022-23	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27	FY 2027-28	FY 2028-29	FY 2029-30
Total Capacity available	MW	796	796	499	513	513	513	513	513
Peak Demand forecast	MW	905	923	942	961	980	999	1019	1040
Additional Capacity requirement w.r.t. peak demand	**MW**	119	137	443	447	467	486	506	527
Total Energy available	MU	4,344	4,385	1,930	2,591	2,591	2,591	2,591	2,591
Total energy forecast	MU	4,661	4,754	4,849	4,946	5,045	5,146	5,249	5,354
Additional Energy requirement w.r.t. energy forecast	**MU**	**698**	**753**	**3,305**	**2,743**	**2,844**	**2,947**	**3,052**	**3,159**

3.28 The delay of SECI Solar and Hybrid will result in shortfall of power availability in FY 2024-25 as PPA with TPC-G will expire on 31 March 2024. Therefore, there will be requirement of up to 200 MW RTC power. Accordingly, BEST will carry out a competitive bidding process for up to 200 MW RTC and up to 200 MW Peak power on a Medium-Term basis. BEST has considered this power in its proposal.

Transmission Corridor Availability

3.29 From last one decade, Mumbai utilities are facing difficulties for availability of transmission corridor and struggling to bring power inside Mumbai from Maharashtra and outside Maharashtra. There are constraints at state periphery in CTU-STU corridor and utilities are deprived from optimizing their power purchase portfolio by purchasing cheap power from outside Maharashtra. On the contrary, high-cost power from embedded thermal generators of TPC-G is required to be purchased. This is ultimately resulting into higher tariff to consumers in Mumbai.

3.30 STU has granted conditional NOC dated 10 May 2022 on the application of BEST for supply of 400 MW hybrid power (Solar + Wind) from SECI as per PPA executed on 26 June 2021 under long term arrangement for 25 years. Further BEST has executed PPA with SECI for another 234 MW for solar @ Rs 2.71/ kWh

3.31 The Commission in its Order in Case No 107 of 2022 directed STU to assess the power procurement plan which will be submitted by BEST considering its consistency with the available transmission capacities and accordingly advise the BEST or other Mumbai Distribution Licensee

3.32 STU in its letter has mentioned that 2856.87 MW additional capacity is required based on allocation received. For this additional ATC requirement, CTU-STU interface is required and it is mentioned that conditional NOCs issued are applicable subject to

completion of strengthening projects of CTU-STU network & availability of ATC margin with obligation to Indemnity Bond

Mumbai Transmission Corridor Allocation (MSETCL to Mumbai) and its Utilization

3.33 Transmission constraints between MSETCL and Mumbai system is major constraints for Mumbai utilities for Power Purchase from Outside Mumbai/Maharashtra. Further, the utilization of the corridor is not on equitable basis and utilities which have made arrangement from power outside Mumbai are availing the benefits of corridor.

3.34 The Commission while issuing an order in Case Nos. 25, and 26 of 2017 has mentioned under Clause No. 42.5 as below:

> *"Considering the transmission constraints, BEST has suggested that the share of each Distribution Licensee in the limited transmission capacity be determined on the same methodology as for the sharing of Transmission Charges, and that all the remaining power can be purchased by the Mumbai Licensees proportionately from out of the embedded generation. In their respective submissions on the presentation made by the STU on the removal of embedded generation, TPC-D and RInfra-D have also suggested that the Available Transmission Capacity be allocated among the Mumbai Distribution Licensees. TPC has also suggested that the allocation be in the same ratio as for sharing of Transmission Charges, viz., the respective shares of the Distribution Licensees in the average of CPD and NCPD."*

3.35 As such, the utilities are paying STU transmission charges according to their Transmission Capacity Rights. Hence, in order to have equitable sharing in the MSETCL to Mumbai transmission corridor, it is necessary to allocate the corridor capacity to utilities within Mumbai in proportion to their Transmission Capacity Rights.

3.36 Power purchase of all Mumbai utilities from outside Mumbai depends on availability of capacity of Transmission corridor between Mumbai and MSETCL. As of now there no protocol established for utilization of this corridor by Mumbai utilities. Hence, it is necessary to establish a protocol for allocation this corridor among Mumbai utilities.

3.37 Hence, it is requested that "Each Distribution Licensee shall be allocated capacity within ATC of MSETCL to Mumbai transmission corridor proportionate to the capacity to be determined on the same methodology as per the sharing of Transmission Charges, and that all Mumbai Licensees can utilize the corridor for purchase of power from outside Mumbai.

a) For allocation of ATC, the Transmission Capacity Rights (TCR) are considered as per order dated 30 March 2020 in Case No. 322 of 2019 for MYT order of MSEDCL.
b) Available Transfer Capability (ATC) : 2746.00 MW
c) TCR of Indian Railway (Mumbai) : 108.34 MW
d) MSEDCL Load within Mumbai fed through TPC-D network : 248.00 MW
e) Balance capacity excluding IR (Mumbai) and MSEDCL load : 2389.66 MW

Table 8: Allocation of Available Transfer Capability

Year	Utility	TCR	% In TCR	ATC	Indian Railway (Mumbai)	MSEDCL Load in Mumbai	Balance Capacity	Share in Balance ATC (MW)
FY 2022-23	TPCL-D	830.26	25.97	2746	108.34	248.00	2389.66	620.50
	AEML-D	1544.70	48.31		108.34	248.00	2389.66	1154.44
	BEST	822.52	25.72		108.34	248.00	2389.66	614.72
	Total	3197.48	100.00					2389.66
FY 2023-24	TPCL-D	841.24	25.91	2746	112.17	248.00	2389.66	619.16
	AEML-D	1576.88	48.57		112.17	248.00	2389.66	1160.66
	BEST	828.27	25.52		112.17	248.00	2389.66	609.84
	Total	3246.39	100.00					2389.66

3.38 As per calculation above, share of BEST in ATC of MSETCL to Mumbai Transmission corridor for FY 2022-23 is 614.72 MW.

Power Procurement Strategy:-

3.39 Based on the approach for analysis and development of power procurement plan, BEST has used Plexos Model to simulate power procurement strategy up to FY 2029-30 considering available generator with BEST and requirement of new generating sources to meet load. Accordingly, two scenarios are developed to analyse the impact on APPC as shown below.

Table 9: Scenario analysis for running of TPC-G Generator

Particulars	TPC-G U5	TPC-G U7 (APM)	TPC-G U8	TPC-G Hydro
Scenario 1: (Only hydro considered without extension of PPA with Manikaran Power from FY 2025-26 onwards)	× (From 2025 to 32)	× (From 2025 to 32)	× (From 2025 to 32)	√ (From 2022 to 2032)
Alternate Scenario: (Only hydro considered with extension of PPA with Manikaran Power from FY 2025-26 onwards)	× (From 2025 to 32)	× (From 2025 to 32)	× (From 2025 to 32)	√ (From 2022 to 2032)

(Note: X symbol denotes exclusion of the TPC-G unit for the specified years and the √ symbol denotes the running of the TPC-G unit for the specified year.)

3.40 The Plexos modelling for Power Procurement Planning is performed for the two scenarios i.e., Scenario 1 and Alternate Scenario with the objective to optimize the Average Power Purchase Cost (APPC) of BEST in Short Term, Medium term and Long-Term power purchase.

3.41 Based on the results of scenarios built in Plexos model, additional power requirement of BEST, existing PPAs up to FY 2029-30 and analysis of generation duration curves, two power purchase options are identified as below:

Particulars	Generator source	Capacity (MW)	Remark
Existing contracted capacity	TPC Hydro	228 MW	BEST wants to tie up with TPC Hydro considering its first right to avail supply from hydro generation.
	SECI Hybrid	400 MW	Power will be available from December 2024 onwards.
	SECI Solar	234 MW	Power will be available from FY 2025-26 onwards.
	Walwhan/ Welspun Solar	20 MW	BEST is procuring power from Walwhan Solar under Long Term PPA up to FY 2037-38.
Option 1	Medium Term RTC	Up to 300 MW	Medium term contract up to 300 MW power will be required from FY 2024-25 onwards as PPA with TPC-G will expire to meet the base load requirement.
	Medium Term (Peak and Night)	Up to 200 MW	Medium term contract of up to 200 MW will be required during evening 1700 hrs to 0500 hrs in the morning due to non-availability of RE power.
	Short term DAM & GDAM	As required	Power from DAM & GDAM can be procured as and when it will be necessary.
Option 2	LT Solar (New)	300 MW	From FY 2027-28 onwards, additional solar power with 300 MW capacity can be procured to meet day-time load of BEST.
	MT Peak & Night	Up to 400 MW	Medium term contract of up to 400 MW to meet the load from 1700 hrs to 0500 hrs from FY 2024-25 onwards will be required. The power flow will commence from FY 2024-25
	Short Term DAM & GDAM	As required	Power from DAM & GDAM can be procured as and when it will be necessary.

3.42 With detailed analysis of Option 1 & 2, it is observed that Option 1 is more suitable. Further, BEST is planning to procure 200 MW power from MPL with extension of existing PPA.

3.43 Accordingly, BEST has submitted revised Option 1 power procurement plan for approval of the Commission.

Existing Contracted capacity:

Hydel power - 228 MW
SECI (Wind-Solar Hybrid) – 300MW(S)+100 MW(W)
SECI (Solar) – 234 MW
Manikaran Power Ltd/ Sai Wardha: 200MW
Walwhan Solar: 20 MW

Option-1:

Medium Term RTC Contract – Upto 200 MW
Medium term Peak & Night – Upto 200 MW (1700 hours to 0500 hours)
Short term – DAM and GDAM (as necessary)

3.44 From the revised power procurement strategy, it can be observed that major quantum of BEST demand can be met through MPL, TPC-Hydro and SECI Hybrid & SECI Solar plants. It will help BEST to optimize its power purchase cost in longer duration. Hence, it is requested to approve the same.

4. **Maharashtra State Transmission Utility (STU) in its submission dated 11 January, 2023 and 27 January 2023 has stated as follows:-**

4.1 Mumbai system demand (for the present reply - TPC-D, BEST and AEML-D) is catered by way of embedded generation with installed capacity of 1877 MW within Mumbai and external power sources (around 2000 MW), imported into Mumbai through four interconnections points with Intra-State Transmission Network (InSTS) at 220 kV Trombay, Kalwa, Borivali and Boisar sub-stations of MSETCL. The entire 1877 MW of embedded generation is tied up with these three distribution companies. Further, PPAs in respect of embedded generation of AEML-G and TPC-G are expiring in October 24 and March 24 respectively.

4.2 Due to reduction in embedded generation and growth in Mumbai demand there is increased power flow from outside to Mumbai through tie-lines to meet the demand of the island. Further, all the three distribution licensees have tied up significant renewable power which is also approved by the Commission and is likely to be commissioned in next 2-3 years.

4.3 The Mumbai power system is connected with the rest of the Maharashtra grid through 15 tie lines (220kV & 110kV) at MSETCL's four receiving stations (Trombay, Kalwa, Borivali, and Boisar). Also, AEML Dahanu's generating units and its associated transmission network are connected to TPC's transmission network through three tie lines at the TPC - Borivali receiving station and AEML – Versova receiving station.

4.4 The total Available Transmission Capacity of the tie lines to bring power within Mumbai is 2522 MW. The said transmission capacity is able to meet the present demand of Mumbai considering the embedded generation capacity of 1877 MW.

4.5 Presently, the Mumbai Demand and ATC are as given below:

Particulars	Mumbai Peak Demand - MW	ATC - MW
FY 2018-19	3888	2474
FY 2022-23	3851(Till Jan 2023)	2522

4.6 Further, on the backdrop of the partial Grid failure occurred in MMR & Mumbai area on dated 12 October, 2020, the maximum permissible line loadings have been modified than as considered earlier. The revised maximum permissible loading on the said 400 kV lines are as below:

a. 400 kV Talegaon (PG) – Kalwa: 900 MW
b. 400 kV Talegaon (PG) – Kharghar: 900 MW
c. 400 kV Padghe – Kalwa D/C: 800 MW each.

4.7 The transmission constraints subsequently have been observed on 400 kV lines viz. 400 kV Talegaon (PG) – Kalwa, 400 kV Talegaon (PG) – Kharghar, 400 kV Padghe – Kalwa D/C.

4.8 Accordingly, now while carrying out the systems studies for calculating the Mumbai system TTC/ ATC, the constraint on 400 kV lines hits even before the 220 kV constraints with present network conditions. As a result of this the region under consideration for any actions with respect to this congestion becomes larger MMR area including all the locations fed through these lines.

4.9 As, the loads in MMR have impact on these 400 kV lines, ATC considered in the Petition need to be recalculated thereby considering contingencies on these 400 kV lines.

4.10 Accordingly, STU & MSLDC have carried out simulation studies at different Mumbai demand scenarios viz. 2200 MW, 2500 MW, 2700 MW, 3000 MW, 3300 MW, 3500 MW, 3800 MW & 3940 MW. Contingency of tripping of highest loaded 400 kV line is considered to check whether loading on remaining lines is up to permissible limit.

4.11 Most credible contingency, tripping of 400 kV Talegaon (PG) – Kharghar & 400 kV Talegaon (PG) – Kalwa lines have been considered as 'N-1' condition. The observations from simulation studies are as below**:**

- In all cases under study the system under consideration is not N-1-1 compliant and will always result into a load trimming / curtailment scenario.
- For Mumbai Demand below 3000 MW with full embedded generation on bar, the 400 kV lines in MMR remains 'N-1-1; compliant.
- For Mumbai demand @ 3800/3940 MW, even after full embedded generation on bar, the 400 kV lines are not 'N-1' compliant. Under such conditions, load trimming is the only option available for reliability.
- The voltages in the MMR & Mumbai area under non-availability of embedded generation are reducing drastically below permissible limits specified in the IEGC as the Mumbai System becomes load rich. Under such scenario, the low voltages will pose limitations for reliable import from the Grid to Mumbai System.
- Thus, TTC of Mumbai System is limited to 1979 MW and ATC as 1905 MW with 74 MW as TRM considering contingencies at 400 kV level due to transmission constraints.

4.12 Considering the existing PPAs, LTA being granted and availed by the beneficiaries on the Mumbai Tie Line is 597 MW for the power being sourced from within the State. The details are as given below:

Utility	Mumbai Tie-Line Capacity Utilised
TPC-D	137 MW
AEML-D	100.5 MW

BEST	120 MW
MSEDCL	240 MW (as per Demand)
Total	597 MW

4.13 In addition to the aforesaid, the LTA being granted/used in Mumbai Tie-Line for inter-state power is 153 MW (AEML-D -Dhurshar Power -33 MW and Railways – 120 MW). Thus, the total capacity of Mumbai Tie Lines which is granted LTA and is operational is 750 MW (597+33+120 MW) out of available 1905 MW.

4.14 Considering the fact that, PPAs signed for embedded generation are expiring in March 2024/October 2024 leading to further reduction in embedded capacity within Mumbai and expected increase in Mumbai demand @CAGR of 3.75%, the following schemes have been planned and are under different stages of execution to enhance the Mumbai transmission capacity to 4657 MW by FY 2024-25. The details of the scheme are as given below:

Sr.No	Schemes	Executing Agency	Estimated Date of Completion	Status
1*	**400 kV Vikhroli Substation:** • 400/220 kV GIS Substation with 3 x 500 MVA, 400/220 kV ICTs • 400 kV Kharghar-Vikhroli D/C & M/C line with bays at Kharghar & Vikhroli (with conductor capacity of 2,000 MW) along with 400 kV Bus extension at 400 kV Kharghar end. • LILO on 400 kV Talegaon-Kalwa line at 400 kV Vikhroli GIS S/S with bays. • LILO of existing 220 kV Trombay - Salsette I & II and 220 kV Trombay – Salsette III & IV at 400/220 kV Vikhroli S/S. • Installation of 1 x 125 MVAR 400 kV Bus reactor.	Kharghar Vikhroli Transmission Private Ltd	July 23	• **400kV Kharghar-Vikhroli D/C –F-55/71, E-47/71, S-9.84/21.7 Kms** • **Substation work - 94%.**
2	400 kV Velgaon Substation: • 2x500 MVA, 400/220kV ICT • LILO on 400 kV Tarapur - Kudus II line at Velgaon	MSETCL	Mar 25	MERC approval under process
3	400 kV Navi Mumbai Substation • Padghe (PG)(GIS) – Khargar/Vikhroli 400kV D/c line along with LILO of Padghe-Vikhroli LILO at Navi Mumbai • 220kV Apta-Taloja LILO at Navi Mumbai • 220kV Apta-Kalwa LILO at Navi Mumbai	Sterlite (CTU/TBCB)	Dec 23	Chronic ROW issues being faced. No physical progress
4	400 kV Kalwa GIS Substation • 400/220 kV Kalwa GIS with 3x500 MVA ICT. • Reorientation of 220kV Kalwa-Salsette-III, 220kV Kalwa-Salsette-IV, 220kV Kalwa-Siemens, and 220kV Kalwa-Tiffil. • Proposed 220kV Kalwa-Salsette 3rd Line. • Proposed 400 kV Padghe-Kalwa GIS (additional) DC Line. • Existing 400 kV Kalwa-Kharghar Line.	MSETCL	Mar 24	MERC approval under process
5	400 kV Kalwa-Padghe S/C I and II - HTLS conversion	MSETCL	Mar 23 (Ckt I) Dec 23 (Ckt II)	Ckt I – Stringing 34/53 km completed

Sr.No	Schemes	Executing Agency	Estimated Date of Completion	Status
6	400 kV Kalwa – Padghe Conversion from S/C to D/C	MSETCL	Mar 26	Scheme Under Preparation
7	1000 MW Kudus Aarey HVDC Link with HVDC terminal stations at Aarey and Kudus	AEMIL	Mar 25	Work in progress
8	400 /220kV Kudus – 220kV downstream network: a. LILO of 220kV Padhge-wada b. LILO of 220kV Kolshet-wada	MSETCL	Jun 23	F-29/50, E-27/50, S-10.32/35.78 km Forest clearance awaited.

** Estimated Date of Completion of projects awarded through TBCB is as per MERC Order*

4.15 The year-wise increase in Mumbai Transmission Capacity as given below:

Financial Year	Project likely to be Commissioned	Increase in Transmission Capacity - MW	Total TTC (Cumulative – MW)	Total ATC considering Reliability Margin of 500 MW
FY 2022-23	Existing Capacity		3022	2522
FY 2023-24	Vikhroli/Kudus	693	3715	3215
FY 2024-25	Velgaon/Kalwa GIS/ Kudus Aarey -HVDC	1200	4915	4415

4.16 The schemes that have been identified as mentioned above are expected to be completed by FY 2024-25. However, considering the ROW issues, forest clearance, permission from various statutory authorities in the MMR area, some of the transmission projects may be delayed beyond FY 2024-25. However, considering the urgency of enhancement of adequate transmission capacity of Mumbai, various Committees have been formed to monitor the execution of the aforesaid projects. Also, State Government is actively involved in resolving the issues related to various statutory permissions/approvals for speedy execution of the projects.

Maharashtra STU-CTU Interconnection

4.17 As per the discussion in 62nd Meeting of Western Region Constituents regarding LTA and connectivity applications in Western Region held on 27 August, 2021, WRLDC informed that the present ATC of Maharashtra is 9760 MW.

TTC	TRM	ATC
10060	300	9760

4.18 From 23 November, 2022, WRPC has revised the Central Sector Power allocation for Maharashtra to 6274.54 MW. The NOC proposals received by STU for grant of LTA to CTU network as on 31 December, 2022 and further their approval etc are detailed below:

Present ATC of Maharashtra (x)	9760 MW
Total LTA operationalized (As on 01.07.2022) (y)	9840.41 MW
Available ATC Margin (A) (x-y)	0 MW (-80.41 MW)
LTA Granted but not operationalized (B)	700 MW*
NOC issued but LTA not granted (C)	1686 MW (Conditional NOCs)
NOC applications under process (D)	433 MW
ATC Requirement by strengthening CTU-STU lines (B+C+D-A)	2899.41 W

**700 MW includes 550 MW LTA granted to MSEDCL for RE Capacities which are yet to be commissioned and 150 MW LTA granted to TPC-D for solar project which is operationalized but being scheduled under Short Term Open Access on account of evacuation issues at plant-CTU connectivity.*

a. Total LTA Operationalized

Central Share allocation to Maharashtra (Firm+infirm) and Central Generator Contracted:	7877.41 MW
LTA granted to Discoms by CTU (Old):	258 MW
NOCs issued by STU and LTA granted by CTU and operationalized for R.E. Power	1705 MW
Total LTA operationalized	9840.41 MW

b. Conditional NOC issued by STU but LTA yet to be granted by CTU**:**

From	To	Quantum (MW)
Adani Renewable energy Park Rajasthan Ltd (RSEPL Hybrid Power one Ld)	AEML-D	700
Tata Power Renewable energy Ltd (TPREL)	TPC-D	225
BEST (SECI)	BEST	400
M/s. Rewa Ultra Mega Solar Ltd. (RUMSL)	Central Railway	61
M/s ACME Solar Holding Ltd.	MSEDCL	300
(C) : Total		1686

c. NOC applications received and under process by STU:

From	To	Quantum (MW)
National Hydroelectric Power Corporation (NHPC)	MSEDCL	183
M/s. ReNew Solar power Pvt. Ltd.	MSEDCL	200
Central Railway (Generator-M/s Green Infra Energy Ltd)	Central Railway	50
(D) : Total		433

4.19 Presently there is no ATC margin available in the CTU-STU network. Summary of Peak demand & ATC requirement vis-à-vis ATC enhancement in Maharashtra (Year wise) with planned schemes is as below:

Maharashtra						
Year	**Peak Demand (ant.) (MW)**	**ATC requirement (MW)**		**ATC availability (MW)** ***(with Under implementation/ planned Transmission schemes)***		**Surplus ATC (MW)**
		Addl. Requirement (A)	**Cumulative (B)**	**Enhancement (C)**	**Cumulative (D)**	**(D)-(B)**
Present	28800	-	9905	-	9905*	0
2022-23	29500	893	10798	1038	10798	0
2023-24	31600	461	11259	702	11500	241
2024-25	33000	1408	12667	5500	17000	4333
2025-26	34500	1500	14167	4500	21500	7333
2026-27	36000	1500	15667	1000	22500	6833

**Including 145MW being accommodated under Reliability Margin*

STU has provided details of various transmission schemes anticipated up to 2026-27 time-frame which are directly impacting ATC enhancement of Maharashtra from ISTS.

4.20 STU is continuously monitoring the project schemes being implemented for strengthening of CTU-STU network and directing concerned transmission licensees to ensure completion of the same on or before their scheduled COD.

4.21 In view of the constraints, STU in respect of applications received for power to be supplied in Maharashtra from inter-state generators, have issued unconditional and conditional NOC based on availability but LTA not granted (and also not operationalised) by CTU due to constraints. The details of the same are as given below:

Particulars	TPC-D	AEML-D	BEST	TOTAL
Unconditional NOC granted by STU	150 MW	-	-	150 MW
Conditional NOC granted by STU	225 MW	700 MW	400 MW	1325 MW
Total	375 MW	700 MW	400 MW	1475 MW

4.22 Even though the LTA is not granted by CTU, the power from 700 MW contract of AEML-D and 150 MW, 225 MW contract of TPC-D is being scheduled under short term open access and there has been no curtailment or denial of corridor under short term from the date of COD of the said plants. In addition to this AEML-D is purchasing 500MW power in Short term open access through Interstate power. The 400 MW plant for which BEST has signed PPA is yet to be commissioned.

4.23 The present balance available transmission capacity of 1155 MW (1905-597-153 MW) on Mumbai Tie-Lines is being utilised for scheduling the power contracted by Mumbai utilities under long term PPA wherein LTA is yet to be granted by CTU (AEML-D - 700 MW, TPC-D -150 MW & 225 MW) a total of 1075 MW on short term open access basis in addition to the Short open access contracts of 500 MW by AEML-D.

4.24 As and when constraints are removed, LTA will be regularised on First Come First Serve basis for which STU has previously granted conditional NOC's as per provisions of Transmission Open Access Regulations. Thus, as per extant Regulations, STU would be constrained to grant any long/medium term open access for any application received by it for intra-state or inter-state power to be supplied to Mumbai Utilities before regularising the open access of previous applications/conditional NOC's issued by it.

4.25 In respect of allocation of transmission capacity, STU has submitted as follows:

a. Presently, there is no regulatory provision available for allocation of ATC among the stakeholders in the State.

b. In this case the available Mumbai ATC on the 220kV Tie Lines is calculated based on the capacity enhancement of interconnections but is further limited due to the transmission constraints on the 400kV network. 400 kV network being grid connected elements, the power flow depends upon various grid conditions viz. availability of HVDC, loading on 400 kV Babhaleshwar-Padghe lines, power flow from Tarapur Generation (depends on Gujrat network), loading on Talegaon (PG)

(depends up on 765 kV network of CTU & RE generation in Karnataka), forced outages on any embedded generating units or lines, etc. These conditions would also affect the ATC of Mumbai.

c. For allocation of ATC to MSEDCL & Railways, the Base TCR of both of these utilities is common for the State whereas only part of the load having impact on the 400 kV line constraints is in MMR. No separate schedules of MSEDCL & Railways for MMR area are available.

d. The method has only considered current contracts of Discoms with generators. In future, for reliable and secure operation of Mumbai system, ensuring Unit commitment of Mumbai embedded generators would be necessary till transmission congestion is relieved.

4.26 The applications for Long Term/ Medium Term Open Intra-State access are granted by STU as per MERC (Transmission Open Access) Regulations, 2016 and its amendment from time to time. In respect of applications received for power to be supplied in Maharashtra from inter-state generators, the conditional NOCs issued by STU subject to completion of strengthening projects of CTU-STU network & availability of ATC margin with obligation to Indemnity Bond. The power procurement plan submitted by BEST includes power proposed to be procured/contracted from outside state. However, there is no margin available at CTU-STU interconnection and various schemes are proposed to increase the capacity. Thus, any approval/NOC issued would be subject to completion of the proposed projects.

4.27 If the embedded generation is withdrawn due to expiry of PPA before the schemes for enhancement of transmission capacity are executed, it will impact the reliability of supply to Mumbai. Embedded generation is required to remain operational till transmission capacity is enhanced for safe, secure, and reliable operation of the grid to meet the demand of Mumbai.

4.28 Reduction in embedded generation poses significant risk to the successful operation of Mumbai Islanding scheme unless and until the planned schemes are commissioned. Various Committees formed pursuant to grid failure incident of 12 October, 2020 to find the root cause of the grid disturbance have made many suggestions including enhancement of embedded generation for islanding scheme and also strengthening & connectivity for Mumbai transmission system.

4.29 Bundling of thermal power with renewable energy as per MoP Letter dated 26 May 2022 on replacement of thermal energy to be explored by TPC-G and AEML-G which will not only reduce the overall cost of generation but also provide additional embedded generation capacity within Mumbai.

4.30 As per the study results, it can be inferred that the entire embedded Generation of TPC-G at Trombay cannot be taken out at one stroke that will affect the reliability of Mumbai

supply, but rather be planned in phase wise manner along with the completion of projects enhancing the Mumbai transmission system capability & CTU-STU ATC.

5. **Maharashtra State Load Despatch Centre (MSLDC) in its submission dated 11 January, 2023 has stated as below:-**

5.1 STU and MSLDC had made joint submission in earlier Case No 25, 26 of 2017 and MA 10 and 15 of 2017 before the Commission that, the Available Transmission Capacity (ATC) after deducting Transmission Reliability Margin (TRM) of 500 MW Trombay Unit-5 is 2286 MW. However, the said capacity was calculated by considering contingencies on 220 kV and 110 kV MSETCL-Mumbai interconnection lines as these lines were not 'N-1' complaint.

5.2 The transmission constraints subsequently have been observed on 400 kV lines viz. 400 kV Talegaon (PG) – Kalwa, 400 kV Talegaon (PG) – Kharghar, 400 kV Padghe – Kalwa D/C.

5.3 MSLDC has made similar submissions as that of STU on the ATC availability, simulation study and the infrastructure projects for the capacity addition.

5.4 Further the Mumbai Demand is increasing. The past trend of Mumbai Demand is given in below table;

Mumbai Demand In MW

Year	FY 2015-2016	FY 2016-2017	FY 2017-2018	FY 2018-2019	FY 2019-2020	FY 2020-2021	FY 2021-2022	FY 2022-2023 Up to Dec-22
Demand In MW	3368	3310	3592	3670	3744	3038	3368	3851 (28/04/2022)

5.5 Based on the simulation study results and for reliable & secure operation of Mumbai System, embedded generation is mandatory.

5.6 In the matter of allocation of ATC among Mumbai Utilities MSLDC has stated as below:

a. Presently there is no regulatory provision available for allocation of ATC among the Stake holders in the State.

b. In the matter of implementation of the DSM Regulations, the Commission has constituted a DSM Working Group.

c. The DSM WG in its report while discussing the issue of VSE operation has suggested allocation of ATC among Mumbai Utilities in Option 2 of suggested options. The same is reproduced below:

"On Day ahead basis:
MSLDC to consider ATC of Mumbai on day ahead basis and distribute ATC amongst Mumbai Discoms based on prescribed formulation (e.g., in proportion to Base TCRs).

External power flow will be limited up to ATC in planned manner which will reduce requirement of VSE during intra-day operation. DISCOMs will have to enter into D<>D exchange on day ahead basis, (say) at VC of incremental Embedded Generation.

On Intra-Day basis:

MSLDC to ramp up /down embedded generation as per requirement to maintain ATC.

MSLDC will create separate Pool for Mumbai Discoms (Virtual Pool – Mumbai (VPM)) and incremental /decremental generation will be booked against VPM Pool to pay the generator. The incrementing Discom responsible for transmission line loading will pay into the VPM pool. This will avoid burden on common VSE pool where MSEDCL is also Party.

Rate of Settlement:

Incremental Discom will pay into pool at the wt. avg. rate of Variable cost of incrementing generator(s).

Merits:

All Mumbai Discoms will get equal option to source cheaper power outside Mumbai in proportion to their Base TCR.

Minimise instances of backing down external power and VSE Operation.

In case on increased load during real time operation, surplus capacity/spinning reserves within embedded generation will be operated to release congestions.

De-Merits:

In some cases, Discom' s embedded generation will be less, and allocated transmission Capacity will be also lesser, may lead to planned load curtailment.

Complex accounting treatment will be required to monitor the increase in transmission flows during real time operation and Discoms responsible for it.

Inter-se Settlement within Discoms will be complex as parties need to agree on sharing of incremental costs of embedded generation and entities responsible for it."

d. The analysis & ruling of the Commission in the Suo-motu Order dated 2 August, 2022 is reproduced below:

"18.36. *The Commission understands that creation of VPM has been suggested by the Working Group to reduce the burden on common VSE pool where other Distribution Licensees such as MSEDCL are also the Parties. The basic intention behind this appears to be the understanding in case of Mumbai Transmission Constraints, MSEDCL need not be required to contribute to the charges associated to VSE operations which get initiated purely on account of Mumbai Transmission Constraints. However, the Commission notes that the Mumbai Transmission Constraints have arisen mainly on account of instructions from WRLDC for limiting loading to 650 MW of critical lines such as 400 kV Kalwa-Talegaon Line and 400 kV Kalwa-Kharghar Line etc.. These Lines/Stations supply power not just to Distribution Licensees in Mumbai, but a portion of MMR region is also supplied from these Lines/Stations where MSEDCL is the*

Distribution Licensee. Hence, suggestion for creation for VPM to keep MSEDCL out of it, is not in accordance with the ground realities.

18.37. *Further, if the same logic (i.e. for the Transmission Constraints in any area, only the Distribution Licensee in that area has to pay towards the VSE charges) is to be applied for transmission constraints in rest of Maharashtra (like Bhabhleshwar Line or Talegaon line), then for such transmission constraints, only MSEDCL will bear the entire burden. However, there is no such recommendation by the Working Group or comment of MSPC. The Working Group appears to be suggesting creation of separate pool for VSE operations to deal with the Transmission constraints issue i.e., Virtual Pool for Mumbai and Virtual Pool for rest of Maharashtra. The Commission is of the view that it is not in consistent with the principles of operating transmission network for the State as whole under the Transmission pricing framework adopted in Maharashtra wherein irrespective of location, the Transmission System Users are required to contribute to it based on their CPD/NCPD ratio. Since the benefits of Transmission System grid are not shared location-wise, burden on account of deficiency or constraints in Transmission System also cannot be restricted to specific area and all the Transmission System Users have to share it.*

18.41. *As regards implementing the Option-2 and Option-3 on trial basis, it is directed that MSPC shall decide the period for testing these options, modality of testing, the criteria for evaluation of results for deciding merits and demerits with due consultation with all concerned and after implementing these options, MSPC shall recommend to the Commission the appropriate option along with the detailed analysis and suggesting the actions necessary to implement the selected option."*

e. In accordance with the directives issued by the Commission, MSLDC has prepared preliminary methodology for allocation of ATC (based on Base TCR) among TPCL, BEST & AEML along with MSEDCL & Railways as these utilities also have loads in MMR & Mumbai which have impact on the 400 kV lines. The said methodology has been circulated to Mumbai Utilities including MSEDCL & Railways vide e-mail dated 27 December, 2022 for seeking comments/suggestions so that the same can be discussed in the MSPC. Till date the comments from TPC-D have been received vide email dated 06 January, 2023.

5.7 Thus, for reliable & secure operation of Mumbai System embedded generation is mandatory till strengthening of the ongoing & proposed transmission network.

6. **AEML-D in its submission dated 13 January, 2023 has stated as below:**

6.1 By seeking a relief of re-allocation of transmission capacity amongst the Distribution Licensees in Mumbai, BEST is trying to create prejudice against the other distribution licensees (such as AEML-D, MSEDCL and Railways), so that somehow the transmission capacity allocated to the said distribution licensees is reduced, so that

BEST is in a position to not purchase the costlier power from the embedded generation of the TPC-G in order to allow it to take power from outside from renewable & Non-renewable sources at a cheaper rate.

6.2 BEST can't seek such a relief, when it was its own commercial decision to enter into PPAs with TPC-G (which is an embedded generation) in past when TPC-G generation was cheaper. Further as TPC-G Generation was contracted on long term basis and generation was running fully, the STU did not plan for additional Transmission capacity for this scenario where there is no/ nil generation at Trombay plant of TPC-G. It is only after BEST informed STU about coming out of the TPC-G PPA, STU has planned various schemes, which are still under execution. Therefore, the consequence of costlier power of TPC-G cannot at all be passed upon the other distribution licensees operating in Mumbai as TPC and BEST have enjoyed the lower cost of generation of TPC-G in the past.

6.3 Under prevalent Regulatory framework adopted by the Commission for Transmission pricing/capacity allocation there is no provisions for allocation of capacity on Tie lines / individual elements of Transmission system to individual user whereas the cost and capacity is shared as pooled assets basis.

6.4 If the relief sought by BEST is granted by the Commission, then the same would lead to a situation where the consumers of AEML-D would be severally prejudiced as BEST is seeking to share Transmission capacity which is historically used by AEML in line with the directions of the Commission.

6.5 Further, following difficulties would emerge for AEML-D if the transmission capacity is re-allocated by the Commission:

i. AEML-D planned its purchase from the Generators located outside Mumbai pursuant to the decision of the Commission vide Order dated 6 November, 2007 in Case Nos. 87, 88 of 2006 and 30 of 2007 whereby AEML-D was denied power purchase from TPC-G (which had lower cost of generation). Thus, AEML-D is historically procuring around 70% of its requirement through Mumbai Tie lines whereas TPC/BEST are procuring only ~25% of its requirement on Tie lines, which shows historically AEML-D is the existing User of major Tie line capacity. Therefore, if same capacity is allocated to other licensees in Mumbai, then AEML-D will be deprived of the external purchase and may face curtailment in extreme cases /contingencies.

ii. To maintain continuity of supply, AEML-D will be forced to buy from the same TPC-G generation which BEST/TPC do not wish to buy citing higher cost. Therefore, effectively, AEML-D will be forced to buy costly power from its competing licensee severely impacting its competitiveness.

iii. Low-cost power from embedded generation is enjoyed by TPC & BEST since 2007-08 forcing AEML-D to buy costly power on Mumbai Tie lines, now the TPC-G thermal cost has increased. Thus, in the garb of re-allocation of the transmission capacity, AEML-D will be forced to share costly generation, severely impacting its tariff to Consumers.

iv. AEML-D is mostly sourcing RE Power from outside Mumbai, however, if existing capacity is allocated to other licensees, then AEML-D will be forced to curtail supply from such RE sources, which would ultimately impact RPO compliance of AEML-D. This will also lead to increase the cost, as these sources are must run in nature.

6.6 Thus, in view of the above, it is clear that the relief as being sought by BEST is nothing but a relief whereby the said Petitioner and TPC-D is put to a better position at the cost of other distribution licensees in Mumbai. The Commission should take a serious view of this and accordingly dismiss the said sought relief.

6.7 Issue of transmission constraints has already been dealt by the Commission in its Orders in Case No 249 of 2018 and in Case No 44 of 2019 and has come to a conclusion that till such time the issue of transmission constraints is mitigated; the distribution licensees should continue with their existing PPA (or by way of extension of the said existing PPAs). The Commission has already acknowledged that economic supply will be possible for Mumbai Licensees only after strengthening of Transmission lines of Mumbai & not before that. Thus, this issue cannot at all be agitated again by BEST in the present petition, by contending that it will not purchase from TPC-G generation and instead will purchase power from outside Mumbai.

6.8 The situation of transmission constraint still exists in Mumbai, and as such, there is no change in the scenario which could compel the Commission to allow the present relief of reallocation of transmission capacity as sought by BEST in the present petition. In this regard, reliance is placed upon the settled principle of law that a court is bound by its own decision. For this, reference is drawn to the judgment of the Hon'ble Supreme Court in *Mamleshwar Prasad and another versus Kanhaiya Lal (dead) through LR,* reported in *(1975) 2 SCC 232.*

6.9 The issue of transmission constraints has also been taken into consideration by the Govt. of Maharashtra (GoM), and accordingly implored directions under Section 108 of EA, 2003 upon the Commission to only extend the existing PPAs of the licensees/ authorities, till the said issue of transmission constraint is resolved. This was done specifically in 'public interest'. As per Section 108 of EA, 2003; whenever a direction has been issued in public interest, the same is binding upon the Commission. Furthermore, transmission constraint issue is significant and is directly related to the interest of consumers for ensuring reliable power supply. Thus, the aforesaid directions cannot be ignored while adjudicating the present proceedings.

6.10 In view of the above, till the time additional Transmission capacity is developed, the existing capacity utilisation as approved by the Commission cannot be altered, as the same would then severely impact on AEML-D and other licensees in MMR.

6.11 As a consequence, the revised power procurement plan of BEST may be approved only when the additional Transmission capacity is developed which enables withdrawal of embedded generation.

6.12 Post the grid disturbance in Mumbai on 12.10.2020, the Western Regional Load Despatch Centre (WRLDC) is closely monitoring Mumbai Transmission System. WRLDC has asked MSLDC to maintain the N-1 contingency margin at 400 kV lines and also restricted the loading on the lines.

6.13 It is imperative that till the issue of transmission constraints is resolved in Mumbai, the embedded generation needs to be continued. Therefore, BEST ought to take power from TPC-G, by extending the term of its PPA, without their being any re-allocation of transmission capacity amongst the distribution licensees in Mumbai.

7. **MSEDCL in its submission dated 16 January, 2023 has stated as follows: -**

7.1 As per study carried out by MSLDC; embedded generation must be utilized considering the present transmission constraints. Though the intent of BEST is to bring in cheaper power in Mumbai for his consumers, the interest of other stakeholders also needs to be protected. Embedded generation in present situation must be utilized by Mumbai utilities for grid stability and reliable and secure operation of Mumbai system, till the issue of transmission constraints is resolved.

7.2 Further, as per the directives of the Commission vide Order dated 2 August,2022, MSLDC is in the process of implementing Option-2 and Option-3 regarding embedded generation.

7.3 The project of M/s. Kharghar Vikhroli Transmission Pvt. Ltd. is approaching completion and expected to be commissioned shortly, which will enhance ATC for Mumbai/MMR. Further, other projects such as HVDC Kudus –Aarey is also under implementation.

8. **At the time of E- hearing held on 17 January, 2023**

8.1 Parties who have filed their submission have reiterated the same during the hearing.

8.2 In reply to the query, BEST clarified that it is not pressing for extension of existing PPA with MPL for 10 years and the approval of the additional power from SWPGPL in this petition but will approach the Commission through separate Petition.

8.3 STU requested the Commission to allow rectifying the typographical errors in the submission.

8.4 TPC-G stated that it has not completed the analysis of BEST's petition and need more time to analyse impact on their generation business. Accordingly, TPC-G requested time for making submissions in this matter.

8.5 AEML-G stated that it is having the same submission as per AEML-D and no additional submissions in this regard.

8.6 TPC-D sought additional time for filing their submission and stated that issue of sharing of corridor is having prime importance to TPC-D also for its power procurement.

8.7 Other respondent have stated that they are not filing any submission in the present matter.

8.8 The Commission, accepting the request of TPC-G and TPC-D allowed 10 days for their submission in the matter and also directed the STU to rectify the errors in the submission. The case was reserved for Order.

9. **TPC-D in its submission dated 24 January, 2022 has stated as follows:**

9.1 Issue of transmission constraint was highlighted to this Commission during the process of approval of the PPAs approved for the period FY 2020-2024. The Commission vide its Order in Case No. 249 of 2018 had directed the following:

> *"14. … in order to avoid such futile exercise of bringing cheaper power to Mumbai even after five years of extension, the Commission directs Managing Director of MSETCL (STU) to take review of the progress of transmission system of Mumbai and its implementation on monthly basis. MSETCL should submit progress report of execution of these transmission projects on quarterly basis to the Commission. Without strengthening of Mumbai transmission system, it would be difficult to meet the growing electricity demand of Mumbai city and its suburbs. Therefore, considering importance of the issue, the Government of Maharashtra (Energy Department) needs to support transmission project implementing agencies in getting approval from various Government Authorities."*

9.2 The above mentioned directions were to provide flexibility to the Distribution Licensees in Mumbai for procuring power from outside Mumbai such that the Distribution Licensees can carry out optimum power purchase at economical rates to meet the requirements of their consumers, dependency on embedded generation reduces and power procurement is not constrained on account of availability of transmission corridor to bring power from outside Mumbai / Maharashtra. However, from the prevailing scenario and the submissions made by STU and SLDC in the

present petition, it is submitted that the transmission constraints will be continuing in future also.

9.3 In view of the above, utilities are deprived of optimizing their power purchase portfolio by purchasing cheaper power from outside Maharashtra. On the contrary, power from embedded thermal generation is forced to be purchased by the contracting distribution licensees even at the time when comparatively cheaper power is available to be purchased from the other short-term sources in the market. This has resulted in considerable increase in power purchase cost of TPC-D in FY 2022-23 resulting into additional burden on its consumers. There is no concession available to the stakeholders who procure power from embedded generation in Mumbai and thus do not utilize the transmission corridor to that extent.

9.4 With reference to the Order of the Commission in Case No. 25 & 26 of 2017 on the issue of corridor allocation among the Mumbai Distribution licensees, all the distribution licensees had agreed in their respective submission during the said proceeding before the Commission that there should be corridor allocation among the Mumbai Distribution licensees. This would provide equitable opportunity to all the stakeholders to optimize their respective power purchase cost. It is requested to consider the transmission corridor allocation issue on priority and initiate the due process / procedure for the same.

9.5 In line with the principles of natural justice, the transmission corridor may be allocated in the ratio of the demand of respective stakeholders / beneficiaries in Mumbai.

10. **TPC-G in its submission dated 24 January, 2022 has stated as follows:-**

10.1 BEST, in its Petition has indicated that they would like to continue with the Hydro PPA for the next seven year as per the arrangement in the current PPA. Prudency demands that BEST cannot solely/unilaterally decide regarding the future of the PPA as the current PPA with BEST is under the Electricity Act 2003 (Section 62) and subject to review by PPA participants every five years.

10.2 If BEST decides to procure power through bidding process, TPC-G may consider participating in the process at the appropriate stage.

11. **BEST in its rejoinder dated 2 February, 2023 has stated as follows:-**

<u>Response to AEML-D submission:-</u>

11.1 In order to pass on the benefit of competitive power procurement price to the consumers of Mumbai island city and facilitate hassle free power flow to Mumbai BEST has requested the Commission for 'allocation of transmission corridor among Mumbai utilities on the basis of Base Transmission Capacity rights.' As a principle of natural justice, the utilities in Mumbai have also equal rights to utilize transmission corridor in

proportion to their TCR/base TCR as the transmission charges are paid as per TCR/base TCR to STU transmission pool account.

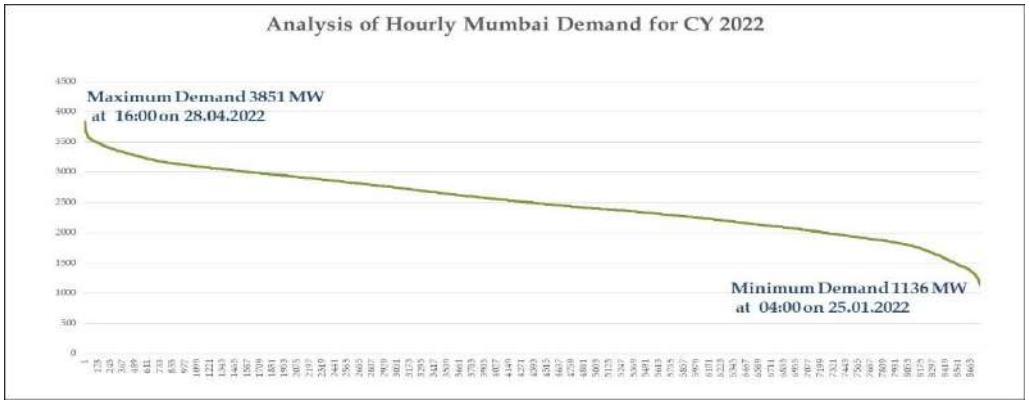
11.2 As per MERC Transmission Open Access Regulation 2016, BEST has already signed Bulk Power Transmission Agreement (BPTA) with STU which entitles for equal transmission capacity rights being a long-term TSU. All the Distribution licensees being a long-term TSU have equal and uniform transmission capacity rights over transmission network and corridor. There is no priority or preferential treatment or first right as has been envisaged among all long tern TSUs as per TOA and Grid Code Regulations. In fact, TOA Regulations encourage and vouch for non-discriminatory treatment among all long term TSUs. Hence, in the case of continued transmission corridor constraints it is important to allocate corridor capacity among the TSUs based on non-discriminatory principle such as proportion to base TCR.

Response on submission of STU

11.3 STU in its submission has provided year wise increase in Mumbai Transmission Capacity. Further, STU has submitted enhancement schemes for ATC of STU-CTU interface which shows that there is adequate margin available intra-state as well as inter-state ATC from FY 2024-25 onwards, which is crucial period for power procurement of BEST.

11.4 STU in its revised submission has made changes in the ATC calculations decreasing the ATC availability for Mumbai system from 3402 MW to 2522 MW and further reduced to 1905 MW due to 400 kV and 220 kV tie line constraints. However, ATC for operational purpose cannot be based on contingency of tie lines as already reliability margin is considered while calculating ATC. STU's submission that ATC is 1905 MW with TRM as 74 MW is not realistic and did not present real scenario of tie line flows.

11.5 BEST has carried out analysis of hourly Mumbai demand for FY 2022 for entire 8760 hours and observations are as under:



Analysis of Hourly Demand based on above Load Duration Curve of Mumbai is as below:

Demand Range MW	No.of Hours	Percentage
Above > 3400 MW	249	2.84
3399> MW < 3000	1352	15.43
2999 < MW > 2500	2749	31.38
2499 < MW > 2000	2882	32.90
1999 < MW > 1500	1288	14.70
Below 1500 MW	240	2.74

a) From above it can be seen that Mumbai demand is remaining below 3000 MW for 81.72 % of the time.
b) Only for 2.84 % of the time demand has exceeded 3400 MW, which is the ATC of Mumbai corridor for FY 2022-23 as per earlier submission of STU.
c) STU in its study has considered n-1-1 contingency of 400 kV lines connecting MMR region. However, power procurement plan cannot be based on n-1-1 contingency.

11.6 The Maximum Hourly Mumbai demand of 3851 MW occurred on 28th April 2022 at 16:00 hrs with exchange between MSETCL and Mumbai as 2260 MW (excluding MSEDCL demand about 240 MW fed through TPC's network) and embedded generation was 1591 MW. No congestion in network was reported.

Response on submission of MSLDC.

11.7 The Commission in Suo Moto Order dated 2 August 2023 has upheld the principle of allocation transmission corridor in proportion to TCR/base TCR. BEST strongly object to STU and SLDC's TTC and ATC computations which do not factor in the increments in capacity and additional capacities due to upgradation of transmission network between MSETCL and Mumbai transmission system. The latest status of the schemes completed/under progress for upgradation of transmission network are as below:

a. HTLS conversion of 220 kV Kharghar-Trombay lines.
b. HTLS conversion of 220 kV Kalwa-Trombay lines.
c. HTLS conversion of 220 kV Boiser(PG)-Boiser(MS) lines.
d. HTLS conversion of 400 kV Padhage-Kalwa D/C lines is in progress and to be completed by June-2023.
e. Commissioning of 220 kV Salsett-Kalwa 3rd circuit is expected before March 2023

11.8 Under the circumstances, transmission corridor ATC should be dynamically and regularly assessed. STU should give realistic scenario to stakeholders and in case of any congestion or constraint, the same ATC should be allocated amongst all Discoms in equitable and fair basis in proportion to TCR/Base TCR.

Response on submission of MSEDCL

11.9 MSEDCL in its submission has requested the Commission to take appropriate decision regarding allocation of transmission corridor between Mumbai Utilities in view of the

expected improvement in ATC for Mumbai/MMR, (Kharagar-Vikroli and HVDC Kudus –Aarey*)*

11.10 BEST intends to procure power from outside Mumbai after expiry of PPA with TPC-G on 31 March, 2024. Hence, the requirement intra-state and inter-state transmission corridor is from 1 April, 2024 onwards. As per STU submission, there is adequate increase in transmission corridor after FY 2024-25. Therefore it is requested that the Commission may adopt the principle of allocation of transmission corridor among Mumbai utilities on the basis TCR/base TCR.

Response on submission of TPC-D.

11.11 TPC-D has rightly up voted the prayer of BEST for allocation of transmission corridor in proportion to TCR/Base TCR among Mumbai distribution licensees.

Response on submission of TPC-G

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11.12 While objecting the TPC-G statement that BEST has unilaterally decided the procurement of hydro power from TPC-G , BEST has stated that petition is filed before the Commission as per provisions of the Electricity Act, 2003 and MERC MYT Regulation, 2019 and all stakeholders are respondents to the petition. BEST has no intention to decide about power purchase unilaterally.

11.13 BEST strongly objecst to TPC-G contention that the PPA is for 5 years control period, it to state that control period is only for determination of norms under Section 62 of Electricity Act, 2003 and duration PPA is entirely different from the control period.

Right of transmission capacity:-

11.14 Right of transmission capacity of Discoms, being deemed TSUs (Long Term Users) is supreme and takes priority over any LTOA /MTOA /STOA allocation.

11.15 BEST is a Transmission System User (TSU) and executed Bulk Power Transmission Agreement (BPTA) with STU for 796.69 MW for FY 2021-22 as base Transmission Capacity Rights.

11.16 Hence, in view of above, AEML contention of allocation of corridor on First Come First Served (FCFS) basis or STU/SLDC's contention of precedence in LTOA is not in accordance with the TOA and MYT Regulations and is not justified.

11.17 Therefore, in case embedded generation is required to be scheduled for dispatch due to transmission constraint, the associated cost (Fixed and Variable) of embedded Generation should be shared by all concerned DISCOMs in similar proportion linked to TCR/Base TCR amongst concerned parties exposed to transmission constraints/congestion**.**

12. **AEML-D in its additional submission dated 7 February, 2023 has stated as follows:**

12.1 TPC-D and BEST are relying upon an Order dated 23 September, 2017 passed by the Commission in Case Nos. 25 & 26 of 2017, wherein it was recorded that all the distribution licensees agreed for allocation of transmission capacity on account of the transmission constraint. In that Order the consent given by AEML-D (earlier R-infra) was with respect to allocation of 'available transmission capacity based on the actual usage after considering availability from embedded generation; In the present case, BEST is seeking for re-allocation of the already allocated/ tied up transmission capacity of the distribution licensees, which was never consented to by AEML-D, neither in the past nor in the present petition.

12.2 AEML-D rejects the allegations made by BEST that AEML-D should not be given undue preference and every Licensee /User have proportionate right. It is submitted that already allocated capacity pursuant to approval of PPA's / power procurement plan cannot be withdrawn from existing user just for benefit of new user.

12.3 AEML-D objecting BEST's submission that the Commission has already upheld that principle of allocation of Transmission corridor vide Order dated 02 August, 2022. In this regard, AEML-D never accepted the proposal of the DSM Working Group for allocation of the Transmission Corridor. As DSM Working Group has suggested options, the Commission directed MSPC for undertaking consultations and trial operations, however, the Commission has not accepted the proposal for DSM working group.

12.4 As per submission from STU, STU has booked the transmission capacity of 240 MW for MSEDCL, which is as per demand. It is stated that there was no firm LTA which has been granted to MSEDCL pursuant to applications for the above 240 MW but only based on its existing PPA's approved by the Commission. However, in the case of AEML-D, STU has mentioned that the transmission capacity is booked for 100.5 MW. In this regard, it is submitted that AEML-D (like MSEDCL) is also a long-term user of Intra State Transmission System (InSTS), and it has already entered into long term/ medium term PPAs as follows

Sr. No	Name of Generator	Type	Capacity (MW)
1	Adani Hybrid Energy Jaisalmer Four Ltd (AHEJ4L)	RE Hybrid (Wind+Solar)	700
2	Raipur Energen Ltd (REL)	Thermal	300
3	Mahan Energen Ltd (MEL)	Thermal	200

The above PPAs have already been approved by the Commission. The open access qua the same is pending only on account of STU-CTU interconnection capacity shortfall, whereas the Tie line capacity on Mumbai is already blocked and power is flowing under Short Term Open Access (STOA). Therefore, when STU has considered the

MSEDCL's capacity as 240 MW (which is 'as per demand' basis only), the said utility ought to consider the capacity already booked by AEML-D qua the above PPAs, in order to come to a conclusion qua any spare availability of transmission system related issues.

12.5 STU has submitted that the Users have flexibility to change injection / drawl points as per the Transmission Open Access Regulations, 2016. However, while doing so, STU must ensure that the above PPAs/ PPA plans of AEML-D approved by the Commission ought to be factored in for those corridors before approving any change in Drawl/injection points on such corridors.

12.6 AEML-D is not in agreement with the preliminary methodology for allocation of ATC, circulated by MSLDC among the Licensee.

Commission's Analysis and Ruling:

13. BEST has submitted the Petition for approval of power procurement plan for 7 years from FY 2023-24 to FY 2029-30 covering the next control period as per Regulation 20.1 of MYT Tariff Regulations, 2019.

14. Regulation 20.1 of the MYT Regulations, 2015 specifies as follows about the Power Procurement Plan to be submitted by a Distribution Licensee as follows:

> *20.2 The power procurement plan of the Distribution Licensee shall comprise the following:*
> *(a) A quantitative forecast of the unrestricted base load and peak load for electricity within its area of supply;*
> *(b) An estimate of the quantities of electricity supply from the identified sources of power purchase, including own generation if any;*
> *(c) An estimate of availability of power to meet the base load and peak load requirement: Provided that such estimate of demand and supply shall be on month-wise basis in Mega-Watt (MW) as well as expressed in Million Units (MU);*
> *(d) Standards to be maintained with regard to quality and reliability of supply, in accordance with the relevant Regulations of the Commission;*
> *(e) Measures proposed for energy conservation, energy efficiency, and Demand Side Management;*
> *(f) The requirement for new sources of power procurement, including augmentation of own generation capacity, if any, and identified new sources of supply, based on (a) to (e) above;*
> *(g) The sources of power, quantities and cost estimates for such procurement:*
>
> *Provided that the forecast or estimates contained in the long-term procurement plan shall be separately stated for peak and off-peak periods, in terms of quantities of power to be procured (in MU) and maximum demand (in MW):*

Provided further that the forecast or estimates for the Control Period from FY 2020-21 to FY 2024-25 shall be prepared for each month over the Control Period:

Provided also that the long-term/medium-term procurement plan shall be a least cost plan based on available information regarding costs of various sources of supply.

(Emphasis Added)

The Commission has evaluated BEST power procurement plan in terms of the above provisions of MYT Regulations, 2019. In addition to above issue of transmission constraints, request for reallocation of transmission capacity has been raised during the proceeding. Accordingly, the Commission has framed following issues for its consideration in present matter:

a. Demand Projections of BEST Undertaking
b. Power Procurement Plan of BEST Undertaking considering transmission constraint.
c. Way forward

15. **Issues A: Demand projections of BEST Undertaking**

15.1 BEST has submitted Maximum and minimum demand (peak and base) for last 10 years is as follows.

Particulars	FY 12-13	FY 13-14	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22
Peak Demand										
Max	882.5	876.8	900.9	890.3	923.4	916.9	938.8	927.4	722.5	778.5
Min	672.8	665.7	631.4	666.1	650.0	706.6	635.6	671.9	550.9	613.9
Base Demand										
Max	390.9	399.7	427.6	431.1	420.7	417.0	439.9	434.4	394.6	379.5
Min	219.6	214.8	226.0	230.8	226.4	238.0	211.3	214.8	238.7	198.3

From the above data, it is observed that historically the peak demand is ranging from 880MW to 940 MW whereas base demand is in the range of 350 MW to 450 MW. The Commission notes that BEST has analysed historical daily load curve, seasonal load curve, annual load curve and observes that there is negligible change in the load curve pattern except for COVID period.

15.2 The Commission notes that BEST has considered FY 2019-20 as a base year for projecting demand for future period. Similar approach has been adopted by BEST in the MTR Petition filed before the Commission in Case No 212 of 2022.

15.3 BEST has evaluated the projected demand using two methods (i) Trend based method (ii) Trend base + new growth method as elaborated in the earlier section of the Order.

After analysing the two methods, BEST concluded that Trend base method is showing 2% CAGR in demand growth and Trend Base + new growth method is showing 2.6% CAGR growth in demand over the years. As per historical growth analysis, 2.6% CAGR growth seems unrealistic and therefore BEST has projected the demand as per Trend base method considering the base year as FY 2019-20. Accordingly, the projected demand is as follows:

Base load and peak load forecast (T<>D) from FY 2022-23 to FY 2029-30 as per Trend based Method (MW)

Particulars	FY 2019-20	FY 2022-23	FY 2023-24	FY 2024-25	FY 2025-26	FY 2026-27	FY 2027-28	FY 2028-29	FY 2029-30
Base Load (MW)	385	393	401	409	417	425	434	442	451
Peak Demand (MW)	888	905	923	942	961	980	999	1,019	1,040

15.4 The Commission has noted the assumptions considered by BEST for its future demand in the Trend-based method which includes historical demands, anticipated new load developments and anticipated reduction in the load on account of rooftop solar, consumer migration and demand side management schemes. The Commission note that the methodology used for projecting the demand is well founded considering all aspects required to be considered in the power procurement plan. Further the projections are in consonance with the MTR Petition filed by BEST in Case No 212 of 2022.

15.5 BEST has projected its sales as per Trend based method considering 2% CAGR on base year of FY 2019-20. In MYT Order issued in March 2020, the Commission has projected growth rate of 1% for the Control Period. BEST's present projection of 2% is slightly higher than the same. The Commission has for the time being accepted the base load, peak load and energy sales projected by BEST for the future period so as to analyse its power procurement plan. However, final approval for sales projection would be given in MTR Order.

16. Power Procurement Plan of BEST Undertaking considering transmission constraint

16.1 Once demand projection is established, next step is to access the available contracted capacity and shortfall which needs to be met through additional power procurement.

16.2 The Commission notes that BEST Undertaking has following existing PPAs:

Sr. No	Power Project / Agency	Type of Source	BEST's Contracted Capacity (MW)	Rate (Rs. /kWh)	Period
PPA-1	TPC-G	Hydro	228.73	Under Sec. 62	FY 2019-20 to FY 2023-24
	TPC-G Unit No-5	Thermal	255.85		
	TPC-G Unit No- 7	Thermal	92.11		
	TPC-G Unit No-8	Thermal	100		

Sr. No	Power Project / Agency	Type of Source	BEST's Contracted Capacity (MW)	Rate (Rs. /kWh)	Period
PPA-2	Welspun Energy Maharashtra Ltd.	Solar PV	20	8.56	Oct 2013- Sep 2038
PPA-3	Manikaran Power	Thermal	100	2 Part Tariff: Base FC and EC is revised Y-O-Y (as per Clause 11 & 12 of PPA)	Mar 2020 to Feb 2025
PPA-4	SECI Hybrid	Solar	269.55	2.48	FY 2024-25 to FY 2049-50
		Wind	103.45	2.48	
PPA-5 (In process)	SECI Solar	Solar	234	2.71	FY 2025-26 to FY 2050-51

16.3 The Commission notes that the existing contract with TPC-G for 676.69 MW is expiring in March 2024 and with MPL for 100 MW is expiring in February, 2025. Therefore, FY 2023-24, BEST has sufficient contracted capacity, but from FY 2024-25 onwards i.e. post expiry of PPA with TPC-G and MPL, BEST does not have sufficient contracted capacity to meet their consumer demand. Available contracted capacity based on existing contracts for FY 2024-25 and FY 2025-26 onwards is as follows:

Sr. No	Power Project / Agency	Type of Source	BEST's Contracted Capacity (MW)	Rate (Rs. /kWh)	Power available for FY 2024-25 in MW	Power available for FY 2025-26 in MW
PPA-1	TPC-G	Hydro	228.73	Under Sec. 62	0	0
	TPC-G Unit No-5	Thermal	255.85			
	TPC-G Unit No- 7	Thermal	92.11			
	TPC-G Unit No-8	Thermal	100			
PPA-2	Welspun Energy Maharashtra Ltd.	Solar PV	20	8.56	20	20
PPA-3	Manikaran Power	Thermal	100	2 Part Tariff: Base FC and EC is revised Y-O-Y (as per Clause 11 & 12 of PPA)	100	0
PPA-4	SECI Hybrid	Solar	269.55	2.48	0	400
		Wind	103.45	2.48		
PPA-5 (In process)	SECI Solar	Solar	234	2.71	0	234
Total Power availability: -					**120**	**654**

16.4 From above, for FY 2024-25 only 120 MW contracted capacity is available. Whereas in case of FY 2025-26 onwards 654 MW power from RE sources is available. As RE sources are intermittent in nature, BEST cannot depend upon the same to supply reliable

power to its consumers. Therefore, BEST needs to undertake power procurement for meeting their base and peak power requirement.

16.5 BEST has analysed various options to meet its demand through various sources to optimise its power purchase cost. In all these options, BEST has proposed to discontinue PPA with TPC-G for thermal capacities as energy charge for these units have reached upto Rs 8 to 11 per unit in recent past. BEST has contended that cheaper sources of power is available in the market and hence it would opt for the same instead of continuing with such costly PPA. At the same time, BEST has stated that it will like to continue with Hydro Capacity under the PPA with TPC-G being cheaper source of power. Accordingly, BEST has proposed following power procurement plan for FY 2024-25 onwards:

Sr. No.	Source	Capacity (MW)
Existing Contract		
1	SECI (Wind -Solar Hybrid)	400
2	SECI (Solar)	234
3	Walwhan Solar	20
New Propose Contracts		
1	TPC-G Hydro	228
2	Manikaran Power Ltd / Sai Wardha	200
3	Medium Term (RTC)	200
4	Medium Term Peak & Night (1700 hrs to 0500hrs)	200

In addition to above, short term power in day ahead market would be purchased as required.

16.6 As BEST has proposed to discontinue thermal capacity with TPC-G. STU and MSLDC in its submission have stated that all embedded generation capacity in Mumbai is required to be continued till transmission constraint is removed. They have highlighted that as on date there is transmission constraint at two level viz (1) Mumbai transmission constraint (on MSETCL – Mumbai tie-lines) and (2) CTU-STU tie-lines. Same is summarised as below:

16.6.1 Mumbai Transmission Constraint:

a. Total ATC of the tie lines to bring power within Mumbai is 2522 MW. The said transmission capacity is able to meet the present demand of Mumbai (3851 MW till Jan 2023) considering the full embedded generation capacity of 1877 MW.

b. Subsequent to partial Grid Failure occurred in MMR & Mumbai area on 12 October 2020, maximum permissible line loading of 400 kV lines have been reduced. Therefore, while carrying out the system studies for calculating the Mumbai system TTC/ ATC, the constraint on 400 kV lines hits even before the 220 kV constraints with present network conditions. As a result of this the region under consideration for any actions with respect to this congestion becomes larger MMR area.

c. As, the loads in MMR have impact on 400 kV lines, ATC Mumbai tie-line needs to be recalculated considering contingencies on 400 kV lines. Accordingly, STU & MSLDC has carried out simulation studies at different Mumbai demand scenarios. Contingency of tripping of highest loaded 400 kV line is considered to check whether loading on remaining lines is up to permissible limit.

d. In all cases under study the system under consideration is not N-1-1 compliant and will always result into a load trimming / curtailment scenario.

e. For Mumbai Demand below 3000 MW with full embedded generation on bar, the 400 kV lines in MMR remains 'N-1-1; compliant.

f. For Mumbai demand @ 3800/3940 MW, even after full embedded generation on bar, the 400 kV lines are not 'N-1' compliant. Under such conditions, load trimming is the only option available for reliability.

g. The voltages in the MMR & Mumbai area under non-availability of embedded generation are reducing drastically below permissible limits specified in the IEGC as the Mumbai System becomes load rich. Under such scenario, the low voltages will pose limitations for reliable import from the MSETCL Grid to Mumbai System.

h. Thus, TTC of Mumbai System is limited to 1979 MW and ATC as 1905 MW with 74 MW as TRM considering contingencies at 400 kV level due to transmission constraints.

i. Out of total ATC of 1905 MW of Mumbai Tie Lines, operational LTA is 750 MW.

j. Considering the fact that, PPAs signed for embedded generation are expiring in March 2024/October 2024 leading in further reduction in embedded capacity within Mumbai and expected increase in Mumbai demand @CAGR of 3.75%, various transmission schemes have been planned and are under different stages of execution to enhance the Mumbai transmission capacity to 4415 MW by FY 2024-25.

k. However, considering the ROW issues, forest clearance, permission from various statutory authorities in the MMR area, some of the transmission projects may be delayed beyond FY 2024-25.

16.6.2 CTU-STU tie-line constraints:

a. Present ATC of Maharashtra is 9760 MW. Present status of utilisation of the same is tabulated below:

Present ATC of Maharashtra (x)	9760 MW
Total LTA operationalized (As on 01.07.2022) (y)	9840.41 MW
Available ATC Margin (A) (x-y)	0 MW (-80.41 MW)
LTA Granted but not operationalized (B)	700 MW
NOC issued but LTA not granted (C)	1686 MW (Conditional NOCs)

NOC applications under process (D)	433 MW
ATC Requirement by strengthening CTU-STU lines (B+C+D-A)	2899.42 MW

b. Presently there is no ATC margin available in the CTU-STU network. Various scheme has been planned to enhance such ATC margin upto 22500 MW by FY 2026-27. STU is continuously monitoring the project schemes being implemented for strengthening of CTU-STU network and directing concerned transmission licensees to ensure completion of the same on or before their scheduled COD.

c. In view of the constraints, even though the LTA is not granted by CTU, the power from 700 MW contract of AEML-D and 150 MW, 225 MW contract of TPC-D is being scheduled under short term open access and there has been no curtailment or denial of corridor under short term from the date of COD of the said plants. In addition to this AEML-D is purchasing 500MW power in Short term open access through Interstate power. The 400 MW plant for which BEST has signed PPA is yet to be commissioned.

16.6.3 The present balance available transmission capacity of 1155 MW (1905-750 MW) on Mumbai Tie-Lines is being utilised for scheduling the power contracted by Mumbai utilities under long term PPA wherein LTA is yet to be granted by CTU (AEML-D - 700 MW, TPC-D -150 MW & 225 MW). Such 1075 MW is being scheduled under short term open access basis in addition to the Short open access contracts of 500 MW by AEML-D.

16.6.4 As and when constraints are removed, LTA will be regularised on First Come First Served basis for which STU has previously granted conditional NOCs as per provisions of Transmission Open Access Regulations.

16.6.5 Thus, as per extant Regulations, STU would be constrained to grant any long/medium term open access for any application received by it for intra-state or inter-state power to be supplied to Mumbai Utilities before regularising the open access of previous applications/conditional NOC's issued by it.

16.6.6 As per the study results, it can be inferred that the entire embedded Generation of TPC-G at Trombay cannot be taken out at one stroke that will affect the reliability of Mumbai supply, but rather be planned in phase wise manner along with the completion of projects enhancing the Mumbai transmission system capability & CTU-STU ATC.

16.7 While opposing such submission of STU & MSLDC, BEST has contended that ATC for operational purpose cannot be based on contingency of tie lines as already reliability margin is considered while calculating ATC. In calendar year 2022, Mumbai demand was below 3000 MW for 81.72 % of the time. STU in its study has considered n-1-1 contingency of 400 kV lines connecting MMR region. However, power procurement plan cannot be based on n-1-1 contingency. BEST also highlighted that Maximum

Hourly Mumbai demand of 3851 MW occurred on 28th April 2022 at 16:00 hrs with exchange between MSETCL and Mumbai as 2260 MW (excluding MSEDCL demand about 240 MW fed through TPC's network) and embedded generation was 1591 MW. No congestion in network was reported.

16.8 In this regard, the Commission notes that as per corrected submission filed by STU, existing ATC of Mumbai Tie-lines is 2522 MW which has been reduced to 1905 MW in view of contingencies being faced at 400 kV line. But even if 400 kV contingency is not considered then also existing ATC of Mumbai Tie-line is limited to 2522 MW which is not sufficient to meet Mumbai Demand (@3851 MW achieved on 28 April 2022) without support of embedded generation. As submitted by BEST on such date of Maximum demand Mumbai tie-line loading was 2260 MW and embedded generation was 1591 MW. Even if on that day tie-lines was loaded to their full ATC i.e. 2522 MW then also 1329 MW embedded generation would have required. Therefore, in existing scenario, embedded generation is required for meeting electricity demand of Mumbai Consumers.

16.9 BEST has also pointed out that as per various scheme proposed for strengthening of transmission system, ATC of Mumbai Tie line will be increased upto 4415 MW in FY 2024-25 and hence sufficient capacity would be available for bringing cheaper power from outside. Although, STU and the MSLDC have pointed out such planned capacity addition in its submission but they have also cautioned that in case such schemes are delayed on account of RoW issues, forest clearance etc then desired transmission capacity addition would not be achieved. Hence, they have suggested that instead of removing embedded generation in one stroke it should be planned along with transmission capacity addition. The Commission notes that Mumbai Discoms' PPAs with embedded generation are valid till FY 2023-24. As per the planned scheme, Mumbai transmission capacity is likely to increase by 693 MW in FY 2023-24 and 1200 MW in FY 2024-25 to achieve cumulative transfer capacity of 4415 MW. Considering importance of such transmission schemes for reliable supply to Mumbai, these schemes are being monitored at various level including Government of Maharashtra level. Inspite of the efforts, most of the transmission projects get delayed and hence the possibility of delay in commissioning of these considered scheme cannot be ruled out completely. Hence it would be prudent to wait till commissioning of these transmission schemes before phasing out embedded generation. Hence, the Commission is of the opinion that at least upto FY 2024-25, embedded generation needs to be continued.

16.10 The Commission looked at the possibility of partial/phased reduction in embedded generation capacity. However, STU and MSLDC in its submission has also highlighted that non availability of embedded generation in Mumbai would create low voltage issue which will limit power transfer capability of Mumbai Tie-lines. Therefore, embedded generation is required for MSLDC for controlling grid voltages. In case some of the capacity of the embedded generation in not contracted then such capacity remains out of reach of SLDC as SLDC can give instruction to generating unit only if it has valid

PPA with any buyer. Therefore, when system operator i.e. MSLDC based on its expertise as a system operator backed up by the study is recommending continuation of embedded generation for safe, secure and reliable system operation, the Commission cannot instruct against the same at least till the envisaged transmission capacity addition is achieved.

16.11 In view of above, considering issue of transmission constraint, BEST needs to extend its existing PPA with TPC-G for FY 2024-25 i.e. till March 2025. The Commission notes that Government of Maharashtra is also concerned about the supply to the Mumbai city and it has also issued direction under section 108 of the EA, 2003 to this Commission to extend PPA with embedded generation at least for 10 years once Distribution Licensee approaches for the same. The Commission has taken note of the concerns of the Government of Maharashtra and has conveyed to Government that the Commission would take appropriate and necessary steps with regards to extension of the existing PPA so as to ensure reliable and secure power supply to Mumbai. Through this present Order, the Commission is directing the extension of the existing PPAs only upto the end of this control period i.e 2024-25 (one year extension) because once transmission capacity addition projects are commissioned, Mumbai Distribution Licensee shall be free to explore cheaper alternative of power supply. This is necessitated since the consumers of the Mumbai cannot be exposed to the possibility of unsecured, unreliable and vulnerability to curtailment of power.

16.12 The Commission also notes that TPC-G's all embedded generation units are under Section 62 of the Electricity Act, 2003 and its ARR and tariff under MERC MYT Regulations 2019 has been determined till 4th Control Period i.e. till FY 2024-25. Hence, TPC-G would not have any issue in extending the PPA till March 2025.

16.13 In view of above, the Commission directs BEST to extend its existing PPA (Thermal + Hydro) with TPC-G till March 2025. Further, six months prior to end of such extended PPA, BEST may approach the Commission for future power procurement. At that time, based on the augmented transmission capacity, BEST may propose discontinuation of PPA with TPC-G in appropriate phases. STU and SLDC shall submit updated load flow studies at that point of time based on new element added in the system and increased transmission capacity.

16.14 Having directed BEST to extend existing PPA with TPC-G till March 2025, the Commission notes that BEST in its submission has stated that in case the Commission comes to conclusion that existing PPA needs to be extended then cost implication of such costly source needs to be shared by all distribution licensee in Mumbai. AEML-D has opposed such contention of BEST and stated that BEST for last several years has chosen to have PPA with TPC-G and enjoy the benefit when cost of power was lower and now when cost of generation has increased, it cannot seek to load it on other distribution licensee. AEML-D has also contended that in the past cheaper power of TPC-G was denied to them. In this regard, the Commission notes that sharing of cost cannot be allowed beyond the provisions of PPA and applicable regulatory framework.

PPA requires cost to be shared by beneficiaries. However, in case of operation of generating capacity on SLDC instruction, cost needs to be shared as per DSM Regulations. The Commission notes that issue of transmission constraint and its implication on scheduling has already been identified as issues of concern and the Commission in its Order dated 2 August 2022 (quoted in para 5.6 (d) above) has directed MSPC to evaluate implementation of Option 2 and Option 3 and submit report to the Commission with suggested option. MSLDC in its submission in present matter has stated that they are working on the same. Once such report is submitted the Commission will decide on the same in consultation with all the stakeholders after following due process.

16.15 The Commission also notes that although BEST in its Petition has proposed extension of PPA with Manikaran Power Ltd and entering into additional 100 MW PPA with Sai Wardha on same terms and condition, during the hearing in present matter, BEST has clearly stated that they are not pressing for the same and if required would approach separately. During pendency of present Petition, BEST has already initiated bidding process under Section 63 of the Electricity Act 2003 for procurement of 200 MW power on long term basis. In this regard, the Commission notes that although the Commission has directed for extension of existing PPA with TPC-G, in the past TPC-G's thermal units have not been used upto full capacity. Beneficiaries of TPC-G i.e. BEST and TPC-D tried to procure cheaper power under short-term contract to replace costly generation of TPC-G thermal sources. Such short-term power is being allowed without any curtailment. If BEST is able to discover cheaper tariff in its ongoing long term bidding process, then such power can replace BEST's existing short-term sources. Although there would be issue of granting Long Term Access on account of transmission constraint, with conditional NoC from STU said power can flow under short term Open Access, with the remote possibility of curtailment due to system constraints. Hence, although the Commission has directed BEST to extend PPA with TPC-G for a year, it should continue its bidding process for long term power procurement. At the time of tariff adoption, BEST in its Petition shall factor in possible financial and the power availability impact due to transmission constraint and its implication on net power purchase cost of BEST.

16.16 The Commission notes that BEST has filed present Petition for approval of power procurement plan under Regulation 20.1 of MERC MYT Regulations 2019. Such power procurement plan is ideally filed along with MYT/MTR Petition and hence, MYT Regulations 2019 has following provisions of approving such plan in MYT/MTR Order:

"20.6 The Commission shall approve the power procurement plan for the Control Period as part of its Order on the MYT Petition.

……

20.8 The Commission may, as a result of additional information not previously known or available to the Commission at the time of approval of the procurement plan under Regulation 20.6, if it deems appropriate, suo motu or on a Petition filed

by the Distribution Licensee, modify the procurement plan of the Distribution Licensee for the remainder of the Control Period, as part of the Mid-term Review."

However, as BEST's proposed power procurement plan is exceeding MYT control period it has filed it through this Petition, but while deciding the same the Commission has to rely on provisions of MYT Regulations. Regulation 20.8 of MYT Regulations, 2019 enables the Commission to modify the power procurement plan if it deems appropriate based on information available.

16.17 In view of issue of transmission constraints highlighted in above analysis, by using power under Regulation 20.8 of the MYT Regulations, 2019, the Commission is restricting its decision on BEST's power procurement plan only upto FY 2024-25 (present control period). The Commission would decide on BEST's long term power procurement plan when it files Petition six months before March 2025 after factoring the then available transmission capacities.

17. **Way Forward:**

17.1 In view of prevailing transmission constraints, the Commission directs BEST to extend existing PPA with TPC-G (Thermal + Hydro) by one more year i.e. till March 2025.

17.2 BEST shall approach the Commission with power procurement plan after considering transmission capacity addition, six months prior before March 2025.

17.3 STU shall coordinate with all implementing agencies for ensuring that all proposed transmission schemes are completed as per plan.

17.4 MSLDC submit its report (reference para 16.1) to the Commission with suggested option within six months from date of this Order.

17.5 Meanwhile, BEST is free to contract other cheaper long/medium term sources and getting it dispatched under Short Term Open Access after undertaking cost benefit analysis of the same.

18. Hence, following Order:

ORDER

1. **Case No. 240 of 2022 is partly allowed.**

2. **BEST to extend existing PPA with TPC-G (Thermal + Hydro) by one more year i.e. till March 2025.**

3. **Six months before March 2025, BEST shall approach the Commission with power procurement plan after considering transmission capacity addition.**

4. **Meanwhile, BEST is free to contract other cheaper long/medium term sources and getting it dispatched under Short Term Open Access after undertaking cost benefit analysis of the same.**

Sd/-	Sd/-	Sd/-
(Mukesh Khullar)	(I.M. Bohari)	(Sanjay Kumar)
Member	Member	Chairperson

(Abhijit Deshpande)
Secretary