Before the Maharashtra Electricity Regulatory Commission

IN THE MATTER OF

Application for grant of Transmission Licence for the proposed 1000 MW HVDC (VSC based) Link between 400 kV MSETCL Kudus & 220 kV AEML Aarey EHV station (Case No.190 of 2020)

Submission by Prayas (Energy Group), Pune 25th January 2021

1 Approach and Context

There has been a long-standing need for schemes to increase the transmission capacity in Mumbai to address concerns related to reliability and importing power. Given the outage in Mumbai on October 12th 2020 and the fact that the constraint on import of power affects DISCOMs' ability to sign economical Power Purchase Agreements (PPAs), there is a renewed urgency in initiating schemes to ease the constraint.

In this context, the present petition seeks grant of licence to AEMIL for developing a 1000 MW (VSC based) HVDC line between MSETCLs Kudus sub-station and AEML's Aarey sub-station. While the line might contribute to increase the import capacity and reliability of Mumbai transmission network, it is not clear if this is the most cost-optimal way to address the challenge.

The need for the scheme should be seen in the light of rising cost of supply and non-competitive tariffs already being paid by Mumbai consumers. In fact, the proposed capital cost of the project is about INR 6,700 crores which is a significant burden for Mumbai consumers to bear. **In fact, this single scheme alone could result in an approximate Rs. 0.50/unit tariff increase for all consumers in Mumbai annually[1]. This translates to a tariff increase of 8% from tariff approved for FY25.** Approving such a scheme, without careful assessment of alternatives, would reverse efforts by the commission in the 4th Control Period, to limit tariff impact on consumers. As the scheme is proposed as a cost-plus scheme

[1] Assuming cost plus ARR estimation based on norms prescribed in the MERC MYT Regulations, 2019, the annual aggregate revenue requirement the estimated cost is about INR 1,100 crores for FY25. Average tariff impact was estimated based on the ABR and sales estimates approved by the commission for all Mumbai utilities for FY25.

with uncertainty with respect to procurement of land and obtaining clearances there is a significant possibility of time and cost overruns as well.

The petition also mentions an additional 1000 MW line between the same sub-stations for future capacity addition. The treatment of this line could set a precedence for the upcoming line as well.

Given the cost impact, it is vital that the Commission:

- Evaluates the need for the specific scheme and suggested technology in the context of alternate schemes, routes and technologies to enhance Mumbai's transmission capacity in the most cost-optimal manner.
- Move away from the cost-plus approach and direct the STU to conduct competitive bidding for the most cost-optimal specifications.
- Reject the present petition as AEMIL would not require a licence if the project to meet this requirement is awarded via competitive bidding.

In this context, our detailed submissions are given below.

2 Commission to evaluate cost-optimal alternatives to present scheme

As per AEMIL's petition, the present scheme has not been approved by the Commission. Previously, a 1000 MW HVDC line from Nagothane substation to Aarey substation was approved in 2014. Subsequently, due to lack of progress of this scheme, a 400kV HVAC line between Aarey substation and Kudus substation was approved in 2016. This approval was for an HVAC line and not the presently specified HVDC line.

Given the cost impact of the scheme, the regulatory in-principle approval should be provided only after a comprehensive assessment of costs and potential benefits of the present scheme along with all possible alternatives. This is all the more crucial given the urgency and the scale of the investment to prevent resource lock-ins, delays and reliability issues for Mumbai consumers. Some considerations for a comprehensive assessment are noted below:

2.1 Load flow studies to assess all options

To assess the need of the scheme and based on the Commission's recommendation, AEML sought CEA's suggestion on '*appropriate bulk power injection scheme/strengthening of existing network of Mumbai and destination of HVDS termination (from feeding source like kudus) in Mumbai Transmission System'*.

Further, the STU also sought CEA's recommendation on *'transmission scheme for pushing power in MMR from Kudus 400/220 kV substation'.*

To assess these specific requirements, CEA conducted a load flow study based on data submitted by the utilities. The load flow studies only considered schemes planned by Mumbai utilities till FY25 and STU till FY22[2]. It is pertinent to note that alternative lines and options were not considered as part of this analysis. It is also not clear if transmission lines which are likely to come up post FY22/FY25 have been considered.

Further, the assessment of load does not account for change in load due to rooftop generation, potential in-city generation sources beyond FY25 and measures to reduce or shift peak demand.

Since the recommendation was sought specifically for the feasibility of this project without comprehensively considering projects in the pipeline and without considering alternatives, it is suggested that the Commission conduct a more comprehensive load flow analysis based on upcoming capacity, network changes, alternatives and changes in demand and supply for Mumbai. This should be a pre-requisite to assess the need for schemes to strengthen Mumbai's transmission network.

In fact, the need for comprehensive assessment was also noted by CEA in its recommendations to the STU in a letter dated 23th Oct, 2020 where it noted that *'for building robust transmission system for feeding load the of Mumbai with reliability, there is a need for long term planning with a horizon of 10 to 15 years' time frame.'*

The recommendations, analysis and findings of the Independent High Level Committee constituted by Commission to investigate the MMR Grid Failure incident should also be considered while assessing capacity expansion options.

2.2 Assessment of alternative options for the scheme

Evaluation of alternative solutions including storage

As stated earlier, evaluation of alternate lines, specifications and technologies should also be considered while evaluating the scheme. Without such an evaluation by MERC and the STU, the present proposal should not be considered. This evaluation should be done by the technical committee as suggested

[2] Please refer Annexure O of petition.

below and should also include options such as energy storage for transmission deferral and power purchase optimization.

For example, for the same capital expenditure (even without considering time and cost overrun for the HVDC project), Mumbai DISCOMs could install large grid scale battery energy storage, ~ 1000 MW – 4000 MWh, systems (BESS). BESS being modular in nature would allow the deployment to be spread over few years and would contribute to further optimizing tariff impact. BESS could also be deployed at strategic locations / loads within licensees' areas. This would further enhance reliability of supply for strategic loads.

BESS could also be used effectively to optimize power procurement by procuring power at low cost and using the same at the time of peak power cost. This will further optimize overall tariff impact. This example is just to illustrate the need to consider different options, and how it is essential to have a comprehensive view to minimize tariff impact for Mumbai consumers.

Rationale behind selection of VSC technology

While the STU plan and CEA recommendations mention VSC technology for the line, the rationale for the selection of VSC over CSC technology for the scheme is not clear. The CEA recommendation based on AEML's request merely states that, '*The link being VSC based technology would also help in Voltage regulation'*. The cost increment due to use of VSC based technology as opposed to CSC based technology is also not clear from the petition. This should be clarified and seen in the context of the benefits of adopting VSC for the line.

Specification of 320 kV voltage line

The choice of 320kV line for the present HVDC project is unclear from the petition. MSETCL has a 500kV HVDC line and the earlier proposal for HVDC line between Nagothane and Aarey substations was at 150 kV. Assessment of potential benefits and the rationale for this specification should be clarified.

Route optimization

The present scheme proposed underground HVDC line to be laid along with the water pipeline in order to address issues with right of way and clearances. Given the cost of the line, it is not clear if any route optimization exercises before selecting proposed route. It is also not clear if the present route would require any additional operational cost or maintenance constraints given close proximity to the water pipeline. These should also be clarified at this stage.

2.3 Unclear but visible risks in the proposed project which could lead to delays

Prima facie, there also seem to be several aspects in the petition where clarity has not been provided. These could potentially result in delays and cost overruns and need to be detailed before awarding the project.

Land required for the scheme

The petitioner has stated that procurement of about 50 acres of land would be needed for the implementation of the scheme. Of this, 40 acres is located in Kudus and 10 in Aarey. It must be noted here that the previously proposed 400 kV HVAC project between the same substations was delayed due to ROW and land issues.

The issue of land availability was also raised in the Final Report by the Standing Committee constituted by MERC to draft a 5 year Business Plan for Mumbai Metropolitan Region (MMR), in December, 2011[3] (Zalte Committee Report). If the land required is forest land at Aarey, it is likely that there would be significant hurdles and delays in acquiring land.

Need for clarity on clearances needed for the scheme

As delay in obtaining clearances also pose a significant risk to timely completion, it is imperative that the petitioner provide an exhaustive list of all possible clearances that would be required from various authorities to complete the project. Indicative timeline for obtaining clearances should also be detailed by the petitioner. This has not been clearly stated in the petition. Evaluation of the proposed scheme by the Commission should consider risk due to obtaining clearances as well.

Financing and Implementation constraints for AEML-T

In the petition, AEML-T has cited *'unforeseen financing and implementation constraints'* as the reason for proposing to execute the proposed scheme under its 100% owned subsidiary company. However, the financing and implementation constraints have not been detailed in the petition. It is not clear if these constraints would persist even after the creation of the subsidiary and would not pose a threat to the execution of the project. Details of these constraints should be detailed and considered by the Commission.

[3] Page 34 of the Standing Committee report.

2.4 MERC to constitute a technical committee to assess transmission strengthening options

In view of the high costs, potential risks and lack of adequate assessment of load, alternatives, the Commission should constitute a technical committee to holistically assess options for transmission strengthening in Mumbai. The need for technical committee is paramount given the changes in the Mumbai power sector and viability of various technological options since the Khaparde Committee gave its recommendations a decade ago.

The committee should assess technical and economic aspects of all possible alternatives by conducting a comprehensive study to assess power transfer and reliability aspects based on different network, demand, storage and generation scenarios. This technical committee should invite proposals from various transmission utilities and experts to be able to consider multiple options to address the challenge. This would ensure a more comprehensive approach to addressing the issue rather than considering only the feasibility of specific lines for the MMR region. The technical committee should also seek recommendations from the CEA to aid its assessment and submit its report to the Commission within four months' time. The report of the technical committee should be finalized after due pubic consultation and the final report should also be available in the public domain.

3 Adopt competitive bidding route for such schemes

3.1 MERC to initiate competitive bidding given urgency for appropriate scheme

Allowing a project costing more than INR 6700 crore under cost-plus regulation will defeat the very purpose of introducing competitive bidding in the transmission sector. This will also be in contravention with Maharashtra Government's G.R. dated 4.01.2019[4].

As per the petition and Commission's order in Case No. 297 of 2019, it seems that the decision regarding competitive bidding for the scheme from the Empowered Committee of the Government of Maharashtra is still awaited. In such a case, the Commission should not approve AEMIL's licence and endorse cost plus regulation for this scheme. This is especially the case if this scheme or any other alternative needs to be initiated in an urgent manner to address Mumbai's constraints.

[4] The GoM resolution dated 4th Jan, 2019 can be accessed here: https://www.maharashtra.gov.in/Site/Upload/Government%20Resolutions/English/201901041644561210.pdf (Last accessed on 21st Jan, 2021)

As competitively bid projects have competitive selection criteria and pre-specified, contractual provisions to limit time and cost overruns, this approach would be ideal to address the current predicament before Mumbai. A recent report by CII[5] analysed 58 cost plus and 43 competitively bid transmission projects and concluded that competitively bid projects typically have tariffs that are 30% lower than if the same project was awarded on a cost-plus basis. Table 1 which is a compilation of data from recent TBCB tariff adoption orders issues by CERC in 2020 shows that the potential reduction from cost plus tariff for recent projects awarded under TCBC route to be about 42%.

Table 1: Compilation of recently awarded TBCB projects where tariffs are lower than via cost plus route

Line	Levelised Transmission Charges (in INR Crore)		% Difference	Petition No.	Developer/ Winning Bidder
	Under TBCB	Based on CERC Norms			
Jam Khambaliya pooling station, inter-connection for RE connectivity. 400/220 kV ICT and bays at CGPL Switchyard	34	67	**49.4%**	47/AT/2020	Adani Transmission Limited (ATL)
Transmission System for LTA applications from Rajasthan SEZ Part-B	72	158	**54.8%**	441/AT/2019	PGCIL
WRSS-21 (Part-B) system strengthening InSTS due to RE injections in Bhuj PS	179	282	**36.5%**	444/AT/2019	Sterlite
Providing connectivity to RE Projects at Bhuj-II (2000 MW) in Gujarat	124	208	**40.4%**	448/AT/2019	PGCIL
System for RE at Bhuj-II, Dwarka & Lakadia	83	141	**40.9%**	443/AT/2019	ATL
Ajmer (PG)- Phagi 765 kV D/C line, bays for Rajasthan SEZ	61	118	**47.8%**	398/AT/2019	PGCIL
400 kV Udupi (UPCL)-Kasargode D/C line	85	114	**25.9%**	336/AT/2019	Sterlite
WRSS-21 (Part A) for InSTS due to RE Injections in Bhuj PS	95	175	**45.5%**	408/AT/2019	ATL

[5] Report available here: https://india-re-navigator.com/utility/report/download/1565090792-63566.NewAgePowerSystems.pdf

In fact, it was due to inordinate delays and potential cost escalation that the Commission directed the STU to submit its recommendations regarding initiation of competitive bidding for the 400 kV Kharghar Vikhroli Line, which is currently under construction to address Mumbai's transmission constraints. It was only after the Commission issued directions in its order dated 29.01.2019 that the empowered committee approved the project for competitive bidding in March 2019. In fact, in this case APTEL also upheld the Commissions decision[6]. As the urgency in this matter is the same, a similar approach should be adopted by MERC.

3.2 Creation of SPV to facilitate competitive bidding and obtaining clearances

To ensure timely completion of the scheme, the STU can create an SPV to acquire land and obtain necessary clearances/approvals from competent authorities. Thus, potential bidders would not have to factor in the risk of time and cost overruns due to this. As in the case of the Kharghar-Vikhroli line, it is also important that there is continuous monitoring of progress of the project by the STU to ensure timely completion.

In view of the significant investment, tariff impact on Mumbai consumers from the proposed project and the potential for cost escalation under the cost-plus framework, we urge the Commission to:

- Reject the petition for grant of licence to AEMIL
- Constitute a technical committee to assess potential alternatives to strengthening Mumbai's transmission network including applications of energy storage
- Direct STU to consider creating an SPV to facilitate RoW, clearances and land acquisition for the most cost-optimal and viable project to meet Mumbai's constraints.
- Direct STU to initiate competitive bidding for the purpose of schemes to ease Mumbai's transmission constraint.

Without such an approach, consumers in Mumbai will be impacted with significant tariff increase due to a single line. It is also likely that the benefits of the increased transmission capacity will be realized much later due to delays and cost overruns.

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[6] Judgement in Appeal No. 88 Of 2019 & IA No. 372 Of 2019