


भारतस रकार केंद्रीय विद्युत प्राधिकरण दक्षिण क्षेत्रीय विद्युत समिति 29, रेसकोर्स क्रॉस रोड बेंगलूर- 560 009		Government of India Central Electricity Authority Southern Regional Power Committee 29, Race Course Cross Road Bengaluru - 560 009
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सं/No. SRPC/MS/2021-22/	दिनांक/ Date	07 <sup>th</sup> March 2022

To

**The Chief Operating Officer**  
 Central Transmission Utility of India Limited (CTUIL)  
 Saudamini, 1<sup>st</sup> Floor,  
 Plot No.2, Sector-29,  
 Gurugram, Haryana-122 001

**Subject: ISTS Network Expansion scheme between Western Region & Southern Region for export of surplus power during high RE scenario in Southern Region –reg.**

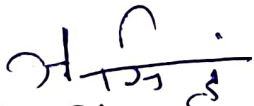
Sir,

Kind reference is invited SRPC letter dated 04.03.2022 communicating SRPC views in respect of the "ISTS Network Expansion scheme between Western Region & Southern Region for export of surplus power during high RE scenario in Southern Region" for taking up the transmission scheme for consideration in the NCT Meeting along with the views of SRPC. Kindly ignore the views furnished vide letter dated 04.03.2022.

Chairperson, SRPC & CMD, TANGEDCO vide mail dated 07.03.2022 has communicated the approved Minutes of the 41<sup>st</sup> SRPC Meeting held on 02.03.2022 and the views of the SRPC to be communicated to CTUIL. The MoM and views of SRPC are attached with the mail. CTUIL may submit the proposed transmission scheme along with the views of SRPC (07.03.2022) (at **Appendix**) for consideration in the NCT meeting.

Thanking You,

भवदीय/Yours faithfully,

  
 (असित सिंह / Asit Singh)

सदस्य सचिव / Member Secretary

## Appendix

### Southern Regional Power Committee

#### Chairperson SRPC approved view of SRPC on CTU's proposal of ISTS Network Expansion scheme between Western Region & Southern Region

1. CTUIL vide letter dated 21.01.2022 had furnished the ISTS Network Expansion scheme between Western Region & Southern Region for export of surplus power during high RE scenario in Southern Region for views of Southern Region Power Committee (SRPC).

S No.	Scope of the Transmission Scheme	Capacity /km
1	Narendra New (GIS) – Pune(GIS) 765kV D/c line with 1x330MVA switchable line reactor on each ckt at both ends	340 km 765 kV line bays-2 (GIS) (at Narendra New) 765 kV line bays-2 (GIS) (at Pune) 765 kV, 330 MVA SLR-2 nos (7 x 110 MVA incl. 1 switchable spare unit) at Pune 765 kV, 330 MVA SLR – 2 nos (6 x 110 MVA) at Narendra (New)
2	Upgradation of Narendra (New) (GIS) to its rated voltage of 765 kV level along with 4x1500 MVA transformers and 2x330 MVA Bus Reactors	765/400 kV, 1500 MVA- 4 no. (13 x 500 MVA incl. 1 spare unit) 765 kV ICT bays- 4 nos.(GIS) 400 kV ICT bays- 2 nos.(GIS)^ 765 kV, 330 MVA BR – 2 nos. (7 x 110 MVA incl. 1 switchable spare unit to be used for both bus/line reactors) 765 kV Bus Reactor bays – 2 nos. (GIS)
	* Narendra (New)(GIS) - Kolhapur 765kV D/c line to be kept charged at 400kV level. ^ Two nos. equipped 400kV bays (opposite Koppal line bays) under implementation under TBCB route (Koppal WEZ scheme) to be utilised for 400kV side of 2 nos. 765/400kV Transformers The Narendra New (GIS) – Pune 765kV D/c line may be LILOed in future at a suitable location as per requirement of MSETC	

CTUIL had requested that SRPC may forward views in respect of “*ISTS Network Expansion Scheme between WR & SR for export of surplus power during high RE Scenario in Southern Region*” at the earliest so that the transmission scheme may be taken up promptly for consideration in the NCT meeting along with the views of SRPC.

2. In the 40<sup>th</sup> Meeting of SRPC held on 31.01.2021 (relevant extract is enclosed at **Annexure A**), the scheme proposed by CTUIL has been deliberated in detail and it

was concluded that comments/observation received from POSOCO/ other utilities would be furnished to CTUIL & other members, CTUIL in turn furnish the clarification in writing and the same would be circulated to the members. Subsequently a technical meeting would be convened and the outcome would be put up to SRPC in the next meeting.

3. Subsequently, POSOCO, APTRANSCO, KPTCL, TANGEDCO and Puducherry ED had furnished their comments. CTUIL had furnished their observations on the comments of SR constituents. Based on the comments/ clarifications received as above, a special TCC meeting of SRPC was convened on 18.02.2022 through VC to discuss them in detail with a view to ascertain the orderliness of the CTUIL's proposal, and suggest suitable recommendations for SRPC so that their considered views may be conveyed to CTUIL for further pursuance with NCT.
4. The minutes of the Special TCC meeting held on 18.02.2022 were issued vide SRPC letter dated 24.02.2022 (**Annexure-B**). The summarized views of SR-Constituents, POSOCO & CTUIL are given below for kind reference:

<b>Constituents</b>	<b>Comments/Observations</b>
<b>TANGEDCO:</b>	<ol style="list-style-type: none"> <li>a) Remarked that the issue of overloading of the Kolhapur (PG) - Kolhapur 400 kV D/C line under N-1 condition was a pre-existing constraint in the State network of Maharashtra prior to the approval of transmission scheme for 8 GW RE capacity additions in SR.</li> <li>b) CTU's approach in linking the grant of LTA with the new network upgradation which was not part of the transmission schemes approved by CERC is contrary to the approval accorded by CERC for 8 GW.</li> <li>c) The optimal feasible solution to resolve the overloading in Kolhapur (PG)-Kolhapur(MS) 400 kV DC line is to make LILO of any one of the 400 kV lines between Kolhapur SS (MS) and any other 400 kV SS in Maharashtra at Kolhapur (PG) substation.</li> <li>d) Underlined that the power system planning studies carried out by CTU are not based on realistic scenario and noticed that the dispatches for RE and conventional Generators adopted by CTU for this study are contrary to CEA's Planning Criteria. All generation from stations in Maharashtra had been reduced whereas in Karnataka entire generation is taken at maximum level apart from ISGS. The same percentage of generation from different sources of generators needed to be adopted in all the states. Informed that after analyzing the LGB considered in the WR, SR and NR in studying the proposal, many issues had been noticed in the data base considered. The projection gives a picture that there is a huge surplus in SR and huge deficit in WR.</li> </ol>

	<p>e) Since the generation in Maharashtra was not considered fully, revised study with all SR beneficiaries, POSOCO, Maharashtra state Transco, Distribution companies with presence of CEA may be conducted.</p> <p>f) Requested to drop the proposal of up-gradation of the Narendra SS (PG) to 765/400 kV SS and Narendra-Pune 765 kV D/C line</p>
<b>APTRANSCO:</b>	<p>a) Stated that they are in agreement with views of TANGEDCO</p> <p>b) Highlighted the skewed Load Generation Balance considered for the analysis, and remarked that norms of CEA planning criteria are not followed in spirit.</p> <p>c) Requested to explore operating Raigarh – Pugalur HVDC link in reverse mode, and other HVDC links (Talcher-Kolar, Gajuwaka, Bhadrawati) in reverse/ block mode.</p> <p>d) The option of considering 765 kV Narendra New – Raichur-PG option with bus-sectionalizer along-with series reactor at Narendra by CTUIL.</p>
<b>KPTCL:</b>	<p>a) Observed that CTUIL had considered full generation from thermal Power Plants &amp; maximum RE generation in SR and suggested that scenario with import of power from Western Region to Southern Region needs to be conducted considering peak RE generation in Western Region.</p> <p>b) Necessary joint study needed to be conducted with participation from CEA, CTU and Southern Region constituents for arriving at an optimal ISTS network expansion scheme between WR &amp; SR.</p> <p>c) Also the financial impact in terms of transmission charges which may be incurred in this regard on the SR constituents needed to be looked into and suggested that detailed techno-economical analysis needed to be carried before finalizing the subject transmission scheme.</p>
<b>PCKL:</b>	<p>a) PCKL representative opined that the addition of network should not financially burden Karnataka state.</p> <p>b) <i>PCKL vide letter dated 22.02.2022(Annexure- C) has submitted their comments on the CTUIL proposal. All the observations are discussed in the Special TCC meeting held on 18.02.2022.</i></p>
<b>TSTRANSCO:</b>	<p>c) There is a necessity to relook the LGB and generation dispatch and they are in agreement with views of TANGEDCO in this regard.</p> <p>d) Regarding the 400 kV Kolhapur PG – Kolhapur (MSETCL) D/C line, there is necessity to plan the proper intra-state network i.e, instead of LILO of the line at Kolhapur (PG), a 400 kV SS may be planned and network reconfiguration may be done.</p>

<b>KSEBL:</b>	<p>a) Enquired CTUIL about the assumptions, LGB and dispatches that went into the calculation and based on that they can have a relook into the system about the assumptions that went into the calculation. Based on that they can have a relook into the system.</p> <p>b) Enhancements in ATC, TTC that would happen with these additions may be furnished by CTUIL.</p> <p>c) They are in agreement with other SR constituents on being burdened unnecessarily and the cost of supply must be reasonable</p>
<b>Puducherry ED:</b>	Electricity Department Puducherry would go by the decision taken/ comments offered by the majority of the Southern Region Constituents.
<b>SRLDC:</b>	Observed that in current scenario also SR to WR TTC is limited due to constraints in 400kV Kolhapur (PG) – Kolhapur (MSETCL) D/C line and beyond. This constraint would further get aggravated with increase in renewable generation in SR especially in Koppal /Gadag area. Hence, the proposed scheme of 765kV Narendra (New) – Pune (GIS) D/C line and re-conductoring of 400 kV Kolhapur (PG) – Kolhapur (MSETCL) D/C line needed to be taken up for implementation on urgent basis. The scheme would help in relieving transmission constraints in exporting surplus power from Southern Region during Solar period and off-peak period.
<b>NLDC:</b>	Mentioned that they have furnished the actual flow on Kolhapur (PG)-Kolhapur (MSETCL) lines and the real time constraints were being faced during export of power from SR. Pune and Mumbai are the load centers in Western Maharashtra and the generation complex is in north Karnataka area comprising generation from Kaiga, Kudgi, hydro generation and the new renewable generation coming to that particular area. As more renewable in the Gadag, Koppal areas get added, line loadings towards the WR side would increase. Even during high import scenario of SR, this situation may continue. Therefore, it has been highlighted that apart from 400 kV Kolhapur PG – Kolhapur (MSETCL) D/C line there are other constraints beyond Kolhapur also. If it is possible to directly transfer power to Pune or Mumbai it will be helpful for the system
<b>CTUIL:</b>	<p>a) Informed that the important considerations for carrying out the study had been furnished by CTUIL for transparency in the proposal. The following were noted w.r.t. important considerations for the study:</p> <p>i) Scenario: Solar Max (Jun'24 Afternoon Peak) with high generations in Narendra complex (Kudgi, Raichur, Bellary, Gadag SEZ &amp; Koppal WEZ)</p> <p>ii) Out of 18.5 GW potential REZ in SR, only 8 GW (Koppal-2.5 GW, Gadag-2.5 GW, Karur-2.5 GW &amp; Tuticorin-0.5 GW) has been considered. Balance 10.5</p>



	<p>GW (Bidar-2.5 GW, Kurnool &amp; Anantapur – 8 GW) has not been considered due to non-availability of land and other issues.</p> <p>iii) Out of 7GW REZ potential in Maharashtra, only 1 GW at Kallam has been considered. Further, additional 1 GW at Kallam is under Intra State and balance 5 GW (Wardha – 2.5 GW, Solapur – 2.5 GW) has not been considered due to non-availability of land and other issues.</p> <p>iv) All India Demand of 224 GW has been considered and demand for WR &amp; SR is considered as 69 GW &amp; 54 GW respectively as per the Load Generation Balance considered for All India Studies for 2024-25 timeframe, as per the methodology finalized with CEA, CTU and POSOCO.</p> <p>v) For simulating the worst case:</p> <ul style="list-style-type: none"> <li>➤ 100% Despatch has been considered at Gadag and Koppal REZs (2500 MW each)</li> <li>➤ 90% Thermal Despatch has been considered at Kudgi TPS (3x800 MW)</li> </ul> <p>b) The LTA (existing IR links) had been utilized for exporting power up to 3850 MW from SR. With the re-conductoring of Kolhapur (PG)- Kolhapur (MS), additional 600 MW had been granted. The worst scenario is considered by CTUIL to ensure that LTA is not curtailed and CEA’s Planning Criteria is complied. They have LTA applications of around 1080 MW.</p> <p>c) It was pointed out that in case of SR, only 8 GW is considered against the proposed potential of 18.5 GW and w.r.t Maharashtra, only 1 GW is considered against the proposal of 7 GW due to non availability of land etc. If CTUIL had considered the full capacity it could have been noted as a skewed generation w.r.t dispatches considered.</p> <p>d) Generators are approaching for LTA for their full capacity and if LTA is granted for the same it is a commitment ensured to dispatcher that they can transfer the full LTA quantum granted and are liable for billing for the same.</p> <p>e) W.r.t. using Raigarh - Pugalur HVDC in reverse direction, the limit is 3000 MW and up-gradation of ICTs at both buses (A &amp; B) are required. The sensitivity of the Raigarh – Pugalur HVDC link for the proposed link is only about 5%, while the same for HVDC-Gakuwaka link is zero. Similarly, Talcher-Kolar HVDC link cannot be used in reverse direction since no backup transmission system has been planned for the same due to which the 400 kV Talcher-Meramudali lines would get</p>
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	<p>overloaded.</p> <p>f) On the issue of overloading of Kolhapur (PG) – Kolhapur (MH) 400kV D/C line and the same can be accomplished by LILO of any one of the circuits emanating from Kolhapur (MS) S/s to other substations at Kolhapur (PG) CTUIL had stated that these lines are state lines and very old which are designed to operate at 45<sup>0</sup>C ambient temperature and limited to 75<sup>0</sup>C max temperature limiting the thermal loading to 850 MW. Several MSETCL intra-state transmission lines are loaded much beyond their thermal limits and critically loaded in the base case itself (going beyond 1100 MW in base case itself).</p> <p>g) On APTRANSCO suggestion of 765 kV D/C Line from Narendra New to Raichur with Bus Sectionalization along-with series reactors It was pointed out that the Narendra New 765/400kV substation is a GIS substation and Bus Sectionalization may not be feasible due to the Short Circuit Levels at 400kV bus of Narendra New is about 48 kA which is very close to its design limits of 50 kA.</p> <p>h) CTUIL informed that the present TTC declared is 19,650 MW and the ATC is 18,900 MW. That is for the present with Raigarh - Pugalur as 6000 MW. By April 2023, with the availability of Warora-Warangal, the TTC would be 21,450 MW and ATC would be 20,700 MW. The constraint is on Warora- Warangal. With the addition of 765 kV Narendra (new) – Pune GIS D/C line, an estimated 1500-2000 MW enhancement in ATC is anticipated. But the exact TTC and ATC numbers would be worked out and shared with the SR beneficiaries.</p> <p>i) Looking into the urgent requirement of the “<i>ISTS network expansion beyond Kolhapur for export of surplus power during high RE scenario in Southern Region</i>” for facilitating export of power under LTA to the identified beneficiaries in the NEW Grid from the RE generation projects in Southern Region, the scheme may be recommended by SRPC to be taken up for implementation to ensure timely availability of required transmission system for evacuation of power from RE projects at Koppal, Gadag, Karur and Tuticorin.</p>
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#### 5. Summary of deliberations of the 41<sup>st</sup> meeting of SRPC held on 02.03.2022:

Constituents	Comments/Observations
CTUIL	<p>a) Without the proposed system CTUIL would not be able to grant LTA for a quantum of 1080 MW RE generation for which LTA applications had already been received and for any new applicants who may apply for LTA.</p> <p>b) Govt. of India has set a target for establishment of 500 GW</p>

	<p>capacity by 2030 from non-fossil fuel based generation projects. For meeting the target considering the RE capacity already commissioned, transmission system already identified / under implementation and margins available in the existing / under implementation transmission system for RE capacity planned, additional transmission system is to be planned for about 180 GW RE generations on all India basis. Out of this 180 GW, more than 80 GW is being identified in SR particularly in the States of Andhra Pradesh, Telangana, Karnataka and 5GW of Offshore Wind in Tamil Nadu. Against this capacity in SR, transmission system for about 50 GW considering storage, is to be identified in due course of time.</p> <p>c) As agreed in the TCC meeting for working out of the TTC for import as well export scenario of Southern Region, CTUIL informed that based on the studies it is found that under the present scenario the export TTC from SR to WR is 4800 MW and considering the TRM of 400 MW (as also has been considered by NLDC as well), the ATC for export of power from SR to WR is about 4400 MW. This capability has already been utilised in grant of LTA for export of power from SR to beneficiaries in NEW Grid. Further with the consideration of Narendra – Pune 765kV D/c link and augmentation of ICTs at Raigarh in the 2024-25 timeframe, the TTC for export from SR to WR is expected to be about 11000 MW with consideration of 3 Units (3x800 MW) at Kudgi NTPC and expected to be about 13000 MW with consideration of 1 Unit (1x800 MW) at Kudgi NTPC with full RE generation despatch from Gadag and Koppal.</p> <p>d) Further, TTC of 19650 MW for import of power from NEW Grid to SR Grid in present time frame has been declared by CTU. With the consideration of Warora – Warangal 765kV D/c link, Narendra – Pune 765kV D/c link and augmentation of ICTs at Nizamabad &amp; Raigarh in the 2024-25 timeframe, TTC is expected to be about 25000 MW.</p> <p>e) Appraised the forum that the scheme was already approved by WRPC and Maharashtra DISCOMS have put forth some observations, which were being pursued by CTUIL separately.</p>
<b>TANGEDCO</b>	<p>a) Pointed out that the skewed LGB considered in the PSSE base case for Maharashtra region with 26000 MW load but an internal generation of only 10000 MW, whereas the present generation of WR itself was amounting to 17000 MW. But full despatch of RE at Gadag and Koppal alongside 90% despatch</p>



	<p>from Kudgi Thermal station has been considered.</p> <p>b) Raised apprehensions regarding consideration of high value of lumped load of the order of 400-900 MW in substations in Maharashtra. It was pointed out that that is not in line with CEA's Planning Criteria.</p> <p>c) Pointed out regarding overloading of 220 kV STU network of Maharashtra in the considered PSSE base case and reiterated that commissioning of the new line may not be an optimal solution for export of power without addressing issues of existing over loadings of transmission system.</p> <p>d) It was stated by TANGEDCO that the proposed link/elements would create a redundant asset, involving huge investment. Hence, the proposal may be dropped.</p> <p>e) CTUIL has carried out studies directly for LTA margin of 10000 MW with the proposed line and have kept on hold LTA application stating that sufficient margins were not available. Whereas they should have carried out studies for intermediate levels like 6000 MW or 7000 MW and propose the optimal system and grant LTA.</p> <p><b>CTUIL response :</b></p> <p>(i) A fair analysis based on technical considerations was carried out alongside the CEA to put forth the proposal. Over loadings/ LGB in STU network are not under their jurisdiction and beyond the control of CTUIL, and the responsibility lies with respective State Transmission Utility (STU). Regarding lumped loads in Maharashtra they informed that the same was considered based on the inputs from Maharashtra, who were planning to commission new substations to meet their load requirement. Regarding the specific query on low generation considered, CTUIL, WR representative informed that as per the base case, i.e., 4<sup>th</sup> scenario considered for the studies, [which is the high RE scenario], generation in Maharashtra was arrived considering the merit order. CTUIL also stated that regarding correctness of data/STU network overloading no concerns were raised during the Joint Study meeting of SR and WR.</p> <p>(ii) CTUIL reiterated that all the data used in the system studies for the proposal was discussed in the Joint Study Meeting and all the assumptions/scenarios were as per the discussions held on 11.03.2021 between CEA, CTU and</p>
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	POSOCO regarding LGB for All-India Studies.
<b>APTRANSCO</b>	<p>a) Uniformity in LGB finalization should be maintained/ ensured in respect of consideration of RE generation across India, unlike in present study where high RE generation is considered only in Karnataka and load at Maharashtra.</p> <p>b) A physical Joint Study meeting is required with all SR constituents, CTUIL and CEA in order to address the concerns of all SR constituents.</p> <p>c) Redundant system for generation in Krishnapatnam area (which never materialized) had significant impact on AP's transmission charges in the past and the transmission system needs to be planned optimally.</p> <p>d) The spirit of CEA's Transmission Planning Criteria shall be maintained which emphasizes the fact that planning of ISTS and intra-STS shall be taken up in uniform and integrated manner for achieving best utilization of the transmission network, rather than element wise planning. Consistent consideration of merit order needed (only Kudgi is considered at 90%) in the base case selected.</p>
<b>SRLDC</b>	The proposed link is utmost important for the grid from System Operator's point of view. The ambiguity was regarding the correctness of the study carried out and not regarding the necessity of the line. The proposed 765 kV New Narendra – Pune D/C line would serve as an evacuation path of power between SR and NEW grid. Power flow of the region would vary depending on generation and load points and in this proposal flow would be from SR to WR.
<b>MS, SRPC</b>	Suggested that in view of diverse views from SR Constituents on CTUIL's proposal, the consolidated view of all constituents/POSOCO/CTUIL may be furnished to CTUIL for further pursuance with NCT for consideration and appropriate decision regarding the proposed line.
<b>CMD, KSEBL (in chair)</b>	MS, SRPC to consolidate the views of all SR constituents and submit to CTUIL for consideration of NCT.
<b>Conclusion and Recommendation of SRPC</b>	<p>(i) <i>The Southern Regional States observed that the following assumptions considered for the study are wrong and not in line with the CEA's Planning Criteria:</i></p> <p>a) <i>Different diversity factors are adopted for different States</i></p> <p>b) <i>Load –Generation Balance for Maharashtra and Karnataka are adopted in such a way that there</i></p>

	<p><i>would be surplus power in SR and deficit in Maharashtra</i></p> <p><i>c) Adoption of 100% capacity factor for RE generators and 90% for thermal stations in Karnataka and keeping Nil generation in Maharashtra in many State owned generating stations(Internal generation kept at 10272 MW against the demand of 26853 MW)</i></p> <p><i>d) The generation dispatches are not as per MOD</i></p> <p><i>e) Huge Lumped loads considered in various 33 kV, 220 KV and 400 kV buses of Maharashtra</i></p> <p><i>f) Overloading of Intra State network due to the lumped loads as well as unrealistic scenario adoption</i></p> <p><i>(ii) Maharashtra State Discom has also raised similar apprehensions on the proposal and that need to be taken into consideration.</i></p> <p><i>(iii)The Southern Regional States, viz. Tamil Nadu, Karnataka, Andhra Pradesh, Telengana, Kerala and Puducherry unanimously objected for the redundant investment in view of the fact that the entire tariff burden will be borne by the States in the ratio of their LTA+MTOA and requested to rectify the wrong assumptions and conduct revised joint study.</i></p> <p><i>(iv)However, CTU without elaborating on specific factual assumptions objected by Southern States stated that revised joint study may not be required.</i></p> <p><i>(v) Subsequently, TANGEDCO vide letter dated 02.03.2022 (Annexure-D) had furnished additional observations and views of TANGEDCO on the proposal of CTU for ISTS Network Expansion scheme between Western Region &amp; Southern Region for export of Surplus power during high RE Scenario in Southern Region submitted during the 41<sup>st</sup> SRPC meeting held on 02.03.2022.</i></p>
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