

सेंट्रल ट्रांसमिशन यूटिलिटी ऑफ इंडिया लिमिटेड
CENTRAL TRANSMISSION UTILITY OF INDIA LIMITED
(Wholly Owned Subsidiary of Power Grid Corporation of India Limited)
(A Government of India Enterprise)

Ref: CTU/W/07/1st WR Joint Study

12th Nov, 2021

As per Distribution List

Sub: 1st Joint study meeting on Transmission Planning for Western Region held on 05.11.2021 – Minutes of Meeting

Sir,

Please find enclosed the minutes of the 1st Joint study meeting on Transmission Planning for Western Region held on 05.11.2021 to discuss transmission network augmentation w.r.t. Gujarat through video conferencing.

The minutes are also available at our website (www.powergrid.in >> [CTU Open Access](#)).

Thanking you,

Yours faithfully,



(Partha Sarathi Das)
Sr. General Manager

Encl: Minutes of Meeting

Distribution List:

1. Chief Engineer (PSP&A – I) Central Electricity Authority Sewa Bhawan, R.K.Puram, New Delhi-110 066.	2. Managing Director Gujarat Energy Transmission Corp. Ltd, Sardar Patel Vidyut Bhawan, Race Course, Vadodara -390 007
3. Director (Operation) Maharashtra State Electricity Transmission Co. Ltd., 4 th Floor, "Prakashganga", Plot No. C-19, E-Block, Bandra – Kurla Complex, Bandra (East), Mumbai- 400051	4. Director (SO) POSOCO 9 th Floor, IFCI Towers, 61, Nehru Place, New Delhi – 110019
5. Chief General Manager (I/c) Western Regional Load Despatch Centre F-3, M.I.D.C. Area, Marol, Andheri East, Mumbai-400 093	

Minutes of 1st Joint study meeting on Transmission Planning for Western Region held on 05.11.2021 over VC amongst CEA, CTU, POSOCO and GETCO to discuss transmission network augmentation w.r.t. Gujarat

The 1st Joint Study Meeting on Transmission Planning for Western Region was held on 05.11.2021 over Video conferencing amongst CEA, CTU, POSOCO and GETCO to discuss transmission network augmentation w.r.t. Gujarat. List of participants is enclosed at **Annexure-I**. Sr. GM, CTUIL welcomed all the participants. Thereafter, deliberations as per the agenda commenced and the gist of deliberations are as given below.

I. Brief Background

GETCO vide letter dated 26.10.2021 has highlighted certain issues being faced in Gujarat which require ISTS system strengthening to increase ATC (copy of letter attached at **Annexure-II**) such as constraints observed on Vadodara 765/400kV ICTs, Kala – Kudus 400kV D/c line and Banaskantha – Veloda (Sankhari) 400kV D/c line. Further, as decided in 61st meeting of WR constituents for Connectivity & LTA Applications on 27.07.2021, adequacy of transmission system in vicinity of Navsari (incl. 2x315MVA+1x500MVA, 400/220kV ICTs) due to drawl of power by Hindustan Zinc Limited (HZL) also needs to be assessed.

The issues were preliminary discussed in a meeting held on 13.09.2021 amongst CEA, CTU, POSOCO, GETCO & MSETCL post which GETCO has shared revised study file with their proposals vide e-mail dated 18.09.2021.

In order to finalize the above issues, the following points were taken up for discussions in the subject meeting:

1. Critical loading observed on 765/400 kV, 2x1500 MVA ICTs at 765 kV Vadodara substation under low local generation in Gujarat
2. Review of comprehensive System Strengthening in Gujarat associated with integration of RE projects from Khavda potential RE zone. The System strengthening scheme needs to be assessed in both High RE as well as evening peak scenarios in order to provide maximum benefit for state of Gujarat in terms of RE evacuation as well as ATC enhancement.
3. Assessment of adequacy of transmission system in vicinity of Navsari (incl. 2x315MVA+1x500MVA, 400/220kV ICTs) due to drawl of 150MW power by Hindustan Zinc Limited (HZL)

II. Deliberations and decisions taken in the meeting

A) Transmission Network Expansion in Gujarat

CTU briefed the participants regarding the issues in Gujarat which need to be finalized in the subject meeting and proposed to discuss the item nos. 1 and 2 above in a

comprehensive manner taking into consideration inputs from GETCO and POSOCO regarding operational issues being faced in Gujarat.

GETCO stated that Gujarat is facing constraints in drawl of power from the ISTS under the current circumstances when availability of state generation is impacted on account of issues of coal availability / quality, non-operational gas-based generations as well as imported coal based generations not operating to full capacity. The limiting constraints are observed to be 765/400kV 2x1500MVA Vadodara ICTs, Kala – Kudus 400kV D/c line and Banaskantha – Sankhari 400kV D/c line. Hence, system strengthening scheme in Gujarat needs to be evolved in such a manner that it is able to cater to RE evacuation from Khavda area as well as to enhance Gujarat system ATC for drawl of power from ISTS under peak load scenario (low RE). It was further informed that the ISTS drawl requirement (in terms of ATC) is as given below:

Year	Anticipated Gujarat Peak Demand (MW)	State & Pvt Generation (MW)	ATC Requirement (MW)
2021	18000	7000-8000	10000
2022	20000	7000-8000	12000
2023	21500	7000-8000	13500

The generation dispatches & ATC requirement as received from GETCO are enclosed at **Annexure-IV**.

The requirements of GETCO were discussed and after further deliberations, the following load generation scenario was agreed to be studied in evening peak load case for two time-frames i.e. 2023-24 and 2024-25 in order to simulate long term power drawl requirements of Gujarat:

Year	Anticipated Gujarat Peak Demand (MW)	State & Pvt Generation (MW)	ATC Requirement (MW)
2023-24	23900	8650	15250
2024-25	25000	8650	16350

POSOCO stated that the system should be developed taking into consideration flexibility requirement of GETCO as there are many uncertainties to be addressed such as merit order dispatch, low gas availability, generation outages (e.g. Ukai), fuel uncertainties, etc.

CTU presented the schemes already agreed for evacuation of power from Khavda REZ (8GW) as well as the originally planned scheme for System Strengthening in Gujarat associated with integration of RE projects from Khavda potential RE zone (**Annexure-III**), which was to be reviewed. CTU further stated that after deliberations in the last meeting held on 13.09.2021 on above issues, the following suggestions for strengthening schemes in South Gujarat area were received from GETCO. The suggestions were deliberated in detail and gist of deliberations is also indicated along-side:

Sl.	GETCO Proposal(s)	Deliberations / Outcomes based on studies
1	<p>Establishment of 400/220 KV, 2x500MVA Saykha substation (GETCO) near Dahej area through following interconnections:</p> <ul style="list-style-type: none"> • LILO of 400 KV S/C Pachchham – Kosamba & 400 KV S/C Chharodi (Sanand) – Kosamba lines at Saykha substation • LILO of 220 KV S/C Haldarwa – Dahej & 220 KV S/C Wagra – Dahej lines at Saykha substation 	<p>The scheme was agreed under Intra-state to feed load in Dahej area</p>
2	<p>The planned 765/400/220 KV Kosamba ISTS substation may be located between Navsari & Chikhli substations of GETCO (within 20km. of each of the two substations) with following 220kV & 400kV interconnections:</p> <p><u>220kV Interconnections</u></p> <ul style="list-style-type: none"> • LILO of both circuits of 220 KV D/C Navsari – Chikhli line at ISTS substation • LILO of both circuits of 220 KV D/C Navsari – Nasik line at ISTS substation <p><u>400kV Interconnections</u></p> <ul style="list-style-type: none"> • 400 KV D/C Kosamba – Magarwada line (alternatively LILO of both circuits of 400 KV D/C Navsari(PG) – Magarwada lines at Kosamba (ISTS) substation) • 400 KV D/C Kosamba – Kala line • 400 KV D/C Kosamba – Vapi-II line <p>765kV interconnection of Kosamba S/s with Ahmedabad & Padghe is proposed to remain unchanged.</p>	<p>The proposal of GETCO to locate the planned Kosamba 765/400/220kV S/s between Navsari & Chikhli substations of GETCO (within 20km. of each of the two substations) was accepted and it was agreed to name the substation as Navsari(New) (South Gujarat) 765/400/220kV S/s.</p> <p>After load flow studies, the following 220kV & 400kV interconnections were agreed from the Navsari(New) (South Gujarat) (South Gujarat) 765/400/220kV S/s:</p> <p><u>220kV Interconnections (Under Intra-state)</u></p> <ul style="list-style-type: none"> • LILO of both circuits of 220 KV D/C Navsari – Chikhli line at Navsari(New) (South Gujarat) substation • LILO of both circuits of 220 KV D/C Navsari – Nasik line at Navsari(New) (South Gujarat) substation <p><u>400kV Interconnections (Under ISTS)</u></p> <ul style="list-style-type: none"> • Navsari(New) (South Gujarat) – Magarwada 400 KV D/C line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)* • Navsari(New) (South Gujarat) – Kala 400 KV D/C line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) <p>765kV interconnection of Navsari(New) (South Gujarat) S/s with Ahmedabad & Padghe shall remain unchanged.</p>

Sl.	GETCO Proposal(s)	Deliberations / Outcomes based on studies
3	400/220 KV, 2 x 500 MVA transformers at Kakrapar substation	<p>Power flow was observed to remain less than 100MW per ICT in both evening peak and high RE (Afternoon) scenarios. Hence, it was opined that for reliability purposes, 1x500MVA, 400/220kV ICT may be considered. Regarding space, it was informed that a group comprising of officers from WRPC, WRLDC, GETCO, NPCIL and PGCIL visited KAPS 3&4 on 14.11.2018 to ascertain the space for 2x500MVA ICTs. Although the group had suggested that space is available for ICT installation with or without modification of 220kV switchyard, NPCIL did not agree to the same and had stated that the same is infeasible.</p> <p>In view of the above, it was decided that any decision on installation of additional 400/220kV ICT at NPCIL Kakrapar switchyard may only be taken in consultation with NPCIL.</p>
4	220 KV D/C Navsari (PG) – Sachin (Talangpore) line (by using LILO portion of 220 KV Vav – Sachin & 220 KV Navsari – Sachin lines (220 KV Vav – Navsari line may be made through)	Due to non-availability of space at Navsari(PG), it was decided that GETCO may review the proposal.
5	<p>LILO of both circuits of 220 KV D/C Kakrapar – Vapi line (ISTS line) at 400/220 KV Vapi-II substation.</p> <p>Already approved LILO of 220 KV Chikhli – Vapi line at Vapi-II under Intra-State scheme will be reviewed by GETCO</p>	<p>GETCO had originally planned the following 220kV outlets from Vapi-II (GIS) S/s for which 4 nos. 220kV bays are already under implementation under ISTS as part of the S/s:</p> <ul style="list-style-type: none"> • Vapi-II – Atul 220kV D/c line • LILO of 220 KV Chikhli – Vapi 220kV S/c line at Vapi-II <p>The revised proposal of GETCO was studied and it was observed that only LILO of both circuits of 220 KV D/C Kakrapar – Vapi line (ISTS line) at 400/220 KV Vapi-II substation leads to N-1 non compliance on Vapi-II – Vapi 220kV D/c line. Further, even after considering already approved LILO of 220 KV Chikhli – Vapi line at Vapi-II, Vapi-II – Vapi 220kV T/c line remains critically loaded (N-1 flow of 2x250MW under high RE scenario).</p>

Sl.	GETCO Proposal(s)	Deliberations / Outcomes based on studies
		<p>In view of the above, it was agreed that GETCO may implement both LILO lines under Intra-state:</p> <ul style="list-style-type: none"> • LILO of both circuits of 220 KV D/C Kakrapar – Vapi line (ISTS line) at 400/220 KV Vapi-II substation. • Already approved LILO of 220 KV Chikhli – Vapi line at Vapi-II <p>Vapi – Vapi-II 220kV T/c line may need to be re-conducted in future based on high loadings in High RE scenario.</p> <p>The LILO portion interconnecting Vapi to Vapi-II for both the above LILO lines shall be constructed with conductor with minimum capacity of 400 MVA/Ckt at nominal voltage so that in future only the balance 220kV line section (excluding LILO portion) may have to be reconducted based on requirement.</p>

***Note:** An alternative proposal of Navsari(New) (South Gujarat) – Navsari 400kV D/c line along with bypassing of KAPS 3&4 – Navsari & Magarwada – Navsari 400kV D/c lines at Navsari so as to form KAPS3&4 – Magarwada 400kV D/c line was also studied. However, the alternative suffered from following disadvantages:

- High Fault level at Navsari (~38.2kA) after implementation of Ahmedabad – Navsari(New) (South Gujarat) 765kV D/c line as compared to proposal of Navsari(New) (South Gujarat) – Magarwada 400 KV D/C line (~36.5kA)
- Lesser reliability in terms of no. of lines emanating from Navsari(PG) S/s as well as Magarwada(PG) S/s
- 2 nos. 400kV line bays at Navsari(PG) S/s getting unutilized as well as requirement of line reactor on KAPS3&4 – Magarwada 400kV D/c line due to increased line length

Representative of GETCO agreed with the above proposals and stated that in order to mitigate operational constraints being observed on Vadodara 765/400kV ICTs and Kala – Kudus 400kV D/c line, the “System Strengthening in Gujarat associated with integration of RE projects from Khavda potential RE zone” scheme which is already planned (refer **Annexure-III**) needs to be expedited before 2024-25.

CEA suggested that the transmission system strengthening at **Annexure-III** with modifications as proposed by GETCO above may not all be linked with Khavda REZ (5GW) system under Phase-A (Ph-II). The strengthening requirement should be phased out based on requirements of GETCO.

Considering the above suggestions of various stakeholders as well as revised studies carried out during the meeting in evening peak as well as high RE scenarios, the following was decided:

- 1) The following Transmission Network expansion schemes in Gujarat under ISTS systems (with their tentative time-frame) were agreed:
- To meet the ATC requirement of ~16000MW of Gujarat in 2024-25 time-frame: Transmission Network Expansion scheme in Gujarat (Parts-A, B & C below)
 - To cater to system strengthening requirements associated with integration of RE projects from Khavda potential RE zone

a) Transmission Network Expansion in Gujarat to increase its ATC from ISTS

i. Part A

- Augmentation of transformation capacity at Vadodara 765/400/220kV S/s by 1x1500MVA, 765/400kV ICT (3rd) along with associated 765kV ICT bay*
**Out of the 2 nos. 400kV line bays already constructed by POWERGRID for DGEN – Vadodara line, 1no. line bay to be utilized for 765/400kV ICT (3rd) at Vadodara*

Implementation Time-frame: Apr'22 (as decided in meeting taken by Secretary (Power), MoP on 02.11.2021 regarding resource adequacy plan)

ii. Part B

- Establishment of 2x1500 MVA, 765/400 kV & 3x500 MVA, 400/220 kV Navsari(New) (South Gujarat) S/s (GIS) with 2x330 MVA 765 kV and 1x125 MVA 400 kV Bus reactor. [with 110MVA 765kV single phase reactor units (spare units for bus/line reactor) and 1x500 MVA, 765/400 kV single phase spare transformer].
- Navsari(New) (South Gujarat) (GIS) - Kala (GIS) 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) (~110 km length) with 63MVA switchable line reactor on each ckt at Kala (GIS) end
- Navsari(New) (South Gujarat) (GIS) – Magarwada (GIS) 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) (~80 km length)
- Navsari(New) (South Gujarat) (GIS) – Padghe (GIS) 765 kV D/c line (~200 km length) with 330 MVA, 765 kV Switchable line reactor on each ckt at Navsari(New) (South Gujarat) end.
- Augmentation of transformation capacity at Padghe (GIS) 765/400 kV substation by 1x1500 MVA ICT.

Implementation Time-frame: Jun'23

Note:

- i. Navsari(New) (South Gujarat) S/s shall be establishment as GIS substation to reduce the land requirement as there may be issues in getting contiguous land in this area which is industrial in nature as well as densely populated.
- ii. As Kala and Magarwada are located close to each other, majority of common stretch of Kosamba – Kala and Kosamba – Magarwada 400 kV

D/c line may be constructed using Multi-circuit towers in order to save RoW.

- iii. GETCO shall implement the following downstream system in matching time-frame of Navsari(New) (South Gujarat) S/s:

220kV Interconnections (Navsari(New) (South Gujarat) S/s) [Under Intra-state]

- LILO of both circuits of 220 KV D/C Navsari – Chikhli line at Navsari(New) (South Gujarat) (GIS) substation along with associated line bays at both ends
- LILO of both circuits of 220 KV D/C Navsari – Nasik line at Navsari(New) (South Gujarat) (GIS) substation along with associated line bays at both ends

iii. Part C

- Augmentation of transformation capacity at Banaskantha 765/400 kV S/s by 1x1500 MVA ICT.
- Banaskantha – Sankhari 400 kV 2nd D/c line (~26 km length)

Implementation Time-frame: Matching with establishment of Prantij 400/220 kV and Sankhari- Prantij 400 kV D/C line by GETCO (presently expected by Mar'25).

b) Transmission Network Expansion in Gujarat associated with integration of RE projects from Khavda potential RE zone

- Banaskantha – Ahmedabad 765 kV D/c line (~200 km length) with 330MVA, 765 kV Switchable line reactor on each ckt at Ahmedabad S/s end.
- Augmentation of transformation capacity at Navsari(New) (South Gujarat) 765/400 kV S/s by 1x1500 MVA ICT.

Implementation Time-frame: Matching with Khavda Phase-A (Ph-II) (5GW) scheme. NCT has recommended a time-line of 24 months from SPV Transfer for Khavda Phase-A (Ph-II) (5GW) scheme.

2) In addition to the above schemes, the following Intra-state schemes were also agreed:

- i. Establishment of 400/220 KV, 2x500MVA Saykha substation (GETCO) near Dahej area through following 220kV interconnections:
 - LILO of 400 KV S/C Pachchham – Kosamba & 400 KV S/C Chharodi (Sanand) – Kosamba lines at Saykha substation
 - LILO of 220 KV S/C Haldarwa – Dahej & 220 KV S/C Wagra – Dahej lines at Saykha substation

Implementation Time-frame: Mar'25

- ii. Revised downstream lines at Vapi-II S/s:
 - LILO of both circuits of 220 KV D/C Kakrapar – Vapi line (ISTS line) at 400/220 KV Vapi-II substation (4 nos. 220kV line bays already under

implementation at Vapi-II S/s under ISTS shall be utilized for the subject LILO)*.

- LILO of 220 KV Chikhli – Vapi line at Vapi-II along with associated line bays at Vapi-II (GIS) S/s*

*The LILO portion interconnecting Vapi to Vapi-II for both the above LILO lines shall be constructed with conductor with minimum capacity of 400 MVA/Ckt at nominal voltage.

Implementation Time-frame: Mar'23 (Efforts must be made to complete both LILO lines in matching time-frame)

Vapi – Vapi-II 220kV T/c line may need to be re-conducted in future based on high loadings in High RE scenario. Hence, the LILO portion (Vapi – Vapi-II section only) was agreed to be implemented with high capacity conductor so that in future only the balance 220kV line section (excluding LILO portion) may have to be reconducted based on requirement.

- 3) POSOCO shall compute the revised ATC for Gujarat considering the above elements as well as LILO of Zerda – Ranchhodpura 400kV line at Banaskantha (which is expected by May'22.) Any further constraints may be indicated which shall be taken care of in future studies.

B) Assessment of adequacy of transmission system in vicinity of Navsari (incl. 2x315MVA+1x500MVA, 400/220kV ICTs) due to drawl of 150MW power by Hindustan Zinc Limited (HZL)

It was informed that connectivity & LTA applications have been received from M/s Hindustan Zinc Limited (HZL) located at Dosvada, Tapi, Gujarat. M/s HZL has applied as bulk consumer for drawl of power from ISTS from Dec'22 onwards.

The application was discussed in the 61st WR Conn/LTA meeting held on 27.07.2021 wherein the following transmission infrastructure was proposed for Connectivity to M/s HZL for 150MW as Bulk Consumer in Tapi, Gujarat subject to directions regarding implementation modalities of the transmission system for connectivity by the Hon'ble Commission in Petition No. 124/MP/2021, filed by M/s RIL.

- HZL (AIS/GIS*) – Navsari (GIS) 220kV D/c line along with associated line bay at ISTS ends – 60km (approx.)
**Bays at Bulk Consumer end shall be under the scope of M/s HZL. Further, confirmation regarding AIS/GIS is to be provided by M/s HZL.*
- Estimated Cost: ≈Rs. 48 Cr.

While discussing the LTA application, concerns were raised regarding non-compliance of (n-1) condition under outage of one ICT at Navsari 400/220kV S/s

(2x315+1x500MVA) especially after establishment of Khajod 2x160MVA 220/66kV substation through LILO of both circuits of Kawas (NTPC) – Navsari (PGCIL) 220kV D/c line and LILO of Sachin (Talangpore) - Ichchhapore 220kV S/c line at Khajod S/s.

GETCO stated that Connectivity/LTA to M/s HZL may be granted after considering Navsari(New) (South Gujarat) system so that their import capability is not impacted on account of the subject grant.

CTU stated that the matter was also deliberated in the last joint study meeting held on 13.09.2021 wherein it was observed that no constraints are observed on Navsari ICTs in 2022-23 time-frame even after considering Khajod S/s, other changes as suggested by GETCO as well as with full generation from DGEN (which has currently relinquished entire LTA). However, GETCO had raised concern that grant of LTA to M/s HZL shall result in reduction in margins for offtake of power by GETCO to cater to future load growth in the area. However, now that the proposed 765/400/220kV Kosmba S/s has been agreed to be shifted to Navsari, there shall be shifting of load from Navsari(PG) S/s to the proposed Navsari(New) (South Gujarat) S/s and enough drawl capacity shall be created at Navsari(PG) S/s even after considering drawl by M/s HZL.

Studies were carried out in 2022-23, 2023-24 as well as 2024-25 time frames considering drawl of 150MW by M/s HZL from Navsari S/s and no constraints were observed in Gujarat System.

After further deliberations, it was agreed that Connectivity may be granted to M/s HZL at 220kV level of Navsari S/s and LTA may be granted from Dec'22 without any additional transmission system augmentation. The above shall be subject to directions regarding implementation modalities of the transmission system for connectivity by the Hon'ble Commission in Petition No. 124/MP/2021, filed by M/s RIL.

Meeting ended with a vote of thanks.

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Annexure-I: List of Participants

Name	Organization	Designation
Awdhesh Yadav	PSPA-1, CEA	Director
S R Narasimhan	POSOCO	Director (SO)
Prabhankar Porwal	NLDC, POSOCO	Chief General Manager
Gaurab Dash	NLDC, POSOCO	
K Muralikrishna	WRLDC, POSOCO	Chief General Manager
Pushpa Seshadri	WRLDC, POSOCO	General Manager
Pradeep Kumar Sanodiya	WRLDC, POSOCO	Manager
Venky Minnakuri	WRLDC, POSOCO	
Manoj Kumar	WRLDC, POSOCO	
Srinivas Ch	WRLDC, POSOCO	
P.S. Das	CTUIL	Sr GM
Bhaskar Wagh	CTUIL	Ch. Manager
Pratyush Singh	CTUIL	Manager
Shashank Shekhar	CTUIL	Dy. Manager
Upendra Pande	GETCO	Managing Director
K H Rathod	GETCO	ACE (R&C)
D H Kalsaria	GETCO	SE (STU)
Dipak H. Patel	GETCO	Dy. Engr(STU)

	<p align="center">GUJARAT ENERGY TRANSMISSION CORPORATION LIMITED</p> <p align="center">Regd. Office: Sardar Patel Vidyut Bhavan, Race Course, VADODARA – 390 007. (CIN: U40100GJ1999SGCO36018) Telephone No.(0265) 2353086 (D) Fax No.(0265) 2351218 (GETCO) /(0265) 2337918/2338164 (GUVNL) Web site: www.getcogujarat.com-Email: acerc.getco@gebmail.com</p>	
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Ref No: MD/ACE(R&C)/STU/511/27

Date: 26/10/2021

To,
Shri Goutam Roy,
Member (Power System),
Central Electricity Authority,
Sewa Bhavan, R. K. Puram,
New Delhi – 110 066.

Sub: Strengthening of ISTS network in Gujarat to increase import ATC.

Dear Sir,

Power sector in the country is presently witnessing critical power scenario. In Gujarat also, unprecedented power crisis is observed; availability from generators in the state has been impacted due to issues of coal availability / quality, some technical reasons etc. Further, due to exorbitant price and limited availability of spot RLNG, the gas based power stations are non-operational and the imported coal based projects are also not operating at full capacity due to very high price of imported coal.

In such scenario, Gujarat is trying its level best to meet demand against all odds. Generation in the State is maximised to the extent possible and balance power is being accommodated through ISTS network import.

Earlier, Gujarat drawl capacity was worked out as 9000 MW and by keeping reliability margin of 400 MW, ATC was fixed as 8600 MW. This limit was fixed considering loading on few limiting elements viz. (i) 765/400 kV, 2 x 1500 MVA Vadodara transformers, (ii) 400 kV D/C Kudus – Kala line & (iii) 400 kV D/C Banaskantha – Veloda line. To restrict Gujarat drawl within ATC limits, a rare measure of load curtailment was also exercised on a few occasions.

With increased generation within Gujarat, loading on 765/400 kV Vadodara ICT is reduced to some extent but import from Northern Region is resulting into critical loading of 400 kV D/C Banaskantha-Veloda, 400 kV S/C Bhinmal – Kansari (Zerda) and 400 kV S/C Kankroli – Kansari (Zerda) lines.

Considering above, we submit as under:-

1) Expeditious implementation of under construction scheme i.e. LILO of 400 kV S/C Vadavi – Zerda line at 765 KV Banaskantha substation along with 2 Nos. of 400 kV feeder bays at 765 kV Banaskantha

- 400 kV LILO line is under implementation by VNLTTL (SPV owned by M/s. Sterlite Power - ISTS licensee) and feeder bays at 765 kV Banaskantha substation is under implementation by POWERGRID.
- During a meeting, VNLTTL has shown preparedness to prepone the completion of this line by Feb-22.

- However, POWERGRID submitted that 2 Nos. of 400 kV feeder bays at 765 kV Banaskantha substation may be available earliest by Jul-22.
- Expeditious implementation of the scheme will relieve critical loading of 400 kV D/C Banaskantha – Veloda, 400 kV S/C Bhinmal – Kansari (Zerda) and 400 kV S/C Kankroli – Kansari (Zerda) lines.

This will remove limiting constraint in North Gujarat area and Gujarat ATC drawl capacity will further increase.

2) 765/400 kV, 1500 MVA (3rd) ICT at 765 kV Vadodara substation

- This will remove constraints in Central Gujarat area and will provide flexibility to avail cheaper power available rather than scheduling local generation to control power flow in available transformers.
- This new strengthening scheme may be finalized on immediate basis.
- If possible, POWERGRID may divert transformer and bay equipment planned for any other location for expeditious implementation at Vadodara (PG) substation.

3) New 765/400 kV substations nearby Ahmedabad and the area surrounding Kosamba in South Gujarat

- Both these substations are already planned as a part of Khavda RE Park.
- Required inputs are already given by GETCO through email dated 18.09.2021.

It is requested that in view of the requirement of preponment of elements as mentioned at (1) above, agencies concerned may please be advised for early completion of these elements. We further request your kind attention on above issues for smooth operation of Gujarat grid.

Thanking you,

Yours faithfully


(Upendra Pande)
Managing Director

Copy fwcs to:

- 1) The Secretary, Ministry of Power, Government of India,
Shram Shakti Bhawan. Rafi Marg, New Delhi - 110001
- 2) The Chairman and Managing Director,
Power Grid Corporation of India Limited,
"Saudamini", Plot No-2, Sector – 29, Gurgaon, Haryana – 122 001.
- 3) The Chief Operating Officer,
Central Transmission Utility of India Limited,
"Saudamini", Plot No-2, Sector – 29, Gurgaon, Haryana – 122 001.
- 4) The Member Secretary,
Western Regional Power Committee,
F-3, MIDC Area, Andheri (East), Mumbai – 400 093

System Strengthening in Gujarat associated with integration of RE projects from Khavda potential RE zone

Estimated cost of about Rs. **3819 Cr.**

- i. Banaskantha – Ahmedabad 765 kV D/c line (~200 km length) with 330MVA, 765 kV Switchable line reactor on each ckt at Ahmedabad S/s end.
- ii. Establishment of 2x1500 MVA, 765/400 kV & 2x500 MVA, 400/220 kV South Gujarat S/s with 2x330 MVA, 765 kV and 1x125 MVA, 400 kV Bus reactor. [with 110MVA & 80 MVA, 765kV single phase reactor units (spare units for bus/line reactor) and 1x500 MVA, 765/400 kV single phase spare transformer].
- iii. South Gujarat - Kala (GIS) 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) (~180 km length) with 50MVA switchable line reactors on each ckt at both ends
- iv. South Gujarat – Magarwada (GIS) 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage) (~140 km length) with 63MVA switchable line reactors on each ckt at Magarwada end.
- v. South Gujarat – Padghe (GIS) 765 kV D/c line (~270-280 km length) with 330 MVA, 765 kV Switchable line reactor on each ckt at South Gujarat S/s end and 240 MVA, 765 kV Switchable line reactor on each ckt at Padghe (GIS) S/s end.
- vi. Augmentation of transformation capacity at Padghe (GIS) 765/400 kV substation by 1x1500 MVA ICT.
- vii. Augmentation of transformation capacity at Banaskantha 765/400 kV S/s by 1x1500 MVA ICT.
- viii. Banaskantha – Sankhari 400 kV 2nd D/c line

Note:

- As Kala and Magarwada are located close to each other, majority of common stretch of South Gujarat – Kala and South Gujarat – Magarwada 400 kV D/c line may be constructed using Multi-circuit towers in order to save RoW and hence both the 400 kV lines may be kept part of the same package.
- Implementation of item no. (vii) & (viii) to be done in matching time frame of establishment of Prantij 400/220 kV and Sankhari- Prantij 400 kV D/C line by GETCO.
- Implementation of 4 nos. of 220 kV outlets from South Gujarat 765/400/220 kV s/s to be implemented by GETCO in matching time frame of South Gujarat 765/400/220 kV substation (with 4 nos. 220 kV line bays for 220 kV outlets)
- The above scheme needs to be implemented in the matching time frame of Transmission scheme for evacuation of 8 GW RE power from Khavda RE park (Phase-A).

Generation Capacity to meet Gujarat Demand (MW)

Name of Power Station	Sector	Type	Installed Capacity	GUVNL Share / TPL Share	Generation Available	
					Minimum	Maximum
Gandhinagar TPS	State	Coal	630	630	510	555
Wanakbori TPS (Unit 1-7)	State	Coal	1470	1470	850	925
Wanakbori TPS (Unit 8)	State	Coal	800	800	500	750
Ukai TPS (Unit 3-5)	State	Coal	610	610	340	370
Ukai TPS (Unit 6)	State	Coal	500	500	350	450
KLTPS Panandhro	State	Coal	150	150	50	70
Sikka TPS	State	Coal	500	500	0	0
Bhavnagar (BECL) TPS	State	Coal	500	500	180	225
Dhuvaran CAPP (1 & 2)	State	Gas	219	219	0	90
Dhuvaran CAPP 3	State	Gas	376	376	0	0
Utran CAPP	State	Gas	375	375	0	0
Ukai Hydro	State	Hydro	305	305	0	75
Kadana Hydro	State	Hydro	242	242	0	50
			6677	6677	2780	3560
SLPP Mangrol (GIPCL)	State IPP	Coal	500	500	300	345
GMDC Akrimota	State IPP	Coal	250	250	70	110
GPPC Pipavav	State IPP	Gas	702	702	0	0
GIPCL Vadodara	State IPP	Gas	145	145	0	80
GSEG, Hazira	State IPP	Gas	156	156	0	0
GSEG Extension, Hazira	State IPP	Gas	351	351	0	0
			2104	2104	370	535
Adani, Mundra	Private	Imported Coal	1320	1200	500	600
EPGL, vadinar	Private	Imported Coal	1200	1000	0	0
Torrent Power, Ahmedabad	Private	Coal	362	362	210	330
Torrent Power, Surat (SUGEN)	Private	Gas	1147	1147	400	650
Torrent Power, Surat (UNO-SUGEN)	Private	Gas	382	382	200	325
OPGS, Varshamedi	Private	Coal	300	0	0	0
			4711	4091	1310	1905
Wind	Private	RE	6500	6500	650	2000
Solar	Private	RE	4092	4092		
Other RE	Private	RE	105	105		
			10697	10697	650	2000
Total State and Private Sector Generation...			24189	23569	5110	8000
ISGS within Gujarat						
CGPL	Private	Imported Coal	4150	1971	1400	2000
SSP (RBPH + CHPH)	SSNNL	Hydro	1450	232	0	200
KAKRAPAR -I	Central	Nuclear	440	125	200	400
KAWAS	Central	Gas	656	187	0	175
JHANOR	Central	Gas	657	237	0	175
C/S RE	Private	RE	> 3000	400	200	300
DGEN	Private	Gas	1200	0	0	0
Total ISGS Generation within Gujarat...			11553	3151	1800	3250

Year	Anticipated Gujarat Peak Demand	State & Private Generation	ATC Requirement (MW)
2021	17500-18000	7000-8000	10000
2022	19500-20000	7000-8000	12000
2023	21000-21500	7000-8000	13500