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विद्युत मंत्रालय / Ministry of Power
केंद्रीय विद्युत प्राधिकरण/ Central Electricity Authority
विद्युत प्रणाली योजना एवं मूल्यांकन 2 - प्रभाग /
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No. CEA/PSPA-2/51/4/2016-

Dated:03-May-2016

To

As per Address list

Subject : Minutes of the Joint Study Meeting of Southern Region held on Bangalore during 14-17 March, 2016.

Sir/ Madam,

A joint study meeting involving officials from CEA, POWERGRID, SRPC, SRLDC, APTRANSCO, KPTCL, TSTRANSCO, TANTRANSCO and KSEBL was held during 14-17 March, 2016 at SRPC office, Bangalore.

During this meeting, following issues were studied:

Short-term Planning Issues:

- Possibility of achieving CoD for Yeramarus TPS in view of non-completion of associated transmission system.
- Short-term (temporary) connectivity between Vemagiri-II(PG) and KV Kota (APTRANSCO) for increasing TTC of SR.
- Determination of TTC to import power into Southern Region for the purpose of MTOA and operationalization of LTA.
- Possibility of operating the Tirunelveli – Edamon section of Tirunelveli – Muvathapuza 400kV quad D/c line initially and temporarily at 220kV.

Long-term Planning Issues:

- Transmission system for evacuation of power from NTPC 4000 MW plant at Pudimadaka (Andhra Pradesh).
- Transmission system for evacuation of power from NTPC 1600 MW Telangana STPP Phase-I (2x800 MW)

- c. Transmission system for evacuation of power from Uppur TPS (2x800 MW) of TNEB in Tamil Nadu.
- d. Transmission system for evacuation of power from Solar Parks:
 - i. Telangana (500 MW at Gattu).
 - ii. Andhra Pradesh (1000 MW at Kurnool, 1000 MW at Kadapa and 500 MW at Ananthapuram)
 - iii. Kerala (200 MW at Kasargode) and
 - iv. Tamil Nadu (500 MW at Ramanathapura)
- e. Evacuation of power from extension project at Udupi, Karnataka

Minutes of the meeting including the outcome of joint studies, further action to be taken up is enclosed at **Annexure-I**.

During these meetings, interaction was also held with officials from wind power producers in which officials from M/s Enerfra, M/s Wind World and M/s Suzlon has participated. Minutes of the discussion held with Wind Developers, are also included.

Thanking you.

Yours faithfully,

(प्रदीप जिंदल /Pardeep Jindal)
मुख्य अभियंता (वि प्र यो मू२ –)/ Chief Engineer (PSPA-II),
Tel: 011-26198092

To

<p>To1. The Member Secretary, Southern Regional Power Committee, 29, Race Course Cross Road, Bangalore 560 009. FAX : 080-22259343</p>	<p>2. COO (CTU-Plg), Power Grid Corp. of India Ltd. "Saudamini", Plot No.2, Sector-29, Gurgaon 122 001, Haryana. FAX : 95124-2571932</p>
<p>3. GM, SRLDC, 29, Race Course Cross Road, Bangalore 560 009 FAX – 080-22268725</p>	<p>4. The Director (Transmission), Karnataka State Power Trans. Corp.Ltd., Cauvery Bhawan, Bangalore - 560 009. FAX : 080 -22228367</p>

<p>5. The Director (Transmission), Transmission Corp. of Andhra Pradesh Ltd., (APTRANSCO) Vidyut Soudha, Hyderabad – 500 082. FAX : 040-66665137</p>	<p>6. The Director (Grid Transmission and Management), Transmission Corp. of Telangana Ltd., (TSTRANSCO) Vidyut Soudha, Khairatabad Hyderabad – 500 082. FAX : 040-23321751</p>
<p>7. The Director (Trans. & System Op.), Kerala State Electricity Board, Vidyuthi Bhawanam, Pattom, Thiruvananthapuram - 695 004. FAX : 0471-2444738</p>	<p>8. Director (Transmission), TANTRANSCO / Tamil Nadu electricity Board (TNEB), 6th Floor, Eastern Wing, 800 Anna Salai, Chennai - 600002. FAX : 044-28516362</p>

**Minutes of Joint Study Meeting of CEA, CTU, SRPC, SRLDC and STU's of SR
held from 14/03/2106 to 17/03/2016 at SRPC office, Bengaluru**

A joint study meeting was called by CEA vide letter dated 7th March, 2016 to analyse

Short-term Planning Issues:

- a. Possibility of achieving CoD for Yeramarus TPS in view of non-completion of associated transmission system
- b. Short-term (temporary) connectivity between Vemagiri-II(PG) and KV Kota (APTRANSCO) for increasing TTC of SR.
- c. Determination of TTC to import power into Southern Region for the purpose of MTOA and operationalization of LTA.
- d. Possibility of operating the Tirunelveli – Edamon section of Tirunelveli – Muvathapuza 400kV quad D/c line initially and temporarily at 220kV.

Long-term Planning Issues:

- f. Transmission system for evacuation of power from NTPC 4000 MW plant at Pudimadaka (Andhra Pradesh)
- g. Transmission system for evacuation of power from NTPC 1600 MW Telangana STPP Phase-I (2x800 MW)
- h. Transmission system for evacuation of power from Uppur TPS (2x800 MW) of TNEB in Tamil Nadu.
- i. Transmission system for evacuation of power from Solar Parks:
 - v. Telangana (500 MW at Gattu).
 - vi. Andhra Pradesh (1000 MW at Kurnool, 1000 MW at Kadapa and 500 MW at Ananthapuram)
 - vii. Kerala (200 MW at Kasargode) and
 - viii. Tamil Nadu (500 MW at Ramanathapura)
- j. Evacuation of power from extension project at Udipi, Karnataka

The above joint studies/discussions were held in the office of SRPC involving representatives from CEA, SRPC, SRLDC, CTU, KPTCL, TANTRANSCO, TSTRANSCO, APTRANSCO & KSEBL from 14/03/2106 to 17/03/2016. List of participants is given in **Appendix-4.0**

Short-term Planning Issues:

1.0 Possibility of achieving CoD for Yeramarus TPS in view of non-completion of associated transmission system

Chief Engineer (PSPA-II), CEA informed that in a review meeting chaired by Member (Power System), CEA on 02.03.2016 regarding evacuation of power from Yeramarus TPS, it was decided that the possibility of COD of this TPS may be studied during the proposed joint study meetings in Bangalore. Accordingly, studies were carried out with full evacuation at Yeramarus Unit-I considering 750 MW dispatch (Ex-bus) for 2016 scenario and it was found that the Gooty-Bangalore lines get overloaded. To contain these overloading about 700 MW at Raichur TPS (the units connected at 400 kV) were required to be reduced. Alternatively, if Karnataka draws about 500 MW at Madhugiri then this overloading can be avoided.

So, based on studies, it was decided that Karnataka may commission first unit of Yeramarus TPS either by reducing about 700 MW at Raichur TPS or by drawing about 500 MW at Madhugiri. Considering that a March/early April is low wind season, Karnataka should attempt to achieve COD within March/ early April. This discussion is exclusively for the purpose of COD. Regarding scheduling of YTPS power, KPTCL/Karnataka would coordinate with SRLDC. The LTA and MTOA in ISTS would have priority, and the margins if any after meeting these LTA/MTOA commitments may be considered by SRLDC.

2. Short-term (temporary) connectivity between Vemagiri-II(PG) and KV Kota (APTRANSCO) for increasing TTC of SR.

APTRANSCO planned a 400kV D/c line from KV Kota S/s to Vemagiri-I(AP) substation. However there are space constraints for provision of bays at Vemagiri-I(AP) 400kV substation for termination of the KV Kota line. . In view of this space constraint, a scheme - "Removal of Constraints in 400 kV bay extensions at 400 kV Vemagiri S/S" is under implementation by POWERGRID.

During studies, it is observed that in the absence of the scheme - "Strengthening of transmission system beyond Vemagiri" and with generation at East Coast, 400 kV Vemagiri-I(AP)-Vemagiri-II(PG) D/C line will be 'Limiting Constraint' and Total

Transfer Capacity(TTC) for import of power to Southern Region gets adversely affected.

In order to relieve overloading of Vemagiri-I(AP)-Vemagiri-II(PG), different options were studied. It was proposed that one circuit of Vemagiri(PG)-Vemagiri(AP) may be connected with KV Kota and other circuit may be connected to Vijayawada (PG). This will result in following configuration:

At Vemagiri-I(AP)

1. 400 kV Vemagiri-I(AP) – KV Kota - One Circuit
2. 400 kV Vemagiri-I(AP) – Vijayawada(AP) - One Circuit
3. 400 kV Vemagiri-I(AP) – Vizag Pool – Two Circuits

At Vemagiri-II(PG)

1. 400 kV Vemagiri-II(PG) – Vijayawada(PG) - Four Circuits
2. 400 kV Vemagiri-II(PG) – KV Kota - One Circuit
3. 400 kV Vemagiri-II(PG) – Simhadri - Two Circuits
4. 400 kV Vemagiri-II(PG) – Gazuwaka - One Circuit
5. 765 kV Vemagiri-II(PG)- Srikakulam – Two Circuits

The above issue was also discussed only 39th meeting of the SCPSPSR.

The studies were carried out and it was found that after commissioning of the Wardha – Hyderabad and Angul – Srikakulam – Vemagiri 765kV lines, the TTC for import of power by Southern Region would increase from 6650 (at present) to 9600 MW. However, this TTC reduces by 1700 MW upon commissioning of the scheme – “Removal of constraints in 400 kV by extension at 400 kV Vemagiri substation”, which had been planned for accommodating the KV Kota - Vemagiri at Vemagiri(AP). In these studies, one unit (660 MW) of East Coast was also considered. To overcome the reduction in TTC for import of power by Southern Region, system studies were carried out by considering a short-term (temporary) connectivity between Vemagiri-II (PGCIL) and KV Kota (APTRANSCO) as detailed above. It was observed that with this measure, the TTC would increase to 11000 MW.

Considering the benefit of this temporary connectivity which would be needed till the commissioning of ISTS system beyond Vemagiri, all the states requested APTRANSCO to consider this proposal positively. APTRANSCO requested

POWERGRID to send draft proposal for consideration and approval of their boards. Draft proposal sent by POWERGRID is enclosed at **Appendix-5.0**

3. Determination of TTC to import power into Southern Region

The base case was established in discussion with the participant states. The broad parameters and assumptions regarding generation, load and tie lines of base case are given under as Appendix

Appendix -1 (A) : All India summary

Appendix -1 (B) : SR summary

Appendix -1 (C) : Tie line flows between NEW-SR

Appendix -1 (D) : SR generation plants and despatches worked out as per discussion with constituent states

Based on the expected commissioning schedule of various generations and transmission addition which would affect the power transfer to Southern region, it was decided to study following scenarios. A summary of generations & transmission addition is given in **Appendix – 2.0**

S.No.	Case	Time frame	Inter State Transmission System Considered
1	Scenario-I	Aug'16	Angul-Srikakulam-Vemagiri alongwith LILO of one circuit Gazuwaka-Vijayawada 400kV S/c line
2	Scenario-II	Mar'17	Scenario-I + 765kV D/c Wardha -Nizamabad + 400kV D/c Nizambad –Dichipally
3	Scenario-III	Sep'17	Scenario-II + Wardha- Nizamabad-Maheshwaram 765kV D/c with associated transmission system
4	Scenario-IV	Dec'17	Scenario-III + Removal of constraints beyond Vemagiri and proposed rearrangement.
5	Scenario-V	Dec'17	Scenario-IV + Wardha-Nizamabad-Maheshwaram 765kV D/c line with

			associated transmission system is not available.
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Considering assumption, detailed results of the studies are listed in **Appendix-3.0**. Sensitivity of non-commissioning of some of the elements has also been studied.

Simulation studies

For the Base Case present scenario, load flow file with 6650 MW TTC between NEW grid & Southern Region has been considered. This is in line with the declared TTC value between NEW Grid & SR by POSOCO and CTU.

3.1 Scenario-I (August-2016): In this simulation Angul-Srikakulam-Vemagiri alongwith LILO of one circuit Gazuwaka-Vijayawada 400kV line has been considered. Simulation results indicate that power flow is of the order of 840 MW on Vemagiri – Vijayawada 400kV line in the base case. TLTG studies indicates that with the considered base case condition under outage of 765 kV Raichur – Solapur line the loading on the line would be 909 MW and in order to ensure that loading on the line is within capacity of the line, import need to be reduced by 750 MW from base case of 6650 MW. Hence Vemagiri- Vijayawada 400kV line has been opened in base case itself. After detailed deliberations, it was agreed that in actual operating conditions the line shall be opened whenever loading on the line crosses its thermal capacity.

Further study has been carried out considering Vemagiri – Vijayawada 400kV line in open condition. Study indicates that an increment in TTC is about 220 MW only. The limiting constraint is loading on 400 kV Kolar-Hosur line under outage of other circuit of 400 kV Kolar-Hosur line. However, it was deliberated that though 400kV Kolar-Hosur line loading is hitting its limit, it is a flow gate for transfer of power from S1 to S2. As we are transferring power from NEW grid to SR, same can be ignored and should be considered when assessing transferring power to S2. Simulation of limiting condition indicates that S1-S2 can transfer about 5000 MW. As per the LTA and MTOA commitments the expected transfer works out to about 4000MW. Hence no constraint is envisaged in transfer of power upto additional 1000 MW from S1-S2.

The next severe contingency is outage of Raichur-Sholapur 765kV line and the increment TTC as per studies would be 646 MW. Presently allowed line loading limit on 765kV lines to SR is 2500 MW. During the meeting it was opined that wherever the 765kV line loading is the restricting limit, simulations would be

repeated with allowed line loading of 2750 MW on 765kV lines. The revised allowed increment in TTC as per studies would be about 1063 MW. However, considering one unit generation at Kudgi the increase in TTC from present level would be 625 MW from August,2016 onwards, as there are more interconnections. Accordingly, TTC increase of about 625 MW may be considered for August, 2016 onwards.

3.2 Scenario-II (March-2017): To enhance the power transfer capability Wardha – Nizamabad – Maheshwaram corridor is under implementation. The scheduled time frame for this is May/June 2018, however effort are being made to commission it progressively from March 2017 onwards. Accordingly in this Scenario 765kV Wardha -Nizamabad 765kV D/c alongwith 400kV Nizambad –Dichipally has been considered. Simulation with above lines indicate that power flow of the order of 830 MW on Vemagiri- Vijayawada 400kV line. TLTG studies results indicates that with the considered base case condition, under outage of Gazuwaka-Vemagiri line the loading on the Vemagiri- Vijayawada 400kV line increases to about 890 MW which is beyond the allowed loading limit of the line and to bring it within limit import should be reduced by 290 MW from base case of 6650MW. Hence even under this Scenario Vemagiri- Vijayawada 400kV line has been opened in base case itself.

Study indicates that with Wardha-Nizamabad 765kV D/c lines increment in TTC would be about 1750 MW to 1900 MW depending on whether import is from WR or ER. The limiting factor is loading on Raichur-Sholapur line in case of import of power is from WR and Vemagiri - Gazuwaka in case of import is from ER. Accordingly, with conservative approach the increase in TTC from present value of 6650 MW would be 1750 MW(i.e total TTC of 8400 MW).

3.3 Scenario-III (Sept-2017): In this Scenario 765kV Wardha –Nizamabad-Maheshwaram 765kV D/c alongwith 400kV interconnections have been considered. Under this Scenario also, Vemagiri- Vijayawada 400kV line has been opened in base case itself.

Simulation with above lines indicate that power flow of the order of 9600 MW and 9900 MW can be imported depending on whether import is from WR or ER. The limiting factor is loading on Wardha-Nizamabad line in case of import of power is from WR and Vemagiri - Gazuwaka in case of import is from ER. Further, it was also observed that in case of no outlet from Vemagiri 765/400 kV S/S, the import capacity of SR reduces to about 8800 MW. With conservative approach the

increase in TTC from present value of 6650 MW would be 2950 MW(i.e total TTC of 9600 MW).

3.4 Scenario-IV (Dec-2017): APTRANSCO planned a 400kV D/c line from KV Kota S/s to Vemagiri-I(AP) substation. However there are space constraints for provision of bays at Vemagiri-I(AP) 400kV substation for termination of KV Kota line at Vemagiri(AP). In view of above space constraint, scheme “Removal of Constraints in 400 kV bay extensions at 400 kV Vemagiri S/S” is under implementation by POWERGRID.

During studies, it is observed that in the absence of “Strengthening of transmission system beyond Vemagiri” and with generation at East Coast, 400 kV Vemagiri-I(AP)-Vemagiri-II(PG) D/C line will be Limiting Constraint and Total Transfer Capacity(TTC) for import of power to southern region gets adversely affected.

In order to relieve overloading of Vemagiri-I(AP)-Vemagiri-II(PG), different options were studied. It was proposed that one circuit of Vemagiri(PG)-Vemagiri(AP) may be connected with KV Kota and other circuit may be connected to Vijayawada (PG). This will result in following configuration:

At Vemagiri-I(AP)

4. 400 kV Vemagiri-I(AP) – KV Kota - One Circuit
5. 400 kV Vemagiri-I(AP) – Vijayawada(AP) - One Circuit
6. 400 kV Vemagiri-I(AP) – Vizag Pool – Two Circuits

At Vemagiri-II(PG)

6. 400 kV Vemagiri-II(PG) – Vijayawada(PG) - Four Circuits
7. 400 kV Vemagiri-II(PG) – KV Kota - One Circuit
8. 400 kV Vemagiri-II(PG) – Simhadri - Two Circuits
9. 400 kV Vemagiri-II(PG) – Gazuwaka - One Circuit
10. 765 kV Vemagiri-II(PG)- Srikakulam – Two Circuits

In this Scenario the effect of “Removal of Constraints in 400kV bay extensions at Vemagiri” was simulated. It was observed that under base case without proposed rearrangement import Capacity is limited by Vemagiri(PG)-Vemagiri(AP) loading and increase in import capacity is only 1250-1700MW. With the proposed rearrangement the import capacity increases by 4850-5300MW based on whether import is from WR or ER. However, with high gas generation at Vemagiri(AP), increase in TTC would be limited to 4450 MW to 4850 MW based on whether import

is from WR or ER. Accordingly, with conservative approach the increase in TTC from present value of 6650 MW would be 4450 MW(i.e total TTC of 11,100 MW).

Scenario-V (Dec-2017): In this Scenario the effect of non-availability of Wardha – Maheshwaram 765kV D/c link with anchoring at Nizamabad” along with its associated transmission system is studied, as its scheduled commissioning is May/June,2018. It is observed that, if “Wardha – Maheshwaram 765kV D/c link with anchoring at Nizamabad” along with its associated transmission system is not commissioned by December 2017, the TTC value is getting reduced to 5980 MW to 6090 MW from present level of 6650 MW based on whether import is from WR or ER after the commissioning of “Removal of Constraints in 400kV bay extensions at Vemagiri”. With proposed rearrangement the TTC is increased to 8100 MW to 8210 MW based on whether import is from WR or ER. However, with high gas generation at Vemagiri(AP), increase in TTC would be limited to 1150 MW to 1250 MW based on whether import is from WR or ER. Accordingly, with conservative approach the increase in TTC from present value of 6650 MW would be 1150 MW(i.e total TTC of 7800 MW).

3.5 From the above study following is observed:

- A. TTC is expected to increase to 7275 (6650 + 625 MW) with commissioning of 765 kV D/c Angul-Srikakulam-Vemagiri and LILO of Gajuwaka-Vijayawada at Vemagiri-II(PG). However, with commissioning of Kudgi generation, TTC is expected to decrease which can be offset by increasing transfer limit on 765 kV D/C Raichur – Solapur to 2750 MW.
- B. After commissioning “Angul-Srikakulam-Vemagiri 765 kV D/c line along with “Constraints in 400kV bay extensions at Vemagiri” the TTC value is getting reduced to 5980 MW from present level of 6650 MW. However, after rearrangement as proposed in 39th Standing Committee meeting on Power System Planning in Southern region held on 28th & 29th December, 2016, the TTC value is increased to about 7800 MW to 8100 MW depending on gas generation at Vemagiri(AP).
- C. S1-S2 corridor capacity significantly improved with commissioning of 400kV Tumkur(Vasanthanarasapura) – Dharmapuri D/C line.

4.0 Operationalization of MTOA of PTC India & Jindal India Limited.

Operationalization of MTOA of PTC India Ltd for 300 MW (200 MW + 100 MW) from Simhapuri Energy Pvt Ltd. to KSEB, Kerala was discussed wherein KPTCL informed that the operationalization of the MTOA may overload upstream lines of Karnataka such as 400 kV D/C Hiriyyur-Neelamangala, 400kV S/c Gooty-Neelamangala line and 400 kV S/c Gooty – Somanhally line. However, KSEB informed that as the loads at Kozikhode area are being operated in radial mode, there shall be no significant increase in flow on Mysore – Kozhikode 400 kV D/C line and 400 kV upstream lines of Mysore with operationalization of MTOA of 300 MW. Further, KSEB informed that presently 300 MW from Simhapuri Energy Pvt Ltd. is already being transferred to KSEB under STOA utilizing the existing margins. Accordingly, it was observed that margins are available to accommodate the MTOA of PTC India Ltd.

The operationalization of MTOA of Jindal Power Ltd. for 59.5 MW from Jindal Power Limited, Chhattisgarh to TANGEDCO, Tamil Nadu was also discussed and it was observed that margins were available to accommodate the same.

Accordingly, it was decided that POWERGRID may consider above discussions while processing the above MTOAs. KSEBL would draw the loads at Kozhikode in radial mode.

5.0 Possibility of operating Tirunelveli – Edamon section of Tirunelveli – Muvathapuzha 400kV quad D/c line initially and temporarily at 220kV.

Possibility of operating Tirunelveli – Edamon section of the Tirunelveli – Muvathapuzha 400kV quad D/c line initially (and temporarily) at 220kV by bunching with existing 220kV line was discussed. TANTRANSCO informed that as per their studies, the proposal will increase loading on the upstream 230 kV lines of Tirunelveli - Edamon which are already critically loaded under high wind scenario. The study has been reviewed and CEA stated that the cumulative increase in loading is not more than 30-40 MW. Further, TANTRANSCO mentioned that, vide their letter dated 08.02.2016, they have informed that completed Tirunelveli-Edamon portion of Tirunelveli-Cochin 400kV Quad D/c line may be utilized by terminating the above feeder at Edamon 230 kV SS and may be charged at 230 kV level as an interim arrangement.

Long-term Planning Issues:

6. Transmission system for evacuation of power from NTPC 4000 MW plant at Pudimadaka (Andhra Pradesh)

CE(PSPA-II), CEA informed that during the 39th meeting APTRANSCO said that they were re-considering whether the ATS for Pudimadaka will be built as APTRANSCO or as ISTS. Later, on 25th January, 2016 they have informed that evacuation of Pudimadaka NTPC plant may be entrusted as ISTS. In the joint study meeting the views of NTPC representative was also obtained. NTPC informed that the Pudimadaka Plant may get delayed and is now expected in the end of 13th Plan/early 14th Plan. It was decided that NTPC would apply to CTU seeking LTA to this plant and based on this application, a suitable transmission system shall be planned. CEA also informed that, regarding allocation of power from Pudimadaka, the matter is under consideration in MoP and depending upon the allocation to APTRANSCO, i.e. 85% or 100% this will have impact on transmission system requirement.

7. Transmission system for evacuation of power from NTPC 1600 MW Telangana STPP Phase-I (2x800 MW)

The issue of evacuation of power from Telangana STPP(2X800 MW) of NTPC was also studied. Telangana informed that they will be taking 100% of power from this project and accordingly transmission system for evacuation of power from this project will be built as STU system. Accordingly, NTPC informed that this project is likely to be commissioned in 2018-19. Accordingly, preliminary studies were carried out considering following transmission system.

1. Establishment of 400 kV S/S at Karimnagar(Nedunuru) by LILO of 400 kV Tippapur-Janagaon 400 kV D/c line(Quad)
2. Telangana STPP-Karimnagar 400 kV Quad D/c line
3. Telangana STPP-Narsapur 400 kV Quad D/c line

During the studies LILO of Nizamabad-Y.Mailaram at Narsapur was reviewed and instead Narsapur-Y.Mailam was taken up. Further, Telangana informed that they would like to construct LILO of Gajwel – Y.Mailaram line at Narsapur instead of direct line between Narsapur and Gajwel as earlier envisaged. The transmission system in respect of immediate connectivity for generation project

is planned towards Narsapur & Karimnagar. The Load flow file was shared with TSTRANSCO and decided they will carry out detailed system study and they will send their proposal to CEA & CTU.

8. Transmission system for evacuation of power from Uppur TPS (2x800 MW) of TNEB in Tamil Nadu.

For evacuation of power from Uppur, Udangudi, SEPC and other wind and solar generations in south Tamil Nadu, it was felt that total system needs to be reviewed. Accordingly, Director(Transmission/Projects) suggested pooling station at Virudhunagar. Accordingly, studies were carried out with following system :

1. Uppur-Virudhunagar 765 kV D/c line
2. Virudhunagar – Ariyalur 765 kV D/c line
3. Virudhunagar – Coimbatour 765 kV D/c line
4. Udangudi- Virudhunagar 400 kV D/c line(Quad)
5. Udangudi- Ottapidaram 400 kV D/c line(Quad)
6. Kamuthi-Uppur 400 kV D/c line(Quad)

It was decided that Tamil Nadu will carry out detailed studies considering proposed HVDC at Pugalur, wind and solar generation projects in that area and send a proposal along with study results to CEA & POWERGRID.

9. Transmission system for evacuation of power from Solar Parks:

i. Telangana (500 MW at Gattu).

Telangana informed that it is convenient for them to evacuate 500 MW solar power at Gattu as follows :

- a) Gattu Solar Park to 400/220 kV Veltoor SS by 220 kV D/c line of TSTRANSCO which is about 70 KM.
- b) Gattu Solar park to upcoming 220 kV Thimmajipet Switching Station by 220 kV D/c line of TSTRANSCO which is about 90 KM

CE(PSPA-II),CEA informed that the above proposal is in order and shall be taken up in the next standing committee meeting.

ii. Andhra Pradesh (1000 MW at Kurnool, 1000 MW at Kadapa and 500 MW at Ananthapuram)

At present 4 solar parks in Andhra Pradesh is under consideration as given below :

1. 1500 MW solar park at Ananthpur – Transmission system for this project is already planned in 38th meeting of SCPSPSR.
2. 1000 MW solar park at Kurnool(Panyam) - Transmission system for this project is already planned in 38th meeting of SCPSPSR and is under implementation APTRANSCO. The project is expected to be commissioned in March, 2017.
3. 1000 MW solar park at Kadapa – APTRANSCO informed that the proposal is under consideration of the State Government and APTRANSCO and time frame and exact location of the solar park is yet to be decided after which evacuation system would be planned.
4. 500 MW at Ananthpur Solar Park - APTRANSCO is informed the this Solarpark is implemented by APGENCO at Tallaricheruv. The tentative system is LILO Uravakonda-Jammalamadugu 400 kV D/c line at Tallaricheruvu. The project is expected to be commissioned by 2019-20.

CE(PSPA-II), CEA requested APTRANSCO to send their proposal along with detailed system studies for this project. APTRANSCO informed that the scheme is under preparation and would be sent to CEA shortly.

iii. Kerala (200 MW at Kasargode)

Kerala informed that Land for 200 MW solar park at Karinthalam is being procured. Solar park is expected to be commissioned in 2017. They are proposing to evacuate power through 220 kV Karinthalam – Mylathi D/c line. Kerala also informed in addition this 200 MW solar park they are also planning another solar park nearby at Ambalathara. For evacuation of this 200 MW solar park they have proposed LILO of both circuits Mylathi-Kanzirod 220 kV D/c line at Solar Park. CE(PSPA-II),CEA requested Kerala to send their proposal after firming up of the Solar Park Generation project.

iv. Tamil Nadu (500 MW at Ramanathapura)

Tamil Nadu informed 500 MW at Ramanathapura Still under consideration of Government. This will be taken up after due approval from Government. They also informed that TEDA will be nodal agency for this project.

v. Transmission System for enabling 648 MW solar parks projects near Kamuthi

CE(PSPA-II), CEA informed that TANTRANSCO, vide letter Lr.No. CE/Plg.&R.C./SE/EE1/AEE3/F.Adani/D.84 dt. 26.02.2016 regarding solar parks of 648 MW in Kamuthi Taluk, Ramnad District to be connected at Kamuthi 400/230 – 110 kV substation of TANTRANSCO. These solar generation projects shall be supplying power to TANGEDCO. Details of the solar parks as given by TANTRANSCO are given below:

Sl. No.	Name of the developers	MW	Connected Voltage (kV)
1	M.s Adani Green Energy (Tamil Nadu) Ltd. – Phase-1 (AGETL)	216	230 kV
2	M/s. Kamuthi Solar Power Ltd. (KSPL)	216	230 kV
3	M/s. Ramnad Solar Power Ltd. (RSPL)	72	110 kV
4	M/s. Kamuthi Renewable Energy Ltd. (KREL)	72	110 kV
5	M/s. Ramnad Renewable Energy Ltd. (RREL)	72	110

For evacuation of power from Kamuthi substation onwards, the transmission system at 400kV level has been discussed in the 37th and the 39th meeting of the Standing Committee of Power System Planning of Southern Region held on 31st July,2014 and 28-29 December, 2015 respectively. In these meetings, following transmission system has been agreed to evacuate up to 1000MW solar power projects that may be connected at Kamuthi 400kV substation. The agreed system is given below:

- i. 400/230 - 100 kV substation at Kamuthi with 3x315 MVA, 400/230 kV transformers and 3x200 MVA, 400/110kV transformers.
- ii. Kamuthi – Karaikudi (PGCIL) 400kV Quad Moose DC line.
- iii. 2x80 MVAR bus reactor at Kamuthi 400kV substation

TANTRANSCO has informed that for terminating the Kamuthi – Karaikudi 400kV DC line at the Karaikudi substation of PGCIL, the 400 kV bays at Karaikudi end may not be ready in the time frame of completion of the Kamuthi substation. Therefore, they have proposed that one circuit of the Kamuthi – Karaikudi line may be linked with one circuit of Kayathar -Karaikudi 400kV DC line near Karaikudi substation, on a temporary basis. On this proposal of TANTRANSCO, we have following observations:

- I. The TANTRANSCO proposal will result in only one circuit between Kayathar – Karaikudi. The second circuit being kept open. Similarly, there will be only one circuit between Kamuthi and Karaikudi. As such, this proposal of TANSTRASCO is not feasible.
- II. However, this issue was also discussed during the joint study meeting at Bangalore held on 14-17 March, 2016. During these discussions, following alternatives were proposed for which TANTRANSCO had agreed to explore and come out with a feasible solution:

Alt(i): Both circuits of Kamuthi – Karaikudi 400 kV line to be connected with one circuit of Kayathar – Karaikudi 400 kV DC line so as to make LILO of one circuit of Kayathar – Karaikudi at Kamuthi. In this proposal, the length from Kamuthi to Kayathar would be more than 300 kilometers and the line reactors at both the ends may be needed. Also, as Kayathar is presently not connected with any other 400 kV substation (other than Karaikudi), the total length from Kamuthi to Kayathar to Karaikudi may be even more than 500 kms which would require additional reactive compensation on this line. For this alternative, Tamil Nadu would explore the possibility of LILO of the Kayathar – Karaikudi line at some place in between instead of near the Karaikudi so that the length of Kamuthi – Kayathar could be reduced.

Alt(ii): Both circuits of the Kayathar - Karaikudi 400 kV DC line may be bunched and connected using only one bay at Karaikudi. Similarly, both the circuits of the new Kamuthi – Karaikudi line may also be bunched and connected in one bay that gets evacuated by bunching both circuits of Kayathar – Karaikudi line. In this alternative, TANTRANSCO will have to ensure that there will not be any constraint in evacuation of power from renewable energy projects that are presently injecting at Kayathar.

It was informed that TANTRANSCO will revise their proposal and send it to CEA and CTU along with appropriate studies.

10. Transmission system for evacuation of power from proposed Udupi extension project in Karnataka:

KPTCL informed that a 2x800 MW addition generating units are being proposed at the Udupi by M/s Udupi Power Corp Ltd. They had carried out preliminary studies and considering the existing system and the proposed Udupi-Kasargod 400kV transmission lines. During the discussions, it was brought out that the total power that would need to be evacuated from this complex would be of the order of 2500-2600 MW after the proposed additional units. The system would have to be planned as per the existing planning criteria, and also considering beneficiaries of this power i.e. whether the whole power would be absorbed in Karnataka or there would be other beneficiaries also. Under N-1-1 reliability criteria, the existing lines and the proposed Udupi-Kasargod lines appear to be inadequate. It was decided that detailed studies, including analysis of RoW issues would be needed. KPTCL was requested to furnish details on possible beneficiaries, likely CoD of new units and possible alternative transmission corridors after due consideration of the RoW, for further studies.

11. Interaction with Wind Developers:

In this meeting the representatives of Enfra, Wind Word and Suzlon participated. The Wind developers presented their proposal (copy of presentation enclosed at **Appendix-6**). During discussions, it was informed that already a number of pooling stations has been planned at Tirunelveli, Bhuj, Banaskantha, Chittorgarh, Ajmer etc which must be utilized by wind developers on priority basis. It was also informed that present wind installed capacity of 24000 MW is envisaged to be increased 60000 MW by end of 13th plan i.e 2021-22. The wind developers were requested to provide information of the additional 36000 MW capacity that is likely to be added during 2016-22 to CEA and CTU. This information should at least include – location, capacity(MW), likely completion date(month/year), distance from nearby 220kV or 400kV grid station.

All India summary-August, 2016

Appendix -1(A)

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS (R)E TUE, MAR 22 2016 16:50
 POWER GRID CORPORATION OF INDIA LIMITED AREA TOTALS
 TTC - ATC FILE IN MW/MVAR

X-- AREA --X	FROM -----AT AREA BUSES-----				TO				-NET INTERCHANGE-			
	GENE- RATION	FROM IND GENERATN	TO IND MOTORS	TO LOAD	TO BUS SHUNT	GNE BUS DEVICES	TO LINE SHUNT	FROM CHARGING	TO LOSSES	TO TIE LINES	TO TIES + LOADS	DESIRED NET INT
1 NORTH	41413.8 -9446.1	0.0 0.0	0.0 0.0	49602.0 10072.1	0.0 -1659.0	0.0 0.0	11.3 14735.4	0.0 53650.4	1760.9 21376.6	-9960.4 -320.9	-9960.4 -320.9	0.0
2 NRTHEAST	2155.8 -586.5	0.0 0.0	0.0 0.0	2301.6 479.3	0.0 1028.2	0.0 0.0	0.0 1478.2	0.0 4283.7	70.1 369.1	-215.9 342.5	-215.9 342.5	500.0
3 WEST	56227.7 -12340.0	0.0 0.0	0.0 0.0	44630.7 9220.1	0.0 3523.7	0.0 0.0	0.0 38142.7	0.0 88083.0	1543.3 21609.5	10053.6 3247.0	10053.6 3247.0	0.0
4 EAST	24489.7 -3196.1	0.0 0.0	0.0 0.0	16984.7 3448.9	0.0 2973.8	0.0 0.0	200.6 5234.8	0.0 18498.0	546.6 6078.3	6757.7 -2433.9	6698.3 -2446.0	26000.0
5 SOUTH	34631.1 1858.7	0.0 0.0	0.0 0.0	40085.1 12907.2	0.0 -812.2	0.0 0.0	0.0 8616.0	0.0 31958.9	1229.6 13738.0	-6683.6 -631.6	-6683.6 -631.6	-6200.0
6 BHUTAN	610.0 -177.7	0.0 0.0	0.0 0.0	59.4 12.1	0.0 0.0	0.0 0.0	0.0 0.0	0.0 7.5	0.5 40.4	550.1 -222.7	609.5 -210.6	0.0
7 BANGLADESH	0.0 0.0	0.0 0.0	0.0 0.0	500.0 50.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 86.9	1.6 17.3	-501.6 19.6	-501.6 19.6	0.0
COLUMN TOTALS	159528.0 -23887.7	0.0 0.0	0.0 0.0	154163.5 36189.7	0.0 5054.6	0.0 0.0	211.9 68207.1	0.0 196568.4	5152.6 63229.4	0.0 0.0	0.0 0.0	20300.0

All India summary December, 2017

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS(R)E																				
POWER GRID CORPORATION OF INDIA LIMITED																				
TTC - ATC FILE																				
TUE, MAR 22 2016 17:01																				
AREA TOTALS																				
IN MW/MVAR																				
-NET INTERCHANGE-																				
X--	AREA	--X	FROM	-----AT	AREA	BUSES-----	TO	TO	TO	TO	TO	TO	TO	DESIRED						
			GENE-	FROM	IND	TO	IND	TO	BUS	GNE	BUS	TO	LINE	FROM	TO	TO	TIE	TO	TIES	DESIRED
			RATION	IND	IND	TO	IND	TO	SHUNT	DEVICES	SHUNT	CHARGING	LOSSES	LOSSES	LOSSES	LOSSES	LOSSES	LOSSES	LOSSES	NET INT
1	NORTH		45148.4	0.0	0.0	62164.1	0.0	0.0	11.0	0.0	11.0	0.0	2571.7	-19598.4	-19998.7	0.0				0.0
			-3498.1	0.0	0.0	7949.8	-3162.4	0.0	15959.2	0.0	15959.2	57605.9	30516.3	2844.8	2793.9					
2	NRTHEAST		2921.1	0.0	0.0	3021.4	0.0	0.0	0.0	0.0	0.0	0.0	116.4	-216.8	-229.6	500.0				
			-769.4	0.0	0.0	401.3	984.0	0.0	1386.0	0.0	1386.0	4334.9	617.3	176.9	175.3					
3	WEST		73017.9	0.0	0.0	58081.3	0.0	0.0	0.0	0.0	0.0	0.0	2733.6	12203.1	12203.1	0.0				
			-7928.3	0.0	0.0	7868.3	-136.4	0.0	43621.8	0.0	43621.8	98160.4	39227.4	-348.9	-348.9					
4	EAST		34615.0	0.0	0.0	21294.0	0.0	0.0	199.5	0.0	199.5	0.0	832.0	12289.5	12631.2	26000.0				
			-2474.4	0.0	0.0	2709.2	1750.9	0.0	6386.6	0.0	6386.6	20865.1	9418.4	-1874.5	-1831.0					
5	SOUTH		43524.2	0.0	0.0	48986.1	0.0	0.0	0.0	0.0	0.0	0.0	1189.8	-6651.7	-6651.7	-6200.0				
			-12918.7	0.0	0.0	7102.3	3998.0	0.0	10277.7	0.0	10277.7	48396.5	14279.8	-180.0	-180.0					
6	BHUTAN		2651.5	0.0	0.0	71.3	0.0	0.0	0.0	0.0	0.0	0.0	2.9	2577.2	2648.6	0.0				
			-550.0	0.0	0.0	9.1	72.8	0.0	0.0	0.0	0.0	143.2	137.4	-626.1	-617.0					
7	BANGLADESH		0.0	0.0	0.0	600.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	-602.9	-602.9	0.0				
			0.0	0.0	0.0	62.7	0.0	0.0	0.0	0.0	0.0	94.2	23.8	7.7	7.7					
COLUMN			201878.1	0.0	0.0	194218.3	0.0	0.0	210.5	0.0	210.5	0.0	7449.3	0.0	0.0	20300.0				
TOTALS			-28138.9	0.0	0.0	26102.7	3506.9	0.0	77631.3	0.0	77631.3	229600.2	94220.4	0.0	0.0					

Appendix -1(B)

SR Summary August, 2016

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS(R)E												
POWER GRID CORPORATION OF INDIA LIMITED												
TTC - ATC FILE												
TUE, MAR 22 2016 16:50												
ZONE TOTALS												
IN MW/MVAR												
-----AT ZONE BUSES-----												
TO												
-NET INTERCHANGE-												
X-- ZONE --X	FROM GENE-	FROM IND	TO IND	TO	TO BUS	GNE BUS	TO LINE	FROM	TO	TO TIE	TO TIES	
	RATION	GENERATN	MOTORS	LOAD	SHUNT	DEVICES	SHUNT	CHARGING	LOSSES	LINES	+ LOADS	
50	8233.2	0.0	0.0	6850.0	0.0	0.0	0.0	0.0	209.0	1174.2	1174.2	
ANDHRA	10.4	0.0	0.0	2251.5	1270.1	0.0	5240.0	12563.1	2067.0	1745.0	1745.0	
51	6079.3	0.0	0.0	6500.0	0.0	0.0	0.0	0.0	159.4	-580.0	-580.0	
TELANGANA	-393.2	0.0	0.0	2136.4	-835.3	0.0	734.4	4088.8	2108.9	-448.8	-448.8	
52	6778.1	0.0	0.0	8717.9	0.0	0.0	0.0	0.0	372.2	-2312.0	-2312.0	
KARNATKA	-643.5	0.0	0.0	2826.8	-1014.3	0.0	1607.0	6899.7	4343.8	-1507.2	-1507.2	
53	1505.7	0.0	0.0	3700.0	0.0	0.0	0.0	0.0	178.8	-2373.2	-2373.2	
KERALA	562.3	0.0	0.0	964.8	-441.3	0.0	0.0	1203.2	1087.2	154.8	154.8	
54	11997.2	0.0	0.0	13973.3	0.0	0.0	0.0	0.0	308.8	-2284.9	-2298.7	
TAMILNAD	2303.7	0.0	0.0	4614.6	235.8	0.0	1034.7	7192.4	4073.7	-462.8	-467.3	
55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
CENTRAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
56	7.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.9	7.9	
TN-WIND	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.0	-0.0	
57	29.7	0.0	0.0	343.9	0.0	0.0	0.0	0.0	1.4	-315.6	-301.8	
PONDY	19.0	0.0	0.0	113.0	-27.3	0.0	0.0	11.7	57.5	-112.6	-108.1	
COLUMN	34631.1	0.0	0.0	40085.1	0.0	0.0	0.0	0.0	1229.6	-6683.6	-6683.6	
TOTALS	1858.7	0.0	0.0	12907.2	-812.2	0.0	8616.0	31958.9	13738.0	-631.6	-631.6	

SR Summary December, 2017

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS(R)E TUE, MAR 22 2016 17:01
 POWER GRID CORPORATION OF INDIA LIMITED ZONE TOTALS
 TTC - ATC FILE IN MW/MVAR

X-- ZONE --X	FROM -----AT ZONE BUSES-----			TO			TO LINE		FROM		-NET INTERCHANGE-	
	GENE- RATION	FROM IND GENERATN	TO IND MOTORS	TO LOAD	TO BUS SHUNT	GNE BUS DEVICES	SHUNT	CHARGING	LOSSES	TO TIE LINES	TO TIES + LOADS	
50 ANDHRA	11381.2 -3562.2	0.0 0.0	0.0 0.0	8655.2 1101.4	0.0 1656.8	0.0 0.0	0.0 5346.3	0.0 14476.6	230.2 2788.8	2495.9 21.0	2495.9 21.0	
51 TELANGANA	7252.6 -2134.5	0.0 0.0	0.0 0.0	9285.5 1803.7	0.0 328.5	0.0 0.0	0.0 2106.2	0.0 10229.1	181.8 2586.2	-2214.7 1270.1	-2214.7 1270.1	
52 KARNATKA	10008.3 -3249.9	0.0 0.0	0.0 0.0	11011.3 1546.8	0.0 1974.3	0.0 0.0	0.0 1440.5	0.0 10276.2	361.4 4333.9	-1364.4 -2269.1	-1364.4 -2269.1	
53 KERALA	1588.6 -393.9	0.0 0.0	0.0 0.0	4104.2 528.6	0.0 -603.5	0.0 0.0	0.0 0.0	0.0 1431.8	140.3 926.0	-2655.9 186.7	-2655.9 186.7	
54 TAMILNAD	12917.4 -3584.0	0.0 0.0	0.0 0.0	15500.6 2067.1	0.0 669.7	0.0 0.0	0.0 1384.6	0.0 11966.7	273.3 3579.9	-2856.6 681.3	-2871.6 679.4	
56 TN-WIND	347.7 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 2.7	1.9 16.8	345.8 -14.0	345.8 -14.0	
57 PONDY	28.2 5.7	0.0 0.0	0.0 0.0	429.2 54.6	0.0 -27.8	0.0 0.0	0.0 0.0	0.0 13.3	0.9 48.2	-401.9 -56.0	-386.9 -54.0	
COLUMN TOTALS	43524.2 -12918.7	0.0 0.0	0.0 0.0	48986.1 7102.3	0.0 3998.0	0.0 0.0	0.0 10277.7	0.0 48396.5	1189.8 14279.8	-6651.7 -180.0	-6651.7 -180.0	

Appendix -1(c)

Tie line flows between NEW-SR August, 2016

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS(R)E TUE, MAR 22 2016 16:50
 POWER GRID CORPORATION OF INDIA LIMITED AREA TIE LINE
 TTC - ATC FILE INTERCHANGE

FROM AREA 5 SOUTH

TO AREA 3 WEST

X----		FROM AREA BUS	----	X	-----		TO AREA BUS	-----	X				
BUS#	X--	NAME	--X	BASKV	BUS#	X--	NAME	--X	BASKV	CKT	MW	MVAR	
514009		CHAND-SR		400.00	374007		BHADRAWATI		400.00*	2DC	-502.4	-204.4	TWO TRM DC "11"
514009		CHAND-SR		400.00*	374007		BHADRAWATI		400.00	2DC	-497.0	246.0	TWO TRM DC "12"
522031		AMBD		220.00	342002		PONDA2		220.00*	2	17.5	-4.4	
522031		AMBD		220.00*	342006		XELDEM		220.00	2	23.6	-18.9	
524015		NARENDR-NEW		400.00*	374050		KOLHAPURPG		400.00	1	-108.2	-109.0	
524015		NARENDR-NEW		400.00*	374050		KOLHAPURPG		400.00	2	-108.2	-109.0	
528003		RAIC800		765.00	378040		SHOLAPUR		765.00*	1	-1211.9	-124.7	
528003		RAIC800		765.00	378040		SHOLAPUR		765.00*	2	-1211.9	-124.7	
TOTAL FROM AREA 5 TO AREA 3											-3598.8	-448.8	

TO AREA 4 EAST

X----		FROM AREA BUS	----	X	-----		TO AREA BUS	-----	X				
BUS#	X--	NAME	--X	BASKV	BUS#	X--	NAME	--X	BASKV	CKT	MW	MVAR	
524011		KOLAR		400.00	424019		TALCHER		400.00*	2DC	-1004.8	-421.8	TWO TRM DC "10"
514010		GAZU-SR		400.00*	424099		GAZ-ER		400.00	2DC	-320.3	164.7	TWO TRM DC "13"
514010		GAZU-SR		400.00*	424099		GAZ-ER		400.00	2DC	-320.3	164.7	TWO TRM DC "14"
524011		KOLAR		400.00	424019		TALCHER		400.00*	2DC	-1004.8	-421.8	TWO TRM DC "9"
518091		SRI_POOL		765.00	428014		ANGUL-765		765.00*	1	-217.4	165.7	
518091		SRI_POOL		765.00	428014		ANGUL-765		765.00*	2	-217.4	165.7	
TOTAL FROM AREA 5 TO AREA 4											-3084.9	-182.7	
TOTAL FROM AREA 5 SOUTH											-6683.6	-631.6	

Tie line flows between NEW-SR December, 2017

PTI INTERACTIVE POWER SYSTEM SIMULATOR--PSS (R)E TUE, MAR 22 2016 17:01
 POWER GRID CORPORATION OF INDIA LIMITED AREA TIE LINE
 TTC - ATC FILE INTERCHANGE

FROM AREA 5 SOUTH

TO AREA 3 WEST

X----		FROM AREA BUS	----	X	-----		TO AREA BUS	-----	X						
BUS#	X--	NAME	--X	BASKV	BUS#	X--	NAME	--X	BASKV	CKT	MW	MVAR			
514009		CHAND-SR		400.00	374007		BHADRAWATI		400.00*	2DC	-502.4	-205.9	TWO TRM DC	"11"	
514009		CHAND-SR		400.00*	374007		BHADRAWATI		400.00	2DC	-497.0	246.1	TWO TRM DC	"12"	
518062		NIZAMABAD		765.00*	378021		WARDHA		765.00	1	-798.8	12.5			
518062		NIZAMABAD		765.00*	378021		WARDHA		765.00	2	-798.8	12.5			
522031		AMBD		220.00	342002		PONDA2		220.00*	2	70.0	-24.4			
522031		AMBD		220.00*	342006		XELDEM		220.00	2	72.3	-32.0			
524015		NARENDR-NEW		400.00*	374050		KOLHAPURPG		400.00	1	312.0	-88.1			
524015		NARENDR-NEW		400.00*	374050		KOLHAPURPG		400.00	2	312.0	-88.1			
528003		RAIC800		765.00	378040		SHOLAPUR		765.00*	1	-571.7	117.7			
528003		RAIC800		765.00	378040		SHOLAPUR		765.00*	2	-571.7	117.7			
TOTAL FROM AREA 5 TO AREA 3													-2974.3	68.1	

TO AREA 4 EAST

X----		FROM AREA BUS	----	X	-----		TO AREA BUS	-----	X						
BUS#	X--	NAME	--X	BASKV	BUS#	X--	NAME	--X	BASKV	CKT	MW	MVAR			
524011		KOLAR		400.00	424019		TALCHER		400.00*	2DC	-1004.8	-421.8	TWO TRM DC	"10"	
514010		GAZU-SR		400.00*	424099		GAZ-ER		400.00	2DC	-320.3	173.4	TWO TRM DC	"13"	
514010		GAZU-SR		400.00*	424099		GAZ-ER		400.00	2DC	-320.3	173.4	TWO TRM DC	"14"	
524011		KOLAR		400.00	424019		TALCHER		400.00*	2DC	-1004.8	-421.8	TWO TRM DC	"9"	
518091		SRI_POOL		765.00	428014		ANGUL-765		765.00*	1	-513.6	124.4			
518091		SRI_POOL		765.00	428014		ANGUL-765		765.00*	2	-513.6	124.4			
TOTAL FROM AREA 5 TO AREA 4													-3677.4	-248.1	

TOTAL FROM AREA 5 SOUTH

 -6651.7 -180.0

Appendix -1(D)

SR Generation Plants & Despatches August, 2016

BUS#	X--	NAME	--X	BASKV	COD	MCNS	PGEN	QGEN	QMAX	QMIN	VSCHED	VACT.	PCT	Q
514001	RSTP			400.00	2	7	2321.6	31.3	1300.0	-650.0	1.0000	1.0000	100.0	
514011	SSLBPH4			400.00	-2	6	367.0	-112.5	225.0	-112.5	1.0000	1.0031	100.0	
514014	SIMHADRI			400.00	2	2	866.3	-86.8	500.0	-250.0	1.0000	1.0000	100.0	
514015	SIMHD-II			400.00	2	2	866.3	18.5	500.0	-250.0	1.0000	1.0000	100.0	
514017	VEMAGIR4			400.00	2	4	400.0	-157.3	500.0	-250.0	1.0000	1.0000	100.0	
514018	TPCIL			400.00	-2	2	501.8	-175.0	330.0	-175.0	1.0000	1.0160	100.0	
514020	RAM-PVT4			400.00	4	2	0.0	0.0	0.0	0.0	1.0000	1.0000	100.0	
514027	KRISH-AP			400.00	-2	2	1000.0	-200.0	800.0	-200.0	1.0000	1.0184	100.0	
514029	KAKTIA-G			400.00	2	2	929.4	-125.9	550.0	-185.0	1.0000	1.0000	100.0	
514030	VIJTP-IV			400.00	2	1	444.1	-101.4	250.0	-125.0	1.0000	1.0000	100.0	
514031	SINGAREN	TPS		400.00	-2	2	485.8	-60.0	300.0	-60.0	1.0000	1.0168	100.0	
514034	EAST-OA			400.00	4	2	1241.7	66.4	660.0	-330.0	1.0000	1.0000	100.0	
514049	KOTH-VI			400.00	2	1	419.4	-91.0	250.0	-125.0	1.0000	1.0000	100.0	
514057	MUDN400			400.00	-2	1	0.0	0.0	0.0	0.0	1.0000	1.0393	100.0	
514088	LANCO-OA			400.00	4	2	0.0	0.0	0.0	0.0	1.0000	1.0000	100.0	
514089	SIMHP-OA			400.00	-2	4	300.0	-75.0	150.0	-75.0	1.0000	1.0173	100.0	
514090	MENAK-OA			400.00	-2	4	0.0	0.0	0.0	0.0	1.0000	1.0172	100.0	
514098	HINDJ-OA			400.00	2	2	445.0	72.4	200.0	-100.0	1.0000	1.0000	100.0	
524003	RAIC			400.00	-2	5	731.5	-220.0	440.0	-220.0	1.0000	1.0123	100.0	
524008	UDUPI400			400.00	2	2	1049.9	-96.5	600.0	-300.0	1.0000	1.0000	100.0	
524012	KAIGA			400.00	2	2	331.8	-86.5	220.0	-110.0	1.0000	1.0000	100.0	
524034	KUDGI-NT			400.00	-2	3	0.0	0.0	0.0	0.0	1.0000	1.0051	100.0	
524076	TORNGL4			400.00	2	4	801.2	-55.4	600.0	-300.0	1.0000	1.0000	100.0	
524082	BELLARY			400.00	2	3	853.3	-100.7	500.0	-250.0	1.0000	1.0000	100.0	
544000	CHENN-EX			400.00	2	2	1004.1	-173.6	600.0	-300.0	1.0000	1.0000	100.0	
544001	NYVL			400.00	2	4	706.8	-17.8	420.0	-210.0	1.0000	1.0000	100.0	
544008	NMADRAS4			400.00	4	2	0.0	0.0	0.0	0.0	1.0000	1.0000	100.0	
544010	NEYEXTN4			400.00	2	2	381.5	-16.7	210.0	-105.0	1.0000	1.0000	100.0	
544015	JYAMKDM4			400.00	4	3	0.0	0.0	0.0	0.0	1.0000	1.0000	100.0	
544019	SOCHE			400.00	4	2	0.0	0.0	0.0	0.0	1.0000	1.0000	100.0	
544020	NEY_IEX			400.00	2	2	448.4	-14.2	250.0	-125.0	1.0000	1.0000	100.0	
544021	KUDAN4			400.00	2	4	885.9	27.8	500.0	-250.0	1.0000	1.0000	100.0	
544041	METTUR4			400.00	2	1	515.8	123.7	300.0	-150.0	1.0000	1.0000	100.0	
544071	TUTICORN			400.00	2	2	901.4	-45.9	500.0	-250.0	1.0000	1.0000	100.0	
544078	MRL4			400.00	4	2	0.0	0.0	0.0	0.0	1.0000	1.0000	100.0	
544088	VTPS			400.00	2	3	1352.1	-258.0	750.0	-375.0	1.0000	1.0000	100.0	
544095	TUTI-OA			400.00	-2	4	0.0	0.0	0.0	0.0	1.0000	0.9985	100.0	
544096	ILFS			400.00	2	2	540.8	-126.5	300.0	-150.0	1.0000	1.0000	100.0	
544114	CEPL			400.00	2	2	1068.9	-31.1	600.0	-300.0	1.0000	1.0000	100.0	
544115	IND-BARATH			400.00	4	2	0.0	0.0	0.0	0.0	1.0000	1.0000	100.0	

SR Generation Plants & Despatches December, 2017

BUS#	X--	NAME	--X	BASKV	COD	MCNS	PGEN	QGEN	QMAX	QMIN	VSCHED	VACT.	PCT	Q
514001	RSTP			400.00	-2	7	2210.7	-650.0	1300.0	-650.0	1.0000	1.0464	100.0	
514011	SSLBPH4			400.00	-2	6	693.2	-225.0	450.0	-225.0	1.0000	1.0593	100.0	
514014	SIMHADRI			400.00	-2	2	832.4	-250.0	500.0	-250.0	1.0000	1.0172	100.0	
514015	SIMHD-II			400.00	-2	2	832.4	-250.0	500.0	-250.0	1.0000	1.0171	100.0	
514017	VEMAGIR4			400.00	-2	2	393.8	-125.0	250.0	-125.0	1.0000	1.0335	100.0	
514018	TPCIL			400.00	-2	2	1040.3	-350.0	660.0	-350.0	1.0000	1.0463	100.0	
514020	RAM-PVT4			400.00	4	2	0.0	0.0	0.0	0.0	1.0000	1.0000	100.0	
514027	KRISH-AP			400.00	-2	2	1257.7	-200.0	800.0	-200.0	1.0000	1.0573	100.0	
514029	KAKTIA-G			400.00	-2	2	798.8	-185.0	550.0	-185.0	1.0000	1.0942	100.0	
514030	VIJTP-IV			400.00	-2	1	426.7	-125.0	250.0	-125.0	1.0000	1.0522	100.0	
514031	SINGAREN	TPS		400.00	-2	2	971.5	-120.0	600.0	-120.0	1.0000	1.1736	100.0	
514034	EAST-OA			400.00	2	2	620.2	-54.6	330.0	-165.0	1.0000	1.0000	100.0	
514049	KOTH-VI			400.00	-2	1	399.4	-125.0	250.0	-125.0	1.0000	1.0639	100.0	
514050	NPKUNTA			400.00	-2	1	138.9	0.0	0.0	0.0	1.0000	1.0381	100.0	
514057	MUDN400			400.00	-2	1	0.0	0.0	0.0	0.0	1.0000	1.0906	100.0	
514080	KOTH-VII			400.00	-2	1	0.0	0.0	0.0	0.0	1.0000	1.0717	100.0	
514088	LANCO-OA			400.00	4	2	0.0	0.0	0.0	0.0	1.0000	1.0000	100.0	
514089	SIMHP-OA			400.00	-2	4	509.9	-150.0	300.0	-150.0	1.0000	1.0463	100.0	
514090	MENAK-OA			400.00	-2	4	808.6	-250.0	500.0	-250.0	1.0000	1.0456	100.0	
514094	NCCPPL			400.00	-2	2	315.8	-175.0	330.0	-175.0	1.0000	1.0520	100.0	
514098	HINDJ-OA			400.00	-2	2	770.2	-200.0	400.0	-200.0	1.0000	1.0213	100.0	
514134	MANUGURU			400.00	-2	4	647.8	-260.0	540.0	-260.0	1.0000	1.0612	100.0	
524003	RAIC			400.00	-2	5	688.1	-220.0	440.0	-220.0	1.0000	1.0577	100.0	
524008	UDUPI400			400.00	-2	2	987.5	-300.0	600.0	-300.0	1.0000	1.0171	100.0	
524012	KAIGA			400.00	-2	2	312.1	-110.0	220.0	-110.0	1.0000	1.0231	100.0	
524034	KUDGI-NT			400.00	-2	3	1862.1	-240.0	1200.0	-240.0	1.0000	1.0356	100.0	
524076	TORNGL4			400.00	-2	4	753.7	-300.0	600.0	-300.0	1.0000	1.0468	100.0	
524082	BELLARY			400.00	-2	3	1306.6	-320.0	850.0	-320.0	1.0000	1.0359	100.0	
524083	YERAMRS			400.00	-2	2	1266.7	-400.0	800.0	-400.0	1.0000	1.0380	100.0	
524087	TUMKUR SP			400.00	-2	1	0.0	0.0	0.0	0.0	1.0000	1.0594	100.0	
544000	CHENN-EX			400.00	-2	2	989.8	-300.0	600.0	-300.0	1.0000	1.0482	100.0	
544001	NYVL			400.00	-2	4	696.7	-210.0	420.0	-210.0	1.0200	1.0462	100.0	
544008	NMADRAS4			400.00	4	2	0.0	0.0	0.0	0.0	1.0000	1.0000	100.0	
544010	NEYEXTN4			400.00	-2	2	370.8	-105.0	210.0	-105.0	1.0000	1.0455	100.0	
544015	JYAMKDM4			400.00	4	3	0.0	0.0	0.0	0.0	1.0000	1.0000	100.0	
544019	SOUCHE			400.00	4	2	0.0	0.0	0.0	0.0	1.0000	1.0000	100.0	
544020	NEY_IIEX			400.00	-2	2	439.0	-125.0	250.0	-125.0	1.0000	1.0457	100.0	
544021	KUDAN4			400.00	-2	4	1746.7	-500.0	1000.0	-500.0	1.0000	1.0632	100.0	
544041	METTUR4			400.00	-2	1	508.5	-150.0	300.0	-150.0	1.0000	1.0597	100.0	
544046	NEY (REP) 4			400.00	-2	2	0.0	0.0	0.0	0.0	1.0100	1.0439	100.0	

544071	TUTICORN	400.00	-2	2	882.8	-250.0	500.0	-250.0	1.0000	1.0314	100.0
544078	MRL4	400.00	4	2	0.0	0.0	0.0	0.0	1.0000	1.0000	100.0
544088	VTPS	400.00	-2	3	1324.2	-375.0	750.0	-375.0	1.0000	1.0483	100.0
544096	ILFS	400.00	-2	2	1001.3	-300.0	600.0	-300.0	1.0100	1.0457	100.0
544114	CEPL	400.00	-2	2	1061.8	-300.0	600.0	-300.0	1.0000	1.0422	100.0
544115	IND-BARATH	400.00	4	2	0.0	0.0	0.0	0.0	1.0000	1.0000	100.0

Appendix-2.0

List of Transmission Lines & Generations Considered

Time Frame	Major Transmission Lines & Generations
August, 2016	<ul style="list-style-type: none"> i) 765kV Angul - Srikakulam - Vemagiri(PG) DC line ii) LILO of 400kV Gazuwaka - Nunna SC at Vemagiri(PG)
March, 2017	<ul style="list-style-type: none"> i) 765kV Wardha – Nizamabad DC line ii) 400kV Nizamabad – Dichipally DC line(HTLS) iii) 765kV Kudgi PG- Tumkur DC line (Charged at 400kV) iv) 400kV Tumkur-Bidadi DC line v) Hinduja Evacuation system except 400kV K.V.Kota-Vemagiri DC line vi) Kudgi NTPC one Unit vii) Singareni Two Units & its ATS(i.e incl. Nirmal SS & downstream) viii) LILO of Mailaram – Gajwel D/c at Narsapur ix) Tumkur down stream with 360 MW load x) 400 kV Tumkur – Dharmapuri D/c xi) 400 kV Nagapattinam – Dharmapuri D/c xii)LILO of Vijawada – Malkaram S/c at Suryapet xiii) KKNP second Unit
September, 2017	<ul style="list-style-type: none"> i) 765kV Nizamabad – Maheshwaram DC line ii) 400kV Maheshwaram – Maheshwaram(TS) DC line iii) 400kV Maheshwaram – Veltoor DC line iv) 400kV Maheshwaram – Shankarpally D/C line v) 400kV Ghanapur – Narnoor LILO @ 400kV Maheshwaram vi) 400kV Yeramarus – Bellary PS DC vii) 400kV Bellary PS - Tumkur DC viii) 400kV Bellary PS – Jindal TPS DC ix) Kudigi Unit – 2 & 220kV Downstream x) 400kV Urvakonda – Jammalamadugu – Narnoor DC xi) 400kV Hindupur – Uravakonda – Veltoor DC xii) 400kV Tumkur – Dharmapuri DC xiii) Yermarus – 1 unit 800 MW
December, 2017	<ul style="list-style-type: none"> i) 400kV LILO of Nunna - Gazuwaka DC at Vemagiri (PG) ii) 400kV Vemagiri - Vemagiri PG D/C iii) 400kV Vemagiri AP - KV Kota D/C iv) 400kV Tumkur - Yelahanka DC v) LILO of Gooty – Tumkur at 400kV Pavagada vi) LILO of 400kV Bellary PS - Tumkur DC at 400kV Pavagadda vii) 400kV Tumkur - Devanahalli DC viii) 400kV Tumkur - Mysore DC ix) East Coast 1 Unit – 620 MW

Study Results

S.No	Case	Case Description	Incremental TTC (WR)	Total TTC (WR)	Limiting Element	Incremental TTC (ER)	Total TTC (ER)	Limiting Element	LGBR
Scenario - 1: August-2016									
0	Basecase-1	Present Network With i) 765kV Angul - Srikakulam - Vemagiri(PG) DC line ii) LILO of 400kV Gazuwaka - Nunna SC at Vemagiri(PG)	-750	5900	400kV Vijaywada - Vemagiri(PG) by tripping of 765kV Raichur - Sholapur line	-623	6027	400kV Vijaywada - Vemagiri(PG) by tripping of 765kV Raichur - Sholapur line	AP: 7059 MW KA: 9085 MW TS: 6659 MW TN: 14281 MW KL: 3878 MW PO: 345 MW SR: 41305 MW
1	Case 1	Basecase with i) Opening of 400kV Nunna - Vemagiri(PG)	212	6862	400kV Kolar - Hosur DC Line	214	6864	400kV Kolar - Hosur Line by tripping other circuit	S1-S2 TTC: 5050 MW
			646	7296	765kV Raichur – Sholapur	668	7318	765kV Raichur – Sholapur	If we ignore 400kV Kolar – Hosur as constraint
2	Case 2	Case 1 with i) Kudgi Unit – 1 Generation	-226	6424	400kV Kolar - Hosur DC Line	-228	6422	400kV Kolar - Hosur Line by tripping other circuit	S1-S2 TTC: 5050 MW

			296	6946	765kV Raichur – Sholapur	306	6956	765kV Raichur – Sholapur	If we ignore 400kV Kolar – Hosur as constraint
3	Case 3	Case 1 with With Raichur – Sholapur Limit to 2750	1064	7714	765kV Raichur – Sholapur	1101	7751	765kV Raichur – Sholapur	If we ignore 400kV Kolar – Hosur as constraint
4	Case 4	Case 2 with With Raichur – Sholapur Limit to 2750	627	7277	765kV Raichur – Sholapur	649	7299	765kV Raichur – Sholapur	
Scenario – 2: March-2017									
0	Basecase-2	Basecase-1 with iii) 765kV Wardha – Nizamabad DC line ii) 400kV Nizamabad – Dichipally DC line i) 765kV Kudgi PG- Tumkur DC line (Charged at 400kV) iv)400kV Tumkur-Bidadi DC line v)Hinduja Evacuation except 400kV K.V.Kota-Vemagiri DC line vi) Kudgi NTPC one Unit vii) Singareni Two Units & its ATS viii) 360 MW Load at 400/220kV Tumkur SS ix) KKNP second Unit	1823	8473	765kV Raichur – Sholapur DC line	1737	8387	400kV Ramagundam – Dichipally line by tripping of 400kV Vemagiri(PG) – Gazuwaka line	AP: 7811 MW KA: 9775 MW TS: 7996 MW TN: 15095 MW KL: 3995 MW PO: 346 MW SR: 44920 MW
1	Case-1	Basecase-2 with i) 400kV Tumkur – Dharmapuri D/C in-service	1880	8530	765kV Raichur – Sholapur DC line	1778	8428	400kV Vemagiri(PG) – Gazuwaka line by tripping of 400kV	

								Ramagundam – Dichipally line	
2	Case-2	Basecase-2 with i) Closing on 400kV Nunna – Vemagiri(PG)	-290	6360	400kV Vijaywada – Vemagiri(PG) by tripping of 400kV Gazuwaka – Vemagiri(PG)	-226	6424	400kV Vijaywada – Vemagiri(PG) by tripping of 400kV Gazuwaka – Vemagiri(PG)	
3	Case-3	Basecase-2 with i) KKNPP Unit – 2 not commissioning	707	7357	400kV Kolar – Hosur DC Line	712	7362	400kV Kolar – Hosur DC Line	
4	Case-4	Case-3 with i) 400kV Tumkur SS not in service	340	6990	Gooty – Nelamangala by tripping of gooty – Somnahally	331	6981	Gooty – Nelamangala by tripping of gooty – Somnahally	
5	Case-5	Basecase-1 with With Raichur-Solapur Limit 2750 MW	1984	8634	400kV Ramagundam – Dichipally line by tripping of 400kV Vemagiri(PG) – Gazuwaka line	1737	8387	400kV Ramagundam – Dichipally line by tripping of 400kV Vemagiri(PG) – Gazuwaka line	
Scenario – 3: September-2017									
0	Basecase-3	Basecase-2 with xiv) 765kV Nizamabad – Maheshwaram DC line ii) 400kV Maheshwaram – Maheshwaram(TS) DC line i) 400kV Maheshwaram – Veltoor DC line iv) 400kV Maheshwaram – Shankarpally D/C line	3241	9891	765kV Wardha – Nizamabad DC line	2950	9600	400kV Gazuwaka – Vemagiri(PG) by tripping of 765kV Wardha – Nizamabad line	AP: 8057 MW KA: 10876 MW TS: 8650 MW TN: 15095 MW KL: 3992 MW PO: 360 MW SR: 47023 MW

		v) 400kV Ghanapur – Narnoor LILO @ 400kV Maheshwaram Vi) 400kV Yeramarus – Bellary PS DC vii) 400kV Bellary PS - Tumkur DC viii) 400kV Bellary PS – Jindal TPS DC ix) Kudigi Unit – 2 & 220kV Downstream x) 400kV Urvakonda – Jammalamadugu – Narnoor DC xi) 400kV Hindupur – Urvakonda – Veltoor DC xii) 400kV Tumkur – Dharmapuri DC							
1	Case 1	Basecase 3 with i. 400kV Gazuwaka – Vemagiri PG Out (Total Hanging of 765kV Angul – Srikakalum – Vemagiri)	2285	8935	765kV Wardha – Nizamabad DC line	2182	8832	765kV Wardha – Nizamabad DC line	
2	Case 2	Basecase 3 with i. 400kV Tumkur – Dharmapuri DC Out	2588	9238	400kV Kolar – Hosur DC	2606	9256	400kV Kolar – Hosur DC	
3	Case 3	Basecase 3 with i. KKNPP Out of service	3247	9897	765kV Wardha – Nizamabad DC line	2967	9617	400kV Gazuwaka – Vemagiri(PG) by tripping on of 765kV Wardha – Nizamabad line	
4	Case 4	Case 3 with i. 400kV Tumkur – Dharmapuri DC Out	569	7219	400kV Kolar – Hosur DC	574	7224	400kV Kolar – Hosur DC	
5	Case 5	Basecase-2 with	3887	10537	400kV Gazuwaka – Vemagiri(PG) by	2950	9600	400kV Gazuwaka – Vemagiri(PG)	

		Raichur – Solapur & Wardha Nizamabad limit of 2750 MW			tripping on of 765kV Wardha – Nizamabad line			by tripping of 765kV Wardha – Nizamabad line	
Scenario - 4: December 2017									
0	Basecase 4	Basecase 3 + Removal of constraint at Vemagiri Area i. 400kV LILO of Nunna - Gazuwaka DC at Vemagiri (PG) ii. 400kV Vemagiri - Vemagiri PG D/C iii. 400kV Vemagiri AP - KV Kota DC iv. 400kV Tumkur - Yelahanka DC v. LILO of Gooty - Tumkur @ 400kV Pavagada vi. LILO of 400kV Bellary PS - Tumkur DC @ 400kV Pavagadda vii. 400kV Tumkur - Devanahalli DC viii. 400kV Tumkur - Mysore DC ix. East Coast – 1 unit only	1717	8367	400kV Vemagiri - Vemagiri PG DC	1294	7944	400kV Vemagiri - Vemagiri PG DC	AP: 8885 MW KA: 11372 MW TS: 9466 MW TN: 15773 MW KL: 4244 MW PO: 431 MW SR: 50176 MW
1	Case 1	Re-Arrangement at Vemagiri PG i. Bypassing Vemagiri AP by straightening Vemagiri PG - Nunna ii. Bypassing Vemagiri AP by straightening 1 circuit of Vemagiri PG - KV Kota	4863	11513	765kV Raichur - Sholapur DC	5291	11941	765kV Raichur - Sholapur DC	
2	Case 2	Case 1 with i. 1400 MW Gas at Vemagiri	4467	11117	765kV Raichur - Sholapur DC	4863	11513	765kV Raichur - Sholapur	

3	Case 3	Case 2 with i. Outage of 765kV Wardha - Nizamabad - Maheshwaram DC and associated 400kV system	1148	7798	765kV Raichur - Sholapur DC	1235	7885	765kV Raichur - Sholapur DC	
4	Case 4	Basecase 4 with i. 765kV Wardha - Nizamabad DC and associated Transmission Out	-672	5978	400kV Vemagiri - Vemagiri PG DC	-555	6095	400kV Vemagiri - Vemagiri PG DC	
5	Case 5	Case 2 with i. Non-Commissioning of 400kV Tumkur - Dharamapuri DC	4463	11113	765kV Raichur - Sholapur DC	4863	11513	765kV Raichur - Sholapur DC	
6	Case 6	Case 5 with i. Non - Commissioning of Yelhanka SS	4403	11053	765kV Raichur - Sholapur	4803	11453	765kV Raichur - Sholapur DC	
7	Case 7	Case 1 with Raichur-Solapur & Wardha Nizamabad limit of 2750	5631	12281	765kV Raichur - Sholapur	6128	12778	765kV Raichur - Sholapur DC	
8	Case 8	Case 1 with i. Outage of 765kV Wardha - Nizamabad - Maheshwaram DC and associated 400kV system	1451	8101	765kV Raichur - Sholapur DC	1561	8211	765kV Raichur - Sholapur DC	
9	Case 9	Basecase with 1400 MW Gas at Vemagiri	4484	11,134	765kV Raichur - Sholapur DC	4762	11,412	400kV Vemagiri - Vemagiri PG DC	

Appendix-4.0

List of participants for Joint Study Meeting of CEA, CTU, SRPC, SRLDC and STU's of SR held from 14/03/2106 to 17/03/2016 at SRPC office, Bengaluru

Southern Region Power Committee (SRPC)

1. S R Bhat Member Secretary I/c
2. N.R.L.K Prasad EE

Central Electricity Authority (CEA)

1. Pardeep Jindal Chief Engineer (PSPA-2)

Power Grid Corporation of India Limited (POWERGRID)

1. Mukesh Khanna AGM(CTU-Planning)
2. V.Thiagarajan Asst. GM (CTU-Planning)
3. V M S Prakash Sr. Engineer (CTU-Planning)

Power System Operation Corporation Limited (POSOCO)

1. S P Kumar DGM, SRLDC
2. G Madhukar Dy. Mgr, SRLDC
3. L.Sharath Chand Engineer, SRLDC

Karnataka Power Transmission Corporation Ltd. (KPTCL)

1. T V Srinivasa EE/PSS
2. L.N.Narasimha Murthy EE/TBC
3. Divya Prabha H AEE
4. Swathi. S Asst. Engineer

Kerala State Electricity Board Limited (KSEBL)

1. SR Anand EE
2. Biju S.S AEE/PSE
3. P Rajan DCE/TDT

Tamil Nadu Electricity Board (TNEB) / TANTRANSCO

1. T.Sethivelan Director/Transmission Projects
2. M.A.Helen Chief Engineer/Planning
3. D.Ravichandran SE/System Studies
4. M Sudarsan EE/System Studies
5. R Kamudha AEE/System Studies

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED / APTRANSCO

1. K.Kesava Reddy ADE/SS
2. K Nirmala DE/SS & TSS
3. Y V Ramakrishna ADE/SS

TRANSMISSION CORPORATION OF TELANGANA LIMITED / TSTRANSCO

1. J.Ajay Kumar DE/System Studies
2. M.Sheshagiri ADE/SS

WIND DEVELOPERS ASSOCIATION

1. U.B.Reddy MD/Enerfra
2. C.R.Srinivas Dir/Enerfra
3. Gurupad Hegae AVP-Proj, Wind World
4. Yogesh Rao AGM Projects, Wind World
5. R.K.Matto GM, State Head, Suzlon

