

Central Electricity Authority, SP&PA Division
Sewa Bhawan, R.K. Puram, New Delhi-110066

No.66/5/99-SP&PA/74-88

Dated: 20-1-2011

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|---|---|
| 1. Member (Transmission),
Bihar State Electricity Board
Vidyut Bhavan, Baily Road,
Patna-800021. | 2. Director (System),
Damodar Valley Corporation
DVC Towers, VIP Road,
Kolkata-700054. |
| 3. Member Secretary,
Eastern Regional Power Committee,
14, Golf Club Road, Tollygange,
Kolkata-700033. | 4. Director (Commercial),
Grid Corporation of Orissa Ltd,
Jan path, Bhubaneshwar-751022. |
| 5. Director (Transmission),
Orissa Power Transmission
Corporation Ltd,
Jan path, Bhubaneshwar-751022. | 6. Director (System Operation),
West Bengal State Electricity Transmission
Company Ltd, Vidyut Bhavan, 5th Floor,
Block-D, Bidhannagar, Sector-II
Kolkata-700091. |
| 7. Principal Chief Engineer cum
Secretary, Power Department
Government of Sikkim, Sikkim. | 8. Director (Projects),
Power Grid Corporation of India
"Saudamini" Plot No. 2, Sector-29
Gurgaon-122001 |
| 9. Director (Technical),
NTPC Limited,
Engineering Office Complex,
A-8, Sector 24, Noida. | 10. Member (Transmission),
Jharkhand State Electricity Board,
In front of Main Secretariat,
Doranda, Ranchi-834002. |
| 11. Executive Director (T&RE),
NHPC Ltd, NHPC Office complex,
Sector 33, Faridabad-121003. | 12. General Manager,
Eastern Regional Load Dispatch Center,
14, Golf Club Road, Tollygange,
Kolkata-700033. |

Sub: Summary record of discussions of the Standing Committee Meeting on Power System Planning in Eastern Region held on 28-12-10 at PGCIL, Gurgaon.

Sir,

Minutes of the meeting for the Standing Committee Meeting on Power System Planning in Eastern Region held on 28-12-10 at PGCIL, Gurgaon, and LTOA minutes of PGCIL are uploaded on the CEA website: www.cea.nic.in. (path to access: *Wings of CEA/Power Systems/Standing Committee on Power System Planning/EASTERN REGION*) for kind perusal.

Yours faithfully,

s/d

(Dr. R. Saha)
Director (SP&PA)

Summary record of discussions of the Standing Committee Meeting on Power System Planning in Eastern Region held on 28-12-2010 at PGCIL, Gurgaon.

List of participants is at Annex-I.

Member(PS), CEA welcoming the participants, stated that about 1,30,000 MW capacity addition is being explored during the 12th plan and we have challenges to plan transmission system requirements even in case of 50% generation projects materialized. Many IPPs are coming in certain locations and the developers need to identify beneficiaries to enable transmission planning in optimal way. He further added that adequate margin in transmission capacity should be provided so that RoW utilization in a corridor can be maximized keeping in view the future system requirements. Director (Proj), PGCIL stated that role of the transmission is superior to power generation and distribution, it should be made with a broader outlook. M (PS) requested CE (SP&PA) to start discussion on the agenda. Initiating the discussions, Chief Engineer (SP&PA) stated that system strengthening in ER, transmission system for Orissa UMPP, and evacuation system for IPPs in Sikkim are the major agenda items. System strengthening requirements in Subhasgram-Farakka-Malda corridor in WB has been evolved through joint studies in accordance with the decision taken in the last SCM. Review and re-orientation of transmission system plan in Sikkim has been made realizing the status and factual positions for development of IPPs in the State. He thanked Energy & Power Deptt., Sikkim Govt. for the initiative taken for development of some common transmission system to facilitate power evacuation from IPPs coming up in Sikkim. CE (SP&PA) requested Director (SP&PA), CEA to take up the agenda. Director (SP&PA) informed in the beginning that the technical solutions that have emerged on various transmission planning related issues are the major outcome of the SCM and its implementation under the regulatory regime being enforced from January 2011 should be decided by the Empowered Committee. He took up thereafter the Agenda.

1.0 Confirmation of the minutes of the meeting held at NRPC, New Delhi on 20.09.2010.

Director (SP&PA), CEA stated that Minutes of the Standing Committee Meeting (SCM) held on 20.09.2010 at NRPC, New Delhi were circulated vide CEA letter No. 66/5/99/SP&PA/1020-32 dated 08.10.2009 followed by a corrigendum vide our letter No. 66/5/99/SP&PA/1282-94 dated 10.12.2010. The ER constituents referred the following items in the context of the SCM held on 20-9-10.

1.1 Spare Transformers in ER

ERPC representative informed that in the last SCM held on 20.09.2010, the requirements of spare transformers for ER Grid were decided and the requirement were further ratified through 16th TCC/ ERPC meeting held on 17/18th December,2010 at Bhubaneswar as given below:

I. New Transformers to be procured by PGCIL

1. 400/220kV, 2X 315 MVA – To be procured by Powergrid
2. 220/132kV, 2x 160/150 MVA(as may be available) – To be procured by Powergrid
3. 132/66 kV, 1x 50 MVA - To be procured by Powergrid
4. 132/33kV, 1x 50 MVA (*) - To be procured by Powergrid

II. After up-gradation with the new transformers, the following would also be kept as spare transformers by PGCIL

1. 220/132kV, 3x 50 MVA (to be released from Malda (2nos.) & Birpara (1no.) S/Stn.)
2. 220/132kV, 2x100 MVA (to be released from Siliguri (2nos.) S/Stn.)
3. 220/132kV, 2x100 MVA (to be released from Purnea (2nos.) S/Stn.)

Note: The above spare transformer(s) will become part of ISTS in Eastern Region for use by the States in ER. In case PGCIL faces difficulty in getting investment approval in respect of transformer of particular voltage class (*) (i.e. 132/33kV), it may go ahead with rest of the transformer(s).

1.2 Nomenclature of the Kishenganj 400kV sub-station (PG) changed to Karandighi S/S.

Regarding Kishenganj location where a 400/220kV S/S has been planned to be constructed by PGCIL, MD (WBSETCL) informed that the location of the 400kV S/S would be Karandighi and henceforth, the name, Karandighi should be used instead of Kishenganj. Members noted it.

1.3 Interim Arrangement for evacuation of power from Teesta-III HEP (1200MW) by Teesta Urja Ltd. through LILO of one circuit of 400kV Teesta V-Siliguri D/C line at Teesta-III HEP

NHPC stated that LILO of one circuit of 400 kV Teesta V- Siliguri D/C line at Teesta-III HEP would lead to technical limitations for full power evacuation from Teesta V, particularly during outage of the 400kV Teesta V-Siliguri 400kV direct circuit. In this context, Director (SP&PA), CEA stated that the technical matters that were earlier raised by NHPC for the LILO of the line, were clarified by CEA and PGCIL and subsequently, PGCIL was advised to take-up LILO work. ED, PGCIL stated that they would make necessary arrangement for special protection scheme (SPS) at Teesta-III in co-ordination with NHPC, ERPC and ERLDC which would enable to trip generating unit at Teesta-III for outage of Teesta V-Siliguri 400kV direct circuit line, ensuring full evacuation from Teesta-V. Chief Engineer (SP&PA), CEA assured NHPC that it would be only interim arrangement and in case of contingency of line outage Teesta-III HEP either have to reduce their generation or trip the unit. NHPC was agreeable for implementation of the proposed LILO work.

With the above observations, MoM held on 28.12.2010 was confirmed.

2.0 Establishment of 400kV Rajarhat-Purnea 400 kV D/c line and 400/220 kV S/S at Rajarhat as system Strengthening in ER.

Director (SP&PA) stated that as a follow up action to the Standing Committee Meeting held on 20-09-10 at NRPC, New Delhi, the detailed load flow studies corresponding to peak and light load conditions especially during low hydro scenario in NER/Bhutan, was carried out jointly by CEA, Powergrid, ERLDC & WBSETCL on 04-10-2010. According to the system studies, establishment of a new 400kV Purnea - Rajarhat D/C line with LILO of one ckt at Farrakka and other ckt at Gokarna, and a new 400kV S/s at Rajarhat were firmed-up. Presenting the results of the studies, Director (SP&PA) explained that the proposed 400kV D/C line would considerably off-load the loading of the existing 400kV Farakka-Malda and Farakka-Jeerat/Subhasgram sections. For better RoW utilization in the Purnea-Rajarhat corridor, the 400kV line would be designed with triple ACSR conductor (Snowbird). Because of RoW and expansion problems at the 400kV Subhashgram and Jeerat S/Ss, setting up of a 400kV sub-station at Rajarhat (New Town) being a growing load center, has been planned with LILO of Subhashgram - Jeerat 400kV S/c line.

ER constituents agreed to the following as ISTS system.

- Establishment of 400/220 kV, 2X500 MVA Rajarhat substation with LILO of Subhashgram - Jeerat 400kV S/c line
- Rajarhat-Purnea 400 kV D/c line (triple snowbird), with LILO of one circuit at Gokarna and other circuit at Farakka.

However, MD (WBSETCL), agreeing to the above stated that the Farakka – Rajarhat section of the 400 kV Rajarhat-Purnea D/c line (triple snowbird) should be at least set-up on priority basis matching with the commissioning 400kV Beharampur switching station with LILO of 400kV Farakka –Jeerat line being developed by PGCIL for power supply to Bangladesh. For delay in implementing the Farakka – Rajarhat section, supplying power to the load centers at Jeerat and Subhasgram areas in WB in the event of power supply to Bangladesh would cause overloading in the Farakka – Jeerat/Subhasgram section, and for any line outage in the corridor, West Bengal would suffer badly. In this connection, ED (PGCIL) informed that as construction of the 400kV Beharampur switching station and associated work are under implementation phase, it would be difficult to bring the 400kV Farakka-Rajarhat portion with the time frame of Beharampur Sw. Station. On the proposal of WBSETCL, CE (SP&PA) stated that on topmost priority efforts would be given for construction of the Farakka – Rajarhat section of the Rajarhat-Purnea 400 kV D/c line. As regards availability and acquisition of land at Rajarhat, MD, WBSETCL assured that WBSETCL would extend help to the extent possible in this regard.

2.1 Termination of the WBSETCL's 400kV Chanditala-Subhashgram D/C line at Rajarhat instead of Subhasgram (PG)

In view of space/RoW constraint at Subhasgram (PG), WBSETCL proposed to terminate their 400kV Chanditala-Subhashgram D/C line at Rajarhat S/S to make it a 400kV Chanditala-Rajarhat D/C line. It was agreed.

3.0 Transmission System for Phase-I and Phase-II IPPs in Sikkim

3.1 Latest scenario of Phase-I IPPs

Phase-1 Gen Projects in Sikkim

Sl. No	Name of the Generation Plant	Capacity/ Power to be transferred	Tentative Beneficiaries	Expected Commissioning Schedule
1	Teesta-III	200x6 =1200 MW	PSEB-340MW, HPGCL-200MW, UPPCL-200MW, Rajasthan Discom-100MW	Dec., 2011
2	Teesta-VI	125x4=500 MW	MSEDCL (Maharashtra)	Nov, 2012
3	Jorethang	48x2 = 96 MW	NR/WR	June, 2012
4	Rangit-IV	40x3=120 MW	NR/WR	June., 2013
8	Chuzachen	49.5x2=99 MW	PSEB, DVB, HSEB, BSEB	March., 2011
9	Bhasmey	25.5x2 = 51 MW	NR/WR	June, 2012

Director (SP&PA) stated that in the 11th Nov'10 meeting held at Gangtok by Energy & Power Deptt., Sikkim the project specific ATS for the above stated Phase-I IPPs in Sikkim were reaffirmed.

3.1.1 Project Specific ATS for Phase-I IPPs:

(under the scope of Generation Project Developers)

a) Upto Pooling Station at New Melli (PG)/ Karandighi (PG)

- Teesta-III:** Teesta-III – Karandighi (PG) 400kV D/c line with Quad Moose conductor (being implemented by TPTL under JV route between TUL and PGCIL)
- Teesta-VI:** Teesta-VI – Rangpo 220kV D/c line with Twin Moose conductor
- Jorethang:** Jorethang – New Melli Sw. station 220kV D/C line with Zebra conductor
- Rangit-IV:** Rangit-IV – New Melli Sw. Stn. 220kV D/C line with Zebra conductor

b) Upto Pooling Station at Rangpo (PG)

- Chuzachen :** Chuzachen – Rangpo 132kV D/C line with Zebra conductor.
- Bhasmey :** LILO of one ckt. of Chuzachen – Rangpo 132kV D/C line at Bhasmey HEP.

3.2 Latest Status of Phase-II IPPs in Sikkim

3.2.1 The list of Phase-II IPPs in Sikkim applied for connectivity/LTA* is the following:

Sl No	Project	Ins. Cap (MW)	LTOA (MW)	Time Frame	Applied for	Remarks
1.	BOP(Chungtang)	99	99	2015	LTOA	Closed
2.	Bhimkyong (Teesta Hydro power project)	99	99	2015	LTOA	Closed
3.	Lachung-Tangchi	99	99	2015	LTOA	Closed
4.	Tashiding (Shiga Energy Pvt. Ltd.)	97	97	Oct., 2012	LTOA	Granted, BPTA/BG by March'11
5.	Tingting (TT Energy Pvt. Ltd.)	99	99	Oct., 2012	LTOA	Granted, BPTA/BG by March'11
6.	Sada Mangdher (Gati Infrastructure)	71	71	Sep'14	LTOA	Granted, BPTA/BG by March'11
7.	Dickchu (Sneha Kinetic Power Projects Ltd.)	96	96	Dec'13	Connectivity & LTA	Granted
8.	Pannan Himagiri Hydro energy Ltd.	300	300	Jan'15	Connectivity	To apply LTA by Jan'11
9.	Lethang (KHC Lethang Hydro Project Pvt. Ltd.)	96	106	Jan'14	Connectivity	To apply LTA by April'11
		1056	1066			

*Furnished by PGCIL

3.2.2 Director (SP&PA) stated that generation specific ATS for Phase-II IPPs coming up in Rangit basin (viz. Tingting, Tashiding Sada Mangdher, Lethang, Ralang and Rangit II HEPs) was evaluated in the 11th Nov'10 meeting held at Gangtok under aegis of Energy & Power Deptt., Sikkim. Generation from the IPPs would be pooled to a common pooling point at Tashiding and thereon to New Melli Sw. Station for further evacuation. It was decided that the common 220kV pooling station at Tashiding and associated 220kV D/c twin moose conductor line upto New Melli Sw. Station (PG), would be developed by Sikkim as part of STU system and Energy & Power Deptt., Sikkim was agreeable to implement the works.

3.2.3 For Panan and Dikchu HEPs coming up in Teesta basin under Phase-II IPPs, the pooling point would be 400/132kV Mangan pooling station of PGCIL. The generation specific transmission system for these projects were reviewed and firmed-up based on system studies. As the project developer for Bhimkyong, Chungtang, and Lachung HEPs (the same developer for the three projects), was not serious about bringing their HEPs and for getting connectivity and LTA, it was decided not to consider the ATS at this stage.

3.2.4 Accordingly, generation specific ATS for Phase-I and Phase-II IPPs in Sikkim and transmission system requirements for power evacuation from pooling point (s) were firmed-up as given below:

I. Phase-II Project Specific Transmission System

A. ATS for immediate evacuation from HEPs (Rangit basin)
(under the scope of Generation Project Developer)

Tingting HEP

- Tingting - Tashiding Sw. Stn 220kV D/c line

Tashiding HEP

- Tashiding– Tashiding Sw. Stn 220kV D/c line

Sada Mangdher HEP

- Sada Mangdher - Tashiding Sw. Stn 220kV D/c line

Lethang HEP (106 MW)

- Lethang HEP - Tashiding Sw. Stn 220kV D/c line

Ralang HEP (100 MW)

- Ralang HEP - Tashiding Sw. Stn 220kV D/c

Rangit II HEP (66 MW)

- LILO of one circuit of 220kV Tashiding Sw. Stn -New Melli Sw. Stn. at Rangit-II

B. ATS for immediate evacuation from Panan and Dikchu HEPs (Teesta basin)

Panan HEP

- Pannan HEP - Mangan 400kV D/c line (under the scope of POWERGRID).

Dikchu HEP

- Dikchu HEP- Gangtok 132kV D/c and Dikchu HEP- Mangan 132kV D/c line with Zebra conductor (as STU's transmission lines)

3.2.5 CTU and/or ISTS System for power evacuation from Phase-II IPPs in Sikkim

- Pannan HEP - Mangan 400kV D/c line
- Establishment of 4x105MVA, Single Phase, 400/132kV pooling station at Mangan.
- LILO of Teesta-III – Karandighi *400kV D/c line at Mangan
- Mangan – Karandighi* 400kV D/c line with quad moose conductor
- New Melli – Rangpo 220kV D/c with twin moose conductor (2nd line)

***Note:-** ‘ Kishanganj’ changed to ‘Karandighi’.

3.2.6 STU System for power evacuation from Phase-II IPPs in Sikkim

- Establishment of 220kV Gas Insulated Pooling/Switching Station near Tashiding
- Pooling station near Tashiding – New Melli 220kV D/c with twin moose conductor
- Dikchu HEP- Gangtok 132kV D/c and Dikchu HEP- Mangan (PG) 132kV D/c line with Zebra conductor.

CoD for Dikchu HEP is Dec'13. ED, PGCIL stated that Dikchu generation deemed to be injected at Mangan by 132kV Dikchu-Mangan line (STU) and in case there is a delay in implementation of the 400/132kV Mangan pooling station, evacuation would be made through 132kV Dikchu-Gangtok D/C line (STU). Sikkim was agreeable to build the 132kV Dikchu-Gangtok D/C line matching with the commissioning of Dikchu HEP.

Above proposal were agreed by ER constituents.

4.0 Transmission System Associated with the Orissa UMPP (5x800MW) and Phase-II IPPs in Orissa.

- 4.1 Orissa Ultra Mega Power Project (4000 MW) shall be set up near Bhedabahal village in Sundergarh district of Orissa by **Orissa Integrated Power Ltd. (OIPL)**. The unit wise CoD as indicated by generation developer would be as follows:

Sl. No.	Unit	CoD
1	1st Unit (800 MW)	Mar - 2016
2	2nd Unit (800 MW)	Sep - 2017
3	3rd unit (800 MW)	Mar - 2017
4	4th unit (800 MW)	Sep - 2017
5	5th unit (800 MW)	Mar - 2018

- 4.2 Ministry of Power vide their letter No. 12/11.2010-UMPP dated 24-09-2010 allocated the 4000MW Orissa UMPP to the following states:

Eastern Region (1300MW)

1. Orissa 1300MW

Northen Region (1800MW)

1. Punjab 500MW
2. Rajasthan 400MW
3. Haryana 400MW
4. Utter Pradesh 300MW
5. Uttarakhand 200MW

Western Region (600MW)

1. Madhya Pradesh 400MW
2. Chhattisgarh 200MW

Southern Region (300MW)

1. Tamil Nadu	300MW
Total	4000MW

4.3 Phase-II IPPs in Orissa

In addition to the Phase-I IPPs in Orissa for which transmission system was already planned, the list of Phase-II IPP projects coming up in Orissa and their latest status are as following:

Phase-II IPPs in Orissa applied for connectivity/LTA*

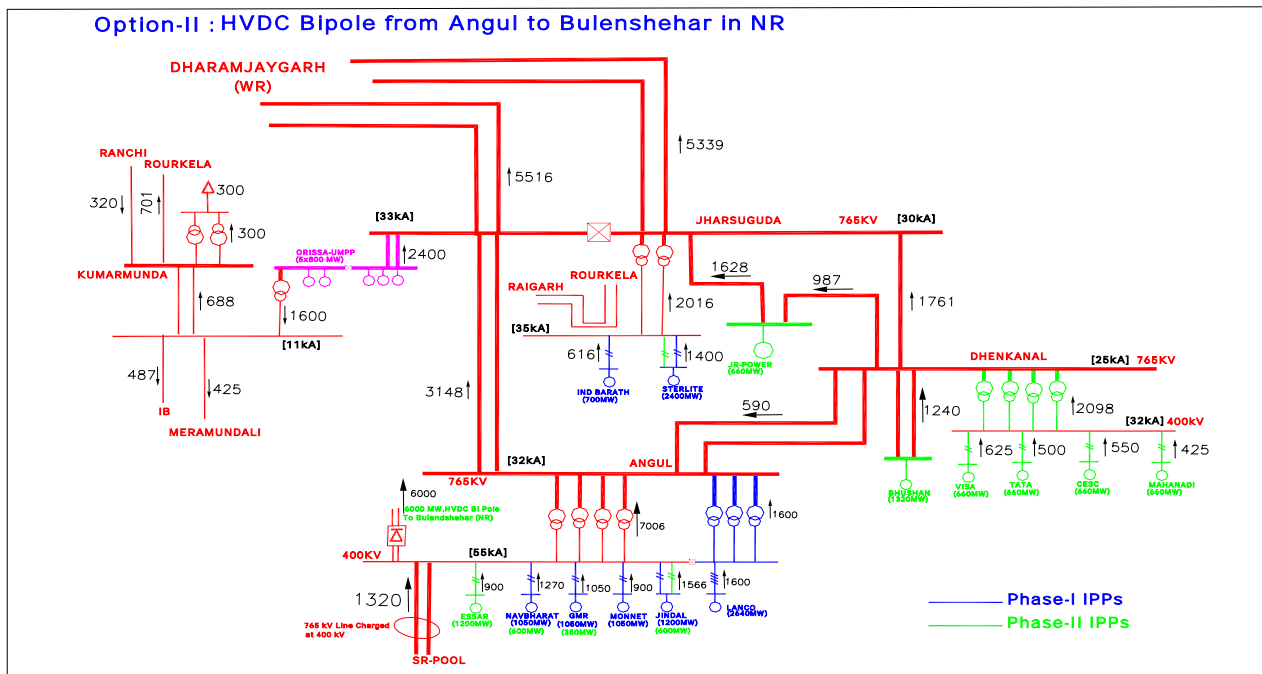
Sl. No	LTA Applicant / Project	Unit Size	Installed Capacity(MW)	LTA/Connectivity (MW)	Time Frame	Applied for	Remarks
1	CESC Ltd.(Orissa)	2x660	1320	900	Mar'15	LTA	Granted
2	Essar Power Ltd.	2x600	1200	900	Mar'14	LTA	Closed
3	Navabharat Power Private Ltd	2x600	1200	1100	Aprl'13	LTA	closed
4	VISA Power Ltd	2x660	1320	1250	Sep'13	Connectivity	To apply LTA by Mar'11
5	Mahanadi Aban Power Co Ltd	2x660	1320	850	Sep'13	Connectivity	To apply LTA by Mar'11
6	Bhushan Energy Ltd)	4x660	2640	2482	Jan.'15	Connectivity	closed
7	Tata Power company Ltd	2x660	1320	1000	Dec'13 / Jan'16	Connectivity & LTA	Granted for 1 unit
8	GMR Energy Limited	1x350	350	220	Dec'11	Connectivity & LTA	Granted
9	J R Power Gen Pvt Ltd	3x660	1980	1980	Jun'14	Connectivity	To apply LTA by Mar'11
10	Jindal India Thermal	1x600	600	522	Sep'13	Connectivity & LTA	Not present
11	Sterlite Energy Ltd.(Phase-I)	(For additional 1000MW LTA)		1000	Sep'11	LTA	Granted
		Total	13250	12204			
1	Orissa UMPP	5x800	4000	4000	Mar.'16	LTA	

*Furnished by PGCIL

4.4 Composite Transmission System for transfer of power from Orissa UMPP and Orissa Ph-II IPP Projects to Beneficiaries (under the Scope of POWERGRID)

A composite evacuation system for power transfer from Orissa UMPP and Phase-II IPPs to the beneficiaries in NR/WR and transmission system requirements to deliver the share of Orissa and Tamil Nadu from Orissa UMPP was determined. On this, PGCIL gave a presentation stating that the generation of Orissa UMPP would be stepped up at 765 kV and

injected at 765kV Jharsuguda pooling station for evacuation. The 765 kV Jharsuguda bus would be split in a way so that two units of UMPP would be dedicated to supply the total share of Orissa and Tamil Nadu, and the other three UMPP units would serve the beneficiaries in NR/WR in independent manner. The share of Orissa and Tamil Nadu would be provided through 765/400kV ICTs at Jharsuguda. For Phase-II IPPs, generation would be pooled to common pooling points at Angul 765/400kV, Jharsuguda 765/400kV and Dhenkanal 765/400kV to enable to cater to the beneficiaries in NR/WR (project specific ATS for Phase-II IPPs upto pooling point as proposed by PGCIL in the LTA meeting followed by the SCM is given under para-4.YX). A hybrid system comprising of 6000MW HVDC Bipole from Angul in ER to Bulandsahar in NR and 765kV system from Jharsuguda/Angul, would transmit the share of NR/WR beneficiaries from UMPP and Phase-II IPPs in Orissa. The location of 6000MW HVDC terminal station is selected at Angul in view of being it a better location among the three power pooling hubs i.e. Jharsuguda, Angul and Dhenkanal. The single line diagram showing the proposed evacuation/transmission systems for Orissa UMPP and Phase-II IPPs is shown below.



4.4.1. Following transmission systems were agreed by the ER constituents.

A. Transmission System to be shared only by beneficiaries of Orissa Ph-II IPPs

- 1 Establishment of 4x1500MVA, 765/400kV substation at Dhenkanal
- 2 LILO of Angul – Jharsuguda 765kV 2xS/c at Dhenkanal
- 3 3000 MW HVDC Terminal each at Angul & Bulandshahr#

B. Transmission System to be shared by beneficiaries of Orissa Ph-II IPPs & Orissa UMPP project #

B1 Transmission line from ER to NR

- 1 ± 800 kV, 6000 MW HVDC Bi-Pole line from Angul to Bulandshahar

B2 Strengthening System in NR

- 1 Bulandshahar – Ambala 765 kV D/c
- 2 Ambala – Malerkotla 400 kV D/c
- 3 Bulandshahar – Neemrana 400 kV D/c
- 4 LILO of Meerut – Moga 765 kV S/c line at Bulandshahar
- 5 Establishment of 2x1500 MVA, 765/400 kV GIS substation at Bulandshahar.

C. Transmission System to be shared by beneficiaries of Orissa Ph-II IPPs & SR IPP projects in AP

- 1 Angul-Jharsuguda 765 kV D/c line
- 2 Jharsuguda-Dharamjaygarh 765 kV D/c line

D. Transmission System to be shared only by beneficiaries of Orissa UMPP project #

- 1 3000 MW HVDC Terminal each at Angul & Bulandshahar
- 2 UMPP - Jharsuguda 765kV D/c line
- 3 Split Bus arrangement at Jharsuguda 765 kV level
- 4 Disconnection of Rourkela-Raigarh LILo arrangement at Jharsuguda
- 5 Arrangement for Power Supply to Orissa (radial mode through isolation of two units of UMPP)

The high capacity transmission corridor mentioned under A (item-3) & B i.e. the ± 800kV, 6000MW Angul-Bulandshahar HVDC line along with 3000MW terminal on either side and strengthening in NR would be developed matching with the time frame of Orissa UMPP project (Mar-2016 to Mar2018). In case UMPP project does not come up, the power from the Orissa Phase-II IPP projects would be evacuated through Angul-Jharsuguda-Dharamjayagarh 765kV D/c corridor. In that case, the HVDC line would be taken up along with future IPP projects in Orissa. In the situation of any changes in the generation projects, the transmission system would be accordingly reviewed and modified. Further, the cost of 6000MW HVDC Angul-Bulandsahar Bipole line and associated converter stations would be entirely shared by the NR/WR beneficiaries.

4.4.2 Transmission system for delivery of Orissa/Tamil Nadu shares from UMPP.

- 400/220kV, 2x315MVA substation at Kumarmundi
- Jharsuguda – Kumarmundi 400kV D/c line
- LILo of one ckt of IB – Meramundali 400kV D/c line at Jharsuguda

The above system would require to be reviewed after considering the system strengthening proposal of GRIDCO/OPTCL for for absorption of Orissa share from Phase-II IPPs.

4.5 ATS for immediate evacuation of power from Phase-II IPPs in Orissa

4.5.1 The following systems were proposed by PGCIL in the LTA meeting followed by the SCM.

<u>Dedicated Transmission System.</u>		
1	Essar Power Ltd.	Essar Power – Dhenkanal 400kV D/c with high capacity (Tripple Snowbird) conductor.
2	Navabharat Power Private Ltd(Phase-II)	Navbharat-Angul 400kV D/c line with Quad Moose conductor (Proposed with Phase-I Project)
3	CESC Ltd.(Orissa)	CESC – Dhenkanal 400kV D/c with high capacity (Tripple Snowbird) conductor.
4	VISA Power Ltd	Visa – Dhenkanal 400kV D/c with high capacity (Tripple Snowbird) conductor.
5	Mahanadi Aban Power Co Ltd	Mahanadi Aban– Dhenkanal 400kV D/c with high capacity (Tripple Snowbird) conductor.
6	Bhushan Energy Ltd	Bhushan-Dhenkanal 765 kV D/c line
7	Tata Power company Ltd	Tata Power – Dhenkanal 400kV D/c with high capacity (Tripple Snowbird) conductor.
8	GMR Energy Limited	GMR-Angul 400kV D/c line with quad Moose(Proposed with Phase-I Project)
9	J R Power Gen Pvt Ltd	LILO of one ckt of Angul/Dhenkanal - Jharsuguda 765kV line at JR Power
10	Jindal	Jindal – Angul 400kV D/c line (2 nd)
11	Sterlite	Sterlite – Jharsuguda 400kV D/c line (2 nd)
<u>Common Transmission System</u>		
New 4x1500MVA, 765/400kV substation at Dhenkanal.		
LILo of Angul – Jharsuguda 765kV 2xS/c at Dhenkanal.		
Angul-Jharsuguda-Dharamjaygargh 765 kV D/c line (Planned for southern region Projects)		

4.5.2 Director (Comm.), GRIDCO stated that for absorption of Orissa share from Phase-I & Phase-II IPPs, OPTCL carried out a detailed system studies through a consultant, and before finalization of the evacuation system for Phase-II IPPs and Orissa UMPP, the proposal of OPTCL could be considered for optimal planning. OPTCL submitting a copy of their study report to CEA gave a brief presentation on their conceptual plan. It was stated that Orissa would draw its share from some of the phase-II IPPs directly to their 400kV grid station for proximity of the IPPs. MD (WBSETCL) and MS(ERPC) had also opined that the proposal of OPTCL could be examined and accordingly, review the overall transmission plan for the IPPs in Orissa. ED, PGCIL stated that there should not be any change in transmission system decided for power transfer from 765kV power pooling points to NR/WR, even if the proposal of OPTCL is further studied. He added that all the developers of phase-II IPPs have already applied for connectivity and LTA to PGCIL, and for any modification in ATS for Phase-II IPPs, GRIDCO would have to discuss their proposal with the concerned developers and consolidate the outcome for further discussion. While, Director, GRIDCO sought to hold a meeting for detailed discussion on the subject with

CEA/PGCIL, CE (SP&PA) stated that the proposed meeting could be held on 11 & 12 January, 2011 at PGCIL, Gurgaon and it was agreed.

4.5.1. Transmission system for transfer of additional 1000MW from Sterlite Project (2400MW) under Phase-I IPPs.

In addition to the LILO of one circuit of 400kV Rourkella-Raigarh D/C line (1st) at Sterlite, which was earlier provided in respect of 400MW LTA as an interim arrangement, the following system requirement (also as an interim arrangement) for additional 1000MW LTA sought by Sterlite for the same project was agreed.

- LILO of one ckt of Rourkela-Raigarh 400kV D/c line (2nd D/C line) at Sterlite.

5.0 Transmission system for IPP Projects in Srikakulam area of Andhra Pradesh

5.1 The list of the IPPs Projects (as given below) coming up in Srikakulam area of Andhra Pradesh, is given below.

Sl. No.	Applicant	Commence ment date	Installed Capacity (MW)	LTOA Quantum Applied (MW)	Allocation of Power (MW)		
					SR	WR	NR
	LTOA						
1.	East-Coast Energy Pvt. Ltd.	March, 2013	1320	1320	1000	320	0
2.	NCC Power Projects Ltd.	January, 2014	1320	1320	900	420	0
	Sub-total		2640	2640	1900	740	0
	Connectivity						
1.	Alfa Infraprop Pvt. Ltd.	Jun, 2014	2640	2640	-	-	-
	Sub-total		2640	2640	-	-	-
	Grand Total		5280	5280	1900	740	0

5.2 The following Common Transmission System was agreed by the Southern Region in its 30th Standing committee of Southern Region held on 13th April, 2010 at PGCIL, Gurgaon for implementation in phase manner.

- (i) Establishment of 765/400kV Pooling Station in Srikakulam area with 2x1500 MVA 765/400kV transformer capacity
- (ii) Srikakulam Pooling station – Angul 765 kV D/C line
- (iii) 765/400kV 1x1500 MVA transformer at Angul
- (iv) Angul – Jharsuguda 765 kV D/C line
- (v) Jharsuguda - Dharamjaigarh 765 kV D/C line
- (vi) Associated 400 kV and 765kV bays at Srikakulam Pooling station, Angul, Jharsuguda and Dharamjaigarh 765/400kV S/Ss.

- 5.3** In the first phase, with initial two units of 660MW either at East Coast or NCC or both, the Srikakulam Pooling Station would be charged at 400kV and the Srikakulam Pooling Station – Angul 765kV D/C line would also be charged at 400kV. Rest of the system, i.e mentioned at (iii), (iv) and (v) above alongwith corresponding bays, would be implemented in first phase.
- 5.4** In the second phase, when any additional unit at East Coast or NCC is commissioned, the Srikakulam Pooling Station would be upgraded to 765 kV S/S by adding 765/400kV 2x1500 MVA transformer. The Srikakulam Pooling Station – Angul 765kV D/C line would be charged at 765kV.

ER constituents noted and concurred the proposal.

6.0 Diversion of 66kV Rangit-Melli S/C regional line to establish 66kV Rangit – Ravangla and Melli-Rothak S/C lines.

Director (SP&PA) stated that Sikkim is not able to construct the approved 66kV Rangit-Ravangala intra-state line due to space constraints for bay extension at Rangit switchyard, and therefore unable to meet load growth at Ravangala and Rothak areas. As a measure, Sikkim proposed to terminate its ongoing 66kV Rangit-Ravangala line at Rangit by diverting the PGCIL's 66kV Rangit-Melli line to Rothak so as to establish 66 kV Ravangala-Rangit and 66 kV Melli-Rathok S/C lines. It was agreed by ER constituents and decided that Govt. of Sikkim would implement it in co-ordination with ERPC, ERLDC and PGCIL to ensure system operation and protection for the 66 kV Ravangala-Rangit and Melli-Rathok S/C lines. The existing transmission charge recovery practice for the 66kV Rangit-Melli line of PGCIL would be continued. The proposal was agreed.

7.0 Provision of space for 132kV bays at Melli for 132kV interconnection between Melli(Sikkim) and Kalimpong(WB) by WBSETCL.

MD WBSETCL stated that meeting growing load demand of Kalimpong from Jaldhaka (WB) is a problem and they would require to construct a new 132kV Melli-Kalimpong line. They sought the space for 132kV bay extension (one or two) at 132kV Melli S/S of Sikkim. Sikkim was agreeable to the proposal of WBSETCL provided adequate space would be available at Melli. It was decided that the WBSETCL and Sikkim would jointly visit and explore the feasibility for 132kV bay extension at Melli.

8.0. Splitting of 400kV Kahalgaon STPS bus by NTPC

Director (SP&PA) stated that in the last standing Committee meeting held on 20-9-10 at NRPC, New Delhi, decision was taken for 400kV bus splitting at Maithon, Durgapur, Kahalgaon, Mathon-RB, Biharsharif Sub-stations. Accordingly, NTPC would have to take up the work for their Kahalgaon Station. While reviewing the progress of 400kV system splitting, to contain fault level, CE(SP&PA), stated that it is a technical system requirement and all

concerned need to carry out necessary splitting in their respective EHV switchyard. AGM , NTPC stated that they would have to incur about 60-70 crores for the work. Upon enquiry from NTPC, it was clarified that the provisions for such capital addition exists under CERC framework for capitalisation of associated expenditure and NTPC should suitably approach the competent authority.

9.0 Progress on Muzafferpur-Dhalkebar 400kV D/C transmission schemes to supply power to Nepal.

PGCIL participant stated that the Govt. of India permitted PGCIL to implement Muzafferpur-Dhalkebar 400kV D/C line for power supply to Nepal. Upon query from ER constituents about sharing of charges for the line, Chief Engineer SP&PA) clarified that no transmission charges would be paid by ER constituents.

10.0 Review of Progress on Earlier Agreed Transmission Schemes

POWERGRID submitted the progress of earlier agreed transmission schemes under implementation is given at Annex-II.

**List of participants for the Standing Committee Meeting on Power System Planning in ER
held on 28.12.2010 at POWERGRID office, Gurgaon**

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Annex-II

STATUS OF PROJECTS UNDER IMPLEMENTATION BY POWERGRID

Sl. No.	Name of the Trans line	Investment Approval	Cost (Appd.) /Ant.	Commissioning Schedule	Remarks / Constraints & assistance required.
1	Common Scheme for 765KV Pooling Station and Network Associated with DVC & Maithon RB Project etc and Inport by NR & WR via ER	Aug'08	7075.33	Aug'12	
	400KV D/C Maithon-Gaya line (Q)			Mar'12	Contingency arrangement being made to connect Maithon -Gaya with Koderma-Gaya, by-passing multi-ckt portion, to form Maithon-Koderma line
	765KV S/C Gaya - Sasaram line			Aug'12	
	765KV S/C Gaya - Balia line			Mar'12	Matching with readiness of Gaya S/Stn. & associated 220KV lines.
	765KV S/C Ranchi - WR Pooling Station			Aug'12	Matching with completion of Ranchi S/Stn.
	765KV S/C Balia - Lucknow line			Mar'12	
	400KV D/C Ranchi (New) -Ranchi line -I (Quad)			Aug'12	
	400KV D/C Ranchi (New) -Ranchi line - II (Quad)			Aug'12	
	400KV D/C Lucknow (New) - Lucknow line - II (Quad)			Mar'12	
	LILO of 400KV D/C Barh - Balia at Patna			Mar'12	
	LILO of both Ckt of Allahabad - Mainpuri at Fatehpur			Mar'12	
2	Supplementary Transmission System Associated with DVC & Maithon Right Bank Proejct	Aug'08	2360.95	Aug'12	
	400KV D/C Maithon RB - Ranchi (PG) line			Aprl'11	Completion matching with 2nd unit of Maithon RB Gen. Project
	400KV D/C Bokara TPS Extn.- Koderma TPS line			Aug'12	Gen. project (Bokaro STPP) delayed beyond Mar'12.
	400KV D/C Koderma - Gaya line (Quad)			Mar'12	Contingency arrangement being made to connect Maithon -Gaya with Koderma-Gaya, by-passing multi-ckt portion, to from Maithon-Koderma line
	400KV D/C Mejia - Maithon line			Jan'11	Completion matching with 2nd unit of Mejia. Final forest clearance (3.28 ha) awaited.Also problem being faced due to severe ROW problem (high compensatation demand).
	765KV S/C Sasaram - Fatehapur line-I			Aug'12	
	765KV S/C Fatehpur - Agra line			Aug'12	
	400KV D/C Biharshariff - Sasaram line (Quad)			Dec'11	
	LILO of 400KV S/C Singrauli - Kanpur line at Fatehpur			Aug'12	
	LILO of 400KV S/C Allahabad - Kanpur line at Fatehpur			Aug'12	
	LILO of 220KV D/C Fatehpur (UPPCL) - Kanpur (UPPCL) line at Fatehpur			Aug'12	
	LILO of 220KV D/C Dehri - Bodhgaya line at Gaya			Dec'11	
3	Eastern Region Strengthening Scheme - I	Oct'06	975.96	Mar'11	

Sl. No.	Name of the Trans line	Investment Approval	Cost (Appd.) /Ant.	Commissioning Schedule	Remarks / Constraints & assistance required.
	400KV D/C Durgapur - Jamshedpur				Route is diverted to allow setting up of Andal Airport. Matter taken up with Ministry of Coal at MOP level. Powergrid is making ready a portion (19 Km) to provide connectivity for LILO at Durgapur Steel TPS (being connected by DVC) for start up power. only 01 section stringing (rly crossing) balance.
	400KV D/C Jamshedpur - Baripada			Jan'11	Severe ROW problem being faced in Jharkhand. Matter taken up with chief Sec. & distt administration. Critical.
	400KV D/C Baripada - Mendhasal			Mar'11	Severe ROW problem being faced in Orissa and also forest clearance is getting delayed by State Govt.
4	Eastern Region Strengthening Scheme - II	Dec'07	227.52	Jan'11	
	400KV D/C Durgapur - Maithon line			Jan'11	Severe ROW problem being faced. CRITICAL Matter taken-up with Distt. Admn.
5	Transmission System for Start - up Power to DVC and Maithon Right Bank Gen. Project.	April'08	290.49	Jan'11	
	400KV D/C Koderma -Biharshariff (Quad)			Jan'11	Forest held up due to compliance of FRA. CRITICAL.
	400KV D/C Maithon RB - Maithon line			Sep'10	Line test charged on 30.09.10.
	LILO of one ckt of 400KV D/C Maithon - Jamshedpur line at Mejia			Jan'10	Line commissioned on 29.01.10.
6	Transmission System Associated with FARAKKA - III	Dec'08	204.07	Jun'11	
	400KV D/C Farakka - Kahalgaon line (2nd line)			Jun'11	Efforts shall be made to match with Gen. Proj. now expected in Feb'11.
7	Immediate evacuation system for NABINAGAR TPS	Feb'10	215.86	Jun'12	Efforts being made to complete the line earlier.
	400KV D/C Nabinagar - Sasaram line (Twin lapwing))			Jun'12	Efforts being made to complete the line earlier to provide start-up power to Gen. Project.
8	Transmission System for Development of Pooling Station in Northern region Part of West Bengal and Transfer of Power from BHUTAN to NR/WR.	Apr'10	4404.57	Jan'15	Compln. Sch. - * 57 months tentatively from the date of investment approval subject to CERC concurrence
	LILO of Bishwanath Chariali - Agra HVDC line at New Pooling Station in Alipurduar for parallel operation of the HVDC stn.			Jan'15	NIT planned in 2011-12.
	LILO fo 400KV D/C Bongaigaon - Siliguri line at New Pooling Station in Alipurduar (Pvt. Sector)			Jan'15	NIT planned in 2011-12.
	LILO of 400KV D/C Tala - Siliguri line at New Pooling Station in Alipurduar			Jan'15	NIT planned in 2011-12.
	400KV D/C Punatsangchu-1 (Gen. Proj. in Bhutan) - Alipurduar line (HTLS Cond.) India Portion.			Jan'15	NIT planned in 2011-12.
	LILO of 220KV D/C Birpara - Salakati line at New Pooling Station in Alipurduar			Jan'15	NIT planned in 2011-12.
	Earth Electrode line at New Pooling Station in Alipurduar & Agra end.			Jan'15	NIT planned in 2011-12.
9	Transmission System for Transfer of Power from Generation Project in SIKKIM to NR/WR Part - A.	May'10	250.03	Jan'13	
	LILO of Siliguri (Existing) - Purnea 400KV D/C line (Q) at New Pooling station at Kishanganj			Jan'13	Tendering under progress.

Sl. No.	Name of the Trans line	Investment Approval	Cost (Appd.) /Ant.	Commissioning Schedule	Remarks / Constraints & assistance required.
	LILO of Siliguri (Existing) - Purnea 400KV D/C line (on which reconductoring is being carried out) at Kishanganj with QUAD Cond.			Jan'13	Tendering under progress.
	LILO of Siliguri - Dalkhola 220KV D/C line at New Pooling station Kishanganj			Jan'13	Tendering under progress.
	LILO of Gangtok - Melli 132KV S/C line up to Rangpo.			Jan'13	Tendering under progress.
10	Eastern Region Strengthening Scheme - III	July'10	1272.80	Nov'12	Compln. Sch. - 28 months from date of investment approval
	400KV D/C Sasaram - Deltonganj line			Nov'12	Tendering under progress.
	400KV D/C Mendhasal - Utra line			Nov'12	Package under award.
	LILO of 400KV D/C Kahalgaon - Biharshariff line (Ist line) at Lakhisarai			Nov'12	Tendering under progress.
	LILO of 400KV D/C Kahalgaon - Biharshariff line (2nd line) at Banka			Nov'12	Tendering under progress.
	LILO of 400KV S/C Meramundali - Jeypore line at Bolangir			Nov'12	Package under award.
	LILO of 400KV S/C Rengali - Baripada line at Keonjhar			Nov'12	Package under award.
	LILO of 400KV D/C (one ckt) Rengali - Baripada line at Dubri (OPTCL)			Nov'12	Package under award.
	LILO of 400KV D/C (both ckt) Jamshedpur - Rourkela line at Chaibasa			Nov'12	Package under award.
11	Transmission System for Phase-I Generation Projects in ORISSA - Part - A.	Sep'10	2074.86	Mar'13	Compln. Sch. - 30 months from date of investment approval
	765KV S/C Angul Pooling station - Jharsuguda Pooling station line -I			Mar'13	Packaging under award.
	765KV S/C Angul Pooling station - Jharsuguda Pooling station line -II			Mar'13	Packaging under award.
	LILO of 400KV D/C Rourkela - Raigarh at Jharsuguda Pooling stn.			Mar'13	Tendering under progress.
	LILO of 400KV S/C Meramunali - Jeypore at Angul Pooling stn.			Mar'13	Tendering under progress.
	LILO of one ckt 400KV D/C Talchar - Meramundali at Angul Pooling station.			Mar'13	Tendering under progress.
12	Interconnection Between Electrical Grid of India and Bungladesh-India Portion	Oct'10	160.32	Oct'12	Compln. Sch. - 24 months from date of investment approval
	400KV D/C Baharampur (India) - Baharampur (B' Deash) line - India Portion			Oct'12	Tendering under progress.
	LILO of Farakka - Jheerat 400KV S/C line at Baharampur (India)			Oct'12	Tendering under progress.