

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

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

Dated: 8-10-2010

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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 20-09-10 at NRPC, New Delhi.

Sir,

Minutes of the meeting for the Standing Committee Meeting on Power System Planning in Eastern Region held on 20-09-10 at NRPC, New Delhi are available on the CEA website: www.cea.nic.in. (path to access-*Wings of CEA/Power Systems/Standing Committee on Power System Planning/EASTERN REGION*).

Yours faithfully,

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

Summary record of discussions of the Standing Committee Meeting on Power System Planning in Eastern Region held on 20-09-10 at NRPC, New Delhi.

List of participants is at Annex-I.

Member(PS), CEA welcoming the participants stated that after implementation of New Electricity Act, 2003 the Power Sector is taking different dimension with having big roll of Genco, Transco and Private Generation developers. They were applying to the PGCIL for LTA and connectivity for National Grid. PGCIL would have to implement the transmission line expeditiously to match with the commissioning schedule of Generating Unit. Stating the new principle of tariff is going to be implemented from 1st Jan 2011, and with remarks that Standing Committee meetings should be held more regularly at a higher frequency, M(PS) requested CE (SP&PA) to start discussion on the agenda. Chief Engineer (SP&PA) assured that the meetings will be conducted more frequently. He informed that after implementation of new Regulation by CERC in all likelihood from January, 2011, 50% transmission charge sharing would be based on national postage stamp methodology and balanced 50% would be based on the point of connection charges. Emphasizing the need that the house should decide the transmission system based on the technical merits, CE (SP&PA) requested Director (SP&PA), CEA to take up the agenda.

1.0 Confirmation of the minutes of the meeting held at Bhubaneswar, Orissa on 14.09.2009.

Director (SP&PA), CEA stated that Minutes of the Standing Committee Meeting (SCM) held on 14.09.2009 at Bhubaneswar, Orissa were circulated vide CEA letter No. 66/5/99/SP&PA/985-996 dated 24.09.2009. No comments were received on the minutes.

The minutes of the Meeting held on 20.09.2010 were thereafter confirmed.

2.0 Establishment of New 400 kV sub-station at Jamshedpur of DVC and LILO of one ckt of 400kV Jamshedpur-Baripada D/C line at Jamshedpur S/S (DVC) in lieu of LILO of one ckt. of 400 kV Parulia-Jamshedpur D/C line.

Director (SP&PA), CEA stated that the proposal for establishment of New 400 kV sub-station at Jamshedpur by DVC through LILO of one ckt. of 400 kV Parulia-Jamshedpur D/C line was agreed in the last SCM held on 14.09.2009 at Bhubaneswar for meeting the upcoming load requirement of TISCO to be supplied by DVC. During survey by DVC It was found that getting the route for LILO of the Parulia-Jamshedpur line at Jamshedpur (DVC)

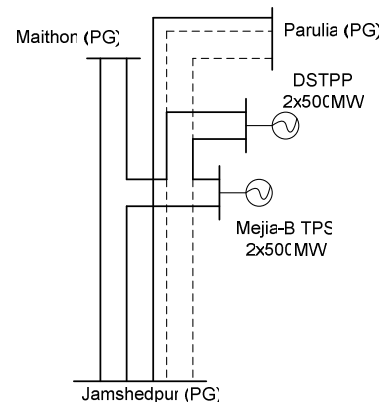
S/S is very difficult due to dense population enroute. Instead, they have proposed for LILO of one ckt of the 400kV Jamshedpur- Baripada D/C line at its new Jamshedpur S/S involving 10km stretch for the LILO work relative to 25km stretch for LILO of the 400 kV Parulia-Jamshedpur line.

It was agreed by all the constituents for setting up of the new 400/220 kV, 2x315 MVA sub-station at Jamshedpur by LILO of one ckt. of 400 kV Jamshedpur- Baripada D/C line by DVC at their own expenses.

3.0 Contingency arrangement for start-up power for 2x500MW Durgapur STPP (Andal) of DVC.

Director (SP&PA), CEA stated that the proposal LILO of one ckt. of the ongoing 400kV Durgapur(Parulia) - Jamshedpur D/C line of PGCIL (Part of approved ERSS-I scheme) at DSTPP was planned under the scope of DVC to cater to the requirement of start-up-power for Durgapur STPP and to facilitate power evacuation. DVC completed the proposed LILO (6 Km) work. As the construction of the 400kV Durgapur(Parulia) - Jamshedpur D/C line at Parulia and Jamshedpur ends was held up due to objections raised by M/s Bengal Aerotropolis Pvt. Ltd (BAPL) and by M/s ECL, he requested PGCIL to give the latest status on it. ED, PGCIL stated POWERGRID has been facing severe right of way constraints due to ECL for termination of Durgapur –Jamshedpur 400 kV line at Durgapur. He stated that effort is being made to complete this 400kV line and terminate at Jamshedpur. The other end of the line which is to be terminated at Durgapur 400 kV Sub-station could be terminated at Durgapur STPP of DVC till the Right of way issues be resolved.

In view of urgency for start-up power for DSTPP of DVC, 1st unit of which would be lit up by July, 10, Director, CEA stated that the temporary start-up power arrangement as decided in the 14th ERPC meeting was to use a portion (approx. 19 km) of the 400 kV Durgapur-Jamshedpur D/C line (under construction by PGCIL) and 4km portion of DVC's line (constructed for LILoing the 400 kV Durgapur-Jamshedpur line) and 400 kV Maithon-Mejia S/C line, so that 400kV DSTPP- Maithon, DSTPP-Mejia and Mejjia-Jamshedpur line gets established. The transmission charges for this arrangement would be borne by DVC upto CoD of 1st unit. Director (Coml.), GRIDCO stated that DVC should also construct the other transmission lines for evacuation of power and this temporary arrangement should not be used for evacuation of power from DSTPP. MS, ERPC stated that



the start-up power arrangement would be temporary in nature and DVC should go for building other transmission system emanating from DSTPP for power evacuation. On the query from Director, CEA regarding progress of construction of 400kV DSTPP-Ragunathpur and Ragunathpur-Ranchi D/C lines by DVC, which would facilitate power evacuation from DSTPP, DVC representative stated that about 70% work on these lines were completed at this time.

ER constituents agreed to the proposed start-up power arrangement.

4.0 ATS for Nabinagar-II TPS (3x660 MW).

4.1 Director (SP&PA), CEA stated that Nabinagar-II TPS (**NTPS-II**) in Bihar would be setup through JV between NTPC and BSEB during 2014-15. The final allocation made by MoP is as following:

State	Allocation in MW
Bihar	1373.5
West Bengal	179
Orissa	155
Jharkhand	60
DVC	54
Sikkim	10
Unallocated	148.5
Total	1980

On the query from M(PS), CEA about the equity proportion of the JV company, BSEB representative state that the equity structure would be 50:50.

The following two 400kV alternatives for NTPS-II with step-up voltage at 400 kV were considered.

Alternative-I

- Nabinagar-II – Nabinagar-I 400kV D/C line
- Nabinagar-II – Patna 400kV D/C line with quad moose conductor

Alternative-II

- Nabinagar-II – Gaya 400kV D/C line with quad moose conductor
- Nabinagar-II – Patna 400kV D/C line with quad moose conductor
- 1x1500MVA 765/400kV ICT at Gaya.

With Alternative-II being a better option, Director, CEA stated that provision of 1x1500MVA 765/400kV ICT in this alternative could be excluded as entire generation

from the project would be consumed within the region. He sought the views of the constituents about the suitable alternative.

Representative from BSEB opined that Alternative-I would be economically/commercially option. PGCIL representative stated that in Alternative-I, 400kV interconnection between NTPS-II and Nabinagar-I and would be highly loaded beyond permissible level during contingency of NTPS-II-Patna line outage and therefore, suggested not to adopt this option. BSEB representative stated that PGCIL should carry out detailed load flow studies in selecting the better alternative for power evacuation from NTPS-II. In this regard, Director, CEA stated that though PGCIL had carried out necessary studies in respect of the above two Alternatives inferring Alternative-II as the better technical option, the results of those studies carried out by PGCIL would be forwarded with the minutes of the meeting. Accordingly, the study results furnished by PGCIL are enclosed at Annex-II.

As regards the provision of 1x1500MVA, 765/400kV ICT at Gaya, ED, PGCIL stated that there are already 2x1500MVA, 765/400kV ICTs at Gaya S/S and the proposed ICT under the NTPS-II would be an additional ICT that would enable to transmit power from ER to NR avoiding overloading during ICT contingency and bottling-up of power in ER. He also added that BSEB and other beneficiaries of the ER would consume its share from NTPS-II by displacement and in effect, power from NTPS-II would go to NR through 765 kV line from Gaya. WBSETCL representative had also opined for some redundancy and agreed to the proposal of PGCIL for an additional ICT at Gaya under NTPS-II. After deliberation, the following ATS for NTPS-II was agreed.

- Nabinagar-II – Gaya 400kV D/C line with Quad moose conductor
- Nabinagar-II – Patna 400kV D/C line with Quad moose conductor
- Additional 1x1500MVA, 765/400kV ICT at Gaya.

5.0 Transmission System for IPP Generation Projects in Jharkhand, West Bengal and Orissa.

Director (SP&PA), CEA stated that the progress of various IPP generation projects and related status of LTA/BPTA were reviewed in the meeting held on 1-02-2010 in CEA with the generation developers. Accordingly, the latest status of the Phase-I IPPs in Jharkhand, West Bengal and Orissa was as hereunder.

5.1 IPPs in Jharkhand & West Bengal and ATS:

Sl No	Projects	Developer/Applicant	Time Frame	Ins. Cap (MW)	LTOA (MW)	Allocation(Mw)			
						NR	WR	ER	Total
A Jharkhand Projects									
1	Adhunik	Adhunik Power & Natural Resources Ltd.	Jan-12	540	450	200	50	200	450
2	Corporate	Corporate Power Ltd	Sept-13	540	480	240	240		480
3	ESSAR	Essar Power (Jharkhand) Ltd.	Mar-13	1200	1100	400	400	300	1100
			Subtotal	2280	2030	840	690	500	2030
B West Bengal Projects									
	WBSEDCL (West Bengal State Electricity Distribution Company Ltd.)		2013-14	1000	1000	600	400	-	1000
			Total	3280	3030	1440	1090	500	3030

5.1.1 Immediate evacuation system for Adhunik, Corporate, Essar and Corporate Phase-I generation projects

- **Adhunik(2x270 MW)** – CoDs in January 2012 and March 2012. *(though connectivity issue to Jamshedpur (PG) S/S was deliberated in the LTA meeting of PGCIL followed by the ER SCM, the discussion is briefly recorded below.)*

As a dedicated line for power evacuation from Adhunik Plant, 400 kV Adhunik-Jamshedpur(PG) D/C was contemplated earlier, and LILO of Maithon-Jamshedpur 400kV D/C at Adhunik would be the interim arrangement till the time the dedicated line be established.

CE (SP&PA) stated that for terminating the dedicated line at PGCIL sub-station at Jamshedpur, the project developer had approached CEA/PGCIL to give them an opportunity to vacate a certain portion of the encroached land. PGCIL stated that they welcomed this initiative and extend necessary support in this regard. PGCIL had also requested the generation developer to take necessary measures for removing the entire encroachment near the sub-station.

Representative from M/S Adhunik Power Ltd. assured that by the end of Oct. 2010, about 8 acres of encroached land at Jamshedpur (PG) S/S would be made free enabling to provide adequate space for 2 Nos. 400kV line bays for terminating the dedicated line. On the issue of removing entire encroachment as requested by PGCIL, it was assured that all out efforts would be made by Adhunik IPP to free the encroached land. For start up power supply to Adhunik first unit, he requested to allow for LILO of the one ckt. of 400kV Maithon-Jamshedpur D/C line at Adhunik. In this context, Member Secretary, ERPC stated that

LILO of the one ckt. of 400kV Maithon- Jamshedpur D/C at Adhunik for start up power for first unit could be permitted with the pre-condition that

- i) M/s Adhunik Ltd. will make available 8 acres of encroached land at 400/220kV Jamshedpur S/S (PG).
- ii) The LILO arrangement would be temporary only for start up power for first unit and would be withdrawn after completion of 400kV Adhunik- Jamshedpur (PG) D/C line.

Adhunik representative and ER constituents agreed to the above.

- **Corporate(540 MW)** – CoD in Sept.,2013
 - Corporate – Jharkhand Pooling Station 400kV D/C line
- **Essar(2x600MW)** –CoDs in March, 2013 and Sept.,2013
 - Essar – Jharkhand Pooling station 400kV D/C (Quad moose) line
- **Corporate Power Ltd Phase-I (2x270 MW)** – CoDs in March 2012 & June 2012
(earlier known as Chitrapur Coal and Power Ltd.)
 - Corporate Ph-I – Ranchi 400kV D/c twin moose line

All the constituents of ER were agreed and noted.

5.1.2 Common system strengthening for transfer of power from Phase-I generation projects in Jharkhand and West Bengal to NR/WR ***(Under the scope of PGCIL)***

Director (SP&PA), CEA stated that the requirement of the common system strengthening works were finalized into three region specific groups viz. 'ER', 'NR' and 'WR' in the last 14th Sept.'09 SCM. As proposed by PGCIL, the works were regrouped into two parts i.e. Part-A & Part-B for implementation. The Part-A would be associated with ER and WR whereas Part-B would be associated with NR. PGCIL representative stated that due to delay in commissioning of Tilaiya UMPP project, LILO of 765kV Gaya – Balia line at Varanasi in NR would be in place of LILO of Tilaiya – Balia line at Varanasi. Accordingly, the scope of work under Part-A & Part-B for the common system strengthening would be as following:

I. Common system strengthening for transfer of power from Phase-I generation projects in Jharkhand and West Bengal - Part-A :

- Ranchi – Gaya 400 kV D/C Quad line via proposed Jharkhand Pooling Station near Essar/ Corporate generation projects
- Ranchi New (765/400kV S/s) - Dharamjayagarh 765kV S/C (instead of Ranchi-Sipat 765kV 2nd S/C line)
- Establishment of 400kV Jharkhand Pooling Station near Essar and Corporate generation projects (depending upon progress of Essar and Corporate IPPs). This will be a switching station without ICTs.

II. Common system strengthening for transfer of power from Phase-I generation projects in Jharkhand and West Bengal - Part-B :

- New 2x1500 MVA, 765/400 kV substation at Varanasi and Kanpur
- Gaya – Varanasi 765 kV S/C (instead of Gaya-Balia 765kV second line)
- LILO of one circuit of Gaya - Balia 765 kV line at Varanasi
- Varanasi – Kanpur 765 kV D/C
- Kanpur – Jhatikra 765 kV S/C
- 400kV connectivity for new 765/400kV S/s at Varanasi & Kanpur
 - Varanasi - Sarnath (UPPCL) 400kV D/C Quad line
 - LILO of Sasaram - Allahabad 400kV line at Varanasi
 - Kanpur (765/400kV) - Kanpur (Existing) 400kV D/C Quad line

III. Private Sector line: *In addition to the above work to be undertaken by PGCIL, Dharamjaygarh – Jabalpur 765kV D/C line (2nd line) would be under the scope of private sector. Associated 765kV line bays at Dharamjaygarh and Jabalpur sub-station would be under the scope of POWERGRID.*

The charges of the common transmission system would be borne by the generation developers of Jharkhand as well as WBSEDCL till the time the long term beneficiaries are finalized. Further, the regional charges of Eastern Region would be borne by the developers of Jharkhand projects in proportion to their installed capacity and by WBSEDCL corresponding to open access quantum i.e. 1000MW. The regional charges for WR and NR would also be shared by the developers of Jharkhand projects and WBSEDCL in proportion to the power allocated to these regions. Once, the long-term beneficiaries are tied-up, transmission charges would be shared by the beneficiaries in proportion to their allocation.

All the constituents of ER concurred.

5.2 Phase-I IPPs in Orissa & ATS:

The latest status of Phase-I IPPs in Orissa would be as given below.

Sl no	Projects	Generation Developer/ Open Access Applicant	Date of Commissioning	Installed Capacity (MW)	LTOA Required (MW)				
					NR	WR	ER	SR	Total
1	Sterlite	Sterlite Energy Ltd	Jun-09	2400	200	200	-	-	400
2	GMR	GMR Kamalanga Energy	Nov -11	1050	600	-	-	200	800
3	Navbharat	Navabharat Power Pvt. Ltd	Mar-12	1050	465	255	-	-	720
4	Monnet	Monet Power Company Ltd	June-12	1050	300	225	225	150	900
5	Jindal	Jindal India Thermal Power	March-11	1200	834	210	-	-	1044
6	Lanco Babandh	Lanco Babandh Power Pvt Ltd	Dec-13	2640	650	950	-	-	1600
7	Ind Barath	Ind Barath Energy(Utkal) Ltd	Dec-11	700	266	350	-	-	616
Subtotal(Orissa)				10090	3315	2190	225	350	6080

5.2.1 Transmission System : (Under the Scope of Generation Developer)

Director (SP&PA), CEA stated that the dedicated transmission lines up to the pooling point at Jharsuguda or Angul for the above IPPs as agreed in the last SCM at Bhubaneswar were the following.

A. ATS planned Upto Pooling Station at Jharsuguda

- 1 Sterlite (2400 MW)
Sterlite – Jharsuguda Pool 400kV D/c line with associated line bays
- 2 Ind-Barath (700 MW)
Ind-Barath – Jharsuguda Pool 400KV D/c line with associated line bays

B. ATS planned Upto Pooling Station at Angul

- 1 Jindal Thermal (1200 MW)
Jindal – Angul Pool 400KV D/c line with associated line bays
- 2 Monnet (1050 MW)
Monet – Angul Pool 400KV D/c line with associated line bays
- 3 GMR (1050 MW)
GMR – Angul Pool 400KV D/c line with associated line bays
- 4 Lanco Babandh(2640 MW)
Lanco Babandh – Angul Pool 400KV 2xD/c line
3x1500MVA, 765/400kV ICT at Angul with associated line bays
- 5 Navbharat Ph-I (1050 MW)
Navbharat – Angul Pool 400KV D/c Quad line with associated line bays

The temporary interim arrangement (under the scope of respective generation developer) for power evacuation from **Sterlite, Ind Bharat, GMR and Jindal IPPs** in Orissa would be as following:

Sterlite	• LILO of one ckt of Rourkela-Raigarh 400kV D/c line
Ind Bharat	• LILO of other ckt of Rourkela-Raigarh 400kV D/c line
GMR	• LILO of one ckt of Talcher-Meramundali 400kV D/c line
Jindal	• LILO of Meramundali-Jeypore 400kV S/c line

All the constituents of ER concurred.

5.2.2 Transmission System for Phase-1 generation projects in Orissa: (Under the Scope of PGCIL)

Director (SP&PA), CEA stated that, the transmission works under the scope of PGCIL for Phase-1 projects in Orissa were earlier formulated under the sub-titles of 'ER', 'ER-WR' and 'WR-NR', which are divided into Part-A, B, C & D to facilitate implementation of the

works as per the requirement of PGCIL. Part-A would be relating to construction of pooling stations at Jharsuguda and Angul and associated interconnections, Part-B would be for system strengthening in WR, Part-C having four elements of which first two elements would be for system strengthening common for WR and NR and 3rd & 4th elements for system strengthening in NR, and Part-D would be for system strengthening in WR and under the scope of private developers.

The scope of work under Part-A, B, C & D would be as following:

I. Transmission System for Phase-1 generation projects in Orissa - Part-A

- Angul Pooling Station – Jharsuguda Pooling Station 765kV 2xS/c
- LILO of Rourkela – Raigarh 400kV D/c at Jharsuguda Pooling station
- *LILO of Meramundali – Jeypore 400kV S/c line at Angul pooling station
- *LILO of one ckt of Talcher - Meramundali 400kV D/c line at Angul pooling station
- Establishment of 2x1500 MVA, 765/400kV Pooling Station at Jharsuguda
- Establishment of 4x1500MVA, 765/400kV Pooling Station at Angul

[* These LILO would be later disconnected when Angul pooling station is developed at 765kV, otherwise it would cause short circuit level problem.]

II. Transmission System for Phase-1 generation projects in Orissa - Part-B

- Establishment of 765kV switching station at Dharamjaygarh / near Korba
- Establishment of 765/400kV Pooling Station at Jabalpur
- Jharsuguda Pooling Station – Dharamjaygarh / near Korba (WR) 765kV D/c
- LILO of Ranchi – WR Pooling near Sipat 765kV S/c line at Dharamjaygarh / near Korba
- Dharamjaygarh / near Korba – Jabalpur Pooling Station 765kV D/c line
- Jabalpur Pooling Station – Jabalpur 400 kV D/c (high capacity) line

III. Transmission System for Phase-1 generation projects in Orissa - Part-C

- Jabalpur Pooling Station – Bina 765kV D/c line
- Bina – Gwalior 765kV S/c (3rd circuit)
- Gwalior - Jaipur 765kV S/c line (2nd circuit)
- Jaipur - Bhiwani 765kV S/c line

IV. Transmission System for Phase-1 generation projects in Orissa - Part- D (under Private Sector)

- Establishment of 2x1500MVA, 765/400kV Bhopal Pooling Station
- Jabalpur Pool – Bhopal – Indore 765kV S/c
- Bhopal New substation – Bhopal (M.P.) 400kV D/c (high capacity)

All the constituents of ER were agreeable to the above systems. However with regard to LILO of CTU lines at IPPs, they were agreeable with the following observations.

- On the issue of the interim arrangement for power evacuation from IPPs by LILO of CTU lines, WBSETCL stated that there should be definite plan & program for implementation of ATS of IPPs. Avoiding such LILO, would enable ER constituents to

make better utilization of the inter-state lines. He further suggested that PGCIL should first installed special protection system in coordination with ERDC and second whether margin is available in the transmission, then only IPP's would be allowed to evacuate power through CTU system. Director , GRIDCO has also the similar view. CE (SP&PA) stated that upcoming methodology for determining transmission charges on the basis of point of connection transmission charges would have no impact on such LILOs. Director (Commercial), GRIDCO stated that only one unit of IPPs should be allowed to evacuate through the LILO arrangement.

- In view of considerable share to be available for Orissa from phase-I IPPS, ED PGCIL mentioned that they did not yet receive any LTA application from GRIDCO for trading of this power and there would be a possibility of power being bottled-up. In this context, Director, GRIDCO informed that their share would be 32.5% in the Phase-I IPPs and entire share would be utilized to meet its own load demand by creating additional 400kV sub-stations/systems in the state. In this regard, GRIDCO would submit the proposals along with necessary system studies to CEA.
- Further, Director , GRIDCO informed that first unit (600MW) at Sterlite IPP was recently commissioned generation of which would be entirely consumed by Orissa. For absorption of Sterlite power within Orissa grid, he requested for bus splitting at 220kV Budhipada S/S. CE (SP&PA) stated that it could be done in co-ordination with ERLDC and ERPC.

6.0 ATS for power evacuation from Phase-I generation projects in Sikkim/Bhutan:

The latest scenario of Phase-1 Gen Projects in Sikkim was the following:

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	Aug., 2011
2	Teesta-VI	125x4=500 MW	MSEDCL (Maharashtra)	Nov, 2012
3	Jorethang	48x2 = 96 MW	NR/WR	April., 2012
4	Rangit-IV	40x3=120 MW	NR/WR	Nov., 2013
#5	Tashiding	48.5x2 =97 MW	NR/WR	Oct.,2012
#6	Tingting	49.5x2=99 MW	NR/WR	Oct.,2012
7	Rongnichu	48x2=96 MW	Chhattishgarh	NA
8	Chuzachen	49.5x2=99 MW	PSEB, DVB, HSEB, BSEB	Sept., 2010
9	Bhasmey	25.5x2 = 51 MW	NR/WR	June, 2012
Total		2358 MW		

Note: Tingting(99 MW) and Tashiding(97 MW) HEPs under Stage-II

Director (SP&PA),CEA stated that the dedicated system requirement for HEPs in Sikkim/Bhutan under the scope of generation developers and the scope of PGCIL work for transfer of power to NR and WR were firmed-up In the last SCM held on 14-09-2009 at Bhubaneswar. He mentioned that as per CERC guidelines notified on 3rd Sept.,2010, the transmission system requirements for evacuation of power from HEPs having capacity 50 MW and below 250MW would require to be relooked by PGCIL and generation developers.

6.1 Project specific revised dedicated transmission system: (under the scope of Generation Project Developers)

A. Upto Pooling Station at New Melli/ Kishanganj / Mangan[#] (proposed at a later date)

1. **Teesta-III:** Teesta-III – Kishanganj 400kV D/c line with Quad Moose conductor (being implemented by TPTL under JV route between TUL and PGCIL)
2. **Teesta-VI:** Teesta-VI – Rangpo 220kV D/c line with Twin Moose conductor
3. **Jorethang & Rangit-IV:** Jorethang – New Melli Switching station 220kV D/C line with single moose conductor, one ckt via Rangit-IV.

4. ATS for Tingting (99MW) and Tashiding (97MW) HEPs:

On the query from CE (SP&PA) about the status of the ATS for Tingting and Tashiding HEPs, additional Chief Engineer (E&P), Govt. of Sikkim stated that Sikkim Govt. is already constructing 132kV Chuzachen HEP to Rangpo Pooling point D/C with Zebra conductor as incentive for first HEP in Sikkim. In this line, Sikkim Govt. would establish the 220kV pooling point at Tingting/Tashiding and connecting 220kV D/C twin moose upto New Melli switching station of PGCIL. CE (SP&PA) welcomed the initiative of Sikkim.

B. Upto Pooling Station at Rangpo

1. **Chuzachen :** Chuzachen – Rangpo 132kV D/C line with Zebra conductor.
2. **Rongnichu:** Rongnichu – Rangpo 220kV D/C line with Zebra conductor.
3. **Bhasmey :** Bhasmey HEP - Rangpo S/S 132 D/C line

Additional Chief Engineer (E&P), Govt. of Sikkim informed that that first unit of Chuzachen HEP would be commissioned by Feb. 2011 and construction of 132kV Chuzachen – Rangpo 132kV D/C Zebra conductor line is an advance stage. He assured that transmission line would be completed before the commissioning of the unit.

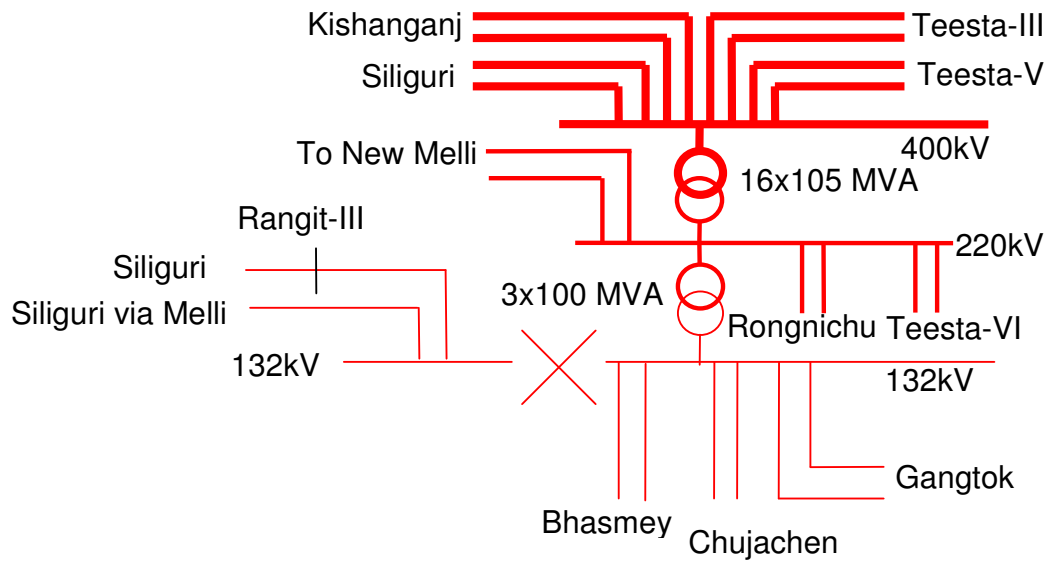
Regarding power evacuation from Bhasmey HEP, he stated that Chuzachen & Bhasmey HEPs are under development in the same basin and by the same developer and suggested that LILO of one circuit of 132kV Chuzachen – Rangpo 132kV D/C Zebra conductor line at

HEP would enable to evacuate power from Bhasmey. Director (SP&PA), CEA stated that in case of outage of one ckt. of Chuzachen – Rangpo 132kV D/C line, generation would be required to be backed down as loading on the remaining line would go beyond thermal limit. He suggested to construct an independent 132kV Bhasmey - Rangpo D/C line. Additional Chief Engineer (E&P), Sikkim stated that they would examine and revert to CEA/PGCIL shortly.

6.2 Revised ATS for HEPs in Sikkim/ Bhutan: (under the scope of PGCIL)

Director (SP&PA), CEA stated that the agreed scope of work under PGCIL for transfer of power from HEPs in Sikkim/ Bhutan to NR and WR were earlier categorized under Part-A, B & C.

- 6.2.1 Under the scope of Part-A work, LILO of the existing Siliguri – Purnea 400 kV D/c twin moose line (being re-conducted with HTLS conductor by PGCIL) at Kishanganj S/S was planned to be constructed with HTLS conductor. ED, PGCIL stated that though re-conducting of the line with HTLS conductor is undertaken, LILO portion would be built with quad moose conductor instead of HTLS conductor to avoid delay in completing the LILO work. It would make saving in cost and there would not be any operational problem on the line. If it was decided that existing Siliguri – Purnea 400 kV D/c twin moose line being re-conducted with HTLS conductor would be LILoed at Kishanganj using quad conductor.
- 6.2.3 Under the scope of Part-B work, construction of 400/220kV, 10x167MVA GIS at New Melli and a 220/132kV, 3x100MVA GIS pooling stations at Rangpo were planned and are in the process of implementation by PGCIL. Due to transportation constraints for electrical equipments (viz. transformer) at New Melli site in Sikkim, shifting of 400/220kV New Melli pooling station to Rangpo considering 220kV switching station only at New Melli, was proposed by PGCIL. Accordingly, the 400 kV Teesta-III - Kishanganj D/C line being implemented by TPTL under JV route for Teesta III HEP and the existing 400kV Teesta-V to Siliguri D/C line, which were earlier envisaged to be LILoed at New Melli, would be LILoed at 400kV Rangpo GIS. For flexibility in operation, a bus-sectionaliser (shown below) would be put at 132kV bus, so that if the power flows in the 132kV ckts downstream of Rangpo (to Siliguri via Melli and Rangit-III) exceeded the limit, the Circuit Breaker connection in the two bus could be opened to divert power from 132kV side to 220kV side.



6.2.4 Under the scope of Part-C work, 400kV evacuation system for Punatsangchhu-I (1200MW) in Bhutan and associated transmission system for power transfer (upto Alipurduar) to NR/WR were planned with high capacity lines using HTLS conductor (both Indian portion and Bhutan portion) to optimize RoW. Subsequently, evacuation system for Punatsangchhu was reviewed to meet the needs of Bhutan and twin moose conductor based transmission lines in place of HTLS conductor were decided.

In accordance with the above proposals, the revised scope of work under Part-A, Part-B & Part-C would be as following:

Part – A: Transmission System for development of pooling station at Kishanganj and associated transmission works (under the Scope of PGCIL)

(By 2011-12, for evacuation of 1300 MW from Sikkim)

- Establishment of New 2x315 MVA, 400kV sub-station at Kishanganj
- LILO of Siliguri (Existing) – Purnea 400kV D/c line(quad) at new pooling station Kishanganj
- LILO of Siliguri (Existing) – Purnea 400kV D/c line (on which re-conductoring with high capacity HTLS conductor is undertaken by PGCIL) at Kishanganj with construction of LILO portion to be made by Quad moose conductor line.
- LILO of Siliguri – Dalkhola 220kV D/c line at new pooling station Kishanganj
- LILO of Gangtok-Melli 132kV S/c line upto Rangpo, where Chuzachen- Rangpo 132kV D/c would be connected so as to form Chuzachen-Gangtok and Chuzachen-Melli 132kV S/c lines. [This would be a temporary arrangement till establishment of Rangpo pooling substation under Part-B of the scheme and termination of Gangtok-Rangpo, Melli-Rangpo and Chuzachen-Rangpo 132kV lines at Rangpo]

Part – B: Transmission System for development of pooling substations within Sikkim and transfer of power to a new pooling station Kishanganj in northern Part of West Bengal/Bihar (under the Scope of PGCIL)

(By 2012-13, when additional 1100MW materializes in Sikkim)

- Establishment of 16x105MVA, 1 ph, 400/220kV and 3x100MVA 220/132kV, Gas Insulated Substation at Rangpo
- Establishment of 220kV Switching station at New Melli
- LILO of Teesta III – Kishanganj 400kV Quad D/c line (to be constructed through JV route) at Rangpo
- New Melli - Rangpo 220kV D/c line (with twin Moose conductor)
- LILO of Gangtok-Rangit 132kV S/c line at Rangpo and termination of Gangtok-Rangpo/Chujachen and Melli–Rangpo/Chujachen 132kV lines (constructed under part-A through LILO of Gangtok-Melli 132kV S/c line upto Rangpo) at Rangpo sub-station
- LILO of Existing Teesta V – Siliguri 400kV D/c line at Rangpo
- Kishanganj – Patna 400kV D/c (quad) line

Part-C: Transmission System for development for power transfer from Bhutan to NR/WR (under the Scope of PGCIL)

(By 2014-15, when Punatsangchu-I (1200MW) comes up in Bhutan)

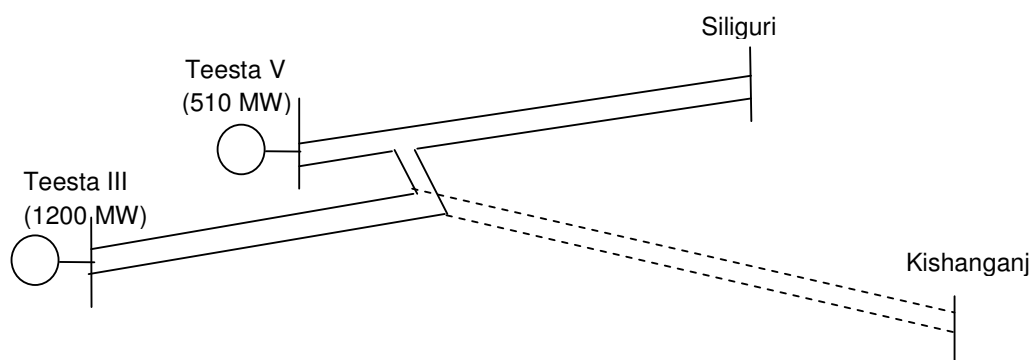
- New 2x315MVA, 400/220kV AC & HVDC sub-station with ± 800 kV, 3000MW converter module at new pooling station at Alipurduar.
- Extension of ± 800 kV HVDC station with 3000 MW inverter module at Agra
- LILO of Bishwanath Chariyali – Agra HVDC line at new pooling station in Alipurduar for parallel operation of the HVDC station
- LILO of Bongaigaon – Siliguri 400kV D/c line(quad) (Bongaigaon – Siliguri 400kV D/c line under Pvt. Sector) at new pooling station in Alipurduar
- LILO of Tala-Siliguri 400kV D/c line at new pooling station in Alipurduar.
- LILO of Birpara-Salakati 220kV D/c line at new pooling station in Alipurduar
- Punatsangchu-I & II – Alipurduar 400kV 2xD/C with Quad moose conductor line Earth Electrode line at new pooling station at Alipurduar
- Earth Electrode line at Agra HVDC Terminal

Note : The transmission charges for Part ‘A’ & ‘B’ of the above transmission works would be initially borne by the generation developers. However, the modality for cost and transmission resource sharing among the IPPs should be sorted out between IPPs and PGCIL. The transmission charges for Part ‘C’ would be borne by beneficiaries of Bhutan power.

The ER constituents were agreeable to the above modifications.

7.0 Interim Arrangement for evacuation of power from Teesta-III HEP (1200MW) being developed by Teesta Urja Ltd.

Director (SP&PA), CEA stated that Teestavalley Power Transmission Ltd. (TPTL), a JVC of Teesta Urja Ltd and POWERGRID would not be able to complete construction of the 400kV Teesta-III - Kishanganj D/C Quad moose line (ATS) before the commissioning of the 1st unit of Teesta-III due to very difficult terrain corridor and right-of-way issues in Sikkim and West Bengal. As an interim arrangement, generation from 1st unit of Teesta-III would be injected to one circuit of 400kV Teest V-Siliguri D/C line (as shown below) for which TPTL would borne the cost. ED, NHPC stated that injection of about 350MW additional power through the ATS of Teesta-V would overload the 400kV Teesta V – Siliguri D/C line. It would also necessitate changes in SCADA /DAS, GIS switchyard bus rating and protection. Special protection scheme would also require to be provided in order to back down Teesta-III generation. Member (PS) suggested that the issue should be resolved in a joint meeting by CEA, PGCIL, NHPC, TPTL & Teesta Urja Ltd. Accordingly, it was decided to hold the meeting on 27-09-2010 at PGCIL's Gurgaon office.



8.0 Cross Border Transmission link between India and Bangladesh

8.1 CE (SP&PA) stated that the establishment of the cross border transmission link between India and Bangladesh was decided at the highest level between the two Governments and the following interconnection was decided.

India portion

- i. Establishment of 400kV Switching Station at Baharampur
- ii. LILO of Farakka - Jeerat 400kV S/C line at Baharampur : 3 km
- iii. Baharampur(India)-Bheramara(Bangladesh) 400kV D/C line (Indian Portion) : 85 km

Bangladesh portion

- iv. Baharampur (India)-Bheramara (Bangladesh) 400kV D/C line (Bangladesh portion) : 40 km
- v. LILO of Ishurdi - Khulna South 230kV D/C line at Bheramara: 5 km

- vi. Establishment of 500MW HVDC back-to-back Station and 230kV Switching Station at Bheramara

The Indian portion would be executed by POWERGRID, while the Bangladesh portion would be executed by PGCB (Power Grid Company of Bangladesh Ltd.), Bangladesh.

- 8.2 WBSETCL participants stated that due to LILO of the 400kV Farakka-Jeerat line at Baharampur switching station from where supply of 500MW to Bangladesh would take place, the 400kV line would be overloaded and could not be able to meet the load demand of Jeerat area. Director, CEA stated that system strengthening in the Farakka-Jeerat-Subhasgram corridor would be firmed up after carrying out the necessary studies to be conducted jointly by PGCIL, WBSETCL, CEA and ERLDC.

9.0 Proposal for LILO of one circuit of 765kV Tilaiya UMPP-Balia D/C line at Gaya S/S as part of ATS for Tilaiya UMPP (4000 MW) in Jharkhand.

Director, CEA stated that ATS for Tilaiya was decided to be Tilaiya UMPP – Balia 765kV D/C and Tilaiya UMPP – Gaya 765kV S/C lines. The proposal for additional LILO for one circuit of 765kV Tilaiya-Balia D/C line at Gaya as required by BSEB was already discussed in the 14th ERPC meeting. Accordingly, the revised ATS for Tilaiya UMPP would be as following:

- 765kV Tilaiya- Gaya S/C line
- 765kV Tilaiya-Balia D/C
- LILO of one circuit of 765kV Tilaiya-Balia D/C line at Gaya

Members concurred.

10.0 System Reinforcements in ER as a Eastern Regional System Strengthening Scheme:

(i) Additional Bus Reactor of 1x125 MVAR each at 400/220kV Patna & Ranchi Sub-stations of PGCIL.

The requirement of additional bus reactor of 125MVAR capacity each at the 400kV Patna and Ranchi S/Ss for which ER constituents were agreeable in the 14th ERPC meeting was concurred.

Members concurred.

(ii) Proposal of PGCIL for spare Transformers/Reactor to meet the needs of Member States.

Director, CEA stated that the list of spare ICTs/Reactor under the scope of PGCIL as given below was already agreed by ER constituents at ERPC forum would be a part of

CTS of ER until any one is requisitioned by any beneficiary, thereafter that element will form a part of STS of that beneficiary.

- one 80 MVAR reactor instead of 50 MVAR approved earlier by 13th ERPC as PGCIL's own scheme
- 2x 315 MVA 400/220 kV ICTs
- 1x 160 MVA 220/132 kV ICT.
- 1x50 MVA 220/132 kV ICT.
- 1x 50 MVA 132/66 kV ICT.

In addition to the provision of above spares, 1X50 MVA, 220/132kV Transformer at Birpara S/S to be replaced by 1X160MVA and 2X50 MVA, 220/132kV Transformers at Malda S/S to be replaced by 2X160MVA units would be also in the list of spares for its utilization.

As part of regional scheme, installation of additional Bay/Breaker against 400kV Malda-Farakka-I feeder at Malda Substation is to be executed by PGCIL.

Members concurred.

(iii) Proposal for a new 400kV Farakka - Subhasgram D/C line with one circuit to be LILLOed at Jeerat S/S and Proposal of ERPC for establishment of 400kV Gokarna-Binaguri or Gokarna - Malda –Purnea 400 kV D/C.

On the proposal WBSETCL informed that there would not be any space for bay extension at Subhasgram and Jeerat sub-stations for construction of the proposed 400kV lines. GM, ERLDC stated that due to overloading of 400kV Farakka-Malda D/C line during winter months, there is a need for construction of additional 400kV lines in that corridor without which, it is required to back down of generations at Farakka and other stations. He suggested that construction of a 400kV Subhasgram-Purnea D/C with LILO at Purnea could offload the existing 400kV Farakka-Malda section.

Keeping in view the requirements for strengthening in Farakka-Jeerat-Subhasgram corridor and also in the Farakka-Malda corridor it was decided after deliberations, that the detailed load flow study would be carried out jointly by CEA, Powergrid, ERLDC & WBSETCL at Powergrid HQ, Gurgaon on 04.10.2010 and based on the outcome of the results, system strengthening requirement would be firmed-up.

11.0 Augmentation of 220/132 kV ICTs at Birpara, Siliguri and Malda S/Ss of PGCIL.

The following augmentation works under the scope of PGCIL as a regional project of ER

for which ER constituents were agreeable in the 14th ERPC meeting, were concurred.

- Additional 1X160 MVA, 220/132kV Transformer with associated bays at 220/132kV Siliguri Substation.
- Replacement of 1X50 MVA, 220/132kV Transformer by 1X160MVA, 220/132kV Transformer at 220/132kV Birpara Substation.
- Replacement of 2X50 MVA, 220/132kV Transformer by 2X160MVA, 220/132kV Transformer at 220/132kV Malda Substation.

The transmission charges would be borne by WBSETCL.

12.0 Proposal of WBSETCL for Provision of two additional 220kV line bays at 400/220kV Alipurduar S/S of PGCIL for interconnection with the Alipurduar 132kV S/S (WBSETCL) being upgraded to 220kV.

PGCIL agreed to provide two additional 220kV line bays in its Alipurduar 400/220kV S/S to enable WBSETCL to establish the 220kV D/C line (10km) from the PGCIL S/S to WBSETCL's 132kV S/S at Alipurduar being upgraded to 220kV.

Members concurred.

13.0 Proposal for establishment of 220kV D/C line from 400/220kV Jeypore(PG) S/S in ER to Jagdalpur in South Chattisgarh of WR for alternative supply to Jagdalpur area.

Director, CEA stated that In the SCM of power system planning in Western Region(WR) held on 8-7-10, Chattisgarh State Power Transmission Company Ltd. (CSPTCL), a constituent of WR, had requested CEA/PGCIL to provide an alternative power supply to the south Chhattisgarh through 220kV D/C line from Jeypore (PG) S/S in ER. The south Chhattisgarh comprising five Districts viz. Jagdalpur, Kanker, Dantewada, Bijapur & Narayanpur, is presently supplied through a 220 kV D/C radial line emanating from Bhilai 220 kV substation to Barasur (Bodghat) which is passing through dense forest with lot of naxal activities. In case of outage of the existing line, there would be no source to feed essential loads there. Director,GRIDCO opined that providing radial supply from Jeypore would not be technically right solution as the corridor involves dense forests. He suggested that either Indravati or Bolangir sub-station in Orissa would be the suitable point from where 220kV connectivity to south Chattisgarh could be provided. It was decided that the CSPTCL has to take up this issue with OPTCL for determining the best route for establishment of 220kV radial line to south Chattisgarh.

14.0 Review of Progress on Earlier Agreed Transmission Schemes

PGCIL submitted the progress of the agreed transmission schemes under implementation which is enclosed at Annex-III.

15.0 The following additional agenda items presented by PGCIL were also discussed and its record of discussions were as following:

15.1 WBSETCL's System Strengthening System

Earlier, in the SCM (14-09-2009), establishment of the 400kV Kharagpur – Jamshedpur(PG) D/C line was agreed as a part of strengthening works of WBSETCL. WBSETCL approached POWERGRID for implementation of the transmission line as deposit work.

POWERGRID explained that due to the space constraint at Jamshedpur S/Stn, the above line would be terminated at 400kV Chaibasa substation being constructed by POWERGRID instead of Jamshedpur (PG) S/S. Accordingly, the WBSETCL's line would be as following:

- Kharagpur – Chaibasa (PG) 400kV D/c line

The proposal was agreed.

15.2 Bussing of the 2nd circuit of 400kV Jamshedpur – Rourkela D/c line at Chaibasa (PG) S/S

Under the regional scheme, LILO of one circuit of the 400kV Jamshedpur – Rourkela D/c line(1st Ckt) at Chaibasa and bussing of the 2nd circuit at a later date was agreed in SCM (14-9-10). PGCIL stated that bussing of the 2nd circuit at Chaibasa would be done.

The proposal was agreed.

15.3 Orisaa UMPP (4000MW) Transmission System

POWERGRID informed that Orissa Integrated Power Ltd. has requested for planning of transmission system for evacuation and transfer of power from Orissa UMPP. The details in this regard were as given below:

- **Generation capacity – 4000 MW - 5x800MW (Tentative)**
- **Location of project :** Bhedabahal, Sundergarh district, Orissa
- **Commissioning Schedule:** March - 2016 (1st unit)

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

➤ **Beneficiary & Allocation details**

Sl.No.	Beneficiary	Allocation(MW)
1	Orissa	1300
2	Uttar Pradesh	300
3	Uttarakhand	200
4	Punjab	500
5	Rajasthan	400
6	Haryana	400
7	Madhya Pradesh	400
8	Chhattisgarh	200
9	Tamilnadu	300
	Total	4000

➤ **Status of Generation Project**

- Land : Section-4 issued
- RFQ : Issued (Last date for submission is 30-09-2010)
- Coal block allotted
- Water Allotted
- EIA report prepared
- Public hearing done

➤ **ATS proposal for Orissa UMPP**

PGCIL stated that the proposed Orissa UMPP would be located near Jharsuguda Pooling station. 4 nos. 765kV circuits are already proposed between Angul and Jharsuguda pooling station (2xS/c for Orisaa IPPs & 1xD/c for SR IPPs). Further, the Angul – Jharsuguda 765kV 2xS/c line would be LILoed for establishment of Dhenkenal pooling station so as to form Angul – Jharsuguda – Dhenkenal 765kV ring. It was therefore proposed to LILo Angul - Jharsuguda 765kV D/c Line at Orissa UMPP and \pm 800kV, 6000 MW HVDC bipole (with 3000 MW terminals) from generation switchyard to suitable location in WR/NR. ED, POWERGRID stated that the details in this regard are being worked out.

In view of the above, following tentative transmission system was proposed:

- Generation step up voltage : 765kV
- LILo of Angul - Jharsuguda 765kV D/c line at Orissa UMPP
- \pm 800kV, 6000 MW HVDC bipole (with 3000 MW terminals) from generation switchyard to suitable location in WR/NR : 1000 – 1200 kms.

CE (SP&PA) CEA stated that the proposed ATS would be further discussed in detail in the next SCM which might be held in November, 2010.

Members noted the proposal of PGCIL.

15.4 Transmission system for Pipavav Energy generation project (1200MW) proposed at district Amreli, Gujarat in Western region

POWERGRID informed that Pipavav Energy Pvt. Ltd. has applied for Long Term access. The target beneficiaries for 360 MW power transfer were indicated to be in the Eastern region. Since the power transfer shall take place on the basis of displacement, no separate strengthening scheme in ER/ER-WR corridor was envisaged.

Members noted the above.

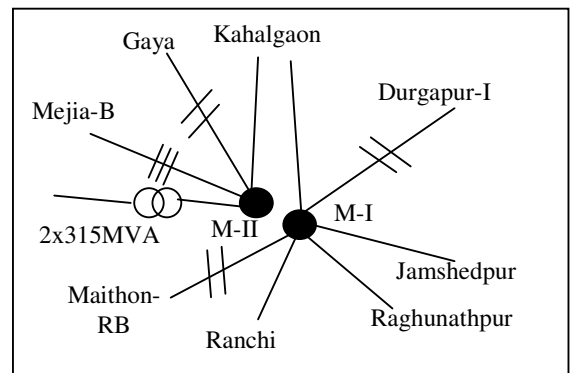
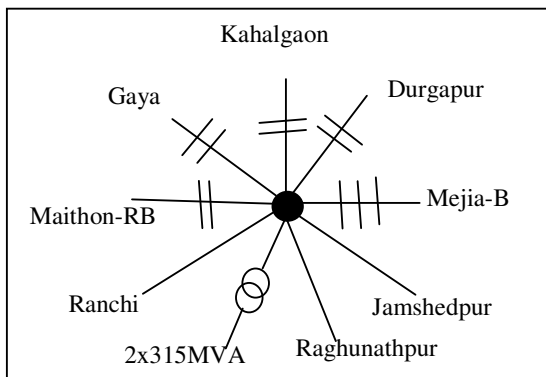
15.5. Measures to control Short-Circuit Level in Eastern Region Substations

- (i) PGCIL stated that due to accumulation of generation projects in Eastern Region and evolution of Regional Grid over the years, the Short Circuit levels (SCL) at 400 kV bus of various sub-stations has grown up to a high value. As more generation projects are being envisaged in coming years, it is likely that the Short Circuit levels of the sub-stations would exceed the permissible limits of existing switchgear capacity (i.e 40 kA) in near future.
- (ii) Based on the system studies carried out by PGCIL to examine the short circuit levels at various substations of Eastern Region, PGCIL suggested measures to reduce SCLs below the permissible limits considering ongoing generation projects and transmission schemes corresponding to 2011-12 condition (with DVC generation projects).
- (iii) Study results showed that short circuit levels at various 400kV substations are exceeding the permissible limit of 40kA at Maithon, Durgapur, Kahalgaon, Mathon-RB, Biharsharif Sub-stations. Step by step splitting arrangement was proposed for the following 400kV substations to contain the short circuit level below 40kA.
 - Maithon
 - Durgapur
 - Kahalgaon
 - Biharsharif
- (iv) POWERGRID made a presentation explaining their study results as narrated below on the above proposal. The schematic diagram showing the proposed split-bus arrangement of the above substations was as given below:

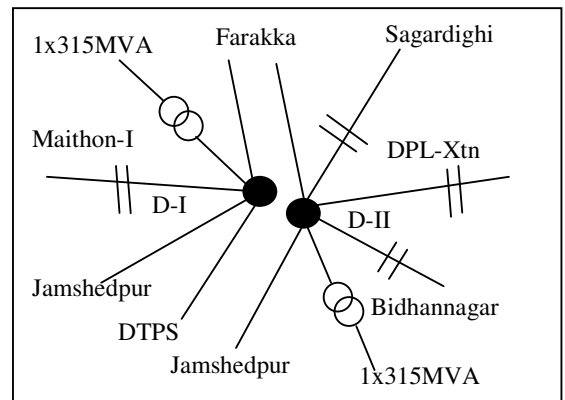
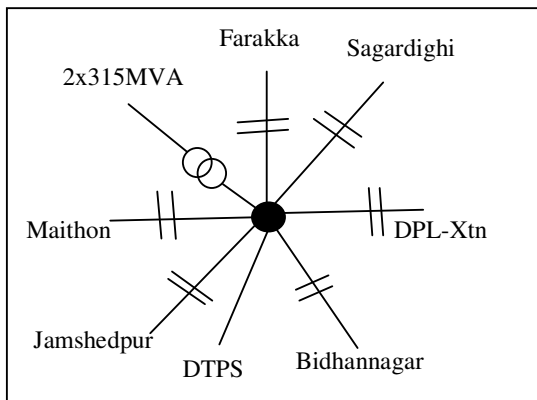
Before Splitting

After Splitting

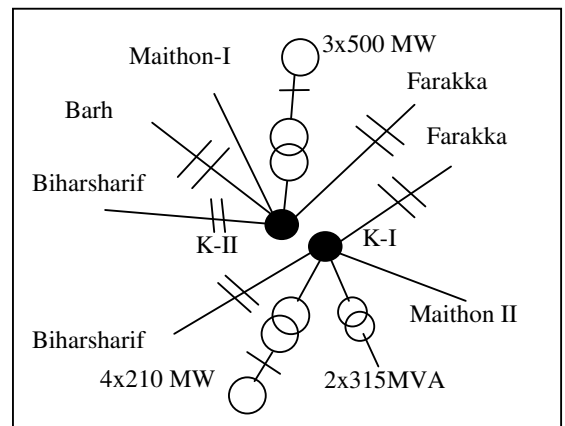
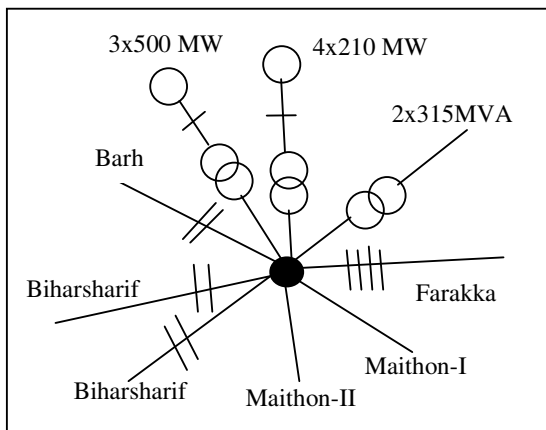
Maithon S/s



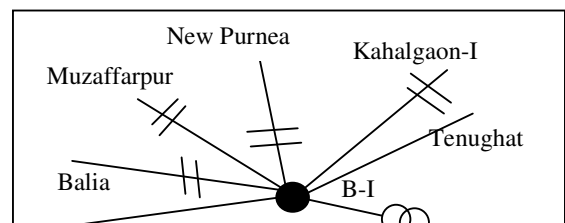
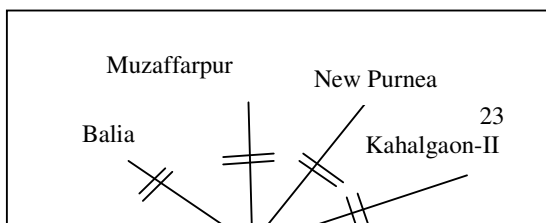
Durgapur S/s

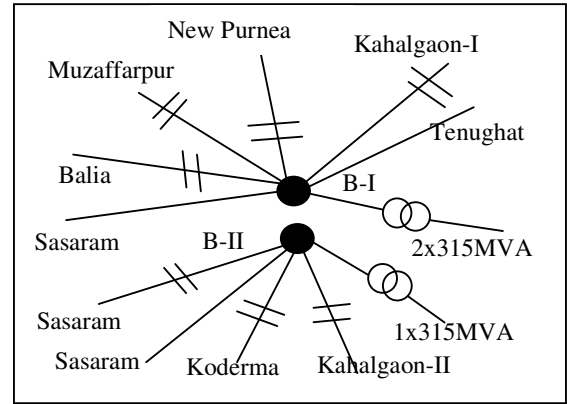
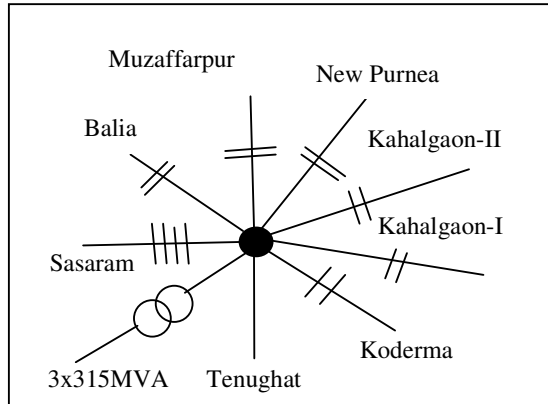


Kahalgaon Switchyard



Biharsharif S/s





In the Bihar Sharif substation, splitting of substation along with swapping of Purnea bays (1 & 2) with Sasaram bays (3 & 4) (both are quad lines) and Kahalgaon#1 bay with Sasaram#1 bay would be required.

With the above measures the short circuit levels of all the substations in Eastern Region would be within the permissible existing switchgear Capacity (40kA) corresponding to 2011-12 condition.

Bus Name	Voltage (kV)	Short circuit level (kA)			
		Base Case	Split at Maithon, Durgapur	Split at Maithon, Durgapur, Kahalgaon	Split at Maithon, Durgapur, Kahalgaon & Bihar Sharif
Kahalgaon	400	44	44	30 & 21	29 & 20
Farakka	400	39	39	38	38
Bihar Sharif	400	45	44	41	27 & 23
Maithon	400	59	35 & 23	34 & 22	35 & 22
Maithon-RB	400	44	32	31	31
Durgapur	400	57	32 & 30	32 & 30	32 & 30
Sasaram	400	34	34	33	32

Further studies would be carried out considering stage-I IPP/UMPP generation projects like Tillaiyya UMPP, Orissa Phase-I IPPs, Sikkim Phase-I IPPs and Jharkhand Phase-I IPPs etc. corresponding to 2013-14 condition.

Accordingly, it was proposed to carry out splitting arrangement with tie line breaker for the following 400kV substations in Eastern Region to contain the short circuit level below 40kA.

- Maithon
- Durgapur
- Kahalgaon
- Bihar Shariff

- (v) The splitting arrangement at Kahalgaon generation switchyard would be carried out by NTPC. In this context, NTPC participant stated that splitting at generation switchyard would be quite complex as compared to that of a sub-station.

Members noted the above proposal of PGCIL and agreed.

M (PS), CEA concluding the Standing Committee Meeting, thanked all the participants.

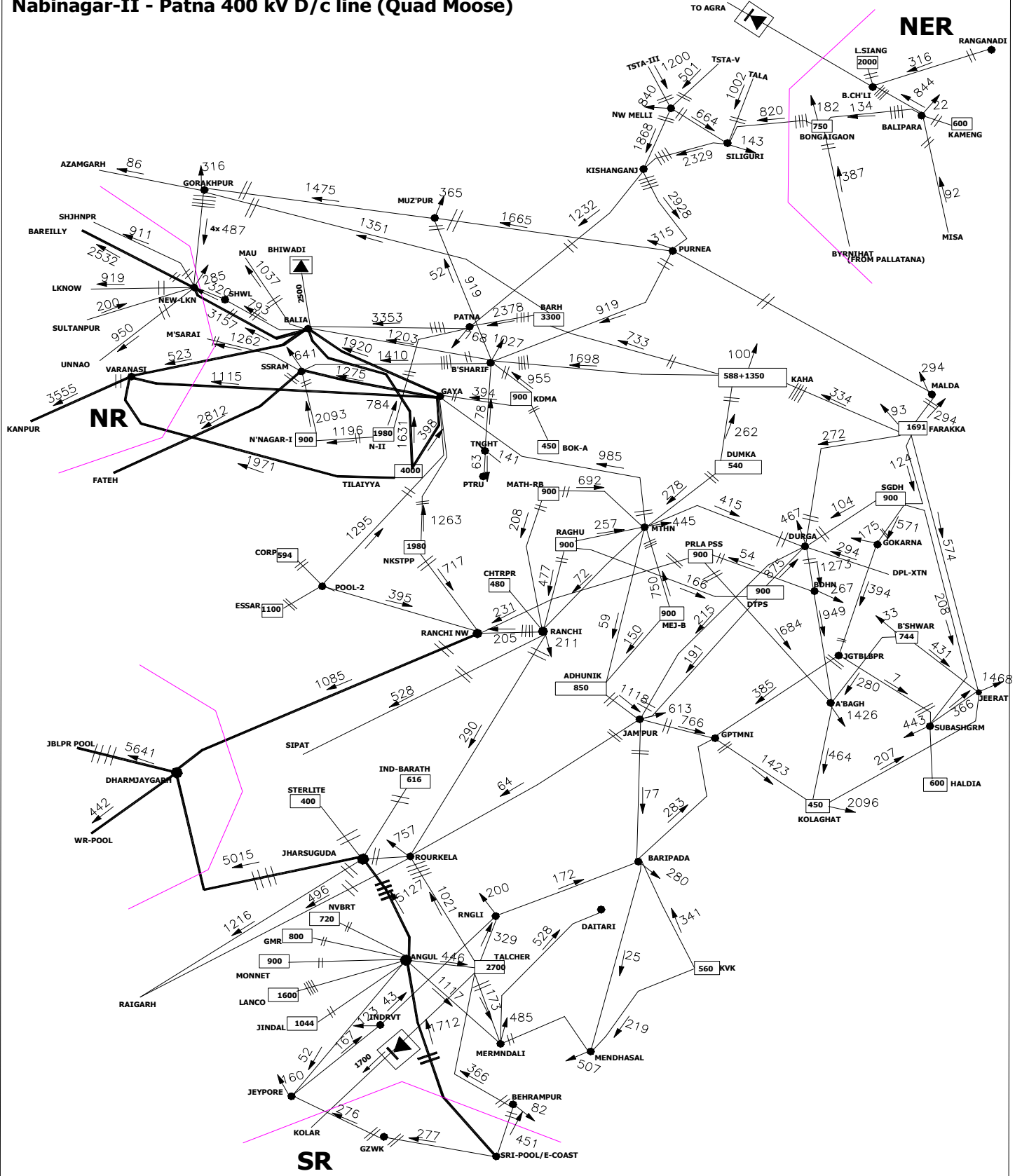
Annex -1

**List of participants for the Standing Committee Meeting on Power System Planning in ER
held on 20.09.2010 at NRPC, New Delhi**

S. N.	S/Shri	Designation	Organization	Mobile/ Tel no	E mail address
1	S. M.Dhiman	Member (PS)	CEA	26104217	
2	Ravinder	Chief Engineer	CEA	011-26102045	
3	A.K.Aggarwal	Member Secretary	NRPC	26967840	
4	Dr. R. Saha	Director	CEA	011-26107144	
5	A.K. Saha	Dy Director	CEA	011-26732330	
6	A.K.Rampal	Member Secretary	ERPC	9432012412	
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20	A. Guha	Director	WBSEDCL	9874043550	
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29	T.T.Jha	Member(T&D)	BSEB	9431456904	
30	Rakesh	EEE	BSEB	9334490538	
31	S.S.Mishra	DGM(Engg.)	NTPC	9650991145	ssmishra@ntpceoc.co.in
32	Nain Singh	ED	NHPC		
33	R.K.Jain	CE	NHPC	9958063999	

Alternative-I :

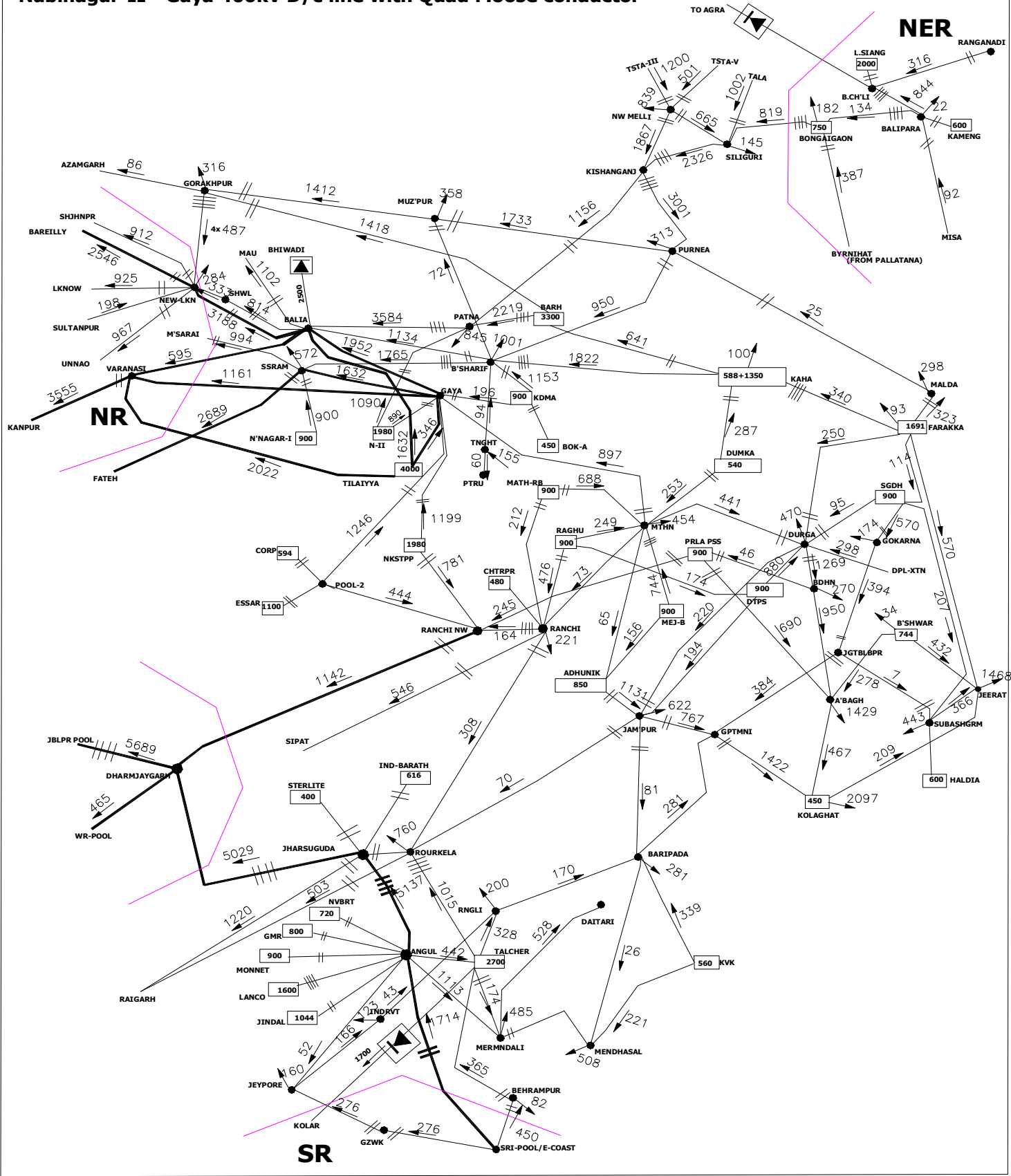
**Nabinagar-II - Nabinagar-I 400 kV D/c line
Nabinagar-II - Patna 400 kV D/c line (Quad Moose)**



Alternative -II:

Nabinagar-II - Patna 400kV D/c line with Quad Moose conductor

Nabinagar-II - Gaya 400kV D/c line with Quad Moose conductor



STATUS OF PROJECT 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)			Dec'11*	* Completion likely to be delayed due to involvement of Multi-ckt (being awarded seperately). Contingency arrangement being made to connect Maithon -Gaya with Koderma-Gaya, by-passing multi-ckt portion, to from Maithon-Koderma line
	765KV S/C Gaya - Sasaram line			Aug'12	
	765KV S/C Gaya - Balia line			Dec'11	
	765KV S/C Ranchi - WR Pooling Station			Mar'12	
	765KV S/C Balia - Lucknow line			Dec'11	
	400KV D/C Ranchi (New) -Ranchi line -I (Quad)			Mar'12	
	400KV D/C Ranchi (New) -Ranchi line - II (Quad)			Mar'12	
	400KV D/C Lucknow (New) - Lucknow line - II (Quad)			Dec'11	
	LILO of 400KV D/C Barh - Balia at Patna			Mar'12	
	LILO of both Ckt of Allahabad - Mainpuri at Fatehpur			Dec'11	

Sl. No.	Name of the Trans line	Investment Approval	Cost (Appd.) /Ant.	Commissioning Schedule	Remarks / Constraints & assistance required.
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)			Dec'11*	* Completion likely to be delayed due to involvement of Multi-ckt (being awarded seperately). 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			Dec'10	Completion matching with 2nd unit of Mejia. Efforts being made to complete the line earlier.
	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	

Sl. No.	Name of the Trans line	Investment Approval	Cost (Appd.) /Ant.	Commissioning Schedule	Remarks / Constraints & assistance required.
3	Eastern Region Strengthening Scheme - I	Oct'06	975.96	Dec'10	
	400KV D/C Durgapur - Jamshedpur			*	* Completion uncertain Critical ECL is not allowing construction on the diverted route diverted to allow setting up of Andal Airport. Powergrid is making ready a portion (19.5 Km) to provide connecting for LILO at Durgapur Steel TPS (being connected by DVC) for start up power.
	400KV D/C Jamshedpur - Baripada			Dec'10	Severe ROW problem being faced in Jharkhand. Matter taken up with chief Sec. & distt administration. Critical.
	400KV D/C Jamshedpur - Baripada			Dec'10	Severe ROW problem being faced in Jharkhand. Matter taken up with chief Sec. & distt administration. Critical.
	Re-conductoring of Siliguri - Purnea 400kV D/c line with high capacity conductor			Mar-12	
4	Eastern Region Strengthening Scheme - II	Dec'07	227.52	Oct'10	
	400KV D/C Durgapur - Maithon line			Oct'10	Severe ROW problem being faced. 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	Dec'10	
	400KV D/C Koderma -Biharshariff (Quad)			Dec'10	Forest clearance critical. About 40 Kms stretch affected. Ist stage clearance accorded in July'10. Final Clearance awaited.

Sl. No.	Name of the Trans line	Investment Approval	Cost (Appd.) /Ant.	Commissioning Schedule	Remarks / Constraints & assistance required.
	400KV D/C Maithon RB - Maithon line			Sep'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	
	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	
	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.

Sl. No.	Name of the Trans line	Investment Approval	Cost (Appd.) /Ant.	Commissioning Schedule	Remarks / Constraints & assistance required.
	400KV D/C Punatsangchu-1 (Gen. Proj. in Bhutan) - Alipurduar line (Indian 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	Eastern Region Strengthening Scheme - III	July'10	1272.80	Nov'12	
	400KV D/C Sasaram - Deltonganj line			Nov'12	Tendering under progress.
	400KV D/C Mendhasal - Ultra line			Nov'12	Tendering under progress.
	LILO of 400KV D/C Kahalgaon - Biharshariff line (1st 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	Tendering under progress.
	LILO of 400KV S/C Rengali - Baripada line at Keonjhar			Nov'12	Tendering under progress.
	LILO of 400KV D/C (one ckt) Rengali - Baripada line at Dubri (OPTCL)			Nov'12	Tendering under progress.
	LILO of 400KV D/C (both ckt) Jamshedpur - Rourkela line at Chaibasa			Nov'12	Tendering under progress.
10	Eastern Region Strengthening Scheme - IV				DPR under preparation

Sl. No.	Name of the Trans line	Investment Approval	Cost (Appd.) /Ant.	Commissioning Schedule	Remarks / Constraints & assistance required.
	Additional 1X160 MVA, 220/132 kV Transformer with associated bays at 220/132kV Siliguri Substation				
	Replacement of 1X50MVA, 220/132 kV Transformer by 1X160MVA, 220/132kV Transformer and associated bays at 220/132kV Birpara Substation				
	Replacement of 2X50MVA, 220/132 kV Transformer by 2X160MVA, 220/132kV Transformer and associated bays at 400/220/132kV Malda Substation				
	Installation of additional Bay/Breaker against 400kV Malda-Farakka-I feeder at Malda Substation				
	125 MVAR Bus Reactor alongwith associated bays at Ranchi 400/220kV S/s				
	125 MVAR Bus Reactor alongwith associated bays at Patna 400/220kV S/s				
11	Interconnecting lines from North Karanpura STPP to the pooling stations at Ranchi and Gaya			Jan '13	DPR ready, NTPC has requested to keep it on hold
12	Immediate evacuation system for Tilaiyya UMPP			May '15	DPR under preparation