

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

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

Dated: 16-12-2010

- | | |
|---|---|
| 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: Meeting of the Standing Committee on Power System Planning in ER.

Sir,

The Standing Committee meeting on Power System Planning for Eastern Region is scheduled to be held on 28.12.2010 at 1100 Hrs. in the 5th Floor Conference Room of PGCIL, Saudamini, Plot #2, Sector-29, Gurgaon-122001. The agenda note has been uploaded on 16.12.2010 to the CEA website: www.cea.nic.in. (Path to access-*Power System/Standing Committee on Power System Planning/EASTERN REGION*).

Any additional issue to be discussed as an agenda for the meeting may please be communicated in advance.

You are requested to kindly attend the meeting.

Yours faithfully,

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

Copy to:

- (i) Sh. S K Soonee, CEO, POSOCO, B-9 Qutab Institutional Area, Katwaria Sarai, New Delhi-110016 – requesting to kindly attend the meeting.
- (ii) Sh. Y K Sehgal, ED (SEF,CE,IT), PGCIL, "Saudamini" Plot No. 2, Sector-29, Gurgaon-122001 – requesting to kindly attend and make necessary arrangement for the meeting.

(Dr. R. Saha)

Agenda Note for Standing Committee Meeting of Eastern Region to be held on 27.12.2010

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

Minutes of the Standing Committee Meeting (SCM) held on 20.09.2010 at NRPC, Delhi were circulated vide CEA letter No. 66/5/99/SP&PA/1020-32 dated 08.10.2010. Subsequently, PGCIL vide their letter No. C/ENG/E/00/SEF/PLG dated 12-11-2010 proposed for some modifications in the minutes. Accordingly, a corrigendum was circulated vide CEA letter No. 66/5/99/SP&PA/1282-94 dated 10.12.2010 and uploaded in the CEA website.

The minutes may be 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:

In the last Standing Committee Meeting on Power System Planning in Eastern Region held on 20-09-10 at NRPC, New Delhi, the proposal for establishment of a new 400kV Farakka - Subhasgram D/C line with one circuit to be LILoed at Jeerat S/S and 400kV Gokarna-Binaguri or Gokarna - Malda –Purnea 400 kV D/C lines were discussed. It was decided that the system requirement would be firmed-up after the detailed load flow study to be carried out jointly by CEA, Powergrid, ERLDC & WBSETCL. Accordingly, joint system studies was carried out corresponding to peak and light load conditions especially during low hydro scenario in NER/Bhutan keeping in view the Subhashgram sub-station expansion problem, non-availability of Right of Way from Subhasgram, and severe system (operational) constraints in the Farakka-Malda 400kV corridor and results of the studies were discussed at Powergrid, Gurgaon on 04.10.2010. The results of the studies are given at Exhibit-1.

Out of the feasible alternatives studied, it has emerged that a new 400kV D/C line from Rajarhat in West Bengal to Purnea in Bihar would provide a good technical solution meeting the system requirement as a whole in the Malda-Farakka-Jeerat-Subhasgram corridor. In addition, LILo of the existing 400kV Jeerat-Subhasgram S/C line at Rajarhat would enable to provide an interconnection among the 400kV Jeerat, Subhasgram and Rajarhat substations which in turn would improve the reliability of power supply in the adjoining areas. Keeping in view the RoW problems in WB, use of triple snowbird conductor line having higher power carrying capacity than twin moose conductor in the 400kV Rajarhat-

Purnea D/C line would enable to meet the long term system requirement.

Accordingly, the following system strengthening was agreed to be adopted under the regional scheme.

- 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.

Further, as intra-state line, 400kV Chanditala-Subhashgram D/C line is being developed by WBSETCL. In view of space/RoW constraint at Subhasgram, WBSETCL has proposed to terminate the 400kV line at the Rajarhat S/S to make it a 400kV Chanditala-Rajarhat D/C line. We are agreeable to the proposal.

Members may kindly discuss and concur.

3.0 Transmission System for IPPs in Sikkim

3.1 Phase-I IPPs

The latest scenario of Phase-1 IPPs as discussed in the first joint co-ordination meeting on 20th Oct.,2010 at PGCIL, Gurgaon relating to high capacity transmission corridor in ER is 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	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

Further, in the meeting held on 11-11-2010 at Gangtok under the aegis of Energy & Power Deptt.,Sikkim, ATS for immediate evacuation of power from Phase-I and Phase-II IPPs in Sikkim was reviewed based on the input from the respective developer. As decided in the meeting, system studies for evolving ATS for Phase-II HEPs in Sikkim has been carried out by PGCIL and the outcome is shown at Exhibit-II. Accordingly, the

following system requirements are evolved.

3.1.1 Project Specific Revised Dedicated Transmission System for Phase-I IPPs: (under the scope of Generation Project Developers)

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

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:** Jorethang – New Melli Switching station 220kV D/C line
4. **Rangit-IV:** Rangit-IV – New Melli Switching station 220kV D/C line

b) Upto Pooling Station at Rangpo (PG)

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

Members may kindly note.

3.2 Phase-II IPPs

Phase-II IPPs in Sikkim (Project developers have applied for connectivity/LTA)			
Sl No	Project	Ins. Cap (MW)	Time Frame
a. Long-term Open Access as per CERC Regulations,2004			
1.	Tashiding (Shiga Energy Pvt. Ltd.)	97	2012-13
2.	Tingting (TT Energy Pvt. Ltd.)	99	2012-13
3.	BOP(Chungtang) (Chungtang Hydroelectric Project)	99	2013-14
4.	Bhimkyong (Teesta Hydro power project)	99	2013-14
5.	Lachung-Tangchi (Lachung Hydro Power Pvt. Ltd.)	99	2013-14
6.	Sada Mangdher(Gati Infrastructure)	71	-
Sub-Total		564	
b. Grant of Connectivity as per CERC Regulations,2009			
1.	Pannan (Himagiri Hydro energy Ltd.)	300	Jul'14
2.	Dickchu (Sneha Kinetic Power Projects Ltd.)	96	Dec'13
3.	Lethang (KHC Lethang Hydro Project Pvt. Ltd.)	106	Jan'14
Sub-Total		502	

I. Phase-II Project Specific Transmission System

It is to note that Tingting(99 MW), Tashiding(97 MW), Sada Mangder(71 MW), Ralang(100 MW), Lathang HEPs(106 MW) and Rangit-II (66MW) are the upcoming projects in Rangit basin and power to be generated from these HEPs would be pooled at Tashiding switching station through dedicated transmission system and thereon to New Melli(PG) Switching Station of PGCIL through a 220 kV D/C line using twin moose conductor.

Energy Deptt. Govt. of Sikkim shall establish the Tashiding Sw. Stn. and associated 220 kV Tashiding-New Melli D/C line with twin moose conductor and has agreed to.

A. ATS for immediate evacuation from HEPs

(under the scope of Generation Project Developer)

Tingting HEP

- Tingting - Pooling station near Tingting 220kV D/c line

Tashiding HEP

Tashiding–Pooling station near Tingting 220kV D/c line

Sada Mangdher HEP

- Sada Mangdher - Pooling station near Tingting 220kV D/c line

Lethang HEP (106 MW)

- Lethang HEP - Pooling station near Tingting 220kV D/c

Ralang HEP (100 MW)

- Ralang HEP - Pooling station near Tingting 220kV D/c

Rangit II HEP (66 MW)

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

B. ATS for power evacuation from Lachung/Bhimkyong/BOP(Chungtang) HEPs

In Teesta basin, Lachung (99MW) Bhimkyong(99MW) BOP-Chungtang(99MW) HEPs are the upcoming HEPs being developed by the same developer i.e. M/s Polyplex (as informed in the 11-11-2010 Ganktok meeting). According to the information gathered from the project developer, these projects are in close vicinity, for which independent dedicated system contemplated earlier at 220kV level for is reviewed and proposed to be made at 132kV level with step-up generation voltage of 132kV. Instead of creating a separate pooling station for the HEPs, BoP-Chungtang would be the injection point for Lachung and Bhyimkyong HEPs. Energy Deptt., GoS has informed that adequate land at Chungtang

would be available. From Chungtung switchyard, power will be stepped up from 132kV to 400kV and transferred to 400/132kV Mangan S/S of PGCIL through a PGCIL's 400kV D/C line with Lapwing conductor. This 400kV line would be utilized at a later date for power evacuation from Teesta-I (300MW) and Teesta-II (480MW) HEPs.

The following ATS for immediate evacuation from the HEPs (under the scope of Generation Project Developer) is evolved.

Lachung HEP (99 MW)

- Lachung –Bhimkyong 132kV D/c line with Zebra conductor

Bhimkyong HEP (99 MW)

- Bhimkyong – BOP-Chungtang 132kV 2xD/c line with Zebra conductor

BOP-Chungtang HEP (99 MW)

Generation from Chungtung switchyard, where Lachung and BhymKyong generation will be also injected, shall be stepped up from 132kV to 400kV and transferred to 400/132kV Mangan S/S of PGCIL through a PGCIL's 400kV D/C line with Lapwing conductor. Adequate space provision at Chungtang for providing 400/132kV ICTs by PGCIL needs to be kept.

C. ATS for immediate evacuation from Panan (300MW) and Dikchu (96MW) HEPs

Panan (300MW) HEP

- Pannan HEP - Mangan 400kV D/c line

The above system is under the scope of POWERGRID. Though the developer has applied for connectivity to PGCIL, they need to sign Transmission Agreement and submit BG failing of which implementation process for setting-up of the transmission system would be held-up.

Dikchu HEP (96 MW) (Dec'13)

- LILO of both the circuits of Gangtok – Mangan 132kV D/c line with Zebra conductor at Dikchu (under the scope of project developer)

It is to note that the Energy & Power Deptt., GoS shall construct the 132kV Gangtok-Mangan D/C line with zebra conductor as a second feed to Gangtok S/S for improving the reliability of power supply in the capital. It is to be implemented matching with the commissioning of the Dikchu HEP. Though the developer has applied for connectivity to PGCIL, they need to sign Transmission Agreement and submit BG failing of which implementation process for setting-up of the transmission system would be held-up.

II. In the light of above the following Transmission System shall be under the scope of POWERGRID

- Pannan HEP - Mangan 400kV D/c line
- Establishment of 4x105MVA, Single Phase, 400/132kV pooling station at Mangan.
- Bop-Chungtang - Mangan 400kV D/c line with twin Lapwing conductor.
- Establishment of 400/132kV ICTs and associated switchyard facility at BOP-Chungtang
- LILO of Teesta-III – Kishanganj 400kV D/c line at Mangan
- Mangan - Kishanganj 400kV D/c line with quad moose conductor
- New Melli – Rangpo 220kV D/c with twin moose conductor (2nd line)

III. In the light of above the following transmission System shall be under the scope of Govt. of Sikkim

- Establishment of 220kV Gas Insulated Pooling Station near Tashiding
- Pooling station near Tashiding – New Melli 220kV D/c with twin moose conductor
- Gangtok – Mangan 132kV D/c line with Zebra conductor

Members may kindly discuss and concur.

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

Transmission system has been evolved for UMPP generation project as well as IPP generation project coming up under phase-II in Orissa. Transmission system for phase-II IPPs in Orissa has also been finalized. The summary of the generation projects are given below :

SI No	Generation Project	Installed Capacity(MW)	LTOA/LTA/Connectivity	Remarks
1	KVK Neelanchal	600	560	Scheme finalized, LTOA granted
2	Phase-I Orissa IPPs	10090	6080	Scheme finalized, LTOA granted
3	Orissa UMPP	4000	4000	Scheme evolved
4	Phase-II Orissa IPPs	12650	11882	Scheme evolved

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) and OIPL has applied for grant of Long Term Open Access. Ministry of Power vide their letter No. 12/11.2010-UMPP dated 24-09-2010 allocated the power to following states from the Orissa UMPP (4000MW):

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

4.2 The unit wise commissioning schedule as indicated by generation developer is as given below:

Sl. No.	Unit	Commissioning Schedule
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

4.3 Phase-II IPP projects in Orissa

In addition to the Phase-I IPPs in Orissa for which transmission system has already been finalized, transmission system requirements for generation projects coming up under Phase-II (POWERGRID has received application for Connectivity/LTA for transfer of power to beneficiaries in different regions) have been evolved. The list of Phase-II IPP projects along with Phase-I IPP projects is given below:

Sl. No	LTA Applicant / Project	Installed Capacity (MW)	LTA/ Connectivity (MW)	Applied for
1. Phase-I Generation Projects				
1	Sterlite	2400	400	LTOA
2	GMR	1050	800	LTOA
3	Navbharat	1050	720	LTOA

Sl. No	LTA Applicant / Project	Installed Capacity (MW)	LTA/ Connectivity (MW)	Applied for
1. Phase-I Generation Projects				
4	Monnet	1050	900	LTOA
5	Jindal	1200	1044	LTOA
6	Lanco Babandh	2640	1600	LTOA
7	Ind Bharat	700	616	LTOA
	Total	10090	6080	
2. Phase-II Generation Projects				
1	CESC Ltd.(Orissa)	1320	1100	LTOA
2	Essar Power Ltd.	1200	900	LTOA
3	Navabharat Power Private Ltd(Phase-II)	1200	1100	LTOA
4	VISA Power Ltd	1320	1250	Connectivity
5	Mahanadi Aban Power Co Ltd	1320	850	Connectivity
6	Bhushan Energy Ltd	2640	2482	Connectivity
7	Tata Power company Ltd	1320	1000	Connectivity & LTA
8	GMR Energy Limited	350	220	Connectivity & LTA
9	J R Power Gen Pvt Ltd	1980	1980	Connectivity
10	Jindal	600	550	Connectivity & LTA
11	Sterlite	(already considered in Phase-I projects)	1000	LTA
	Total	12650	11882	

4.4 Evolution of Transmission System

A comprehensive transmission system comprising of high capacity transmission corridors from Orissa to Northern region via Western region has already been planned for evacuation of power from Phase-I Generation projects in Orissa and the same is under implementation. This high capacity corridor mainly consists of 765kV HVAC lines.

Keeping in view the techno-economical viability as well as operational flexibility of hybrid transmission system, high capacity HVDC transmission link supported with HVAC system has been evolved for evacuation of combined power from Orissa UMPP and Orissa phase-II IPPs by taking into consideration the following aspects:

- i) Due to uncertainty in progress and time-frame of Orissa IPPs, 50% dispatch of Phase-II IPPs (except Sterlite-II) has been considered for the load flow studies.
- ii) As the addition of Phase-II generation capacity is uncertain and is expected to be developed over a long period, the transmission system has been developed without any redundancy in the transmission system i.e. without considering N-1 contingency criteria of transmission planning. The augmentation in the transmission system would be planned depending upon the progress of generation projects.
- iii) It is also to mention here that a number of generation projects are expected to come up in

coastal Andhra Pradesh (Srikakulam area) in Southern region. Accordingly, the power injection (1320MW) from these projects alongwith Angul-Jharsuguda-Dharamjaygarh 765kV D/c corridor (2nd corridor) planned for evacuation of power from these projects has been considered for evolution of transmission system.

- iv) In order to control the heavy rush of power in the underlying 400kV system the LILO of Rourkela-Raigarh line at Jharsuguda as well as the Orissa interconnection for delivery of its share from the UMPP project along with two units of UMPP generation project need to be isolated from the main evacuation system. Accordingly split bus arrangement has been proposed in Jharsuguda 400kV bus.

4.5 Transmission System for Orissa-UMPP

For Orissa UMPP, the evacuation has been planned through high capacity +800kV, 6000MW HVDC line from Orissa hub (Angul/Jharsuguda) to Bulandshahar in Northern region. As the state of Orissa has considerable share (1300MW out of 4000MW) from UMPP, the transmission system has been planned with two (2) drawl points for the state of Orissa. Depending upon the location of HVDC station in Orissa (Angul / Jharsuguda), following two alternatives of transmission system has been considered.

- ± 800 kV, 6000 MW HVDC Bi-Pole from Orissa hub(Angul/Jharsuguda) to Bulandshahar

Option-I

- ± 800 kV, 6000 MW HVDC Bi-Pole from Jharsuguda to Bulandshahar.
- UMPP-Jharsuguda 400kV 2x D/c line with Quad Moose Conductor.
- System Strengthening in NR and WR (to be identified)

Option-II

- ± 800 kV, 6000 MW HVDC Bi-Pole from Angul to Bulandshahar.
- UMPP - Jharsuguda 765kV D/c line.
- System Strengthening in NR and WR (to be identified)

- Power Supply to Orissa.

- 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

4.6 Transmission System for Phase-II IPPs in Orissa

Following Transmission System has been considered for Phase-II IPPs in Orissa.

<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)
Common Transmission System		
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)		

4.7 Short Circuit Studies and Analysis-Splitting of 765kV Jharsuguda Bus

The Transmission System for evacuation of power from Phase-I Generation projects including Angul and Jharsuguda Pooling Stations in Orissa is presently under implementation. With the proposed system for connectivity of Phase-II Generation Projects and Orissa UMPP, the total power pooled at Angul, Jharsuguda & new Pooling Station at Dhenkanal are to the tune of 7550 MW, 8300 MW, 6500 MW respectively.

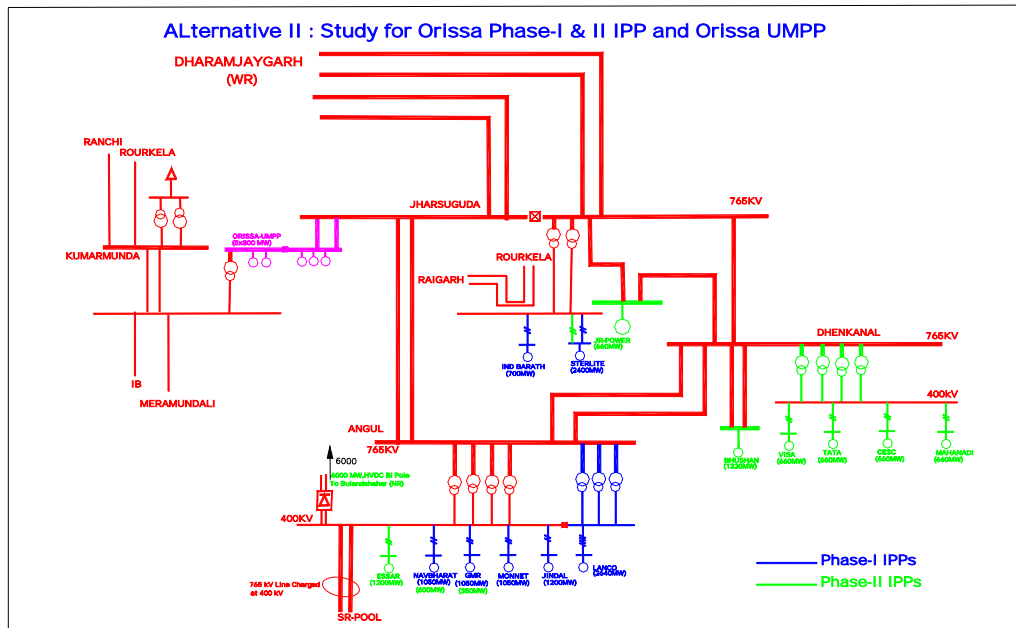
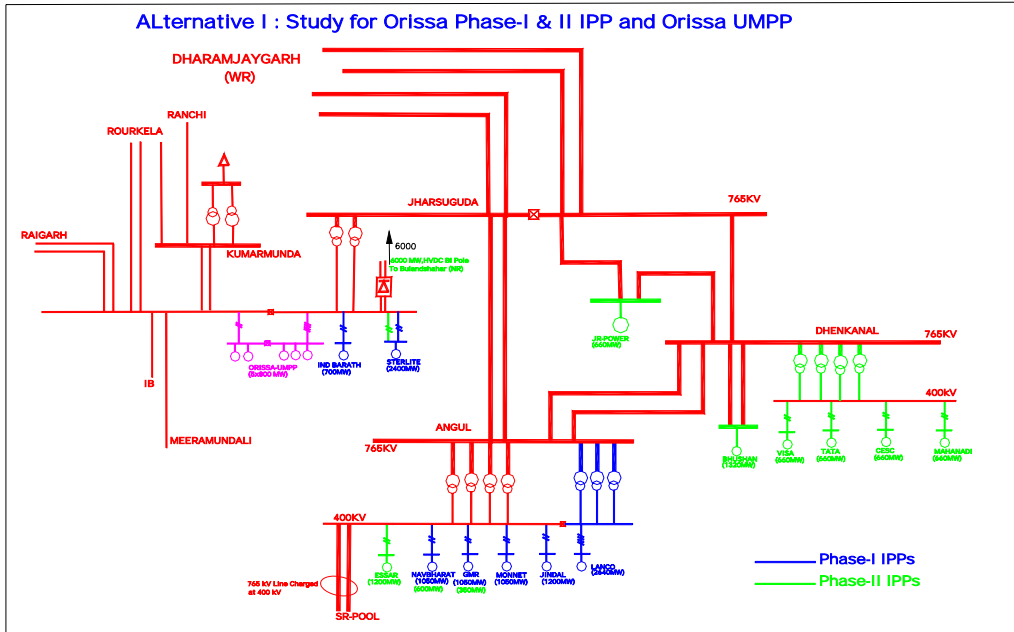
Short circuit studies have been conducted with above Generation Projects and proposed transmission systems. Results of the studies are given at Annexures. As per the studies, the short circuit level at Angul, Jharsuguda and Dhenkanal for various case studies are given below :

Sl no	Cases	Short Circuit Level (kA)					
		Angul 400kV	Jharsuguda 400kV	Dhenkanal 400kV	Angul 765kV	Jharsuguda 765kV	Dhenkana 765kV
I Alternative-I (HVDC bipole line from Jharsuguda)							
Ia	3 UMPP M/c connected, 2 M/c isolated for Orissa (Annexure-Ia)	55	54 / 32	31	32	43	26
Ib	5 UMPP M/c connected (Annexure-Ib)	55	64	31	32	45	26
Ic	5 UMPP M/c connected, split of 765kV bus (Annexure-Ic)	55	61	31	32	35 / 25	25
II Alternative-II (HVDC bipole line from Angul)							
Ila	3 UMPP M/c connected, 2 M/c isolated for Orissa (Annexure-IIa)	55	39 / 21	32	32	47	26
Ilb	5 UMPP M/c connected (Annexure-IIb)	55	42	32	32	55	26
Ilc	5 UMPP M/c connected, split of 765kV bus (Annexure-IIc)	55	43	32	32	35 / 35	26

In view of high Short Circuit levels at Jharsuguda substation, it is required to split the Jharsuguda 765kV bus.

4.8 Power Flow Studies and Analysis

With the outcome of the short circuit studies resorting to split up of Jharsuguda 765kV bus, the schematic single line diagrams indicating UMPP ATS Alternative-I and Alternative-II of the proposed composite scheme is given below.



The power flow study for the above alternatives is enclosed at EXHIBIT-IIIA/A1 and EXHIBIT-IIIB/B1 respectively.

It has been observed that out of the two transmission alternatives proposed for UMPP,

Alternative-I appears to be better option and can be adopted. However in this Alternative-I (Exhibit-III), powerflow in the Angul-Jharsuguda section becomes critical (6978 MW) and this corridor needs to be strengthened at a later stage depending upon the growth of Orissa Phase-II IPP projects.

Further, for delivery of Orissa share, 400kV interconnection to Orissa grid from Jharsuguda substation has been planned. However, as soon as the Orissa grid gets connected with Jharsuguda, there is a huge flow of power through the 400kV interconnection apart from enhancement of short circuit level on either side. Accordingly, it is suggested that share of Orissa may be delivered in radial mode through segregating two units of Orissa UMPP at Jharsuguda 400kV bus.

Members may discuss and concur.

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

5.1 The transmission system for various IPP Projects (as given below) in Srikakulam area of Andhra Pradesh were discussed and agreed in the 30th Standing committee of Southern Region held on 13th April, 2010 at PGCIL, Gurgaon.

Sl. No.	Applicant	Commencement 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 Following Common Transmission System was agreed by the Southern Region and would be implemented in phased manner

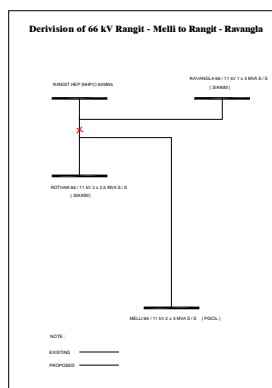
- (i) Establishment of 765/400kV Pooling Station in Srikakulam area with 2x1500 MVA 765/400kV transformer capacity
- (ii) Srikakulam Pooling station – Angul 765 kV D/C line
- (iii) 765/400kV 1x1500 MVA transformer at Angul
- (iv) Angul – Jharsuguda 765 kV D/C line
- (v) Jharsuguda - Dharamjaigarh 765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

Members may discuss and concur.

6.0 Proposal of Govt. of Sikkim for diversion of 66kV Rangit-Melli S/C regional line to establish 66kV Rangit – Ravangla and Melli-Rothak S/C lines.

Energy and Power Department, Government of Sikkim, vide their letter No. 321/CE-III/SLDC/08-09/433 dated 3/12 2010 intimated that the existing 66kV Rangit-Melli S/C line of PGCIL was constructed as a part of evacuation system of Rangit-III HEP(2x20MW) in Sikkim. The 66kV Ravangla S/S along with 132kV S/C line from Rangit-III (to be charged at 66kV) is being implemented by Sikkim. Presently load in this area is being supplied through 11kV system which is not sufficient. Due to space constraint at Rangit -III switch yard, Sikkim is unable to terminate the ongoing 132kV Ravangala- Rangit III line at Rangit-III and proposed to free the existing 66kV line bay of the 66kv Rangit-Melli line (PG) for terminating the ongoing 66kV Rangit-Ravangala line and divert the 66kV Rangit III- Melli line to the existing 66kV Rothak S/S to form 66kV Melli-Rothak S/C line (as shown below).



For the above proposal, Government of Sikkim is agreeable to continue the existing Transmission Tariff arrangement with a view that additional protection and metering system will be made with coordination to the PGCIL/ERLDC. In view of commercial complexity and O &M problem, it will be better option if the ownership of 66kV Rangit-III HEP- Melli S/C line (PG) is given to Sikkim.

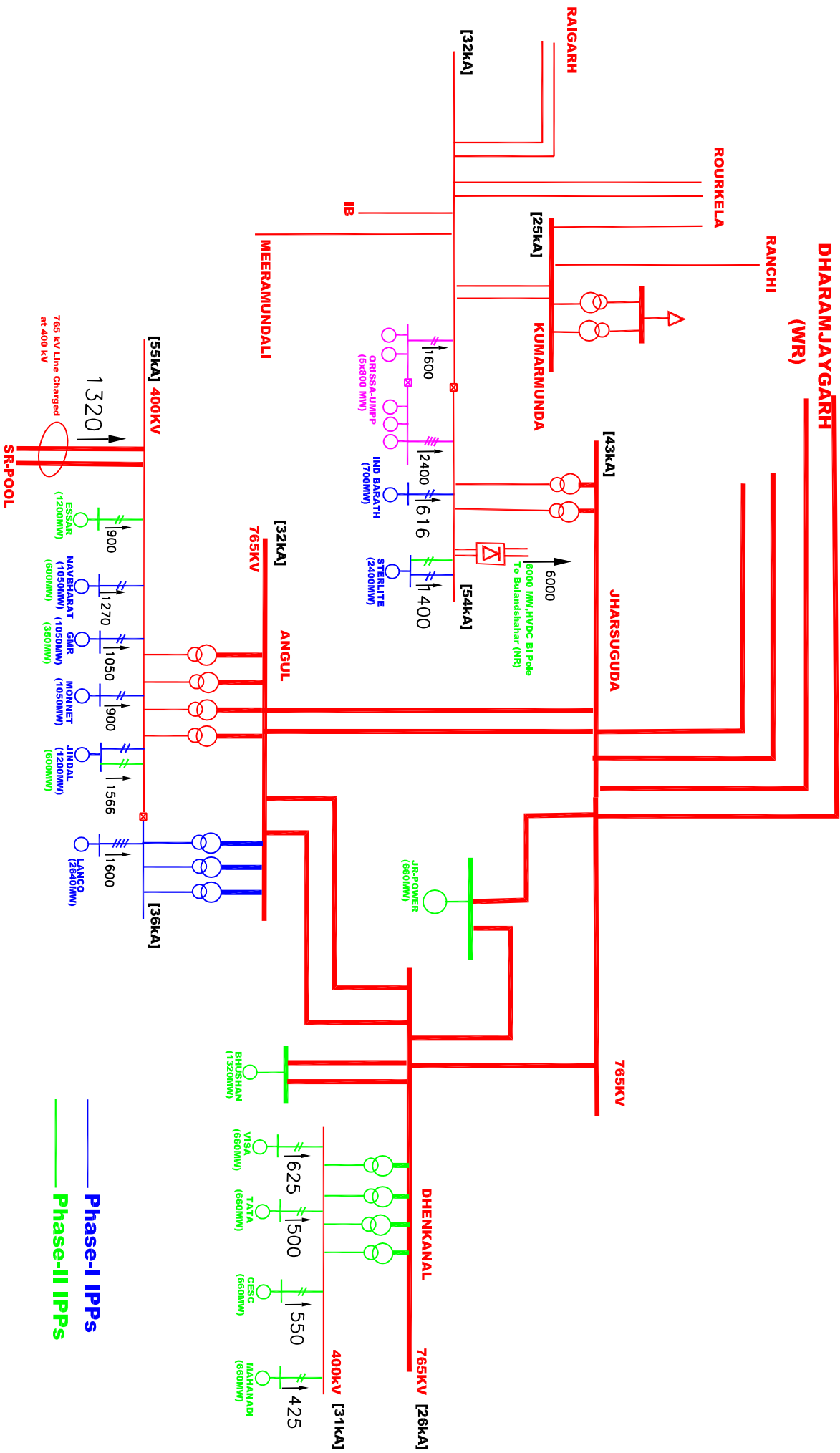
Members may discuss and concur

7.0 Review of Progress on Earlier Agreed Transmission Schemes

POWERGRID may give the progress of earlier agreed transmission schemes under implementation giving:

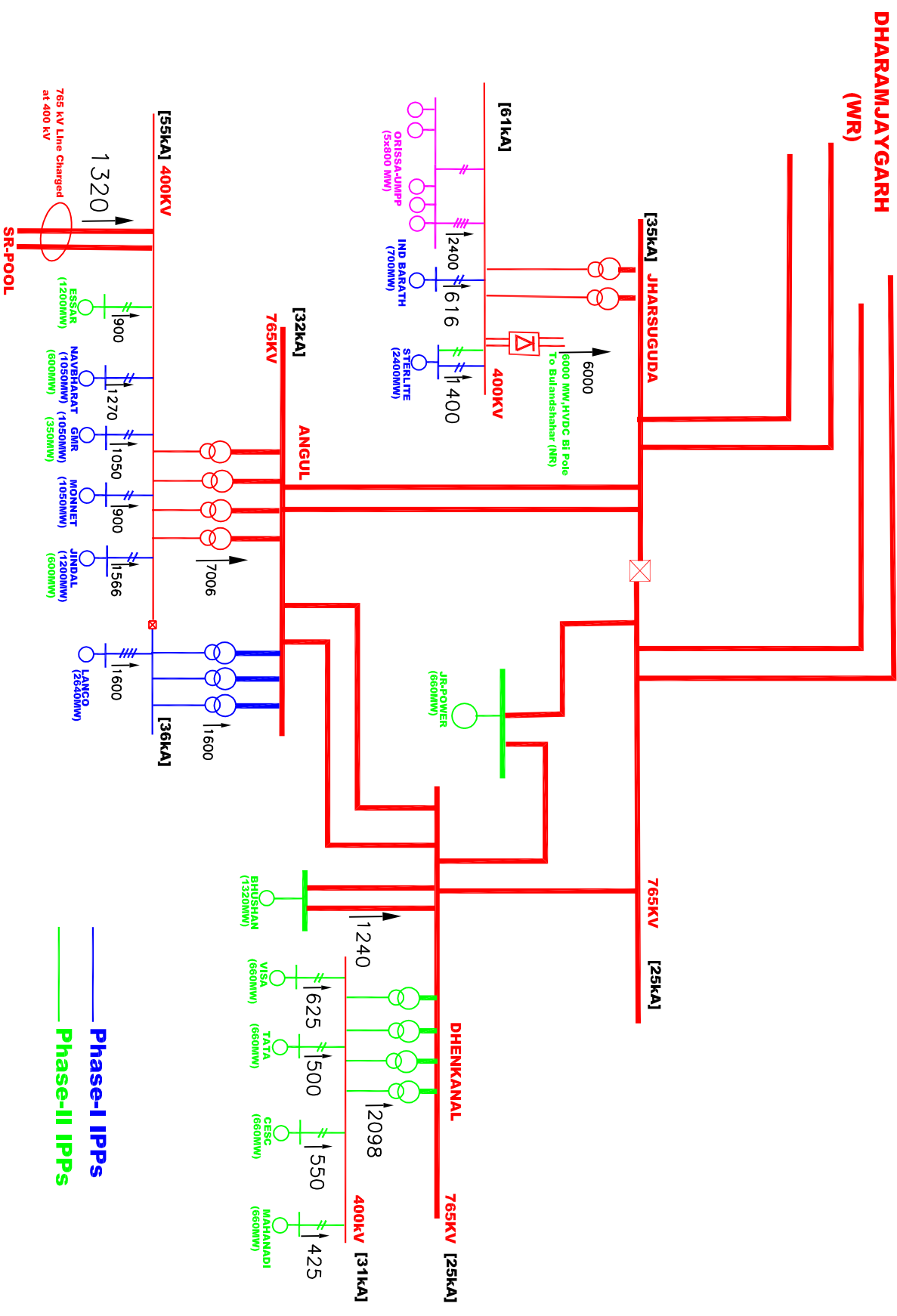
- i) Date of firming-up in Standing Committee
- ii) Target as in the Standing Committee meeting
- iii) Date of FR for the scheme
- iv) Date of approval by PGCIL board or PIB as the case may be
- v) Date of award of the major part
- vi) Target date as of now
- vii) Reason for delay if any

Alternative I: Study for Orissa Phase-I, Orissa UMPP, 50 % of Orissa Phase-II

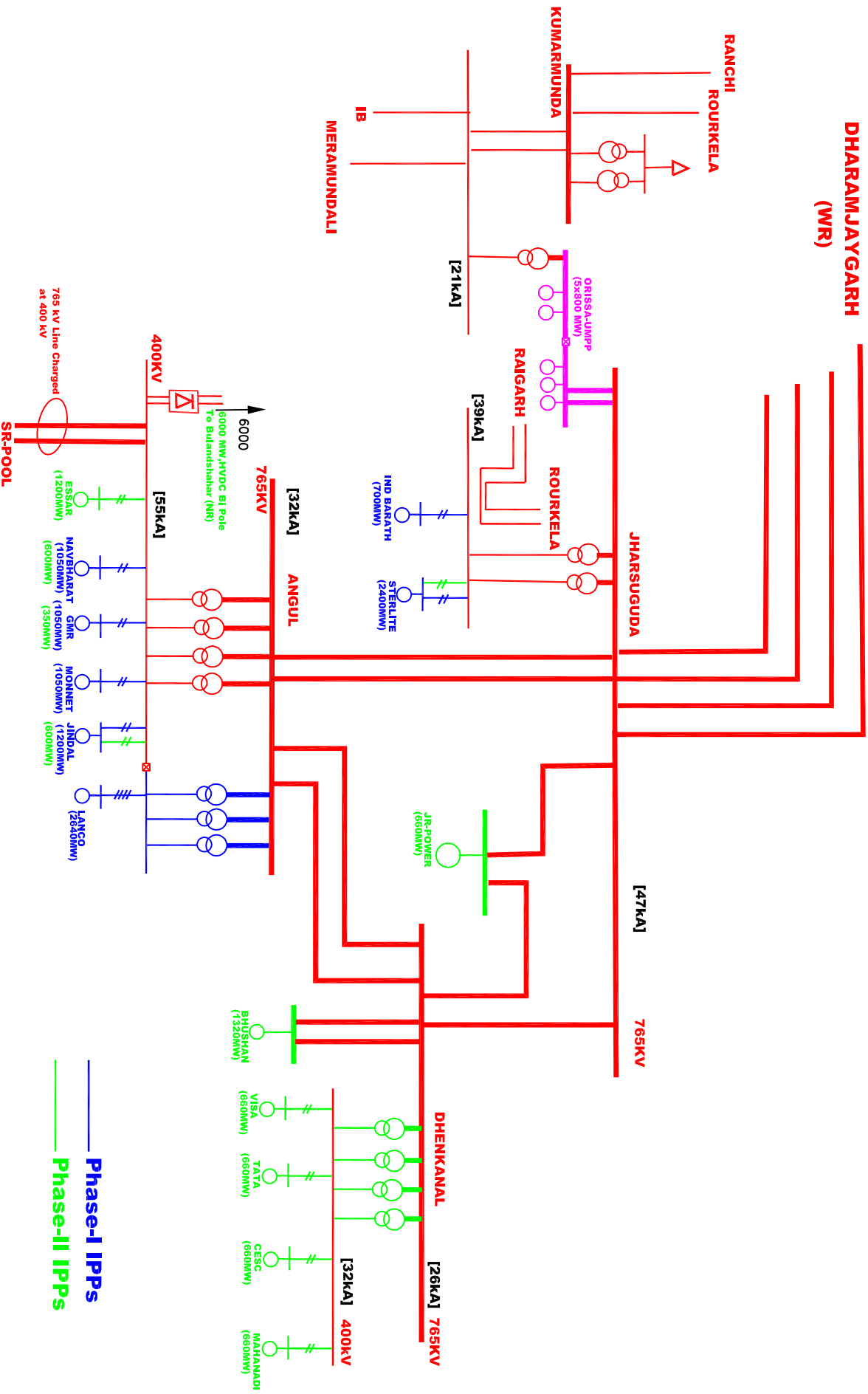


Phase-I IPPs
Phase-II IPPs

Alternative I: Study for Orissa Phase-I, Orissa UMPP, 50 % of Orissa Phase-II



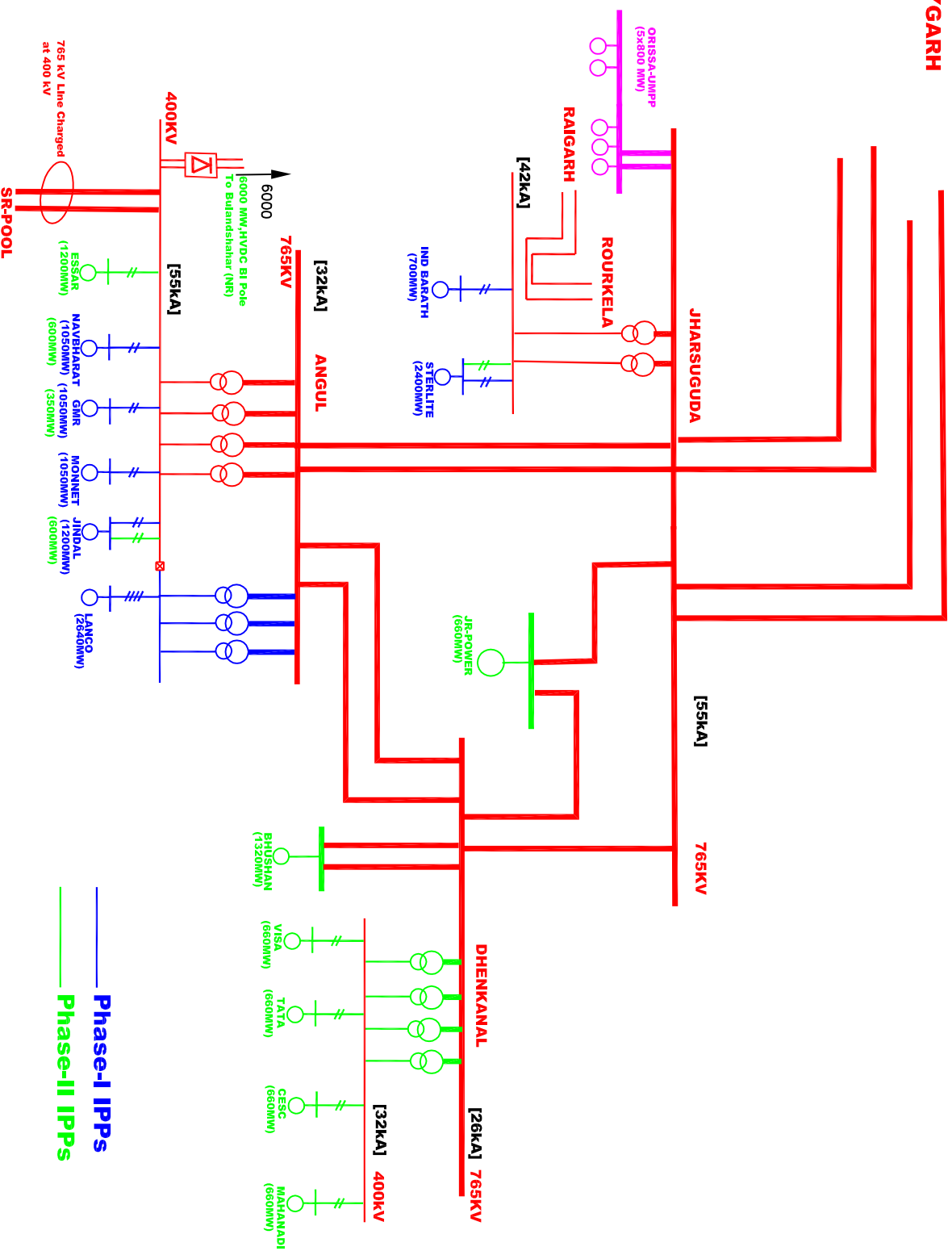
Alternative II: Study for Orissa Phase-I, Orissa UMPP, 50 % of Orissa Phase-II



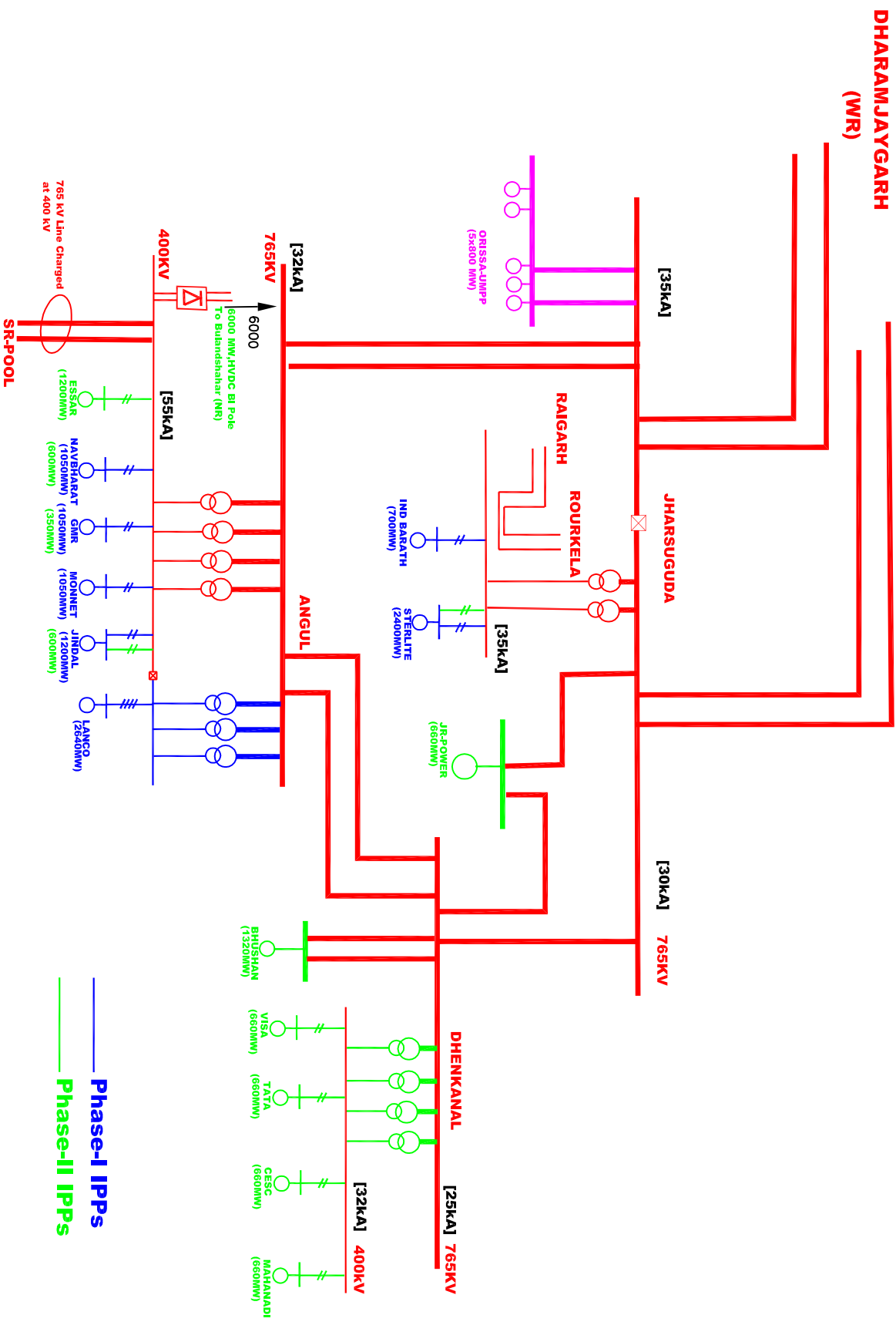
Phase-I IPPs
Phase-II IPPs

Alternative II: Study for Orissa Phase-I, Orissa UMPP, 50 % of Orissa Phase-II

**DHARAMJAYGARH
(WR)**

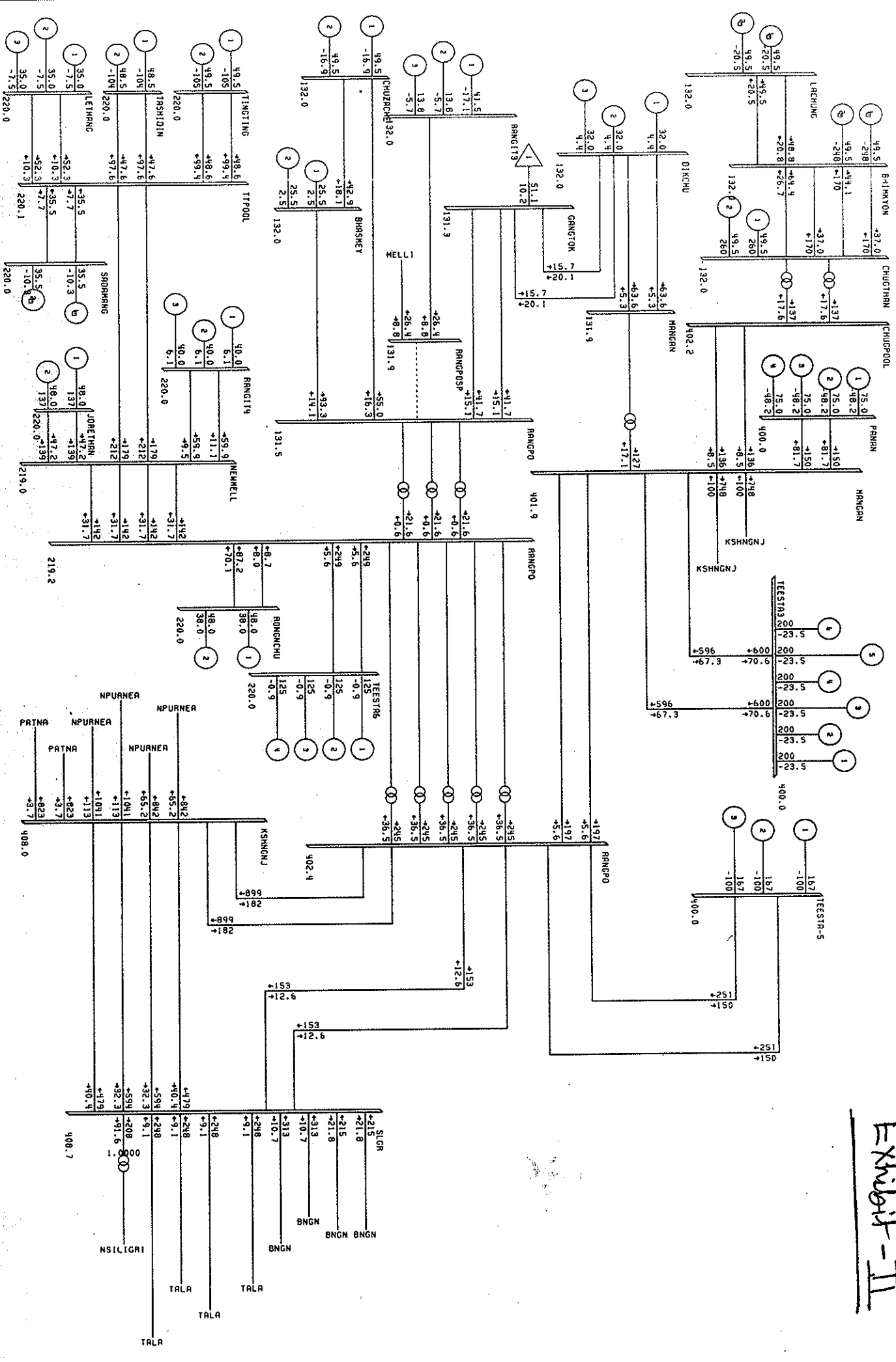


Alternative II: Study for Orissa Phase-I, Orissa UMPP, 50 % of Orissa Phase-II



Phase-I IPPs
Phase-II IPPs

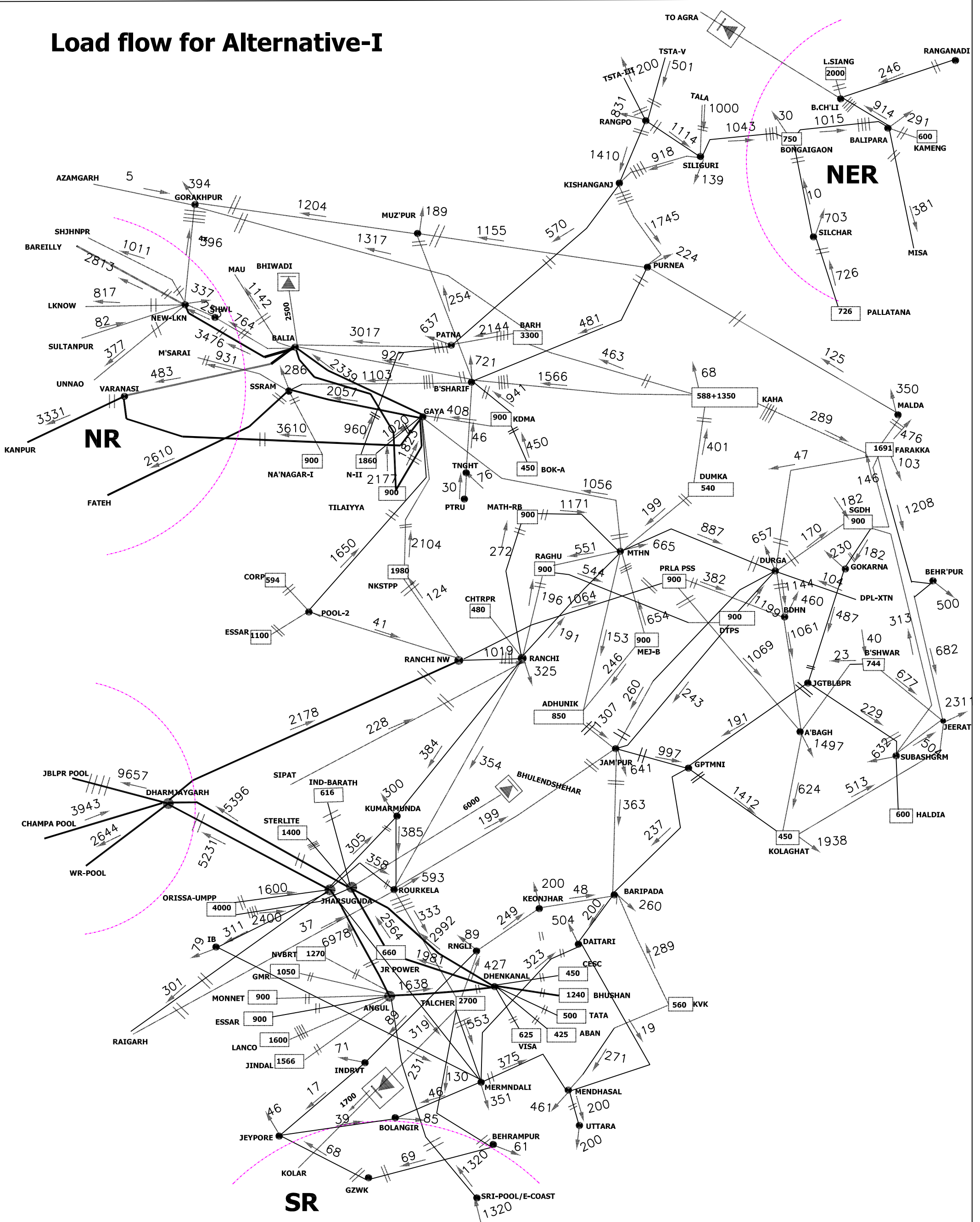
Exhibit - II



THU, DEC 16 2010 16:43

100% RATED
0.950UV 1.050DV
KV: 5132, 5220, 5400
BUS - VOLTAGE (KV)
BRANCH - MW/MVAR
EQUIPMENT - MW/MVAR

Load flow for Alternative-I



Alternative II: Study for Orissa Phase-I, Orissa UMPP, 50 % of Orissa Phase-II

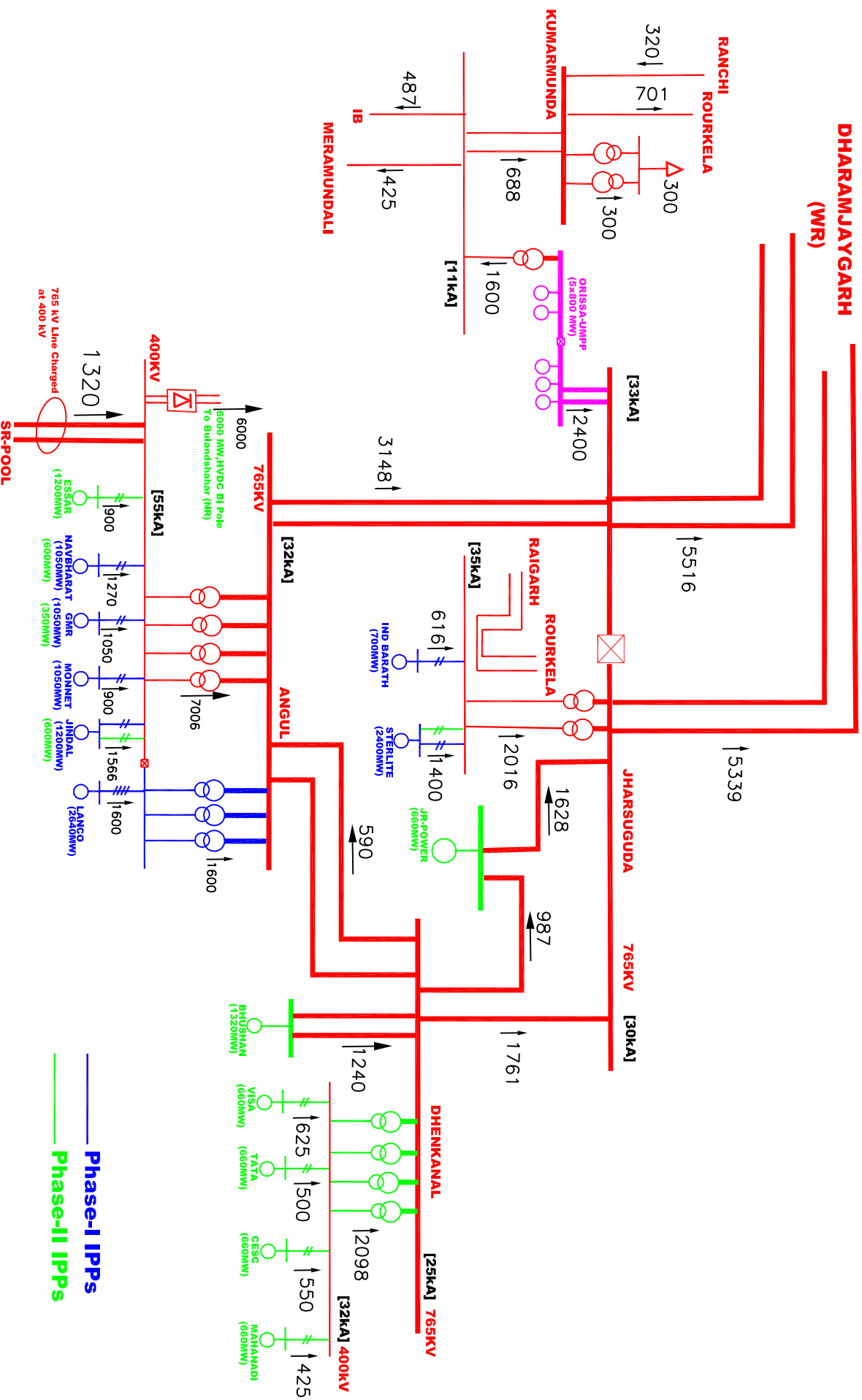


Exhibit-III(b)

