Creation and maintaining a Web based Protection Database and Desktop based Protection setting calculation tool for Eastern Regional Grid

Eastern Regional Power Committee
14 Golf Club Road, Tollygunge,
Kolkata, West Bengal 700033

OPERATIONAL LOAD FLOW STUDIES

June 2016

Power Research and Development Consultants Private Limited
5, 11th cross, 2nd stage,
West of chord road,
Bangalore - 560 086, Karnataka
Tel: +91- 80-23192159 / 23192168
E-mail – prdc@vsnl.com
Web site: www.prdcinfotech.com

Document reference details:

LOA No : ERPC/PR_DBASE/2016/3567

Document reference No : PRDC/2016-2017/ERPC-WB/573

Revision Index

Revision	Description	Date	Remarks
1.0	Operational Load Flow Report	26.06.2016	Initial version
1.1	Modification	28.06.2016	Based on the comments given by Mrs. Debarati Basu
1.2	Modification	29.06.2016	Based on the comments given by Dr.Nagaraja
1.3	Modification	25.07.2016	Based on discussion with ERPC and their constituents on 21.07.2016
2.0	Approved	27.07.2016	Approved

Internal Approval

Prepared by	Mr. Akash Singh Aaryan	25.07.2016	
	Mr. Sujay Ghosh		
	Ms. Suman Kumari		
	Mr. Sanjit Guhathakurta		
	Mr. Rahul Kumar Shrivastava		
	Mr. Madhab Mukherjee		
Reviewed by	Mrs. Debarati Basu	26.0672016	
Approved by	Dr. Nagaraja Ramappa	27.07.2016	

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EXECUTIVE SUMMARY

In the recent past, it has been noted that most of the grid collapses have been attributed to protection system failure or mal functioning. The reports on the North American blackout (August 2003) and the more recent Indian grid collapse (July 2012) have all emphasized the need for "Protection Management System".

As a recommendation of the Enquiry Committee headed by Chairperson CEA on grid disturbances in NEW grid on 30th and 31st July 2012, Ministry of Power constituted a„ Task Force on Power System Analysis under Contingencies" in December 2012.

The task force recommends creation and maintenance of protection database under RPCs. Accordingly, Secretary (Power) in a meeting in Ministry of Power held on 11.03.14 directed all RPCs to implement the recommendations of the report submitted by "Task Force" in a time bound manner.

Following the decision of Ministry of Power ERPC as a pioneering venture has taken up the project "**Creation and maintaining a Web based Protection Database and a Desktop based Protection Setting Calculation Tool for Eastern Regional Grid**"..

M/s PRDC has been awarded with the order by ERPC to implement the project in its entirety including creation of database and supply of software and hardware along with necessary power system analysis relevant for the project.

Eastern Regional Grid comprises of the electrical system of the states of Bihar, Jharkhand, West Bengal, Odisha, Sikkim and area under DVC. The major constituents of ER grid are the State/UT Transmission and Distribution Utilities, Central Transmission Utility, State and Central sector Generating Companies, DVC, CESC, DPL, IPPs and Private sector Transmission and Distribution Utilities. The ER covers a geographical area of 425432 sq km with an installed capacity of 36575 MW. In addition to this the region has an installed capacity of 7840MW in the form of CPP's.

Eastern Regional Power Committee (ERPC) formed by Ministry of Power is entrusted for facilitating the integrated operation of the power system in the region.

As a prerequisite of building the protection management system the first step as envisaged is the electrical modelling of the entire network data under ER system from 765kV to 132kV and 66 kV for Sikkim and carrying out the base case operational load flow analysis and short circuit studies.

The composite network model of ER grid along with inter-regional tie lines will provide the baseline data for ERPC to carry out one of their major function of " Operational Load Flow Studies relating to inter-state/ intra-state transmission system with CTU/ STU for stable operation of the grid" on a regular basis.

The results of these base case studies will provide the reference for protection setting calculations and the tripping analysis studies in the upcoming deliverables of the project.

The data and electrical parameters of the network elements as updated till 31st May 2016 is collected from the owners of the constituent transmission and generation utilities for network modelling in power system analysis software MiP-PSCT.

Load and generation data and line flows at 20:00 hrs for 26th May 2016 was collected from the individual load substations SLDC's, ERLDC and the generating utilities.

Load flow analysis and short circuit studies are conducted and the observations on the results are detailed in subsequent sections of the report.

Summarised particulars of network data for ER as on 31st May 2016 collected during the studies are given below:

EHV Transmission Grid Substations: The total count is 495 with a voltage grade wise population mix as,

- 765 kV: Number of substations is 5 with installed capacity of 18000 MVA
- 400 kV: Number of substation is 45 with an installed capacity of 29645 MVA
- 220 kV: Number of substation is 96 with an installed capacity of 34500 MVA
- 132 kV: Number of substation is 330 with an installed capacity of 30936 MVA
- 66 kV: Number of substation is 19 with an installed capacity of 182.5 MVA

ER generating units under state, central sector and integrated utilities: Aggregated generation capacity of 27107.5 MW with a hydro thermal mix of 15.9 : 84.1.The break up is given as,

- Total number of hydro generating units is 83 with an installed capacity of 4302.5 MW
- Total number of thermal generating units is 105 with an installed capacity of 22805 MW

ER generating units under IPPs: Aggregated generation capacity of 9468 MW with a hydro thermal mix of 2.17 : 97.82.The break up is given as,

- Total no. of hydro generating units is 4 with an installed capacity of 206 MW
- Total number of thermal generating units 31 with an installed capacity of 9262 MW

CPP generation capacity: 7840 MW.

ER EHV and HV Transmission Lines (132 kV and above and 66 kV in Sikkim): 74668.7 ckm

The operational Load Flow study for ER grid is carried out on the collected network data for a load generation condition during regional daily peak. The load generation condition for two time steps is collected for 26th & 27th May 2016 at 20:00 hours. The peak load condition for 26th May 2016 with higher system demand met value was selected for operational load flow case study.

The node wise load and generation data, recorded are collected from the respective system owners and are matched with the demand, generation and exchange recorded by ERLDC, SCADA for the selected time instant.

The consolidated observations from load flow analysis are:

Load Generation Balance:

- System input (Generation & Import): 23554 MW
- System Demand including losses in ER network : 17965 MW
- Consolidated Export from ER bus : 5589 MW

Generation Scheduling: All generators are scheduled as per SCADA records of ERLDC.

Voltage Profile: Busbar voltages at all voltage levels are within the stipulated range of grid code of CEA

Transformer loading: In the entire population no overloading is observed. 72 number transformers are loaded beyond 80% and 270 numbers are loaded below 20%.

Line loading: No overloading is observed in any of the voltage grades. Number of lines loaded between 80 to 100% of thermal capacity is 66 predominantly in 132 kV level. Number of lines loaded below 5% thermal capacity is 121 and the percentage is predominant at 132 kV level.

Bus bar voltages and active power flows are matched at 765 kV and 400 kV level with ERLDC SCADA snapshots and an overall ninety percent matching is observed. However at some pockets the mismatches observed are more than 20%. This mismatch is attributed to insufficient data in load substations and also to the mismatch of SLDC records and ERLDC records.

Short Circuit studies are conducted on the network topology and generation scheduling of the load flow modelling for both three phase symmetrical faults and single line to ground fault conditions at every bus up to 66 kV level by considering sub transient reactance's of the generators and closed bus operation at all 765,400 and 220 kV bus.

It is observed from the results of short circuit studies the fault MVA is exceeding the breaker capacity in following buses:

- Bihar: Biharshariff 400 kV, Kahalgaon 400 kV
- Jharkhand: Maithon 400 kV,
- Odisha: Meramundali 220kV, BSSL (Meramundali) 220kV

Bus splitting is suggested for above substations. Breaker upgradation may also be considered during substation renovations.

Detailed analysis of data and study results for operational load flow and short circuit studies are elaborated in subsequent sections of the report.

ABBREVIATIONS AND ACRONYMS

Acronym	Full form
CEA	Central Electricity Authority
CGP/CPP	Captive generating plant
CTU	Central Transmission Utility
DB	Data Base
DPR	Detailed Project Report
DTR	Distribution Transformer
EHV	Extra High Voltage
ER	Eastern Region
ERLDC	Eastern Regional Load Dispatch Centre
ERPC	Eastern Regional Power Committee
GoI	Government of India
GS	Generating Station
GUI	Graphical User interface
HV	High Voltage
IPP	Independent Power Producer
MiP-PSCT	Protection Setting Calculation Tool
NR	Northern region
PRDC	Power Research & Development Consultants Pvt. Ltd.
PSS	Power System Study
SCADA	Supervisory control and data acquisition
SLD	Single Line Diagram
SLDC	State Load Dispatch Centre
SS	Substation
STU	State Transmission Utility

1 INTRODUCTION

Eastern Regional Grid comprises of the electrical transmission system of the states of Bihar, Jharkhand, West Bengal, Odisha, Sikkim and supply area under DVC. The major constituents of ER grid are the State/UT Transmission and Distribution Utilities, Central Transmission Utility, State and Central sector Generating Companies, DVC, CESC, DPL, IPP's and Private sector Transmission and Distribution Utilities. The ER covers a geographical area of 425,432 sq. km which is about 13% of the total area of the country with an installed capacity of **44415 MW**. Keeping in view the criticality of safe and reliable operation of this vast and complex system of ER, M/s. ERPC has awarded the project for implementation of a software based protection management system that includes building up a comprehensive web based protection database for the ER grid to M/s PRDC, a pioneer consultant in the field of power engineering on 31st March 2016.

As a fundamental prerequisite of building the protection management system and as base work for protection system simulation and studies the entire existing network data under ER system is modeled from 765 kV level to 33 kV buses of 132/33 kV substations for all states other than Sikkim where the network is modeled up to 11 kV buses of 66/11 kV substations. The network model in its entirety encompasses each of the individual power system elements including generators (hydro, thermal, pump storage), substations/switching station equipment, transmission lines, HVDC system, reactors, capacitors and load.

This report presents the results of the base case load flow studies for the modeled EHV transmission network of the ER grid for a selected scenario of peak load condition. With reference to the discussions with M/s. ERPC and its constituents, 26th May 2016 is identified as a typical day with the evening peak load at 20:00 hours. The load flow analysis is carried out with the load generation scenario for the selected instant and the parameters are crosschecked with the SCADA results to authenticate the correctness of the modeling.

ER network is modeled for 26th May 2016 load and generation scenario, wherein a demand of 17965 MW is recorded for the ER grid at 20:00 hrs. This volume of the report presents the details of existing Eastern region transmission network data, load generation balance along with operational load flow and short circuit study results.

2 PROJECT SCOPE

The scope of work envisaged in tender document is elaborated in detailed here.

As per scope PRDC should supply Protection Analysis Software Package with following requirements but not limited to the following modules for the supply of Software and Database building activities,

PRDC should develop and maintain a hardware setup and software package capable of meeting the following objectives; but not limited to:

- Classified database of all bay equipment and the protection system details of all bays 132kV and above, for Eastern Regional power system.
- A user friendly interface for browsing and editing the contents of the database.
- Tool for simulating the performance/ behavior of the protection system under all possible normal and abnormal operating conditions of the power system, including effect of changing one or more parameter setting of the relays.
- Diagnostics for verifying proper coordination among various protective relays.
- Generation of useful reports.

The detailed scope of work is elaborated in Volume-1 of the DPR and submitted on 27.04.2016. A consolidated view on Network Modeling and database building activity for operational load flow involve “Creation and maintaining a Web based Protection Database and Desktop based Protection setting calculation tool for Eastern Regional Grid” is presented below.

2.1 Database Building Activities for Operational Studies

- One time power system network model building for the Load-flow, Short circuit and dynamic simulations of entire Eastern region with Indian national grid transmission network model.
- Data collected from respective substations to be validated before populating the same in the database.
- Complete modeling of ER transmission network for 132kV and above including HVDC systems connected with ER, with relevant system parameters of transmission lines, generators, transformers, reactors for all existing substations. However, for Sikkim 66 kV system along with 66kV interconnections are to be considered.
- Prepared network is made ready for base case load flow analysis and the same has to be verified with field engineers of ER constituents. Both MW and

MVAr flow are computed and Voltage Level at different Buses is ascertained along with suggestive conditions to reduce or enhance Bus voltage.

- Short circuit, studies to be simulated and the results to be demonstrated to the ER constituents for approval.

This report includes operational load flow and short circuit study of existing ER grid.

2.2 Milestone of delivery

The following is the sequence of milestone of deliveries involved in the ERPC project.

3 SYSTEM OPERATIONAL DATA

As increasing electricity demand, electrical transmission and distribution system is expanding at very fast pace. To meet future expected demand with reliable manner there is a need of great integration among electricity generating, transmission and distribution agencies.

With an objective to facilitate integrated operation of power system in Eastern Region, Govt. of India had established Eastern Regional Power Committee comprising the states of Bihar, Jharkhand, Orissa, West Bengal and Sikkim along with area under DVC. The major constituents of ER grid are the State/UT Transmission and Distribution Utilities, Central Transmission Utility, State and Central sector Generating Companies, DVC, CESC, DPL, IPP's and Private sector Transmission and Distribution Utilities. Figure 3.1 depicts constituents of Eastern Regional grid.

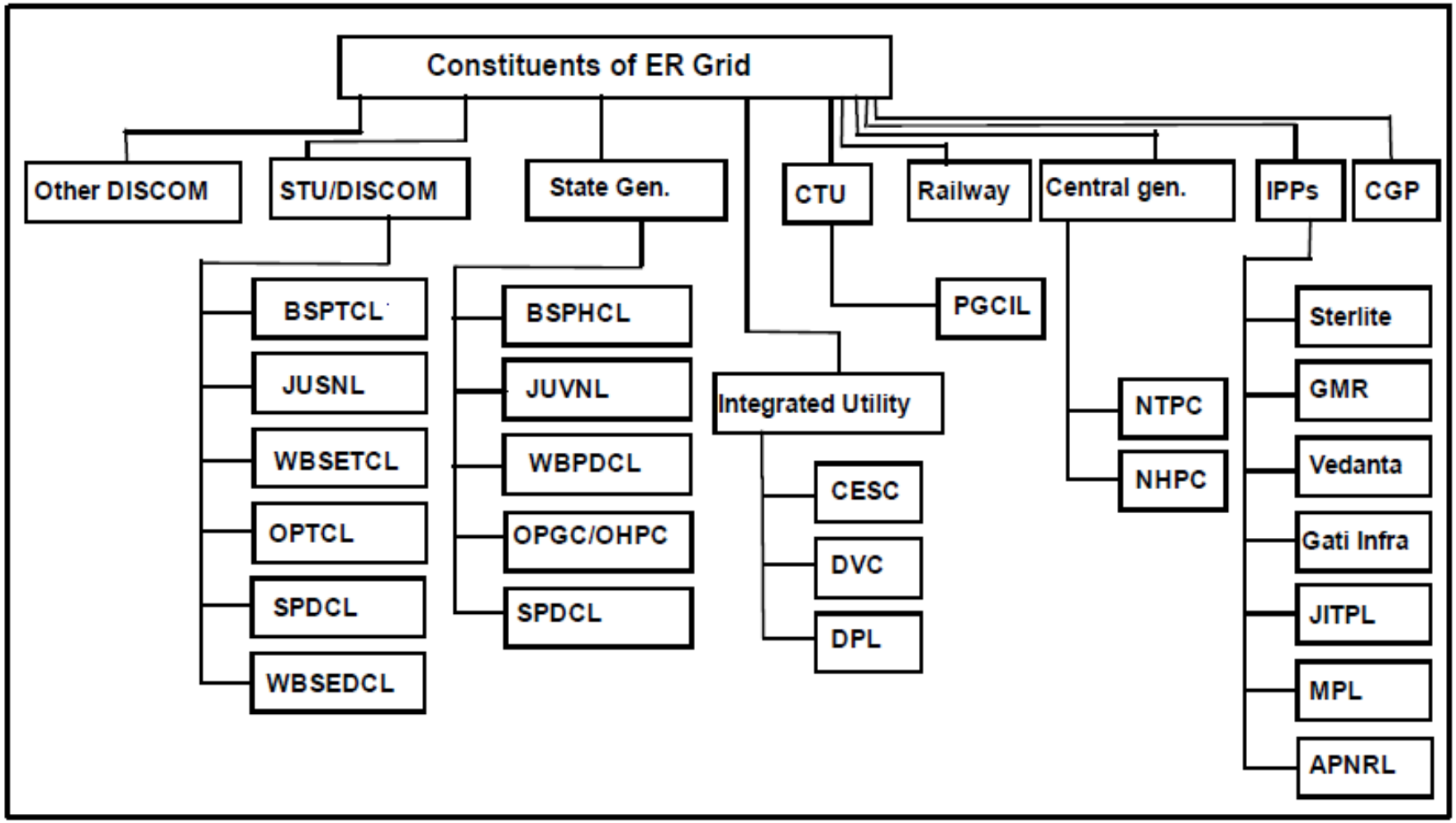


Figure 3.1: Constituents of Eastern Regional grid

3.1 Methodology adopted for performing the load flow analysis

3.1.1 Data Collection Procedure

- In the 1st implementation meeting with ERPC, it was decided to collect the Eastern grid network data for operational load flow and a standard data collection format was prepared and forwarded to ERPC. Subsequently ERPC uploaded same format to their portal.
- In implementation meeting ERPC and constituents agreed to furnish their network details as per data collection format furnished by PRDC and uploaded in ERPC portal.
- M/s PRDC has received the network data from most of the constituents in agreed format and remaining is collected from field survey in coordination with ERLDC and SLDC's.
- Subsequently in OCC meeting, it was decided that operational load flow study will be carried out for peak load scenario of 26.05.2016 and 27.05.2016 at 20.00hr and load generation data collection format was finalized by PRDC and uploaded in ERPC portal.

Network data for all the utilities under Eastern region were collected in co-ordination with ERPC and its constituents. The complete Eastern Region Network from 765 kV level to 33 kV buses of 132/33 kV S/S (with the exception where generator is connected to a lower voltage network) is considered in the studies. However, for Sikkim 66 kV system along with 66kV interconnections are considered. Inter-regional 765 kV, 400 kV, 220 kV and 132 kV transmission lines with Northern, Western, Southern and North-Eastern region is also considered in the studies.

Table 3.1 present the collected/received data status from ERPC and its constituents.

Table 3.1: Data availability status

Constituent of ERPC	State wise Data received*	
	Load data (%)	Network Data (%)
Bihar	54	100
Jharkhand	75	100
Odisha	70	100
Sikkim	0	100
West Bengal	75	100

Note: Network data includes CTU and STU network details as per state wise location while DVC network details are allocated in Jharkhand and West Bengal as per physical location.

**Utility owners have furnished network data for all elements but the line and transformer parameter data is furnished for 70% elements.*

** SCADA record of 765 &400 kV line flow and Generation schedule from ERLDC is collected.*

The methodology adopted by the study team for performing the load flow analysis is as given below.

- Configuring the entire Eastern Regional Grid electrical network down to 33 kV (up to 11kV bus of 66/11 kV S/S in Sikkim) banks of the transmission substations. i.e. transmission system comprising of 765 kV, 400 kV, 220 kV and 132 kV (66 kV S/S in Sikkim) substation buses up to the 33 kV buses at the substations.
- Represented the collective load of the substations at 33 kV buses for Bihar, Jharkhand, Odisha and West Bengal and at 11kV buses in Sikkim.
- Import form generation located outside the region is considered as a bulk import.
- Railway loads are modeled by considering radially link with grid.
- Slack bus is considered outside the region at the point having a maximum power exchange from eastern grid.
- Generation scheduling is matched with ERLDC's SCADA record.
- Allocation of load to the substations is finally done to match the state wise system demand as per ERLDC's SCADA record.
- Simulation of base case load flow analysis done on the integrated Grid transmission network of Eastern Region.
- Geographical drawings for entire Eastern Regional Grid transmission network along with separate maps of eastern grid constituent states.
- Eastern regional transmission network is simulated by taking peak load demand of 26.05.2016 at 20.00hrs. Currently, the modeled Eastern grid network has been simulated for the loading conditions which are given in table 3.2.

Table 3.2: ER loading details

Date & Time	**26th May 2016, 20:00**
System Demand Met	17965 MW
Total Load	17203 MW
System Loss	762 MW

- Comparison of the simulated results with the available SCADA records is accomplished. The comparison has been made with the available data from ERLDC.
- Software used : MiP-PSCT

3.2 May 26, 2016 Peak system demand condition

The study team has received substation wise load data and SCADA records from the ERLDC and SLDC's of eastern region. The data considered for modeling the transmission network and its sources are given in table 3.3.

Table 3.3: Source of the data considered for the study

Sl No	Data	Source
1	Transformers	Field data and CEA planning criteria
2	Transmission lines / UG cable types	Field data and network data received from CTU, STU and other constituents
3	Lines / UG cable parameters	Data received from CTU, STU and other constituents and CEA planning criteria
4	Loads and Generation	SCADA recordings and Load data received from SLDC's

Note: Transmission lines and Transformers parameters, which are not furnished by CTU and STU's, is consider as per CEA transmissions planning criteria.

This section of the report presents the basic data considered for the system studies.

3.3 Salient points of CEA planning criteria referred for network modelling and analysis of study results

3.3.1 Transmission line parameters

Table 3.4 provides the transmission line parameters and the thermal loading limit of the transmission lines at various voltage levels considered for the studies.

Table 3.4: Details of transmission line parameters

Conductor Type	Voltage (kV)	Positive Sequence Resistance (ohm/km/ckt)	Positive Sequence Reactance (ohm/km/ckt)	Positive Sequence Suseptance, B/2 (mho/km/ckt)	Zero Sequence Resistance (ohm/km/ckt)	Zero Sequence Reactance (ohm/km/ckt)	Zero Sequence Suseptance, B/2 (mho/km/ckt)	Thermal Rating (MVA)
ACSR Quad Bersimis	765	0.0114	0.2856	2.01E-06	0.2634	1.0534	1.20E-06	3880
ACSR Hexa Zebra	765	0.0123	0.2552	2.27E-06	0.2247	0.9223	1.38E-06	4452
ACSR Quad Moose	400	0.0147	0.2528	2.29E-06	0.2480	1.0000	1.32E-06	1749
ACSR Twin Moose	400	0.0298	0.3320	1.73E-06	0.1619	1.2400	1.12E-06	874
AAAC Twin Moose	400	0.0309	0.3304	1.77E-06	0.1682	1.2368	1.14E-06	840
ACSR Zebra	220	0.0697	0.3978	1.46E-06	0.2048	1.3344	9.14E-07	213
ACSR MOOSE	220	0.0749	0.3993	1.47E-06	0.2200	1.3392	9.20E-07	240
AAAC Zebra	220	0.0749	0.3993	1.47E-06	0.2200	1.3392	9.20E-07	212
800sqmm XLPE Cable	220	0.0321	0.1260	3.23E-05	0.1400	0.0680	3.00E-05	266
ACSR Panther	132	0.1622	0.3861	1.46E-06	0.4056	1.6222	8.99E-07	83
LARK	132	0.1622	0.3861	1.46E-06	0.4056	1.6222	8.99E-07	94
T Snowbird	132	0.0223	0.2900	1.96E-06	0.2840	0.9784	1.36E-06	432
161 sqmm G.F Cable	132	0.1400	0.1873	4.25E-05	0.2700	0.0519	4.25E-05	50
260 sqmm G.F Cable	132	0.0876	0.2167	4.55E-05	0.1695	0.0600	4.55E-05	70
400 sqmm XLPE Cable	220	0.0617	0.1360	2.20E-05	0.2040	0.0830	2.19E-05	100
630 sqmm XLPE Cable	132	0.0391	0.1267	2.27E-05	0.1120	0.0840	2.24E-05	130
800 Sqmm XLPE Cable	132	0.0321	0.1260	3.23E-05	0.1300	0.0680	3.00E-05	160
ACSR DOG	66	0.3274	0.4267	1.36E-06	0.5578	1.3688	9.84E-07	50

Note: Transmission lines parameters, which are not furnished by CTU and STU's, is consider as per CEA transmissions planning criteria.

3.4 Transformer parameters

Actual transformer parameters wherever provided by CTU and STU's is used. In cases where data is not available standard data as per CEA transmissions planning criteria given in Table 3.5 is considered.

Table 3.5: Details of transformer parameters

Type of Transformer	Transformer reactance Xt (at its own base MVA)
Generator transformer (GT)	14 – 15 %
Inter-Connecting Transformer (ICT)	12.50%

3.4.1 Voltage limits

The steady-state voltage limits prescribed in CEA's "Transmission Planning Criteria" at different voltage levels are presented in Table 3.6.

Table 3.6: Voltage limits at different voltage levels prescribed in CEA's "Transmission Planning Criteria"

Nominal Voltage (kV)	Normal rating				Emergency rating			
	Maximum		Minimum		Maximum		Minimum	
	kV	pu	kV	pu	kV	pu	kV	pu
765	800	1.05	728	0.95	800	1.05	713	0.93
400	420	1.05	380	0.95	420	1.05	372	0.93
220	245	1.11	198	0.90	245	1.11	194	0.88
132	145	1.10	122	0.92	145	1.10	119	0.90
66	72.5	1.10	60	0.91	72.5	1.10	59	0.89

3.5 Network element statistics for ER Grid

3.5.1 Substation details

The summary of the number of substations present in the Eastern region state wise is presented in Table 3.7 and the complete list of substations along with load considered at each substation is given in Table A of Annexure-I.

Table 3.7: Existing number of sub-station in the ER

Sl. No.	Substation*	State				
		Bihar	Jharkhand	Odisha	Sikkim	W. Bengal
1	765 kV	2	1	2	-	-
2	400 kV	11	7	12	1	14

Sl. No.	Substation*	State				
		Bihar	Jharkhand	Odisha	Sikkim	W. Bengal
3	220 kV	16	15	25	-	40
4	132 kV	88	47	86	4	105
5	66 kV	-	-	-	19	-
Total No. of S/S in ER				**495**		

Note: If 765/400/230 kV substation has 400/220 kV transformation level also, in that case 765/400/230 kV substation is counted as single 765 kV substation.

**Above listed substation number excludes switching stations and generating stations*

3.5.2 Transmission line details

The summary of Transmission line data present in the Eastern region is presented in Table 3.8 and the complete list of transmission lines state wise is given in Table B of Annexure-I.

Table 3.8: Summary of transmission line data in the ER

Sl. No.	Voltage (kV)	Line Length (ckm)
1	765	2039
2	400	28776
3	220	17115
4	132	26441
5	66	295

3.5.3 Transformer details

The summary of Transformer data present in the Eastern region is presented below in Table 3.9 and the complete list of substation and their transformation capacity for each constituent state of ER Grid is given in Table A of Annexure-I.

Table 3.9: Summary of transformers capacity in the ER

Sl. No	Voltage Ratio (kV)	Installed Capacity (MVA)
1	765	18000
2	400	29645
3	220	34500
4	132	30936
5	66	182

3.5.4 Generation details

The summary of generator installed capacity present in the Eastern region state wise is presented in Table 3.10 and the complete list of generators is given in Table C of Annexure-I.

Table 3.10: Summary of Generator installed capacity in the ER

Sl. No.	State	Installed capacity (MW)*	
		Thermal	Hydro
1	Bihar	4545	35
2	Jharkhand	5251	289
3	Odisha	15956	2143
4	Sikkim	0	776
5	West Bengal	14155	1265
Total ER		**39907**	**4508**
		44415	

**Note: Installed capacity includes central, state, IPP and CPP generations*

3.5.5 HVDC details

The details of the existing converter stations used for HVDC transmission and HVDC Back to Back, considered in the studies are given in Table 3.11 and Table 3.12.

Table 3.11: HVDC Back to Back in the ER

Sl. No.	Parameter	Sasaram B2B	Gazuwaka B2B	
1	Power Rating	1 X 500 MW	1 X 500 MW	1 X 500 MW
2	Number of blocks	1	Block 1	Block 2
3	AC voltage	400 kV	400 kV	400 kV
4	DC voltage	205 kV	205 kV	177 kV
5	Converter transformer (Inverter/Rectifier)	6 X 234 MVA	6 X 234 MVA	6 X 201.2 MVA

Table 3.12: HVDC Link in the ER

Sl. No.	Parameter	Talcher to Kolar
1	Power Rating	2000 MW
2	Number of Poles	2
3	AC voltage	400 kV
4	DC voltage	± 500 kV
5	Converter transformer (Inverter)	6 X 398 MVA
6	Converter transformer (Rectifier)	6 X 398 MVA

3.5.6 Shunt Reactor details

The complete list of state wise shunt reactors installed in the Eastern region is presented in Table D and E of Annexure-I.

3.5.7 Load details

The state wise summary of load data considered for the study is given in Table 3.13. Substation wise loading details considered for operational load flow is presented in Table F of Annexure-I.

Table 3.13: Load Details of ER

Sl. No.	Constituents	Load*
1	Bihar	3044
2	Jharkhand	991
3	Odisha	3354
4	Sikkim	75
5	West Bengal	5460
6	DVC	2621
7	CESC	1441
8	DPL	217

**Note: 17203 MW (summation of recorded loads in S/S) on 26.05.2016 at 20:00 hrs in ER grid*

3.6 Generation schedule details for operational load flow

The generation schedule considered was based on the information obtained from the ERLDC and other constituents of ER grid. Power plant wise generation allocation is given in table 3.14 and graphically represented in figure 3.2.

Table 3.14: Generation schedule Details of ER

Sl.No.	State	Station Name	Owned By	Scheduled Generation (MW)
1	Bihar	Muzaffarpur	Joint venture of NTPC & BSEB	100
2		Kahalgaon	NTPC	2055
3		Barh		874
4	Jharkhand	Patratu Thermal	JVNL	63
5		Tenughat Thermal		155
6		Kodarma Thermal	DVC	479
7		Chandrapura Thermal		777
8		Mithon Dam		1
9		Bokaro Thermal		175
10		Adhunik Thermal	APNRL	364
11		Mithon RB Thermal	MPL	914

Sl.No.	State	Station Name	Owned By	Scheduled Generation (MW)
12		Net CPP Injection to Grid		232
13	Odisha	Upper Kolab	OHPC	223
14		Indravati		427
15		Rengali		150
16		Hirakud		98
17		Talcher Thermal	NTPC	412
18		IB Thermal	OPGC	173
19		Balimela	OHPC	219
20		Machkund		16.5
21		Talcher Super Thermal	NTPC	2583
22		Meenakshi Power		11
23		GMR	GMR Kamalanga Energy	594
24		Jindal Thermal	JITPL	1013
25		Sterlite Energy	Vedanta Ltd.	13
26		Net CPP Injection to Grid		560
27	Sikkim	Rangit Hydro	NHPC	58
28		Teesta 5 Hydro		530
29		Lagit Hydro	Sikkim Gov.	10
30		Meyong Hydro		3
31		Rongli Hydro		6
32		Chuzachen	Gati Infrastructure Pvt. Ltd	96
33		Jorthang	DANS Energy Pvt. Ltd.	96
34	West Bengal	Bandel Thermal	WBPDCL	147.5
35		Santaldih Thermal		470
36		Kolaghat Thermal		589
37		Bakreswar Thermal		953
38		Sagardighi Thermal		478
39		Purulia Pump Storage Hydro	WBSEDCL	416
40		Jaldhaka Hydro		24
41		Rammam Hydro		30
42		Tista Load Dam Hydro	NHPC	103
43		Farakka Super Thermal	NTPC	1563
44		Mejia	DVC	1475
45		Durgapur Steel Thermal		844
46		DPL Thermal	DPL	203
47		Budge Budge	CESC	839
48		SRS		
49		TRS		
50		Haldia Thermal		555
51		Net CPP Injection to Grid		122

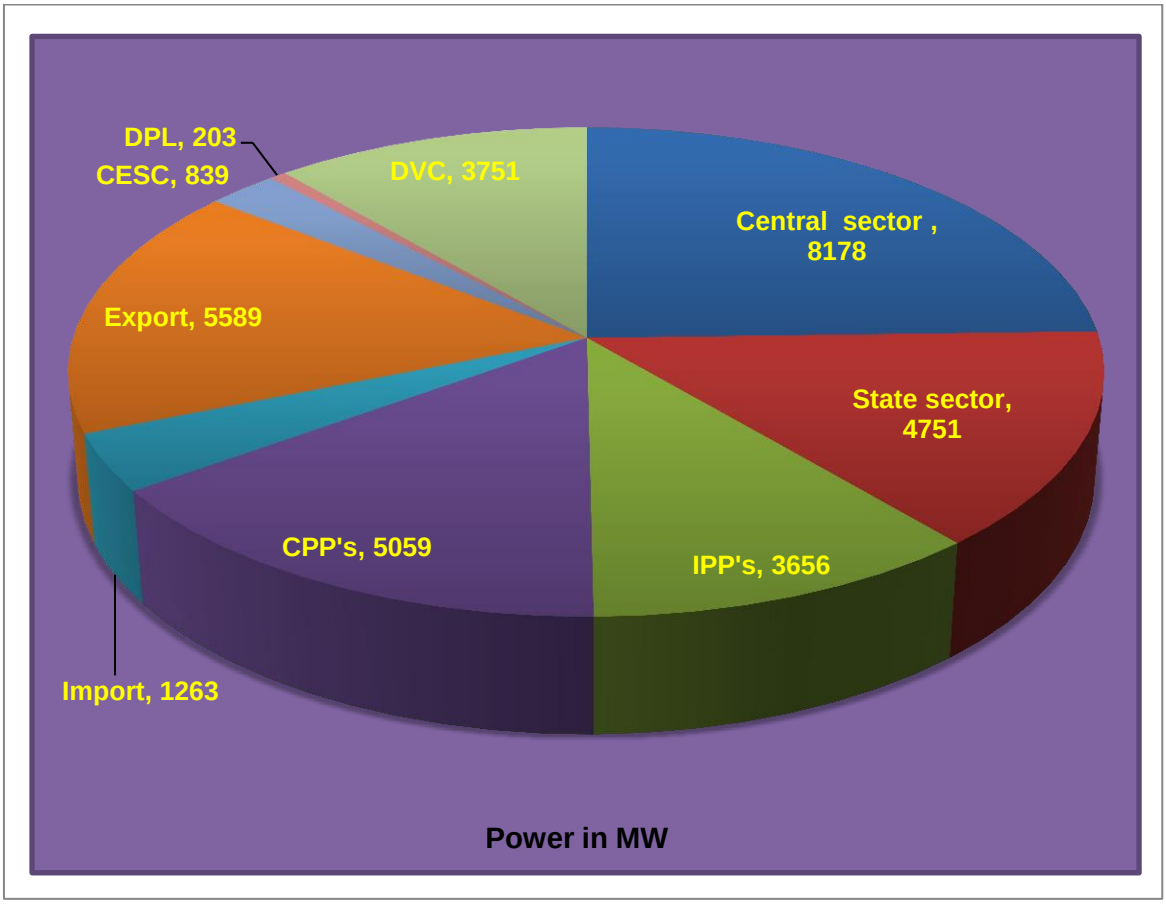


Figure 3.2: Scheduled generation, Import and Export of Eastern Regional grid

4 OPERATIONAL LOAD FLOW STUDY

4.1 Introduction to Load flow analysis

One of the most common computational procedures used in power system analysis is the load flow calculation. The planning, design and operation of power systems require such calculations to analyze the steady state performance of power system under various operating conditions and to study the effects of changes in network configuration. These load flow solutions are performed using computer programs designed specifically for this purpose.

The basic question in the load flow analysis is: “Given the demand at all buses of a known electric power system configuration and the power production at each generator, find the power flow in each line and transformer of the interconnecting network and the voltage magnitude with phase angle at each bus.“

Analyzing the solution of load flow analysis for numerous conditions helps ensure that the power system is designed to satisfy its performance criteria while incurring the most favorable investment and operation costs. Some examples of the uses of load flow studies are to determine,

- Component or circuit loading.
- Steady state bus voltages.
- Active and Reactive power flows.
- Transformers tap settings.
- System losses.
- Performance under emergency conditions.

Modern systems are complex and have many paths or branches over which power can flow. Such systems form networks of series and parallel paths. Electric power flow in these networks divides among the branches until a balance is reached in accordance with established circuit theory.

Computer programs to solve load flows are divided into two type’s static (offline) and dynamic (real time). Most load flow studies for system analysis are based on static network models. Real time load flows (online) that incorporate data input from the actual networks are typically used by utilities in Supervisory Control and Data Acquisition (SCADA) systems. Such systems are used primarily as operating tools for optimization of generation, VAr control, dispatch, losses, and tie line flow control. This discussion is concerned with only static network models and their analysis.

A load flow calculation determines the state of the power system with respect to a given load and generation schedule. It represents a steady state condition which is assumed to remain fixed for some time. In reality, line flows and bus voltages fluctuate in small amounts because load changes due to lights, motors, and other loads being turned on or off in the system. However, these small fluctuations are ignored in calculating the steady state effects on system equipment. As the load distribution, and hence power flow in the network vary considerably during different time periods, it may be necessary to obtain load flow solutions representing different system conditions such as peak load, average load or light load. Generally, these solutions provide,

- Optimum operating modes for normal conditions, such as proper setting of voltage control devices, or how the system will respond to abnormal conditions, such as outage of transformers or lines.
- When the new equipment additions are needed.
- Effectiveness of new alternatives to solve present deficiencies and meet future requirements.

The load flow model is also the basis for several other types of studies such as short circuit, stability, motor starting, and harmonic studies. The load flow model supplies the network data and an initial steady state condition for these studies.

The present study is carried out to determine the power flows at different lines/transformers and to compute the voltage profile at different buses of the existing system. The result of this load flow is validated with the recorded SCADA values for the given operating condition. The system configuration considered for the study, simulation results and the comparison of the simulation results with SCADA are explained in the subsequent sections.

4.2 Load Generation Balance from the results of operational load flow analysis

The detail of load generation balance of ER is given in Table 4.1 and state wise load generation balance is presented in table 4.2, 4.3, 4.4, 4.5, 4.6, 4.7 and 4.8. The detailed load and generation data is given in Annexure-I.

Table 4.1: Load generation balance Details of ER

Sl. No.	Description	Quantity (MW)
1	Generation	22291
2	Import	1263
Total (Generation + Import)		**23554**
3	Loss	762*(3.23%)
4	Load	17203
Demand Met (Load + Loss)		**17965**
5	Export	5589
Total (Load + Export + Loss)		**23554**

**Note: Only for 765 kV, 400 kV, 220 kV, 132 kV and 66 kV transmission network.*

Table 4.2: Load generation balance details of Bihar

Sl. No.	Description	Quantity (MW)
1	Generation	3030
2	Import	2252
Total Total(Generation + Import)		**5282**
3	Loss	148* (2.80%)
4	Load	3044
Demand Met (Load + Loss)		**3192**
5	Export	2090
Total (Load + Export + Loss)		**5282**

**Note: Only for 765 kV, 400 kV, 220 kV and 132 kV transmission network*

Table 4.3: Load generation balance details of Jharkhand

Sl. No.	Description	Quantity (MW)
1	Generation	1529
2	Import	2865
Total (Generation + Import)		**4394**
3	Loss	83*(1.88%)
4	Load	991
Demand Met (Load + Loss)		**1074**

Sl. No.	Description	Quantity (MW)
5	Export	3320
Total (Load + Export + Loss)		**4394**

**Note: Only for 765 kV, 400 kV, 220 kV and 132 kV transmission network*

Table 4.4: Load generation balance details of Odisha

Sl. No.	Description	Quantity (MW)
1	Generation	6491
2	Import	933
Total (Generation + Import)		**7424**
3	Loss	190*(2.56%)
4	Load	3354
Demand Met (Load + Loss)		**3544**
5	Export	3880
Total (Load + Export + Loss)		**7424**

**Note: Only for 765 kV, 400 kV, 220 kV and 132 kV transmission network*

Table 4.5: Load generation balance details of Sikkim

Sl. No.	Description	Quantity (MW)
1	Generation	798
2	Import	0
Total (Generation + Import)		**798**
3	Loss	15*(1.88%)
4	Load	75
Demand Met (Load + Loss)		**90**
5	Export	708
Total (Load + Export + Loss)		**798**

**Note: Only for 400 kV, 132 kV and 66 kV transmission network*

Table 4.6: Load generation balance details of West Bengal

Sl. No.	Description	Quantity (MW)
1	Generation	5450
2	Import	3066
Total (Generation + Import)		**8516**
3	Loss	239*(2.80%)
4	Load	5460
Demand Met (Load + Loss)		**5699**
5	Export	2817
Total (Load + Export + Loss)		**8516**

Note: Only for 400 kV, 220 kV and 132 kV transmission network

Table 4.7: Load generation balance details of DVC

Sl. No.	Description	Quantity (MW)
1	Generation	3951
2	Import	1272
Total (Generation + Import)		**5223**
3	Loss	68*(1.30%)
4	Load	2621
Demand Met (Load + Loss)		**2689**
5	Export	2534
Total (Load + Export + Loss)		**5223**

Note: Only for 400 kV, 220 kV and 132 kV transmission network

Table 4.8: Load generation balance details of CESC

Sl. No.	Description	Quantity (MW)
1	Generation	839
2	Import	617
Total (Generation + Import)		**1456**
3	Loss	15*(1.03%)
4	Load	1441
Demand Met (Load + Loss)		**1456**
5	Export	0
Total (Load + Export + Loss)		**1456**

Note: Only for 220 kV and 132 kV transmission network

Table 4.9: Load generation balance details of DPL

Sl. No.	Description	Quantity (MW)
1	Generation	203
2	Import	49
Total (Generation + Import)		**252**
3	Loss	4*(1.58%)
4	Load	217
Demand Met (Load + Loss)		**221**
5	Export	31
Total (Load + Export + Loss)		**252**

Note: Only for 220 kV and 132 kV transmission network.

A block diagram illustrating the interstate and inter regional power exchange of ER is presented in figure 4.1

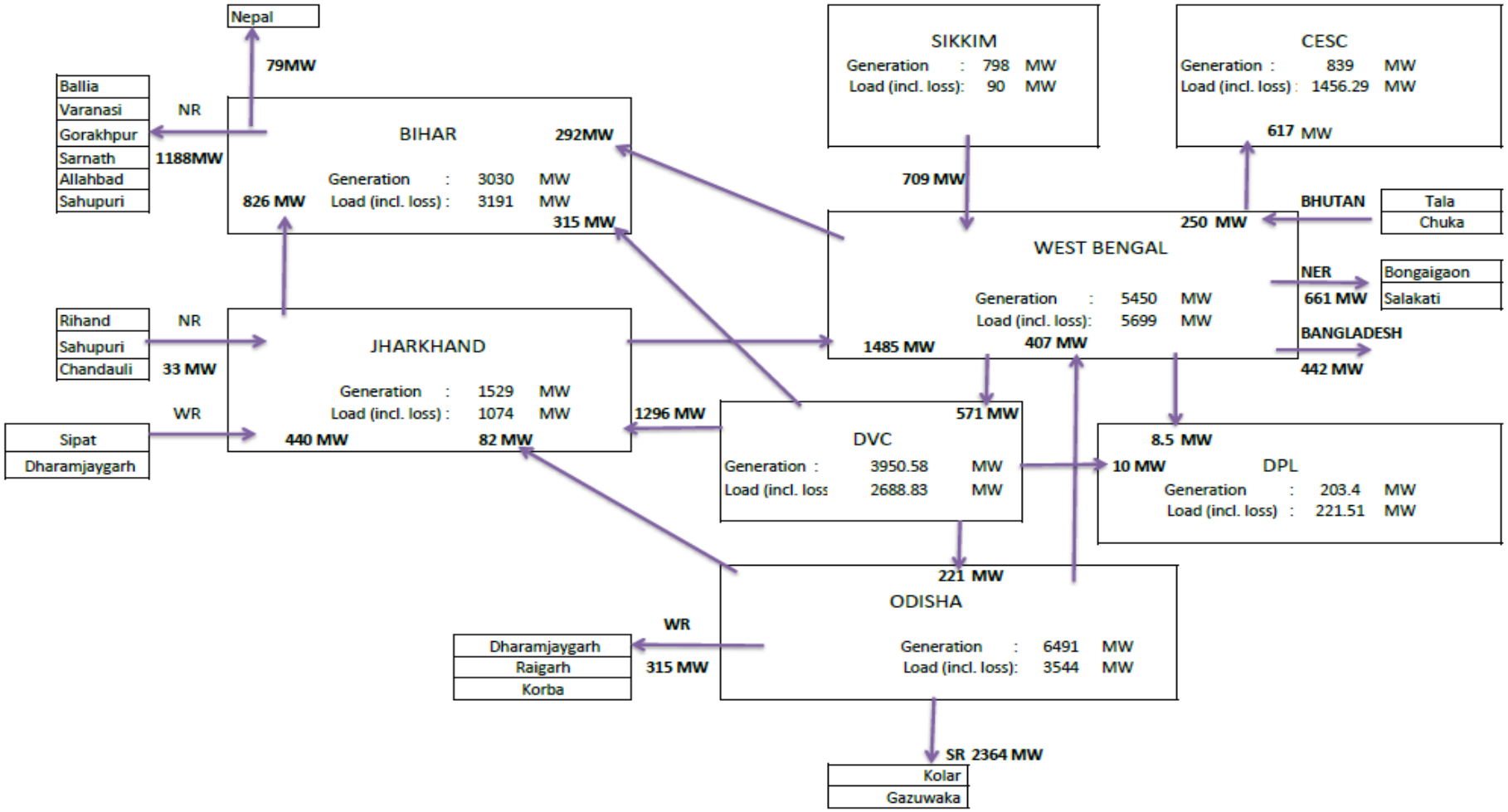


Figure 4.1: Block diagram of load generation balance of ER

Note: Inter regional exchange is shown as net exchange

4.3 Line loading conditions

Under operational load flow study, number of lines whose loading is below 5% and above 80% is presented in table 4.10 for complete ER grid and table 4.11 to 4.18 for constituent state of ER grid.

Table 4.10: Percentage loading details of lines of Eastern Region

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of lines loaded 80% and above	No of Lines loaded 5% and below
1	765	13.60	1.60	9.88	0	1
2	400	58.90	3.00	20.96	0	16
3	220	97.50	0.20	31.05	15	30
4	132	99.50	0.10	33.34	51	71
5	66	65.10	1.60	14.18	0	3

Table 4.11: Percentage loading details of lines of Bihar

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of lines loaded 80% and above	No of Lines loaded 5% and below
1	765	11.50	1.60	6.55	0	1
2	400	33.80	4.10	16.65	0	4
3	220	91.70	5.90	42.67	5	0
4	132	99.50	0.40	31.20	11	15

Table 4.12: Percentage loading details of lines of Jharkhand

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of lines loaded 80% and above	No of Lines loaded 5% and below
1	765	13.60	12.80	13.20	0	0
2	400	57.00	3.00	19.51	0	7
3	220	63.00	0.60	27.49	0	2
4	132	97.90	1.80	24.97	1	7

Table 4.13: Percentage loading details of lines of Odisha

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of lines loaded 80% and above	No of Lines loaded 5% and below
1	765	9.70	9.70	9.70	0	0
2	400	57.40	3.50	21.80	0	1
3	220	81.60	0.70	26.93	1	11
4	132	96.40	0.10	27.41	7	30

Table 4.14: Percentage loading details of lines of Sikkim

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of lines loaded 80% and above	No of Lines loaded 5% and below
1	400	35.10	30.30	32.70	0	0
2	220	13.50	9.80	12.20	0	0
3	132	72.60	9.70	36.58	0	0
4	66	65.10	1.60	12.64	0	3

Table 4.15: Percentage loading details of lines of West Bengal

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of lines loaded 80% and above	No of Lines loaded 5% and below
1	400	58.90	3.80	24.42	0	2
2	220	97.20	0.20	34.52	5	10
3	132	98.50	0.20	41.44	20	11
4	66	23.80	23.80	23.80	0	0

Table 4.16: Percentage loading details of lines of DVC

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of lines loaded 80% and above	No of Lines loaded 5% and below
1	400	22.2	3.7	16.03	0	1
2	220	97.5	0.9	23.64	4	7
3	132	97.5	1.2	33.64	5	8

Table 4.17: Percentage loading details of lines of CESC

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of lines loaded 80% and above	No of Lines loaded 5% and below
1	220	60.4	32.7	41.37	0	0
2	132	91.5	8	45.73	7	0

Table 4.18: Percentage loading details of lines of DPL

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of lines loaded 80% and above	No of Lines loaded 5% and below
1	132	75.10	16.60	35.22	0	0

Note: As observed in operational load flow that no line is loaded 100% and above.

4.4 Transformer loading conditions

Under operational load flow study, number of transformers whose loading is below 20% and above 80% is presented in table 4.19 for complete ER grid and table 4.20 to 4.27 for constituent state of ER grid.

Table 4.19: Percentage loading details of Transformers of Eastern Region

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of Transformers loaded 80% and above	No of Transformers loaded 20% and below
1	765	11.1	3.3	7.98	0	12
2	400	88.4	0.4	46.00	9	28
3	220	88.1	0.9	44.76	21	75
4	132	98	0.6	42.27	42	155
5	66	68	34.4	46.44	0	0

Table 4.20: Percentage loading details of Transformers of Bihar

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of Transformers loaded 80% and above	No of Transformers loaded 20% and below
1	765	11.1	5.7	8.40	0	4
2	400	86.2	9.9	49.46	2	4

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of Transformers loaded 80% and above	No of Transformers loaded 20% and below
3	220	93.9	14	46.04	6	10
4	132	94.6	7.9	41.09	12	29

Table 4.21: Percentage loading details of Transformers of Jharkhand

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of Transformers loaded 80% and above	No of Transformers loaded 20% and below
1	765	7.7	7.7	7.70	0	2
2	400	86.7	0.4	48.53	2	2
3	220	86.7	0.9	41.75	2	2
4	132	76.4	2.7	33.36	0	14

Table 4.22: Percentage loading details of Transformers of Odisha

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of Transformers loaded 80% and above	No of Transformers loaded 20% and below
1	765	11	3.3	7.92	0	6
2	400	73.2	1.8	32.45	0	13
3	220	82.3	2.1	36.38	2	38
4	132	71.5	0.6	37.88	0	58

Table 4.23: Percentage loading details of Transformers of Sikkim

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of Transformers loaded 80% and above	No of Transformers loaded 20% and below
1	400	88.4	3.8	46.10	3	5
2	220	86.3	3.8	40.29	2	5
3	132	63	6.7	35.32	0	4
4	66	60.5	34.9	47.70	0	0

Table 4.24: Percentage loading details of Transformers of West Bengal

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of Transformers loaded 80% and above	No of Transformers loaded 20% and below
1	400	81.5	5.8	52.42	2	4
2	220	88.1	2.3	49.30	9	16
3	132	98	1.5	52.56	29	19
4	66	68	34.4	45.60	0	0

Table 4.25: Percentage loading details of Transformers of DVC

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of Transformers loaded 80% and above	No of Transformers loaded 20% and below
1	400	-	-	-	-	-
2	220	77.5	10.2	48.86	0	2
3	132	75.4	6.9	39.52	0	18

Table 4.26: Percentage loading details of Transformers of CESC

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of Transformers loaded 80% and above	No of Transformers loaded 20% and below
1	220	75.5	12.6	43.67	0	2
2	132	77.7	10	43.19	0	5

Table 4.27: Percentage loading details of Transformers of DPL

Sl.No	Voltage Grade (kV)	Loading Percentage				
		Max	Min	Avg	No of Transformers loaded 80% and above	No of Transformers loaded 20% and below
1	220	67.2	52.4	56.10	0	0
2	132	87.9	5.5	38.62	1	8

4.5 Voltage profile

Bus Voltage Profile for Eastern Region grid is presented in table 4.28

Table 4.28: Bus Voltage Profile for Eastern Region

Sl.No	Voltage Grade (kV)	Bus Voltage In pu		
		Max	Min	Average
1	765	1.0191	0.9626	0.9946
2	400	1.0416	0.9688	1.0145
3	220	1.0431	0.9463	0.9969
4	132	1.0475	0.9066	0.9766
5	66	1.0186	0.9331	0.9926

Note: As observed in operational load flow study that bus voltage of ER grid is within the acceptable limit (as per CEA grid code).

4.6 Comparison with SCADA values

An attempt has been made to compare the bus voltages and line loadings with the SCADA record collected from ERLDC. Comparison results elaborated in Table G and H of Annexure-II. It is evident from the comparison that, simulation results are matching well with the available SCADA data in most of the areas. Higher percentage of mismatch is observed in line flows in some parts of Bihar. This is attributed to unavailability of accurate substation loading conditions for the time instance.

From comparison of SCADA value to simulated result, Voltage mismatch is observed at few of the substations, which are presented Table G in attached annexure-II.

4.7 Analysis of the load flow study results

- Power map of ER grid along with separate power map of constituent states (Bihar, Jharkhand, Odisha, Sikkim and West Bengal) for operational load flow study is presented in Annexure-II.
- The voltages at all the bus bars (765 kV, 400 kV, 220 kV, 132 kV and 66 kV) were within the standard tolerance limits (as per CEA grid code).
- The line /transformers were loaded within the rated capacity under peak operating condition of 26th May 2016 at 20.00hrs.
- Maximum inter regional power exchange is 1799 MW to NR.

5 SHORT CIRCUIT STUDIES

Even the most carefully designed power systems may be subjected to damaging arc blast or overheating and the explosive magnetic forces associated with high magnitude currents flowing during a short circuit. To ensure that circuit's protective equipment can isolate faults quickly and minimize system component damage, personal hazard and outage severity, it is essential that a short circuit study be included in the electrical design of new industrial and commercial power systems, and for modifications to existing system. There are five possibilities for a short circuit in three-phase system.

- 3-phase to ground fault.
- Single line to ground fault.
- Line to line fault.
- Double line to ground fault.
- Open conductor fault.

If a short circuit of one type is not interrupted promptly, it often progresses to another type, which generally results in more severe damage. For example in a solidly grounded system, a single line to ground fault, if not interrupted, can quickly escalate to a double line to ground or a three phase to ground fault. The choice of study that is required for a particular system is a matter of engineering judgment based on an analysis of the basic single line diagram and determination of the specific purpose of the study.

For the three-phase industrial and commercial power systems, the most common study is the calculation of three-phase (balanced) short circuit current which is more severe compared to other faults, specifically for comparison with switching equipment capability. The short circuit current determined from this type of study generally represents the highest value at a particular location in the system. It is important to realize that single line to ground or double line to ground short circuit current magnitude can exceed three-phase short circuit current under certain conditions. This condition may arise near,

- Solidly grounded synchronous machines.
- Solidly grounded star connection of a delta-star transformer of the three-phase core design.
- Grounded star-delta tertiary autotransformers.

- Grounded star-delta tertiary three winding transformers.

In system where any of these machines or transformer connections exists, it may be necessary to conduct a single line to ground short circuit study. Medium and high voltage circuit breakers have 15% higher interrupting capability for single line to ground short circuits than for phase to phase or three phase short circuits. This difference must be taken into account when comparing short circuit duty with equipment ratings. Further, future network growth (about 20% increases in result obtained through study) has to be accounted while considering the fault levels for equipment ratings.

5.1 Short circuit study result analysis

The detailed results of the Short circuit study for the three phases to ground fault and single line to ground faults are tabulated in Table I and presented in Annexure-III.

Based on the detailed analysis, it is observed that

- For 400kV and 220 kV voltages, 3phase fault level & SLG fault level at some of the substations are at the critical level. Fault levels which are more than 80% of breaker rating are listed in table 5.1 and table 5.2.
- It is observed from the results of short circuit studies the fault MVA is exceeding the breaker capacity in following buses:
    - **Bihar:** Biharshariff 400 kV, Kahalgaon 400 kV
    - **Jharkhand:** Maithon 400 kV
    - **Odisha:** Meramundali 220kV, BSSL (Meramundali) 220kV
- For 765kV, 132 kV & 66 kV voltage level, there is no violation in the fault level.

Table 5.1: 3-Ph fault levels > 80% of breaker rating

Sl.No.	Substation Name	Rated Voltage (kV)	3-Phase fault (MVA)	Fault Current (kA)
1	Biharshariff	400	29750.571	42.943
2	Kahalgaon	400	30656.806	44.251
3	Maithon	400	30582.791	44.144
4	Meramundali	400	25681.695	37.069
5	TTPS	220	13365.247	35.076
6	Budhipadar	220	13604.885	35.705
7	Meramundali	220	17985.484	47.201
8	Parulia	400	24883.889	35.918

Sl.No.	Substation Name	Rated Voltage (kV)	3-Phase fault (MVA)	Fault Current (kA)
9	Bidhannagar	220	14019.033	36.791
10	Durgapur Thermal	132	5787.794	25.316
11	NALCO	220	13639.101	35.794
12	BSSL (Meramundali)	220	15753.283	41.343

Table 5.2: SLG fault levels > 80% of breaker rating

Sl.No.	Substation Name	Rated Voltage (kV)	SLG fault (MVA)	Fault Current (kA)
1	Kahalgaon	400	29265.46	42.242
2	Maithon	400	24288.165	35.058
3	Meramundali	400	23469.652	33.877
4	Budhipadar	220	13538.205	35.53
5	Meramundali	220	18415.717	48.33
6	Bidhannagar	220	14347.347	37.653
7	Mejia	220	13001.516	34.121
8	Durgapur Thermal	132	6089.079	26.634
9	Bokaro Thermal	132	6067.58	26.54
10	DPL	132	6503.868	28.448
11	Vedanta	220	12847.675	33.717
12	NALCO	220	14094.736	36.99
13	BSSL (Meramundali)	220	15157.966	39.781

Note: In some of the Generating stations the SLG fault rating is exceeding 80% while the three phase fault rating is within 80% of breaker capacity.

6 CONCLUSION

Based on the operational load flow studies carried out for aforesaid condition following observation are made,

- The voltages at all the bus bars (765 kV, 400 kV, 220 kV, 132 kV and 66 kV) were within the standard tolerance limits (as per CEA grid code).
- The line /transformers were loaded within the rated capacity under peak operating condition of 26th May 2016 at 20.00hrs.
- Maximum inter regional power exchange is 1799 MW to NR.
- It is observed that short circuit levels are critical at some of the substations and violating at certain locations. Such cases are listed above in section 5.1.
- Bus splitting is suggested for above substations. Breaker upgradation may also be considered during substation renovations.

The network modelling for operational load flow and short circuit study and the results will provide the base for the subsequent protection system analysis and calculation. This will also provide the base for transient studies and tripping analysis as subsequent deliverables under the project scope.

ANNEXURE I – EXISTING EASTERN REGION TRANSMISSION NETWORK AND LOAD DETAILS

Table A: State wise list of substations present in the Eastern region grid

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
Bihar						
765 kV Level						
1	Sasaram	765/400	1	1500	1500	PGCIL
		400/220	1	315	315	
			1	500	500	
		132/33	2	10	20	
2	Gaya	765/400	3	1500	4500	PGCIL
		400/220	1	315	315	
			1	500	500	
400 kV Level						
1	Banka	400/132	2	200	400	PGCIL
2	Barh	400/132	2	200	400	NTPC
3	Biharsharif	400/220	3	315	945	PGCIL
4	Kahalgaon	400/132	2	200	400	NTPC
5	Muzaffarpur	400/220	2	315	630	PGCIL
			1	500	500	
		220/132	1	100	100	
6	New Purnea	400/220	1	315	315	
			1	500	500	
7	Patna	400/220	2	315	630	
8	Lakhisarai	400/132	2	200	400	
9	Sasaram B2B	400/(93/√3)/93	3	234/117/117		
10	Kishanganj	400/220	2	500	1000	
11	Nabinagar RLY	400/132	2	200	400	Railway
220 kV Level						
1	Purnea	220/132	3	160	480	PGCIL
2	Arrah	220/132	1	160	160	
			2	100	200	
3	Biharshariff	220/132	3	150	450	BSPTCL
		132/33	1	20	20	
4	Bodhgaya	220/132	4	150	600	
		220/132	1	160	160	
		132/33	3	50	150	
5	Darbhanga new	220/132	2	160	320	
6	Dehri	220/132	4	100	400	
		132/33	2	50	100	
7	Fatuha	220/132	5	100	500	
		132/33	3	50	150	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
8	Gopalganj	220/132	3	100	300	
		132/33	3	50	150	
9	Khagaul	220/132	4	100	400	
		132/33	5	50	250	
10	Begusarai	220/132	4	100	400	
		132/33	3	50	150	
11	Sipara	220/132	2	150	300	
		220/132	1	160	160	
		132/33	2	50	100	
12	Hazipur new	220/132	2	100	200	
13	Madhepura	220/132	3	100	300	
		132/33	2	20	40	
14	Pusauli New	220/132	2	150	300	
		132/33	2	50	100	
15	Sonenagar	220/132	2	160	320	
		132/33	2	50	100	
16	Muzaffarpur (MTPS)	220/132	3	100	300	
132 kV Level						
1	Arrah	132/33	1	20	20	BSPTCL
			3	50	150	
2	Ataula (Arwal)	132/33	2	20	40	
3	Aurangabad	132/33	2	20	40	
4	Banjari	132/33	3	20	60	
5	Banka	132/33	3	20	60	
6	Barauni TPS	132/33	1	50	50	
			2	20	40	
7	Barh	132/33	1	20	20	
			1	50	50	
8	Baripahari	132/33	2	50	100	
9	Belaganj	132/33	2	20	40	
10	Bettiah	132/33	2	20	40	
			1	50	50	
11	Bihta	132/33	3	50	150	
12	Bikramganj	132/33	2	20	40	
			1	50	50	
13	Buxar	132/33	2	20	40	
			1	50	50	
14	Chandauti (Gaya)	132/33	2	50	100	
		132/25	2	13.35	26.7	
15	Chhapra	132/33	2	20	40	
			1	50	50	
16	Darbhanga (old)	132/33	2	50	100	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
17	Dhaka	132/33	3	20	60	
18	Dalsingsarai	132/33	2	20	40	
19	Digha	132/33	3	50	150	
20	Dumraon	132/33	1	20	20	
			1	50	50	
21	Ekma	132/33	1	20	20	
22	Ekanga Sarai (Ekanagar)	132/33	3	20	60	
23	Forbeshganj	132/33	1	20	20	
			1	50	50	
24	Goh	132/33	2	20	40	
25	Gangwara	132/33	2	50	100	
26	Gaighat	132/33	2	50	100	
27	Hazipur	132/33	3	50	150	
28	Hulasganj	132/33	2	20	40	
29	Harnaut	132/33	2	20	40	
30	Hathidah	132/33	3	20	60	
31	Imamganj	132/33	2	20	40	
32	Jagdishpur	132/33	2	20	40	
33	Jandaha	132/33	2	20	40	
34	Jainagar	132/33	3	20	60	
35	Jakkanpur	132/33	4	50	200	
			1	20	20	
36	Jamalpur	132/33	2	50	100	
37	Jamui	132/33	2	20	40	
38	Jehanabad	132/33	2	20	40	
39	Kahalgaon	132/33	2	20	40	
			2	50	100	
40	Karmnasa	132/33	2	50	100	
			1	20	20	
		132/25	1	21.6	21.6	
			1	20	20	
41	Kataiya	132/33	3	20	60	
42	Katihar	132/33	3	20	60	
			1	50	50	
43	Katra	132/33	3	50	150	
44	Kusheshwarsthan	132/33	2	20	40	
45	Kochas	132/33	2	20	40	
46	Karbigahiya	132/33	4	50	200	
47	Kudra	132/33	2	20	40	
48	Khagaria	132/33	2	20	40	
			1	50	50	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
49	Kishanganj	132/33	1	50	50	
			1	20	20	
50	Lakhisarai	132/33	3	20	60	
51	Madhubani	132/33	2	20	40	
52	Masaurhi	132/33	2	20	40	
53	Mithapur	132/33	2	50	100	
54	Mohania	132/33	1	50	50	
			1	20	20	
55	Motihari	132/33	1	20	20	
			1	50	50	
56	Masrakh	132/33	2	20	40	
57	Muzaffarpur	132/33	3	50	150	
58	Nalanda	132/33	2	20	40	
59	Naugachhia	132/33	3	20	60	
60	Nawada	132/33	1	20	20	
			3	50	150	
61	Pandaul	132/33	2	20	40	
			1	50	50	
62	Phulparas	132/33	2	20	40	
63	Purnea	132/33	1	20	20	
			2	50	100	
64	Rafiganj	132/33	1	50	50	
			1	20	20	
65	Rajgir	132/33	2	20	40	
66	Ramnagar	132/33	2	20	40	
67	Raxaul	132/33	2	20	40	
68	Remi nagar (Runni Saidpur)	132/33	2	20	40	
69	Sherghati	132/33	2	20	40	
70	SKMCH	132/33	2	50	100	
71	Sonebarsa	132/33	2	20	40	
72	Sabour	132/33	3	50	150	
73	Saharsa	132/33	1	20	20	
74	Samastipur	132/33	2	20	40	
75	Sasaram	132/33	2	50	100	
76	Shekhpura	132/33	2	20	40	
77	Sheetalpur	132/33	2	20	40	
78	Sitamarhi	132/33	3	50	150	
79	Siwan	132/33	1	20	20	
			2	50	100	
80	Sonenagar	132/33	1	50	50	
			1	20	20	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
		132/25	1	21.6	21.6	
			1	20	20	
81	Sultanganj	132/33	2	20	40	
			2	50	100	
82	Supaul	132/33	3	20	60	
83	Tehta	132/33	2	20	40	
84	Tekari	132/33	2	20	40	
85	Udaikishanganj	132/33	2	20	40	
86	Vaishali	132/33	2	20	40	
87	Valmikinagar	132/33	1	10	10	
88	Wazirganj	132/33	2	20	40	
Jharkhand						
765kV Level						
1	Ranchi New	765/400	2	1500	3000	PGCIL
400kV Level						
1	Jamshedpur	400/220	2	315	630	PGCIL
2	Maithon	400/220	2	315	630	
3	Ranchi	400/220	2	315	630	
4	Chaibasa	400/220	2	315	630	
5	Koderma (KTPS)	400/220	2	315	630	DVC
		220/132	2	150	300	
6	BTPS_A (Bokaro)	400/220/33	2	315	630	
220kV Level						
1	Chandil	220/132	4	100	400	JUSNL
2	Chaibasa	220/132	2	150	300	
		132/33	2	50	100	
3	Hatia New	220/132	3	150	450	
4	Lalmatiya	220/132	1	100	100	
		132/33	1	20	20	
			2	50	100	
5	PTPS	220/132	2	150	300	
6	Ramachandrapur	220/132	3	150	450	
7	TTPS	220/132	2	250	500	
8	Dumka(New)	220/132	2	150	300	
9	BTPS_B (Bokaro)	220/132	2	150	300	DVC
		132/33	2	50	100	
10	CTPS	220/132/11	3	150	450	
		132/33	2	80	160	
11	Giridhi	220/132/33	2	150	300	
		220/33	2	80	160	
		132/33	3	80	240	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
12	Jamshedpur	220/132/33	2	150	300	
		132/33	3	50	150	
13	Ramgarh	220/132	2	150	300	
		132/33	2	80	160	
			1	50	50	
14	Dhanbad	220/33	2	80	160	
		220/132				
15	Kalyanswari	220/132/33	2	150	300	
		220/132/33	1	160	160	
		132/33	2	50	100	
132kV Level						
1	Maniqui	132/33	2	50	100	
2	Adityapur	132/33	4	50	200	
3	Chakradharpur	132/33	1	50	50	
4	Dalbhumgarh	132/33	2	50	100	
5	Chaibasa	132/33	1	25	25	
6	Manoharpur	132/33	2	50	100	
7	Deogarh	132/33	3	50	150	
8	Dumka	132/33	2	50	100	
9	Garhwa Rd	132/33	1	50	50	
			1	20	20	
10	Goielkara	132/33	1	20	20	
11	Golmuri	132/33	2	50	100	
12	Gumla	132/33	2	20	40	
13	Hatia old	132/33	4	50	200	
14	Tamar	132/33	2	50	100	
15	Madhupur	132/33	2	50	100	JUSNL
16	Sikidri	132/33	2	20	40	
17	Jadugoda	132/33	2	20	40	
			1	50	50	
18	Jamtara	132/33	1	50	50	
			1	20	20	
19	Japla	132/33	2	20	40	
20	Kamdara	132/33	2	20	40	
			1	20	20	
21	Kanke	132/33	2	50	100	
22	Kendposi	132/33	2	20	40	
			1	50	50	
23	Latehar	132/33	2	50	100	
24	Lohardaga	132/33	2	50	100	
25	Namkum	132/33	4	50	200	
26	Nowamundi	132/33	1	50	50	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
27	Pakur	132/33	2	50	100	
28	Rajkharsawan	132/33	1	20	20	
			1	50	50	
29	Sahebgunj	132/33	2	50	100	
30	Daltonganj	132/33	2	50	100	
31	Koderma	132/33	1	80	80	
			1	50	50	
		132/25	1	25	25	
32	Nimiaghat	132/33	2	31.5	63	
		132/25	2	25	50	
33	North Karnapura	132/33	2	50	100	
34	Pradhankanta	132/33	No Load			
35	Patherdhi	132/33	2	80	160	
		132/33	1	50	50	
		132/25	2	12.5	25	
36	Patratu (DVC)	132/33	1	31.5	31.5	
37	Putki	132/33	3	80	240	
38	Barhi	132/33	1	50	50	
		132/33	1	31.5	31.5	DVC
39	Gola	132/33	1	31.5	31.5	
		132/33	1	20	20	
40	Hazaribag road	132/33	No load			
41	Hazaribagh	132/33	2	50	100	
42	Kumardhubi	132/33	2	50	100	
			1	80	80	
		132/25	2	25	50	
43	Konar	132/33	1	20	20	
44	Mosabani	132/33	1	31.5	31.5	
		132/33	1	20	20	
45	Biada	132/33	2	80	160	
46	MHS-Right bank	132/33	2	50	100	
47	Panchet	132/33	1	50	50	
Odisha						
765 kV Level						
1	Jharsuguda	765/400/33	2	1500	3000	PGCIL
2	Angul	765/400	4	1500	6000	
400 kV Level						
1	Bisra	400/220	2	315	630	
2	Bolangir	400/220/33	2	315	630	
3	Indravati	400/220/33	2	315	630	PGCIL
4	Jaypore	400/220/33	2	315	630	
5	Kaniha	400/220	2	315	630	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
6	Keonjhar	400/220/33	2	315	630	
7	Kuchei/Baripada	400/220	2	315	630	
		220/132	2	160	320	
8	Mendhasal	400/220	2	315	630	OPTCL
		220/33	1	20	20	
9	Meramundali	400/220	2	315	630	PGCIL
		220/132	3	100	300	OPTCL
		132/33	1	12.5	12.5	
10	Rengali	400/220	2	315	630	PGCIL
11	New Duburi	400/220	2	315	630	OPTCL
12	Sterlite	400/220	2	315	630	SEL
220 kV Level						
1	Atri	220/132	1	160	160	OPTCL
2	Balasore	220/132	2	160	320	
		132/33	2	63	126	
		132/33	1	40	40	
3	Bhadrak	220/132	3	100	300	
		132/33	2	63	126	
		132/33	1	40	40	
4	Bidanasi	220/132	1	160	160	
		220/132	2	100	200	
		132/33	2	63	126	
		132/33	1	40	40	
5	Bolangir new	220/132	2	160	320	
		132/33	1	12.5	12.5	
6	Budhipadar	220/132	2	160	320	
		132/33	1	20	20	
		132/33	1	12.5	12.5	
7	Chandaka	220/132	2	100	200	
		220/132	2	160	320	
		132/33	2	63	126	
		132/33	1	40	40	
8	Duburi	220/132	3	100	300	
		220/33	2	40	80	
		132/33	1	5	5	
9	Jayanagar	220/132	2	160	320	
		132/33	2	20	40	
		132/33	1	12.5	12.5	
10	Joda	220/132	3	100	300	
		132/33	3	20	60	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
		132/33	1	40	40	
11	Katapalli	220/132	1	160	160	
		220/132	2	100	200	
		132/33	1	40	40	
		132/33	2	20	40	
12	Lapanga	220/132	2	160	320	
13	Mendhasal	220/132	2	100	200	
14	Narendrapur	220/132	1	100	100	
		220/132	2	160	320	
		132/33	2	40	80	
		132/33	1	20	20	
15	Paradip	220/132	1	160	160	
		220/132	1	50	50	
		220/132	1	100	100	
		132/33	2	20	40	
		132/33	1	12.5	12.5	
16	Talcher (TTPS)	220/132	2	160	320	
17	Tarkera	220/132	4	100	400	
18	Theruvali	220/132	2	100	200	
		132/33	2	12.5	25	
19	Bhanjanagar	220/132	2	160	320	
20	Puri (Samangara)	220/132	1	160	160	
21	Balimela	220/33	1	20	20	
		220/33	1	40	40	
22	Barkote	220/33	2	40	80	
23	Nayagarh	220/33	1	40	40	
		220/33	2	20	40	
24	Laxmipur	220/33	1	20	20	
25	Rengali	220/33	2	20	40	
132 kV Level						
1	Akhusingh	132/33	2	12.5	25	OPTCL
2	Anandapur	132/33	2	12.5	25	
		132/33	1	20	20	
3	Angul	132/33	2	40	80	
		132/33	1	20	20	
4	Argul	132/33	1	40	40	
		132/33	1	20	20	
5	Atri	132/33	1	20	20	
6	Aska	132/33	3	40	120	
7	Balugaon	132/33	1	40	40	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
		132/33	1	20	20	
		132/33	1	12.5	12.5	
8	Banki	132/33	2	20	40	
9	Barbil	132/33	2	12.5	25	
10	Baragarh	132/33	3	40	120	
11	Baripada	132/33	3	40	120	
12	Barpalli	132/33	1	20	20	
		132/33	1	40	40	
13	Berhampore	132/33	2	40	80	
		132/33	1	20	20	
14	Basta	132/33	1	12.5	12.5	
		132/33	1	20	20	
15	Bhanjanagar	132/33	2	40	80	
		132/33	1	16	16	
16	Bhawanipatna	132/33	2	12.5	25	
17	Bhubaneswar	132/33	3	63	189	
18	Boinda	132/33	1	20	20	
		132/33	2	12.5	25	
19	Boudh	132/33	1	20	20	
20	Bolangir	132/33	2	40	80	
		132/33	1	12.5	12.5	
21	Brajrajnagar	132/33	1	40	40	
		132/33	3	20	60	
22	Chainpal	132/33	2	40	80	
		132/33	1	20	20	
23	Chandikhole	132/33	3	20	60	
24	Chhandpur	132/33	2	12.5	25	
25	Chhatrapur	132/33	3	20	60	
26	Chhend	132/33	3	40	120	
27	Choudwar	132/33	1	20	20	
		132/33	2	40	80	
28	Cuttack	132/33	3	40	120	
29	Dabugaon	132/33	2	12.5	25	
30	Dhenkanal	132/33	3	40	120	
31	Digapahandi	132/33	2	20	40	
		132/33	1	12.5	12.5	
32	Ganjam	132/33	2	12.5	25	
33	Jagatsinghpur	132/33	2	20	40	
		132/33	1	40	40	
34	Jajpur road	132/33	2	40	80	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
		132/33	1	20	20	
35	Jajpur town	132/33	2	40	80	
		132/33	1	20	20	
36	Jaleswar	132/33	2	31.5	63	
		132/33	1	12.5	12.5	
37	Jharsuguda	132/33	1	40	40	
38	Junagarh	132/33	3	20	60	
39	Kalarangi	132/33	2	12.5	25	
		132/33	1	20	20	
40	Kalugaon	132/33	2	40	80	
41	Kamakshyanagar	132/33	1	20	20	
		132/33	2	12.5	25	
42	Karanjia	132/33	2	12.5	25	
		132/33	1	20	20	
43	Kendrapara	132/33	2	40	80	
		132/33	1	12.5	12.5	
44	Kesinga	132/33	1	40	40	
		132/33	2	20	40	
45	Kesura/Badagada	132/33	1	63	63	
		132/33	1	40	40	
46	Khariar	132/33	2	40	80	
47	Khurda	132/33	3	40	120	
48	Konark	132/33	2	20	40	
49	Kuchinda	132/33	2	20	40	
50	Lapanaga	132/33	1	20	20	
51	Mania	132/33	1	12.5	12.5	
52	Marshaghai	132/33	2	20	40	
53	Mohana	132/33	2	12.5	25	
54	Nimapara	132/33	2	40	80	
			1	12.5		
55	Nuapara	132/33	2	20	40	
56	Nuapatna	132/33	1	40	40	
		132/33	1	20	20	
		132/33	1	12.5	12.5	
57	Padampur	132/33	1	20	20	
58	Parlakhemundi	132/33	3	12.5	37.5	
59	Patnagarh	132/33	1	40	40	
		132/33	2	20	40	
60	Pattamundai	132/33	2	20	40	
		132/33	1	12.5	12.5	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
61	Phulbani	132/33	2	12.5	25	
		132/33	1	40	40	
62	Phulnakhara	132/33	2	20	40	
63	Polasapanga	132/33	1	40	40	
		132/33	2	20	40	
64	Puri	132/33	3	40	120	
65	Purusottampur	132/33	2	12.5	25	
66	Rairakhole	132/33	2	12.5	25	
67	Rairangpur	132/33	2	20	40	
		132/33	1	12.5	12.5	
68	Rajgangpur	132/33	3	40	120	
69	Ranasinghpur	132/33	2	63	126	
		132/33	1	40	40	
70	Rayagada	132/33	2	12.5	25	
71	Rourkela	132/33	4	35	140	
72	Saintala	132/33	1	10	10	
		132/33	1	12.5	12.5	
73	Salipur	132/33	2	20	40	
		132/33	1	12.5	12.5	
74	Sambalpur	132/33	2	31.5	63	
		132/33	1	40	40	
75	Shamuka	132/33	2	31.5	63	
76	Somnathpur	132/33	1	12.5	12.5	
77	Sonepur	132/33	3	20	60	
		132/33			0	
78	Soro	132/33	1	40	40	
		132/33	2	20	40	
79	Sunabeda	132/33	3	12.5	37.5	
80	Sundargarh	132/33	1	40	40	
		132/33	1	20	20	
81	Tentulikhunti	132/33	1	20	20	
		132/33	2	12.5	25	
82	Tarkera	132/33	1	12.5	12.5	
83	Umerkote	132/33	2	20	40	
84	Bolani	132/11	2	10	20	
85	Brajrajnagar	132/11	1	12.5	12.5	
86	Jharsuguda	132/11	1	20	20	
		132/11	1	12.5	12.5	
Sikkim						

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
400 kV Level						
1	Rangpo	440/220	5	315	1575	PGCIL
2		220/132	3	100	300	
132 kV Level						
1	Gangtok	132/66	2	50	100	PGCIL
2	Melli	132/66	2	50	100	Sikkim Gov
4	Geyzing	132/66	1	20	20	
5	Rangit	132/66	1	20	20	
66 kV Level						
1	Phodong	66/11	1	5	5	Sikkim Gov
			1	2.5	2.5	
2	Bulbuley	66/11	2	10	20	
3	Sichey	66/11	2	10	20	
			1	5	5	
4	Tadong	66/11	3	5	15	
5	Rongly	66/11	2	2.5	5	
6	Mamring	66/11	1	10	10	
			1	7.5	7.5	
			1	15	15	
7	Melli	66/11	2	5	10	
8	Namchi	66/11	2	2.5	5	
9	Rabangla	66/11	1	5	5	
10	Rothak	66/11	2	2.5	5	
11	Soreng	66/11	2	2.5	5	
12	Geyzing	66/11	2	2.5	5	
13	Purano Namchi	66/11	2	7.5	15	
14	Pakyong	66/11	1	10	10	
15	Pelling	66/11	1	5	5	
16	Rhenock	66/11	1	5	5	
17	Mangan	66/11	2	5	10	
18	Ranipool	66/11	2	7.5	15	
19	Topakhani	66/11	1	7.5	7.5	
		66/11	1	5	5	
West Bengal						
400 kV Level						
1	Arambagh	400/220	4	315	1260	WBSETCL
		220/132	3	160	480	
		132/33	3	50	150	
2	Jeerat	400/220	4	315	1260	
		220/132/33	3	160	480	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
3	Bidhannagar (Durgapur WBSETCL)	400/220	2	315	630	
4	Kharagpur	400/220	2	315	630	
		220/132	2	160	320	
5	Bakreswar	400/220	2	315	630	WBPDCL
		220/33	1	50	50	WBSETCL
6	Kolaghat TPS	400/220	2	315	630	WBPDCL
7	Sagardighi	400/220	2	315	630	
8	Binaguri	400/220	2	315	630	PGCIL
9	Malda	400/220	2	315	630	
10	Parulia (Durgapur PG)	400/220	2	315	630	
11	Farakka	400/220	2	315	630	NTPC
14	Subhashgram	400/220	4	315	1260	PGCIL
			1	500	500	
220 kV Level						
1	Asansol	220/132	1	160	160	WBSETCL
			1	160	160	
		132/33	3	50	150	
2	New_Bishnupur	220/132	3	160	480	
		132/33	2	31.5	63	
3	Dalkhola	220/132	2	160	320	
		132/33	3	20	60	
4	Dharampur	220/132	2	160	320	
		132/33	2	50	100	
4	Domjur	220/132	1	160	160	
			1	100	100	
		132/33	3	50	150	
5	Gokarna	220/132	4	160	640	
		132/33	3	50	150	
6	Howrah	220/132	3	160	480	
			1	150	150	
		132/25	2	20	40	
9	Kasba	220/132	2	150	300	
			2	160	320	
11	Krishnagar	220/132/33	2	160	320	
		132/33	2	50	100	
			1	31.5	31.5	
12	Laxmikantpur	220/132	3	160	480	
		132/33	2	31.5	63	
			1	50	50	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
		132/25	2	12.5	25	
13	New Haldia	220/132	2	160	320	
		132/33	1	31.5	31.5	
		132/33	1	50	50	
14	New Jalpaiguri	220/132	2	160	320	
		132/33	2	50	100	
15	New town action area-III	220/132	2	160	320	
		220/33	2	50	100	
16	Rishra	220/132	3	160	480	
		132/33	3	50	150	
17	Satgachia	220/132	2	160	320	
		132/33	2	50	100	
			1	31.5	31.5	
18	Subhashgram	220/132	2	160	320	
		132/33	2	31.5	63	
19	KTPS 400 kV	220/132	1	160	160	WBPDCL
			2	150	300	
20	STPS (Santhaldih)	220/132	1	130	130	WBPDCL
			1	100	100	
21	Birpara	220/132	2	160	320	PGCIL
22	Malda	220/132	1	50	370	
			2	160	640	
23	Siliguri	220/132	2	160	320	
24	DPL	220/132	2	160	320	DPL
			1	100	100	
25	Bidhannagar(Durgapur)	220/132	2	160	320	WBSETCL
		220/132	1	200	200	
26	Hura	220/132	2	160	320	
		132/33	2	50	100	
27	Foundry park	220/132/33	2	160	320	
		132/33	2	50	100	
28	Midnapur	220/132	3	160	480	
		132/33	2	50	100	
29	Kolkata leather complex (KLC)	220/132	2	160	320	
		132/33	3	50	150	
30	Singur	220/132	2	160	320	
		132/33	2	50	100	
31	EMSS	220/132 /33	5	160	800	CESC
32	BBGS	220/132 /33	2	160	320	
33	NCGS	220/132 /33	2	160	320	
34	Waria (DTPS)	220/132/33	3	150	450	DVC
		132/33	3	50	150	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
		132/25	2	25	50	
35	Durgapur/Muchipara	220/33	2	80	160	
			1	50	50	
36	Parulia	220/33	2	80	160	
		132/33	1	50	50	
37	Barjora	220/132	2	150	300	
		220/33	1	100	100	
			1	80	80	
			1	50	50	
38	Mejia	220/33	2	35	70	
39	Burnpur	220/33	2	50	100	
132 kV Level						
1	Adisapthagram	132/33	2	50	100	WBSETCL
			1	31.5	31.5	
		132/25	2	20	40	
2	Alipurduar	132/66	2	16	32	
			1	20	20	
		132/33	1	31.5	31.5	
3	Amtala	132/33	1	31.5	31.5	
			1	50	50	
4	Asoknagar	132/33	2	50	100	
		132/25	2	7.5	15	
5	Bagnan GIS	132/33	2	50	100	
6	Bagmundi	132/33	1	20	20	
7	Balurghat	132/33	4	12.5	50	
8	Bankura	132/33	2	50	100	
9	Barasat	132/33	3	50	150	
10	Behala/ joka	132/33	3	50	150	
10	Basirhat	132/33	2	50	100	
26	Belmuri	132/33	2	31.5	63	
27	Berhampore	132/33	3	50	150	
28	Bighati	132/33	2	50	100	
29	Birsingha	132/33	2	50	100	
30	Bishnupur (old)	132/33	1	50	50	
		132/33	1	31.5	31.5	
31	Bolpur	132/33	3	50	150	
32	Bongaon	132/33	3	31.5	94.5	
33	Barjora	132/33	2	31.5	63	
34	Chanditala	132/33	2	50	100	
35	Chandrakora road	132/33	1	50	50	
			1	31.5	31.5	
36	Contai	132/33	2	50	100	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
37	Coochbehar	132/33	3	50	150	
39	Darjeeling	132/33	3	10	30	
40	Debogram	132/33	1	20	20	
			1	31.5	31.5	
			1	50	50	
42	Dhulian	132/33	2	31.5	63	
43	Egra	132/33	3	50	150	
44	Falta	132/33	2	31.5	63	
			1	50	50	
45	Gangarampur	132/33	3	20	60	
			1	12.5	12.5	
46	Haldia	132/33	1	50	50	
			1	31.5	31.5	
		132/25	1	10	10	
			1	12.5	12.5	
47	Haldia NIZ	132/33	2	31.5	63	
48	Hizli	132/33	1	31.5	31.5	
			1	50	50	
		132/25	2	10	20	
49	Jangipara	132/33	2	31.5	63	
50	Jhargram	132/33	1	31.5	31.5	
			1	50	50	
51	Kurseong	132/33	3	10	30	
52	Kakdwip	132/33	2	31.5	63	
53	Kalan	132/33	2	31.5	63	
54	Kalyani	132/33	1	31.5	81.5	
			1	50	150	
55	Khatra	132/33	2	50	100	
56	Katwa	132/33	2	31.5	63	
			1	50	50	
57	Khanyan	132/33	2	31.5	63	
58	Kharagpur	132/33	2	31.5	63	
	Khejuria GIS	132/33	2	50	100	
59	Kolaghat	132/33	3	50	150	
		132/25	2	12.5	25	
60	Lalgola	132/33	2	31.5	63	
61	Lilooah	132/33	3	50	150	
		132/25	2	20	40	
62	Mahachanda	132/33	2	31.5	63	
			1	50	50	
	Mathabhanga	132/33	1	50	50	
			1	31.5	31.5	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
63	Malda	132/33	3	50	150	
65	Mankar	132/33	3	31.5	94.5	
66	Maynaguri	132/33	1	31.5	31.5	
			1	50	50	
			2	30	60	
67	North Bengal university (NBU)	132/33	2	31.5	63	
			1	50	50	
68	New town AA 1	132/33	2	50	100	
69	Pingla	132/33	3	50	150	
70	Purulia(WB)	132/33	2	31.5	63	
			1	20	20	
		132/25	2	12.5	25	
71	Raghunathganj	132/33	1	31.5	31.5	
			1	20	20	
			1	50	50	
72	Raghunathpur	132/33	2	31.5	63	
73	Raigunj	132/33	1	31.5	31.5	
			2	20	40	
			2	12.5	25	
74	Raina	132/33	1	50	50	
75	Rampurhat	132/33	2	50	100	
76	Ranaghat	132/33	2	50	100	
		132/66	2	31.5	63	
		132/25	1	12.5	12.5	
			1	10	10	
77	Sainthia	132/33	2	50	100	
78	Salt lake	132/33	3	50	150	
79	Salt lake GIS	132/33	2	50	100	
80	Samsi	132/33	3	31.5	94.5	
81	Siliguri	132/33	2	50	100	
82	Sonarpur	132/33	3	31.5	94.5	
		132/25	2	20	40	
83	Tamluk	132/33	2	50	100	
84	Tarakeswar	132/33	1	31.5	31.5	
			1	50	50	
85	Titagarh	132/33	3	50	150	
		132/25	2	20	40	
86	Ukhra	132/33	2	50	100	
87	Uluberia	132/33	3	50	150	
91	Kuli	132/33	2	50	100	
96	Birpara	132/66	3	20	60	
97	Chalsa	132/66	1	20	20	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
			1	10	10	
		132/33	2	20	40	
98	Serakol	132/33	2	50	100	
99	Belur	132/33	3	50	150	CESC
100	BT Road	132/33	2	75	150	
101	B.Garden	132/33	2	50	150	
102	Titagarh(trs)	132/33	5	50	250	
103	Dum Dum	132/33	2	75	150	
104	Park lane	132/33	2	75	150	
105	Jadavpore	132/33	2	50	100	
106	Chakmir	132/33	2	55	110	
107	Majerhat	132/33	2	75	150	
108	BBD Bag	132/33	1	68	136	
109	PRS	132/33	3	50	150	
110	East Calcutta	132/33	2	50	100	
111	NCGS	132/33	2	50	100	
			1	75	75	
112	SRS	132/33	2	55	110	
			1	75	75	
113	Patuli	132/33	2	75	150	
114	A Zone	132/11	1	20	20	DPL
		132/11	2	31.5	63	
		132/33	1	50	50	
115	B Zone	132/11	6	31.5	189	
		132/33	1	50	50	
116	AB Zone	132/33	1	50	50	
117	C Zone	132/11	3	31.5	94.5	
		132/33	1	50	50	
118	C1 Zone	132/11	2	31.5	63	
		132/33	2	50	100	
119	Bamunara SS	132/34	2	50	100	
120	Kalipahari	132/33	1	50	50	DVC
		132/33	2	80	160	
121	Kharagpur	132/11	1	7.5	7.5	
122	Burdwan	132/33	2	50	100	
			1	80	80	
123	Belmuri	132/33	1	50	50	
			1	31.5	31.5	
		132/25	2	25	50	
124	Purulia	132/33/11	1	50	50	
125	ASP	132/33/11	2	50	100	
		132/33	2	50	100	

Sl.No	Name of the Substation	Voltage level (kV)	Substation details			Owned By
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)	
126	Jamuria	132/33	2	50	100	

Table B: State wise list of transmission lines present in the Eastern region grid

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
Bihar					
765 kV					
1	Gaya to Varanasi	D/C	341.00	Quad-Bersimis	PGCIL
2	Sasaram to Fatehpur line-I	S/C	61.26	Quad-Bersimis	
3	Gaya to Ballia	S/C	228.00	Quad-Bersimis	
400 kV					
1	Gaya to Koderma	D/C	126.00	Twin-Moose	PGCIL
2	Gaya to Maithon	D/C	272.00	Quad-Moose	
3	Sasaram to Sarnath	S/C	76.00	Twin-Moose	
4	Sasaram to Allahbad	S/C	215.00	Twin-Moose	
5	Sasaram to Nabinagar	D/C	81.00	Twin-Moose	
6	Biharshariff to Sasaram	S/C	192.00	Twin-Moose	
7	Biharshariff to Sasaram	S/C	203.50	Twin-Moose	
8	Kahalgaon to Farakka I & II	D/C	95.00	Twin-Moose	
9	Kahalgaon to Farakka III & IV	D/C	95.00	Twin-Moose	
10	Kahalgaon to Maithon	D/C	172.00	Twin-Moose	
11	Biharshariff to Lakhisarai	S/C	89.00	Twin-Moose	
12	Biharshariff to Lakhisarai	S/C	102.50	Twin-Moose	
13	Lakhisarai to Kahalgaon	D/C	145.00	Twin-Moose	
14	Kahalgaon to Banka	D/C	48.00	Twin-Moose	
15	Kahalgaon to Barh	D/C	217.00	Quad-Moose	
16	Biharshariff to Koderma	D/C	111.00	Quad-Moose	
17	Biharshariff to Banka	D/C	184.00	Twin-Moose	
18	Biharshariff to Balia	D/C	242.00	Quad-Moose	
19	Biharshariff to Muzaffarpur	D/C	132.00	Twin-Moose	
20	Biharshariff to Varanasi	D/C	321.00	Quad-Moose	
21	Biharshariff to Purnea	D/C	232.00	Quad-Moose	
22	Barh to Patna I & II	D/C	93.00	Quad-Moose	
23	Barh to Patna III &IV	D/C	69.00	Quad-Moose	
24	Patna to Balia	D/C	195.00	Quad-Moose	
25	Patna to Balia	D/C	180.00	Quad-Moose	
26	Patna to Kishanganj	D/C	347.00	Quad-Moose	
27	Muzaffarpur to Gorakhpur	D/C	261.00	Quad-Moose	Power Links
28	Purnea to Muzaffarpur	D/C	240.00	Quad-Moose	
29	Malda to Purnea	D/C	167.00	Twin-Moose	PGCIL
30	Purnea to Binaguri I & II	D/C	168.00	Twin-Moose	
31	Purnea to Kishanganj	D/C	72.00	Quad-Moose	
32	Kishanganj to Binaguri	D/C	98.00	Quad-Moose	
33	Barh II- Gorakhpur	D/C	349.00	Quad-Moose	
220 kV					

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
1	Patna PG-Sipara	D/C	0.50	Zebra	BSPHCL
2	Dehri-Pusauli	S/C	65.00	Zebra	BSPHCL & PG
3	Pusauli-Sahupuri(UP)	S/C	71.00	Zebra	PGCIL
4	Arrah-Khagaul	D/C	50.00	Zebra	
5	Patratu-Bodhgaya	T/C	136.00	Zebra	BSPHCL & JSEB
6	Patna PG-Khagaul	S/C	30.50	Zebra	BSPHCL
7	Tenughat-Biharshariff	S/C	182.00	Twin-Moose	BSPHCL & JSEB
8	Biharshariff (PG)-Biharhariff (BSPHCL)	T/C	1.67	Zebra	BSPTCL
9	Muzaffarpur-MTPS(Kanti)	D/C	24.00	Zebra	POWER LINKS
10	Dehri-Gaya(PG)	D/C	95.00	Zebra	BSPHCL & PG
11	Bodhgaya-Gaya(PG)	D/C	17.00	Zebra	
12	Muzaffarpur-Hazipur-I & II	D/C	53.00	Zebra	BSPTCL
13	Biharshariff-Fatua	D/C	40.00	Zebra	
14	Biharshariff-Bodhgaya	D/C	80.00	Zebra	
15	Purnea - Dalkhola(WB)	D/C	41.00	Zebra	PGCIL
16	Sipara - Khagaul	S/C	39.00	Zebra	BSPTCL
17	MTPS (Kanti) - Gopalganj	S/C	101.35	Zebra	
18	MTPS (kanti) - Darbhanga	S/C	68.53	Zebra	
19	Purnea (PG) - Madhepura	D/C	100.09	Zebra	
20	Biharsariff - Begusarai	D/C	75.00	Zebra	
21	MTPS - Begusarai	D/C	152.00	Zebra	
22	Patna (PG) - Fatuha	S/C	27.60	Zebra	
23	Sipara - Fatuha	S/C	26.00	Zebra	
24	Pusauli (PG) to Pusauli new	S/C	1.72	Zebra	PGCIL
25	Pusauli new to Ara (PG)	S/C	116.00	Zebra	
26	Pusauli (PG) to Ara (PG)	S/C	112.00	Zebra	
27	Purnea (PG) to Purnea old	D/C	2.00	Zebra	
28	Kishanganj to Siliguri	D/C	108.00	Zebra	
29	Kishanganj to Dalkhola PG	D/C	31.00	Zebra	
		132 kV			
1	Kahalgao-KhSTPP	S/C	6.00	Panther	PGCIL
2	KhSTPP-lalmatya	S/C	47.00	Panther	BSPTCL
3	Arrah (PG) -Arrah BS	S/C	2.10	Panther	
4	Arrah (PG)-Dumraon	S/C	61.50	Panther	
5	Purnea(PG)-Purnea(BS)	T/C	1.33	Panther	
6	Purnea(OLD)-Kishanganj	S/C	70.00	Panther	
7	Karmansa-Sahupuri	S/C	131.00	Panther	BSPHCL & UPPCL
8	Karmansa-Chandauli	S/C	25.00	Panther	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
9	Sonenagar-Rihand	S/C	188.00	Panther	
10	Japla - Sonenagar	S/C	56.00	Panther	BSPTCL
11	Kahalgao-Sabour	S/C	19.00	Panther	PGCIL
12	Kahalgao-Lalmatia	S/C	60.00	Panther	NTPC
13	Banka-Sabour	S/C	40.73	Panther	BSPTCL
14	Banka (PG)-Banka(NEW)	S/C	12.50	Panther	
15	Chandauti - Sipara	S/C	90.00	Panther	
16	Chandauti - Belaganj	S/C	20.00	Panther	
17	Belaganj - Jehanabad	S/C	30.00	Panther	
18	Jehanabad - Masaudhi	S/C	30.00	Panther	
19	Masaudhi - Sipara	S/C	24.00	Panther	
20	Jehanabad - Ataula	S/C	28.00	Panther	
22	Chandauti - Sonenagar (L-30)	S/C	76.00	Panther	
23	Chandauti - Rafiganj (L-31)	S/C	41.00	Panther	
24	Rafiganj - Sonenagar (L-31)	S/C	35.00	Panther	
25	Chandauti - Tekari	S/C	28.90	Panther	
26	Bodhgaya - Chandauti (Gaya)(Line-I)	D/C	16.00	Panther	
27	Bodhgaya - Chandauti (Gaya) (Line-II)	D/C	14.00	Panther	
28	Tekari-Goh	S/C	22.00	Panther	
29	Bodhgaya - Wazirganj	S/C	30.00	Panther	
30	Wazirganj - Nawada	S/C	26.00	Panther	
31	Bodhgaya - Sherghati	S/C	27.00	Panther	
32	Bodhgaya - Imamganj	S/C	56.00	Panther	
33	Dehri - Banjari	S/C	38.00	Panther	
34	Dehri - Sasaram Ckt.-I	S/C	20.00	Panther	
35	Sasaram - Kudra Ckt.-I	S/C	13.00	Panther	
36	Kudra - Karamnasa Ckt.-I	S/C	10.00	Panther	
37	Dehri to Pusauli PG Ckt-II	S/C	26.00	Panther	
38	Pusouli PG - Mohania Ckt.-II	S/C	10.00	Panther	
39	Mohania - Karmnasa Ckt.-II	S/C	11.00	Panther	
40	Dehri - Bikramganj Ckt.-II	S/C	45.00	Panther	
41	Bikramganj - Dumroan Ckt.-II	S/C	35.00	Panther	
43	Dumroan - Buxar	S/C	16.10	Panther	
44	Ara (PG) - Jagdishpur	S/C	26.30	Panther	
45	Fatuha - Sipara	S/C	26.00	Panther	
46	Sipara - Mithapur	S/C	16.00	Panther	
47	Mithapur - Jakkanpur	S/C	1.00	Panther	
48	Gaighat - Mithapur	S/C	5.00	Panther	
49	Fatuha - Gaighat	S/C	23.00	Panther	
50	Fatuha - Katra	S/C	17.00	Panther	
52	Biharsarif (SG) - Barh Ckt.-I	S/C	25.00	Panther	
53	Barh - Hathidah Ckt.-I	S/C	20.00	Panther	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
54	Biharsarif (SG) - Hathidah Ckt.-II	S/C	32.50	Panther	
55	Biharsarif (SG) - Ekangarsarai	S/C	30.00	Panther	
56	Ekangarsarai - Hulasgarh	S/C	14.50	Panther	
57	Baripahari - Harnaut	S/C	26.00	Panther	
58	Harnaut - Fatuha	S/C	45.00	Panther	
59	Biharsarif (SG) - Barhi (DVC) (L-28)	S/C	142.00	Panther	BSPTCL & DVC
60	Barhi (DVC) - Rajgir (L-29)	S/C	16.00	Panther	BSPTCL
61	Rajgir - Biharsarif (L-29)	S/C	126.00	Panther	
62	Biharsarif (SG) - Nawada	S/C	41.00	Panther	
63	Hathidah - Lakhisarai	S/C	28.00	Panther	
64	Hathidah - Shekhpura	S/C	28.00	Panther	
65	Lakhisarai - Jamui	S/C	35.00	Panther	
66	Biharsarif (SG) - Shekhpura	S/C	39.49	Panther	
67	Shekhpura - Jamui	S/C	49.00	Panther	
68	Lakhisarai - Jamalpur	S/C	45.00	Panther	
69	Sultanganj - Jamalpur	S/C	38.00	Panther	
70	Sabour - Sultanganj Ckt I	S/C	30.00	Panther	
71	Sabour - Sultanganj Ckt II	S/C	31.00	Panther	
72	Sultanganj - Deoghar	S/C	105.00	Panther	
73	KhSTPP - Sabour	S/C	25.00	Panther	
74	Purnia(bs) - Naugachia (L-16)	S/C	70.00	Panther	
75	Naugachia - BTPS (L-16)	S/C	136.00	Panther	
76	Purnia(bs) - Khagaria (L-23)	S/C	150.00	Panther	
77	Khagaria - BTPS (L-23)	S/C	60.00	Panther	
78	Purnia(BS) - Katihar	S/C	29.00	Panther	
79	Purnia(BS) - Saharsa	S/C	101.20	Panther	
80	Purnia (BS)- Farbisganj	S/C	85.00	Panther	
81	Kishanganj -Dalkola (WB)	S/C	26.00	Panther	
82	Kishanganj - Farbisganj	S/C	88.60	Panther	
83	Farbisganj - Kataya(Kosi) Ckt.-II (Old)	S/C	50.90	Panther	
84	Madhepura - Saharsa	S/C	50.00	Panther	
85	Madhepura - Sonebarsa	S/C	50.00	Panther	
86	Saharsa - UdaKishanganj	S/C	50.35	Panther	
87	Begusarai - Samastipur (L-9)	S/C	57.00	Panther	
88	Begusarai - Dalsingsarai (L-10)	S/C	34.00	Panther	
89	Dalsingsarai - Samastipur (L-10)	S/C	23.00	Panther	
90	KBUNL - Muzaffarpur Ckt-I	S/C	15.50	Panther	
91	KBUNL - Muzaffarpur Ckt-II	S/C	16.70	Panther	
92	KBUNL - SKMSH	S/C	14.12	Panther	
93	Samastipur - Darbhanga	S/C	40.00	Panther	
94	Samastipur - Hazipur LILO Point - Jandaha	S/C	92.00	Panther	
95	Hazipur - Sheetalpur	S/C	30.00	Panther	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
96	Chapra - Sheetalpur	S/C	40.00	Panther	
97	Muzaffarpur - Vaishali	D/C	30.10	Panther	
98	Chapra - Siwan	S/C	70.00	Panther	
99	Chapra/Siwan - Ekma	S/C	0.60	Panther	
100	Gopalganj - Siwan	S/C	40.00	Panther	
101	Gopalganj - Masrakh-Siwan	S/C	74.87	Panther	
102	Gopalganj - Bettia	D/C	60.75	Panther	
	Gopalganj/BettiaCkt-I LILO at Sidhwalia SM	S/C	12.00	Panther	
103	MTPS - Motihari	S/C	70.00	Panther	
104	Bettia - Motihari	S/C	45.00	Panther	
105	Bettia - Ramnagar	S/C	41.50	Panther	
106	Bettia - Raxaul	S/C	37.10	Panther	
107	Ramnagar - BHPC, Valmikinagar	S/C	77.77	Panther	
108	BHPC, Valmikinagar - NepaL(Surajpura)	S/C	7.20	Panther	
109	Motihari - Dhaka	S/C	24.00	Panther	
110	Dhaka - Sitamarhi	S/C	52.00	Panther	
111	Sitamarhi - Runisaidpur(Reminagar)	S/C	21.00	Panther	
112	Runisaidpur - SKMcH	S/C	35.00	Panther	
113	SKMSH - Muzaffarpur	S/C	15.00	Panther	
114	Darbhanga(220 KV) - Darbhanga(132 KV)	S/C	1.00	Panther	
115	Darbhanga - Phoolparas	S/C	71.80	Panther	
117	Pandaul - Madhubani	S/C	16.00	Panther	
118	Madhubani - Jainagar	S/C	40.00	Panther	
119	Jainagar - Phoolparas	S/C	55.00	Panther	
120	Barauni TPS - Begusarai (L-9 &L-10)	D/C	10.00	Panther	
121	BHPC Kosi (KatAiya) - Duhabi(Nepal)	D/C	3.50	Panther	
122	Biharshariff(BSEB) - Baripahari	D/C	5.00	Panther	
123	Dehri - Sonenagar	D/C	14.45	Panther	
124	Khagaul - Bihta	D/C	14.50	Panther	
125	Khagaul - Digha	D/C	16.00	Panther	
126	Samastipur - MTPS (Kanti)	D/C	85.20	Panther	
127	Sheetalpur - Vaishali	D/C	30.21	Panther	
128	Sonenagar - Aurangabad	D/C	21.00	Panther	
129	Supaul - Phulparas	D/C	31.92	Panther	
131	Madhepura - Supaul	D/C	30.00	Panther	
132	Biharshariff - Hullasgarh	S/C	40.00	Panther	
133	Ara - Ara TSS	S/C	4.01	Panther	
134	Dumroan - Dumroan TSS	S/C	2.00	Panther	
135	Rafiganj - Rafiganj TSS	S/C	4.60	Panther	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
136	Barh/Hathidah line - Mokama TSS	S/C	6.00	Panther	
137	Lakhisaai - Lakhisarai TSS	S/C	6.00	Panther	
138	Khagaul - Khagaul TSS	S/C	1.00	Panther	
139	Fatuha - Khusrupur TSS	S/C	7.20	Panther	
140	Chapra - Chapra TSS	S/C	1.00	Panther	
141	Hazipur - Hazipur TSS	S/C	2.00	Panther	
142	Lakhisari PG to Lakhisarai BSPTCL	D/C	15.34	Panther	
143	Chandauti - Tehta	D/C	15.00	Panther	
144	Tehta - Jehanabad	D/C	40.00	Panther	
145	Sipara - Jakkanpur	D/C	18.00	Panther	
146	Farbisganj - Kataya Ckt.-I (New)	D/C	39.70	Panther	
147	Supaul - Kataya	D/C	59.60	Panther	
148	Samastipur - Hazipur (220 KV)	D/C	70.00	Panther	
149	Bodhgaya - Paharpur TSS	D/C	35.00	Panther	
150	Jamui - Jhajha TSS	D/C	31.00	Panther	
151	Lakhisari PG to Jamui	D/C	25.30	Panther	
152	Dehri to Kudra	S/C	46.00	Panther	
153	kudra to Pusauli	S/C	25.00	Panther	
154	Kudra to kochas	S/C	27.00	Panther	
155	Banjari - KCL	S/C	1.00	Panther	
156	Khagaul - Fatuha	S/C	35.00	Panther	
157	Begusarai - Khusweshthan	S/C	65.54	Panther	
160	Fatuha - Birpahari	S/C	42.00	Panther	
162	Nalanda - (L-28) LILO Point	D/C	2.00	Panther	
163	(L-28) Line - Rajgir grid (t-connection)	S/C	6.00	Panther	
165	Muzaffarpur -SKMCH	S/C	16.7	Panther	
167	Sasaram - Banjari	S/C	47.5	Panther	
168	Tehata- Belaganj	S/C	22	Panther	
169	Aurangabad-Shree Cement	S/C	0.75	Panther	
171	Kahalgaon(BSPTCL) -Sultangunj	D/C	63.5	Panther	
172	Darbhanga-Gangwara GSS	D/C	7.3	Panther	
173	Gangwara GSS-Pandaul			Panther	
174	Kisanganj-Forbesganj Circuit-2	S/C	88.4	Panther	
175	Forbesganj-Kataiya Circuit-3	S/C	39.8	Panther	
178	Mithapur-Karbighaia	S/C	2.47	Panther	
181	Dehri-Kochas	S/C	31.6	Panther	
182	Kochas-Dumraon ckt.I	S/C		Panther	
183	Banka (PG) - Sultanganj	D/C	45.96	Panther	
Jharkhand					
765 kV					
1	Ranchi (New) to Dharamjaygarh	S/C	301	Qd Bermis	PGCIL
2	Ranchi (New) to Dharamjaygarh	S/C	344.6	Qd Bermis	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
400 kV					
1	Chaibasa to Bisra (Rourkela)	S/C	131	Twin-Moose	PGCIL
2	Jamshedpur to Chaibasa	S/C	46	Twin-Moose	
3	Jamshedpur to Bisra	S/C	182	Twin-Moose	
4	Jamshedpur to Mejia-B	S/C	168	Twin-Moose	
5	Jamshedpur to Maithon	S/C	153	Twin-Moose	
6	Maithon to Mejia-B	S/C	97	Twin-Moose	
7	Jamshedpur to DTPS	D/C	156	Twin-Moose	
8	Jamshedpur to Adhunik	D/C	0.3	Quad-Moose	APNRL
9	Jamshedpur to Parulia	S/C	177	Twin-Moose	PGCIL
10	Jamshedpur to Baripada	S/C	141	Twin-Moose	
11	Jamshedpur to TISCO	S/C	39	Twin-Moose	
12	TISCO to Baripada	S/C	116	Twin-Moose	
13	Maithon to Maithon-RB	D/C	31	Twin-Moose	
14	Maithon to Kahalgaon	D/C	172	Twin-Moose	
15	Maithon to Mejia-B	D/C	84	Twin-Moose	
16	Maithon to Gaya	D/C	277	Quad-Moose	
17	Maithon to Durgapur	D/C	70	Lapwing	
18	Ranchi to Maithon RB	D/C	188	Twin-Moose	
19	Ranchi to Maithon	S/C	200	Twin-Moose	
20	Ragunathpur to Maithon	S/C	52.9	Twin-Moose	
21	Ranchi to Raghunathpur	S/C	169.17	Twin-Moose	
22	Ranchi to Sipat	D/C	405	Twin-Moose	
23	Ranchi to Rourkela	D/C	145	Twin-Moose	
24	Ranchi to Ranchi (new)	2XD/C	78.6	Quad-Moose	
25	Ranchi (new) to Chandwa (JK POOL)	D/C	69	Quad-Moose	
26	Koderma to Gaya	D/C	82	Quad-Moose	
27	Koderma to Biharshariff	D/C	111	Quad-Moose	
28	Koderma to BTPS	D/C	100	Twin-Moose	
220 kV					
1	Farakka-Lalmatia	S/C	79	Zebra	PGCIL
2	Ramchandrapur-Joda	S/C	130	Zebra	OPTCL & JSEB
3	Chandil-Santadih (STPS)	S/C	98	Zebra	WBSETCL & JSEB
4	Jamshedpur PG-Ramchandrapur	D/C	0.1	Zebra	JUSNL
5	Ramchandrapur-Chandil	S/C	30	Zebra	
6	Chandil-Ranchi PG	S/C	78.4	Zebra	
7	Tenughat-Patratu	S/C	64	Double Moose	
8	Tenughat-Biharsharif	S/C	180	Double Moose	
9	Ranchi PG-Hatia new	D/C	35	Zebra	
10	PTPS-Hatia new	D/C	42	Zebra	
11	Dumka-Rupnarayanpur PG	D/C	74	Zebra	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
	(Maithon PG)				
12	Chaibasa PG-Chaibasa	D/C	0.7	Zebra	
13	PTPS-Bodhgaya	T/C	136	Zebra	BSPHCL & JSEB
14	BTPS(DVC)-Ramgarh	D/C	54.6	Zebra	DVC
15	BTPS-CTPS_old	D/C	31.84	Zebra	
16	CTPS B (NEW) -Dhanbad	D/C	45.62	AAAC Zebra	
17	Jamshedpur DVC-BTPS	D/C	150	Zebra	
18	Dhanbad-Kalyanaswari	D/C	79.2	Zebra	
19	CTPS A (OLD)-Kalyanaswari	D/C	141.8	Zebra	
20	Dhanbad-Giridih	D/C	44.4	AAAC Zebra	
21	Jamshedpur DVC-Jindal (JODA)	S/C	135	Zebra	
22	CTPS A (OLD) -CTPS B (NEW)	D/C	2.6	AAAC Zebra	
23	Giridhi-koderma	D/C	100.92	AAAC Zebra	
24	Dhanbad - Electro Steel	D/C	58.62	AAAC Zebra	PGCIL
25	BSL-CTPS-A	D/C	9	AAAC Zebra	DVC
		132 kV			
1	ABCIL-Garhwa	S/C	2	Panther	JUSNL
2	Adityapur-Ramchandrapur	D/C	8.3	Panther	
3	Chakradharpur-Rajkharsawan	D/C	22	Panther	
4	Chandil 220kV-Rajkharsawan	S/C	34.5	Panther	
5	Rajjharsawan-Chaibasa 132kV	S/C	20	Panther	
6	Chandil 220kV-Adityapur	S/C	16	Panther	
7	Chandil 220kV-Golmuri	D/C	30	Panther	
8	Chandil 220 kV-Chandil 132 kV	S/C	1	Panther	
10	Deoghar-Sultanganj	S/C	92	Panther	
11	Deogarh-Jamtara	D/C	75	Panther	
12	Jamtara-Madupur	D/C	54	Panther	
13	Deoghar-Shankarpur RLY	S/C	11	Panther	
14	Deoghar-Dumka 220 kV	D/C	68	Panther	
15	Dumka 132 kV-Lalmatiya	D/C	96	Panther	
16	Goielkera-Goielkera Rly	S/C	0.5	Panther	
17	Goielkera-Rajkharsawan	S/C	55	Panther	
18	Gumla-Kamdara	S/C	62	Panther	
19	Kamdara-Hatia Old	S/C	61	Panther	
20	Garhwa-Japla	S/C	50	Panther	
21	Hatia old- Sikadari	S/C	46	Panther	
22	Hatia old-HEC	D/C	8	Panther	
23	Hatia New-Lohardanga	D/C	62	Zebra	
24	Chaibasa 132kV-Kendposi	S/C	30	Panther	
25	Jadugoda-Golmuri	S/C	22	Panther	
26	Lalmatia -Kahalgaon TPP	S/C	47	Panther	POWERGRID
27	Kendposi-Noamndi	S/C	28	Panther	JSEB
28	Kendposi-Joda	S/C	42	Panther	JUSNL & OPTCL

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
29	Lalmatia-Sahebgunj	S/C	49	Panther	JUSNL
30	Lohardanga-Latehar	D/C	56	Zebra	
31	Latehar-Daltonganj	D/C	64	Zebra	
32	Maithon DVC 132kV-Jamtara	S/C	25	Panther	DVC & JSEB
33	PTPS-Hatia Old	S/C	44	Zebra	JUSNL
34	Hatia old-Kanke	S/C	28	Zebra	
35	Kanke-PTPS	S/C	28	Zebra	
36	Rajkharsawan-Adityapur	S/C	36	Panther	
37	Saljhagiri RLY-Golmuri	S/C	4	Panther	
38	Sikkidri (pooling point of SHPS)-Namkum	S/C	34	Panther	
39	Namkum-Hatia new	S/C	27	Panther	
40	Sonenagar-Japla	S/C	49.57	Panther	
41	Tolra RLY-Garhwa	S/C	8	Panther	
42	UMI-Adityapur	D/C	3.5	Panther	
43	Gumla-Lohardaga	D/C	71	Zebra	
44	Dumka-Pakur	S/C	85	Panther	
45	Ramchanderpur-APL (Odisha minerals)	S/C	4	Panther	
46	DVM-DVM Railway	D/C	0.5	Panther	
47	PTPS-Patratu DVC	D/C	6.4	Panther	JSEB & DVC
48	Chandil 220 kV-Tamar	S/C	50	Panther	JUSNL
49	Garwa-Rihand	S/C	106	Panther	JSEB & UPPCL
50	Hatia New-Hatia Old	D/C	0.5	Panther	JUSNL
51	Kamdara-Bakaspur RLY	S/C	15	Panther	
52	Kamdara-Bano RLY	S/C	35	Panther	
53	Kendiposi FD STN-Kendiposi	D/C	-	Panther	
54	Lodhma RLY-Hatia Old	D/C	15	Panther	
55	Namkum- Tatisiloi RLY	D/C	15	Panther	
56	Noamundi-Kendiposi FD STN	S/C	-	Panther	
57	Goelkera -Manoharpur	S/C	10	Panther	
58	Sikkidri (pooling point of SHPS)-SHPS-1	S/C	1	Panther	
59	Sikkidri (pooling point of SHPS)-SHPS-2	S/C	7	Panther	
60	Dumka 220 kV-Dumka 132 kV	D/C	2	Panther	
61	Lalmatia-Sabour	S/C	46.6	Panther	BSPHCL & JSEB
62	Chandil-Manique(JSEB)	D/C	1	Panther	JSEB/DVC
63	Chandil to JUSCO	No details available			
64	Maithon(MHS)-Jamtara	S/C	30	Lark	DVC/JSEB
65	Barhi-Rajgir	S/C	149	Lark	DVC
66	Barhi-Nalanda	S/C	138	Lark	
67	PTPS-Patratu DVC	D/C	12.5	Lark	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
68	Patratu - JSPL		No details available		
69	Barhi-Hazaribhag	D/C	36.5	Lark	DVC
70	Barhi- KTPP	D/C	20.1	Lark	
71	BTPS_B - ECR Gomia	D/C	6.9	AAAC Panther	
72	BTPS B-Barhi	D/C	82	Panther	
73	BTPS B-Konar	S/C	23	Lark	
74	Barhi-Konar	S/C	61	Panther	
75	CTPS A-Gola	D/C	36.02	Lark	
76	CTPS B - Putki	D/C	29	Lark	
		D/C	30	Lark	
77	CTPS A - Purulia DVC	D/C	59.63	Lark	
78	CTPS A - Ramkanali	S/C	60	Lark	
79	Ramkanali - DTPS	S/C	73	AAAC Panther	
80	BSL-CTPS-A	D/C	10	Lark	
81	BSL(MSDS)-CTPS-A	D/C	10	Lark	
82	Gola-Manique(DVC)	D/C	86.14	Lark	
83	Jamshedpur-Chandil	D/C	43.74	Lark	
84	Jamshedpur (DVC)-Mosabani	D/C	39.6	Lark	DVC
85	Jamshedpur to TISCO		No details available		
86	KTPP to Koderma	D/C	18-Jan	Lark	DVC
87	Koderma_JSEB-Koderma_DVC	D/C	18.31	ACSR Panther	
88	Konar -Hazaribhag Rd	D/C	35	Lark	
89	Nimiaghat-Putki	D/C	45	AAAC Panther	
90	Nimiaghat-Giridhi (NEW)	D/C	43.6	AAAC Panther	
91	Giiridhi (NEW) - Giridhi (OLD)		No proper data available		
92	Patherdhi-Putki	D/C	22.6	Lark	DVC
93	Patherdhi-Sindri	D/C	3.22	Lark	
94	Pradhankhanda-Sindri	D/C	20	Lark	
95	Patherdhi-Maithon(MHS)	D/C	41	AAAC Panther	
96	Ramgarh-Gola	D/C	25.3	Lark	
97	Gola -SER Muri	D/C	30.29	Lark	
98	Ramkanali-Panchet	D/C	14.5	Lark	
99	Jamshedpur (DVC)-Purulia DVC	D/C	87	Lark	
100	Kalipahari-Kalyanswari	D/C	28.8	Lark	
101	Kalyanswari-MAL IMPEX FERRO	S/C	1.5	AAAC Panther	
102	Mosabani - JSEB(Dhalbhumgarh)	D/C	10.72	Lark	
103	Maithon(MHS)-Kumardubi	S/C	4.9	Lark	
104	Kumardubi - Panchet	S/C	9.6	Lark	
105	Ramgarh - ECR Barkakana	S/C	10-Jan	Panther	
106	Dhanbad - Govindpur	D/C	24-Jan	AAAC Panther	
107	Ramgarh _Patratu	S/C	30.4	Lark	
108	Ramgarh _Patratu	S/C	28	Lark	
109	North Karnpura - Patratu	D/C	32	Lark	
110	North Karnpura - E.C.Rly	D/C	4.5	Lark	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
111	Putki - Balihari 132kV	S/C	0.5	Lark	
112	Patherdih to Balihari	S/C	24	Lark	
113	CTPS-B to Biada R/S	D/C	12.1	AAAC Panther	
114	CTPS_A to Rajabera	D/C	4.9	Lark	
115	CTPS_B to Jamuria	S/C	119.2	Lark	
116	Maithon(MHS) to Panchet	S/C	14.5	Lark	
117	Maithon(MHS)-Kalyanaswari	D/C	1.6	Lark	
Odisha					
765kV					
1	Jharsuguda pooling station to Dharamjaygarh	D/C	151	ACSR Hexa-ZEBRA	PGCIL
2	Angul to Jharsuguda pooling station	D/C	272	ACSR Quad Bersimis	
400kV					
1	Jaypore to Bolangir PGCIL	S/C	287.7	ACSR Moose	
2	Bolangir PGCIL to Angul	S/C	198	Twin Moose	PGCIL
3	Angul to Meramundali-I	S/C	25	Twin Moose	
4	JITPL to Angul	D/C	68	Twin Moose	Jindal
5	TSTPS to Angul	S/C	68	Twin Moose	
6	Angul to Meramundali-II	S/C	18	Twin Moose	PGCIL
7	TSTPS to Meramundali	S/C	52.3	Twin Moose	
8	GMR to Angul	D/C	30	Quad Moose	GMR
9	Meramundali to JSPL	D/C	37.9	Twin Moose	OPTCL
10	Meramundali to Vedanta (Sterlite)	D/C	222	Twin Moose	PGCIL
11	GMR to Meramundali	S/C	8.5	Twin Moose	
12	Meramundali to Mendhasal	S/C	106	Twin Moose	OPTCL
13	Meramundali to New Duburi	D/C	97	Twin Moose	
14	TSTPS to Rengali	D/C	24	Twin Moose	PGCIL
15	Baripada to Keonjhar	S/C	156.253	ACSR Moose	OPTCL
16	Keonjhar PGCIL to Rengali	S/C	100.278	Twin Moose	OPTCL
17	Baripada to Kharagpur	S/C	100.3	ACSR Moose	WBSETCL & OPTCL
18	Baripada to Jamshedpur	S/C	141	ACSR Moose	
19	Baripada to TISCO (DVC)	S/C	115	ACSR Moose	PGCIL
20	Baripada to Mendhasal	S/C	273.507	ACSR Moose	
21	Baripada to Duburi	S/C	190.274	ACSR Moose	OPTCL
22	Dubri to Mendhasal	S/C	140	Twin Moose	
23	Bisra to TSTPS	D/C	171	Twin Moose	
24	Bisra to Ranchi	D/C	145	ACSR Moose	PGCIL
25	Bisra to Chaibasa	S/C	131.48	ACSR Moose	
26	Bisra to Sterlite	S/C	135	ACSR Moose	PGCIL& Sterlite
27	Sterlite to Raigarh	S/C	147	Twin Moose	
28	Bisra to Raigarh	S/C	230.4	ACSR Moose	PGCIL
29	Bisra to Jharsuguda	D/C	145.315	ACSR Twin Moose	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
30	Jharsuguda to Raigarh	S/C	110.045	ACSR Twin Moose	
31	Jharsugud to Indbarath	S/C	62.572	ACSR Twin Moose	
32	Ind-Bharath to Raigarh	S/C	91	Twin Moose	
33	Indravati PG to Rengali	S/C	356	ACSR Moose	
34	Indravati PG to Jaypore	S/C	72	ACSR Moose	
35	Indravati PG to Indravati OHPC	S/C	4	ACSR Moose	OPTCL
36	Jaypore to Gazuwaka	D/C	225	AAAC	PGCIL
37	TSTPS to Kolar	Double pole	1450	HVDC	
38	Bishra to Jamshedpur	S/C	181.4	ACSR Moose	
		220kV			
1	LILO of Balasore to Duburi new S/C line at Bhadrak	S/C	1.432	Zebra	OPTCL
	Balasore to Bhadrak	S/C	70		
	Bhadrak to New Duburi	S/C	70		
2	Balasore to Baripada	D/C	77	Zebra	
3	Budhipadar to Raigarh	S/C	81	Zebra	
4	Budhipadar to Korba	D/C	183	Zebra	
5	Budhipadar to ITPS	D/C	25.3	AAAC MOOSE	
6	Budhipadar to ITPS	D/C	25.3	AAAC MOOSE	
7	Budhipadar to Vedanta	D/C	16.8	ACSR MOOSE	Vedanta
8	Budhipadar to Bhusan	D/C	14.9	Zebra	OPTCL
9	Budhipadar to SPS	D/C	7.1	Zebra	
10	Budhipadar to Basundhara	S/C	35.8		
11	Budhipadar to Lapanga	D/C	25	Zebra	
	Lapanga to Katapalli	D/C	51		
12	Budhipadar to Tarkera	D/C	102	Zebra	
13	Budhipadar to Aditya Aluminum	D/C	20.5	Zebra	
14	Balimela to Upper Silleru	S/C	24.7	Zebra	
15	Balimela to Balimela SC	S/C	0.2	Zebra	
16	Duburi to New Duburi	D/C	6.4	Zebra	
17	Duburi to NINL (Nilachal)	S/C	5.5	Zebra	
18	New Duburi to Paradeep	D/C	113.34	ACSR+AAAC	
19	New Duburi to JSL	D/C	4.8	Zebra	JSL
20	New Duburi to Maithan Ispat Nigam Limited	S/C	4.8	Zebra	MINL
21	New Duburi to Rohit	S/C	4.8	Zebra	Rohit
22	New Duburi to Balasore	S/C	137.9	Zebra	OPTCL
23	New Duburi to Visa	S/C	10.5	Zebra	Visa
24	New Duburi to Tata steel	D/C	4	Zebra	
25	Meramundali to Dubri	D/C	95.6	ACSR Zebra	OPTCL
26	Meramundali to TSTPS	D/C	42	ACSR Zebra	
27	Meramundali to TTPS	D/C	11.15	ACSR Zebra	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
28	Meramundali to NALCO	D/C	11.47	ACSR Zebra	
29	Meramundali to Bhusan steel	D/C	2.4	ACSR Zebra	
30	Meramundali to Bhanja nagar	D/C	139	ACSR Zebra	
31	Mendhasal to Bhanja nagar	S/C	135	Zebra	
	Mendhasal to Nayagarh	S/C	69		
	Nayagarh to Bhanja nagar	S/C	68.6		
32	Mendhasal to Chandaka	4	6.04 & 7.26	ACSR Zebra	
33	Meramundali to Bidanasi	S/C	92.3	Twin Moose	
34	Bidanasi to Mendhasal	S/C	31.12		
35	Mendhasal to Atri	D/C	16	Zebra	
	Atri to Narendrapur	S/C	120	Zebra	
36	Theruvali to Bhanja nagar	D/C	171.46	Zebra	
37	Theruvali to Narendrapur	D/C	196	Zebra	
38	Theruvali to Indravati	D/C	86	AAAC Zebra	
39	Theruvali to Indravati	D/C	91	AAAC Zebra	
40	Theruvali to Upper Kolab	S/C	123	Zebra	
41	Jaynagar to Laxmi pur	S/C	53.5	Zebra	
	Laxmi pur to Theruvali	S/C	70		
	Theruvali to Jaynagar	S/C	123		
42	Jaya nagar to Upper Kolab	D/C	6	Zebra	
43	Jaya nagar to Jaya nagar PGCIL (Jaypore)	D/C	7.73	Zebra	
44	Jaya nagar to Balimela	S/C	92.03	Zebra	
45	Jaya nagar to Balimela	D/C	93	Zebra	
46	Joda to TTPS	D/C	154	Zebra	
47	Joda to chaibasa	S/C	90	Zebra	
48	Joda to JSPL	S/C	12	Zebra	
	JSPL to Jamshedpur(DVC)	S/C	126		
49	Joda to TSIL	S/C	7.3	Zebra	
50	Joda to Ramchandrapur	S/C	130	Zebra	
51	Katapalli to Bolangir	D/C	117.8	Zebra	
	Bolangir to Bolangir PG	S/C	3		
52	Laxmi pur to Aditya Alumina	D/C	16.9	Zebra	
53	Laxmi pur to Utkal Alumina	D/C	14.1	Zebra	
54	Paradeep to Essar steel	D/C	9	Zebra	
55	Paradeep to IOCL	S/C	6.2	Zebra	
56	Rengali PH to TSTPS	S/C	29.5	Zebra	
57	TSTPS to TTPS	S/C	34.5	Zebra	
58	Rengali PH to TTPS	S/C	70	Zebra	
	Rengali PH to NALCO	S/C	62.7		
	NALCO to TTPS	S/C	8.63		
59	Rengali Switching Station to Rengali PG	D/C	1	Zebra	
60	Rengali Switching Station to	D/C	5	Zebra	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
	Rengali PH				
61	Rengali Switching Station to Barkot	S/C	34.68	Zebra	
	Barkot to Tarkera	S/C	115		
62	Rengali Switching Station to Chandiposh	S/C	102	Zebra	
	Chandiposh to Tarkera	S/C	30		
63	Tarkera to Bisra PG	D/C	15	Zebra	
64	Tarkera to RSP	D/C	10	Zebra	
65	Vedanta to SEL	D/C	6	Zebra	
66	Atri to Pandiabil (Uttara)	D/C	22	Zebra	
	Pandiabil (Uttara) to Samangara	D/C	45.9	Zebra	
		132 kV			
1	Angul to MCL Nandira	D/C	10.82	Panther	
2	Angul to Boinda	S/C	38.5	Panther	
3	Angul to Chainpal	S/C	14.93	Panther	
4	Angul to TTPS	S/C	16	Panther	
5	LILO of TTPS to Duburi S/C line at Jambay Ferro Alloys		0.738	Panther	
	TTPS to Jambay Ferro Alloys	S/C	45		
	Jambay Ferro Alloys Duburi	S/C	8		
6	LILO of ICCL to Salipur S/C line at OCL		25.8	Panther	
	ICCL to Mania	S/C	22		
	Mania to OCL	S/C	5		
	OCL to Salipur	S/C	35		
7	LILO at Kamakhyanagar		1	Panther	OPTCL
	LILO at Kalarangi		13.02		
	LILO at OPCL		23		
	TTPS to OPCL	S/C	24		
	Kamakshya Nagar to OPCL	S/C	40		
	Kalarangi to Kamakhyanagar	S/C	36		
	Duburi to Kalarangi	S/C	20		
8	Chainpal to FCI	D/C	7	Panther	
9	Chainpal to Meramundali	D/C	7.8	Panther	
10	Chainpal to TTPS	3	3	Panther	
11	LILO of Chandaka to Choudwar S/C line at Bidanasi		6.8	Panther	
	Choudwar to Bidanasi	S/C	8.61		
	Bidanasi to BPPL	S/C	35		
	BPPL to Chandaka	S/C	10		
12	Choudwar to Kendrapara Road(Traction)	S/C	4.6	Panther	
13	LILO at Rawmeet		8.78	Panther	
	LILO at Nuapatna Tap		-		
	LILO at Arati steel		11.01		

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
	Meramundali to Arati steel	S/C	66		
	Nuapatna Tap Arti Steel	S/C	20		
	Arti Steel to Rawmet	S/C	22.3		
	Choudwar to Rawmet	S/C	27.5		
14	LILO at Maheswari		4.88	Panther	
	LILO at ICCL		-		
	Dhenkanal to Maheswari	S/C	28		
	Maheswari to ICCL	S/C	23.5		
	ICCL to Grid Steel (GSAL)	S/C	2		
	Grid Steel (GSAL) to Choudwar	S/C	1.85		
15	Dhenkanal to Meramundali	S/C	43.8	Panther	
16	Dhenkanal to Joranda traction	S/C	19.35	Panther	
17	LILO at Ranasinghpur		1.33	Panther	
	LILO at Kesura		-		
	Chandaka to Ranasinghpur	S/C	23.6		
	Ranasinghpur to Kesura	S/C	26.36		
	Kesura to Nimpara	S/C	43.17		
18	Chandaka to Nimpara	S/C	62	Panther	
19	Chandaka to Mendhasal	S/C	36.5	Panther	
	Mendhasal to Khurda	S/C	36.5	Panther	
20	Chandaka to Bhubaneswar	D/C	5.5	Panther	
21	LILO of Bhubaneswar to Cuttack S/C line at Phulnakhara		-	Panther	
	Bhubaneswar to Phulnakhara	S/C	23.45		
	Phulnakhara to Cuttack	S/C	19.95		
22	Cuttack to Jagatsinghpur	S/C	35.15	Panther	
23	Jagatsingpur to Paradeep	S/C	56.1	Panther	
24	Jagatsingpur to Gorakhnath (Traction)	S/C	16.23	Panther	
25	Nimpara to Konark	S/C	20.31	Panther	
26	Puri to Nimpara	S/C	30	Panther	
27	Puri to Samangara	S/C	15	Panther	
	Samangara to Nimpara	S/C	20		
28	Khurda to Arugul Tap	S/C	15	Panther	
	Arugul Tap to Arugul	S/C	3.86		
	Arugul Tap to Shamukh	S/C	35.6		
	Shamukh to Puri	S/C	18.6		
29	Khurda to Kaipadar traction	S/C	11.5	Panther	
30	LILO at Balugaon		9.135	Panther	
	LILO at Chandpur		2.31		
	Khurda to Balugaon T	S/C	68.57		
	Balugaon T to Chandapur	S/C	5		
	Chandapur to Balugaon	S/C	30		
	Balugaon to Chatrapur	S/C	54.19		
	Balugaon T to Atri	S/C	18	Panther	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
	Argul to Atri	S/C	19.4	Panther	
	Atri to Baki	S/C	19.6	Panther	
31	Balugaon T to Narendrapur	S/C	86	Panther	
32	Balugaon to Solari Rly	S/C	15	Panther	
33	Chatrapur to Ganjam	S/C	12	Panther	
34	Chatrapur to IRE	D/C	5.8	Panther	
35	Chatrapur to Narendrapur	D/C	13.9	Panther	
36	Chatrapur to Rambha Traction	S/C	28.9	Panther	
37	Chatrapur to Aska	S/C	43.82	Panther	
38	LILO of Aska to Chatrapur S/C line at Purusottampur		2.5	Panther	
	Chatrapur to Purusottampur	S/C	22		
	Purusottampur to Aska	S/C	24		
39	Aska to Bhanja nagar	D/C	33	Panther	
40	Bhanja nagar to Phulbani	S/C	86.56	Panther	
41	Aska to Berhampur	S/C	33.96	Panther	
42	Berhampur to Narendrapur	D/C	11	Panther	
43	LILO of Berhampur to Mohanan S/C at Digapahandi		1.88	Panther	
	Berhampur to Digapahandi	S/C	39		
	Digapahandi to Mohanan	S/C	19		
44	Narendrapur to Jagannathpur traction	S/C	0.54	Panther	
45	LILO of Rayagada to Mohana S/C line at Akhusinghi		-	Panther	
	Rayagada to Akhusinghi	S/C	65		
	Akhusinghi to Mohana	S/C	55		
46	Akhusinghi to Parlakemundi	S/C	76.9	Panther	
47	Rayagada to VVC Ferro (JESCO)	S/C	0.3	Panther	
48	Rayagada to Jayanagar	S/C	108	Panther	
49	Rayagada to Theruvali	S/C	20	Panther	
50	Theruvali to IMFA	S/C	2	Panther	
51	Theruvali to J.K. paper	S/C	9.7	Panther	
52	LILO of Kesingh to Theruvali S/C line at Vedanta Aluminum		12.4	Panther	
	Theruvali to Vedanta Aluminum	S/C	63.7		
	Vedanta Aluminum to Kesingh	S/C	59.4		
53	Jayanagar to Tentulikhunti	S/C	54.6	Panther	
54	Jayanagar to Meenakshi	S/C	53.2	Panther	
55	Jayanagar to Machukhand	S/C	43	Panther	
56	Jayanagar to Machukhand (RE line)	S/C	148	Panther	
	Jayanagar to Jayanagar Traction	S/C	0.54		
	Jayanagar Traction to Maliguda traction	S/C	12		

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
	Maliguda traction to Manbar traction	S/C	17.7		
	Manbar traction to Machukhand road	S/C	37		
	Machukhand road to Machukhand	S/C	50		
57	Jayanagar to Damanjodi	S/C	45	Panther	
	Damanjodi to Sundarbeda	S/C	13		
58	Jayanagar to Sunabeda	S/C	40	Panther	
59	Jayanagar Traction to Ch Kusumi Traction	S/C	20	Panther	
60	Sunabeda to HAL	S/C	0.7	Panther	
61	Machukhand to Vizag	D/C	45(160)	Lark	
62	Machukhand road to Padwa Traction	S/C	20	Panther	
63	Dabugaon to Tentulikhunti	S/C	43.2	Panther	
64	Dabugaon to Umerkote	S/C	45.9		
65	LILO of Kesinga to Junagarh S/C line at Bhawanipatna		6.61	Panther	
	Kesinga to Bhawanipatna	S/C	43		
	Bhawanipatna to Junagarh	S/C	37.4		
66	Kesinga to Khariar	S/C	58.5	Panther	
67	Kesinga to Powmax (turla)	S/C	14.5	Panther	
68	Kesinga to Saintala	S/C	40	Panther	
	Saintala to Bloangir Old	S/C	33	Panther	
69	Khariara to Naupara	S/C	77.23		
70	LILO of Bolangir to Patnagarh S/C line at New Bolangir		0.492	Panther	
	Bolangir to New Bolangir	S/C	3		
	New Bolangir to Patnagarh	S/C	39.8		
71	Bolangir to Bolangir New	S/C	3	Panther	
72	LILO of New Bolangir to Bargarh S/C line at Barpali				
	Barpali to Bargarh	S/C	26	Panther	
	New Bolangir to Barpali	S/C	60	Panther	
73	Bolangir to Sonepur	S/C	54	Panther	
74	Sonepur to Boudh	S/C	51.05	Panther	
75	Patnagarh to Padampur	S/C	44.6	Panther	
76	Baragarh to ACC	S/C	3	Panther	
77	LILO of Chiplima to Bargarh S/C line at Katapali		12.66	Panther	
	Chiplima to Katapali	S/C	16.38		
	Katapali to Bargarh	S/C	38.54		
79	Burla to Chiplima	D/C	20	Panther	
80	LILO at Katapali		8.47	Panther	
	LILO at Rairakhole		0.5		

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
	Burla to Katapali	S/C	11.1		
	Katapali to Rairakhole Tap	S/C	85.16		
	Rairakhole Tap to Sambalpur	S/C	0.386		
	Rairakhole Tap to Rairakhole	S/C	65.25		
	Rairakhole to Boinda	S/C	89.9		
81	Burla to Hindalco	D/C	8.3	Panther	
82	LILO at Sambhalpur		0.47	Panther	
	LILO at Shyam DRI		29.35		
	LILO at Aryan ispat		6.93		
	Burla to Sambalpur	S/C	19.93		
	Sambalpur to Shyam DRI	S/C	33		
	Shyam DRI to Aryan Steel	S/C	10		
	Aryan Steel to Lapanga	S/C	5		
83	Lapanga to SMC	S/C	12	Panther	
	SMC to Kuchinda	S/C	53.33	Panther	
	Kuchinda to Rajgangpur	S/C	100.68	Panther	
	Burla-Rajganpur Tap to Bamra traction	S/C	5	Panther	
	Rajgangpur to Trakera	S/C	28.38	Panther	
	Trakera to Raurkela	S/C	3	Panther	
84	Lapanga to Burla	D/C	57.33	Panther	
	Bhudipadar to Lapanga	D/C	16.4	Panther	OPTCL
85	Bhudipadar to Sundargarh	D/C	29.92	Panther	
86	Bhudipadar to Brajaraj Nagar	S/C	11.7	Panther	
87	Bhudipadar to MSP	S/C	0.592	Panther	
88	Bhudipadar to Jharsuguda	S/C	7	Panther	
89	LILO of Bhudipadar to Tarkera S/C Line at Rajgangpur		1.2	Panther	
	Bhudipadar to Rajgangpur	S/C	81		
	Rajgangpur to Tarkera	S/C	29		
90	Bhudipadar to Kalugaon	S/C	95	Panther	
	Kalugaon to Tarkera	S/C	15		
91	Bhudipadar to MCL	D/C	23	Panther	
92	Jharsuguda to Jharsuguda Traction	S/C	0.15	Panther	
93	Jharsuguda to Action ispat	S/C	1.6	Panther	
94	Jharsuguda to L&T	D/C	15.7	Panther	
95	Rajgangpur to OCL	S/C	0.5	Panther	
96	Rajgangpur to Rajgangpur Traction	D/C	2.1	Panther	
97	Tarkera to Rourkela	D/C	3	Panther	
98	Tarkera to RSP	3	11.04	Panther	
99	Tarkera to Chhend	D/C	6.16	Panther	
100	Chhend to NugaonTraction	S/C	36	Panther	
101	Chhend to Adhunik	S/C	21	Panther	
102	Adhunik to Sriganesh	S/C	2	Panther	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
103	LILO at Barbil		1.36	Panther	OPTCL
	LILO at Arya		0.47		
	LILO at Beekey		2.4		
	LILO at Bolain		7.88		
	Rourkela to Bhalulata Tap	S/C	27		
	Bhalulata Tap to Beekay Steels	S/C	14		
	Beekay Steels to Nalda	S/C	14		
	Nalda to Nalda Traction	S/C			
	Nalda to Barbil	S/C	8		
	Barbil to Arya Iron	S/C	10		
	Arya Iron to Bolani	S/C	12		
	Bolani to Joda	S/C	25		
	Bhalulata top to Bhalulata traction	S/C	3.72		
104	Joda to Kenduposi	S/C	50	Panther	
105	Joda to Bansapani	S/C	2.99	Panther	
106	Joda to FAP_Joda	S/C	1	Panther	
107	Arya iron to BRPL	S/C	9.008	Panther	
110	LILO at Karanjia		23.51	Panther	
	LILO at Polasapanga		18		
	Karenjia to Rairangpur	S/C	72.46		
	Polasapanga to Karenjia	S/C	90		
	Joda to Polasapanga	S/C	55		
111	Polasapanga to Keonjhargarh	S/C	19.433	Panther	
112	Rairangpur to Kuchei	S/C	66.1	Panther	
113	Kuchei to Baripada	S/C	11	Panther	
114	Baripada to Balasore	S/C	57.3	Panther	
115	Balasore to Birla Tyre	S/C	3	Panther	
116	Balasore to Somanthpur	S/C	3	Panther	
	Somanthpur to Emami	S/C	1.5	Panther	
117	Balasore to Balasore Traction	S/C	3.6	Panther	
118	Balasore to Balasore Alloys	S/C	6	Panther	
119	LILO of Balasore to Jaleswar S/C line at Basta		0.536	Panther	
	Balasore to Basta	S/C	24.5		
	Basta to Jaleswar	S/C	32.5		
120	LILO of Balasore to Bhadrak S/C line at Soro		1.01	Panther	
	Balasore to Soro	S/C	34.8		
	Soro to Bhadrak	S/C	40.3		
121	Jaleswar to Jaleswar Traction	S/C	2	Panther	
122	Bhadrak to Dhamara Traction	S/C	36	Panther	
123	Bhadrak to Dhamara Port	S/C	65	Panther	
124	Bhadrak to FACOR	S/C	4.6	Panther	
125	Bhadrak to Bhadrak Traction	S/C	8.5	Panther	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
126	LILO of Bhadrak to Jajpur road S/C at Jajpur town		10.51	Panther	
	Jajpur road to Jajpur Town	S/C	28		
	Jajpur Town to Bhadrak	S/C	38		
127	Jajpur Road to Anadapur	S/C	29.38	Panther	
128	Jajpur Road to Kendrapara	S/C	63	Panther	
129	LILO of Jajpur Road to Kendrapara S/C line at Chandikhole		1.63	Panther	
	Jajpur Road to Chandikhole	S/C	32		
	Chandikhole to Kendrapara	S/C	34.1		
130	Jajpur Road to Duburi	D/C	13	Panther	
131	Kendrapara to Pattamundai	S/C	19.5	Panther	
132	Kendrapara to Paradeep	S/C	34.8	Panther	
133	Kendrapara to Marshghai	S/C	12	Panther	
	Marshghai to Paradeep	S/C	31.5	Panther	
134	Paradip to IFFCO	D/C	7.2	Panther	
135	Paradip to PPT	D/C	7.7	Panther	
136	Paradip to PPL	D/C	6.2	Panther	
137	Duburi to MISRILAL (MSL)	S/C	9	Panther	
138	Duburi to MESCO	S/C	5	Panther	
139	LILO of Duburi to MESCO S/C line at BRPL		2.78	Panther	
	Duburi to BRPL	S/C	4		
	BRPL to MESCO	S/C	6.5		
140	Duburi to Jakhpur Traction	S/C	13.2	Panther	
141	LILO of Duburi to TISCO (Bamanipal) S/C Line at B.C.Mohanty			Panther	
	Duburi to B.C. Mohanty	S/C	8		
	B.C. Mohanty to TISCO (Bamanipal)	S/C	12.97		
142	B.C. Mohanty to Tomaka traction	S/C	11.86	Panther	
143	Meramundali to ML Rungta	S/C	7.5	Panther	
144	Meramundali to BRG	S/C	3.55	Panther	
145	Nuapatna Tap to Nuapatna	S/C	37.12	Panther	
146	Nuapatna Tap to Dhenkanal	S/C	37.12	Panther	
149	KHARGPRASAD to Meramundali	D/C	5.5	Panther	
150	KHARGPRASAD to Nabbharat	D/C	0.57	Panther	
151	KHARGPRASAD to Salibahan	S/C	7	Panther	
152	KHARGPRASAD to Hind Metal	S/C	0.5	Panther	
153	KHARGPRASAD to Samal Metal	S/C	1.03	Panther	
155	KHARGPRASAD to Traction	S/C	1.17	Panther	
Sikkim					
400kV					

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
1	Lilo of Teesta-V to Binaguri D/C line (115km) at Rangpo	D/C	-	Twin Moose	PGCIL
	Teesta-V to Rangpo		12.32		
	Rangpo to Binaguri		110		
220kV					
1	Jorethang loop to Rangpo	S/C	**25**	Zebra	
2	LILO of one circuit of 220kV D/C from Jorethang loop to new melli at Rangpo	S/C		Zebra	
	Jorethang loop to New Melli		10	Zebra	
	Rangpo to new melli		26	Zebra	
132kV					
1	Rangit to Rammam	S/C	27	Panther	PGCIL
2	Rangit to Rangpo	S/C	54.17	Panther	PGCIL
3	Rangeet HEP to Sagbari	S/C	0.3	Panther	NHPC
4	Sagbari to Melli	S/C	32	Panther	-
5	Sagbari to Geyzing	S/C	15.5	Panther	
7	LILO of Gangtok to Melli at Rangpo and Chuzachen	S/C	-	-	-
	Rangpo to Gangtok		26	-	-
	Rangpo to Chuzachen		21	Panther	Gati infra
	Gangtok to Chuzachen		48.6	Panther+Zebra	Sikkim
8	Melli to NJP	S/C	90	Panther	PGCIL
9	Melli to Rangpo	S/C	16.61	Panther	
10	Rangit to Kurseong	S/C	68	Panther	
66kV					
1	LLHP G/T to Ranipool	D/C	0.2	Dog	Sikkim Gov
2	Ranipool to Gangtok PGCIL	S/C	0.7	Dog	
3	Ranipool to Pakyong	S/C	12	Dog	
4	Pakyong to Rongli	S/C	21	Dog	
5	Ranipool to Topakhani	S/C	15	Dog	
6	Tadong to Gangatok PGCIL	S/C	8	Dog	
7	Tadong to Sichey	S/C	5	Dog	
8	Tadong to Phudong	S/C	18	Dog	
9	Sichey to Bulbuley	S/C	4	Dog	
10	Bulbuley to Gangatok PGCIL	S/C	10	Dog	
11	Mangan to Meyong HEP	S/C	12	Dog	
12	Mangan to Phudong	S/C	20	Dog	
13	Rongli HEP to Rongli	S/C	4.9	Dog	
14	Rongali to Rhenock	S/C	12	Dog	
15	Geyzing 132kV to Geyzing 66kV	S/C	0.2	Dog	
16	Geyzing 132kV to Pelling	S/C	2.1	Dog	
17	Geyzing to Namchi	S/C	25	Dog	
18	Melli 132kV to Melli 66kV	S/C	0.1	Dog	
19	Melli 66kV to Purano Namchi	S/C	22	Dog	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
20	Melli 66kV to Namchi	S/C	22	Dog	
21	Melli 66kV to Mamring	S/C	18	Dog	
22	Melli 66kV To Kalingpong	D/C	15	Dog	
23	Rangit HEP to Ravangla	S/C	13	Dog	
24	Purno Namchi to Rohatak	S/C	9	Dog	
25	Rohtak to Soreng	S/C	11	Dog	
West Bengal					
400kV					
1	Jeerat to KTPS	S/C	136	Twin Moose	WBSETCL
2	Jeerat to Bakreswar	S/C	163	Twin Moose	
3	Jeerat to Behrampur	S/C	200	Twin Moose	PGCIL
4	Jeerat to Subhashgram	S/C	80	Twin Moose	
5	Farakka (NTPC) to Behrampur	S/C	73	Twin Moose	
6	Sagardighi to Behrampur	D/C	26	HTLS	
7	Behrampur to Behramara (Bangladesh)	D/C	71*	Twin Moose	
8	Subhashgram to Haldia	D/C	90	Twin Moose	CESC
9	Sagardighi to Subhashgram	S/C	246	Twin Moose	PGCIL
10	Farakka (NTPC) to Sagardighi	S/C	67	Twin Moose	PGCIL
11	Farakka (NTPC) to Kahalgaon I, II, III & IV	4	95	Twin Moose	
12	Farakka (NTPC) to Malda	D/C	40	Twin Moose	
13	Sagardighi to Parulia (PGCIL)	D/C	171	Twin Moose	WBSETCL
14	Arambag to KTPS	S/C	78	Twin Moose	
15	KTPS to Kharagpur	S/C	95	Twin Moose	
16	KTPS to Kharagpur	S/C	91	Twin Moose	
17	Kharagpur to Baripada	S/C	98	Twin Moose	WBSETCL & OPTCL
18	PPSP to Arambag	D/C	210	Twin Moose	WBSETCL
19	PPSP to Bidhanagar	D/C	183.5	Twin Moose	
20	Parulia (PGCIL) to Bidhanagar (Durgapur)	D/C	11	Twin Moose	
21	Parulia (PGCIL) to Jamshedpur	S/C	177	Twin Moose	PGCIL
22	Durgapur (DSTPS) to Raghunathpur(RTPS)	D/C	70.5	Twin Moose	DVC
23	Maithon to Raghunathpur(RTPS)	S/C	52.9	Twin Moose	DVC & PGCIL
	Raghunathpur(RTPS) to Ranchi		169		
24	Raghunathpur(RTPS) to Ranchi	D/C	155	Quard Moose	DVC
25	Durgapur (DSTPS) to Jamshedpur PG	D/C	161	Twin Moose	DVC & PGCIL
26	Maithon to Mejia- B	S/C	84	Twin Moose	PGCIL
	Mejia- B to Jamshedpur		168		
26	Maithon to Mejia- B	D/C	59	Twin Moose	
26	Malda (PGCIL) to Purnea	D/C	167	Twin Moose	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
27	Binaguri (PGCIL) to Purnia I & II	D/C	168	Twin Moose	
28	Binaguri (PGCIL) to Purnia III & IV	D/C	160	Quad Moose	
29	Binaguri (PGCIL) to Malbase	S/C	121*	Twin Moose	
30	Binaguri (PGCIL) to Rangpo-I	S/C	110	Twin Moose	
31	Binaguri (PGCIL) to Rangpo-II	S/C	110	Twin Moose	
32	Binaguri (PGCIL) to Bongaigaon	D/C	217	Twin Moose	
33	Binaguri (PGCIL) to Bongaigaon	D/C	220	Quad Moose	
34	Binaguri (PGCIL) to Tala IV	S/C	98*	Twin Moose	
35	Binaguri (PGCIL) to Tala I & II	D/C	115*	Twin Moose	
36	Farakka (NTPC) to Parulia (PGCIL)	D/C	150	Twin Moose	
37	Arambag to Bakreswar	S/C	130	Twin Moose	WBSETCL
38	Maithon to Parulia (PGCIL)	D/C	70.7	Twin Moose	PGCIL
39	Bidhannagar to Arambag	S/C	115	Twin Moose	
		220kV			
1	Bakreswar to Bidhanagar	D/C	40	Zebra	WBSETCL
2	Bidhanagar to Waria (DTPS)	D/C	17.2	ACSR DEER	DVC
3	Bidhanagar to DPL	D/C	10	Zebra	WBSETCL
4	Gokarna to Bakreswar	D/C	81	Zebra	
5	Jeerat to New Town	D/C	40	Zebra	
6	KTPS to Howrah	D/C	71	Zebra	
7	NJP (WB) to Binaguri	D/C	6	Zebra	PGCIL
8	J K nagar to Bidhanagar	S/C	40.49	Deer+Zebra	WBSETCL/IPCL
9	J K Nagar to STPS	S/C	89.89	Deer+Zebra	
10	STPS to New Bishnupur	S/C	145.5	Zebra	WBSETCL
11	Subhasgram (WB) to Subhasgram (PG)	D/C	0.6	Moose	
12	Kharagpur to Midnapur	D/C	45.6	Zebra	
13	Dalkhola to Dalkhola (PG)	D/C	1	Zebra	PGCIL
14	Dalkhola PG to Kishanganj	D/C	31	Zebra	
	Kishanganj to Siliguri (PG)	D/C	108	Zebra	
15	Dalkhola PG to Purnea	D/C	41	Zebra	
16	Dalkhola PG to Malda	D/C	116	Zebra	
17	Binaguri to Siliguri (PG)	D/C	6	Zebra	
18	Binaguri to Birpara	D/C	80	Zebra	
19	Birpara to Salakati (NER)	D/C	160	Zebra	
20	Birpara to Malbase	S/C	40	Zebra	
21	Birpara to Chukha	D/C	38	Zebra	PGCIL
22	Gokarna to Sagardighi	D/C	40	Zebra	WBSETCL
23	Farakka to Lalmatia	S/C	79	Zebra	PGCIL
24	STPS to Chandil	S/C	98	Zebra	WBSETCL & JSEB
25	Subhashgram (PG) to Newtown (wbsetcl)	S/C	24	Zebra	WBSETCL
26	Kasba to EMSS	S/C	1	Single Core	CESC

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
				XLPE	
27	Subhasgram (PG) to EMSS (CESC)	D/C	23.2	ACSR Moose	
28	EMSS to Budge budge G.S(BBGS)	D/C	85	Moose	
		D/C	2.5	800 sqmm, XLPE	
29	NCGS to EMSS	D/C	19	800 sqmm, XLPE	
30	Arambagh to Midnapore	D/C	71	Zebra	WBSETCL
31	Arambagh to Rishra	S/C	73	Zebra	
32	Arambag to New Bishnupur	D/C	49	Zebra	
33	Bakreswar to Satgachia	D/C	132	Zebra	
34	Domjur to Arambagh	D/C	58	Zebra	
35	Howrah to Foundry Park	D/C	34	Zebra	
36	Foundry Park to Domjur	D/C	14.5	Zebra	
37	Jeerat to Satgachia	D/C	78	Zebra	
38	Kasba to Jeerat	D/C	55	Zebra	
39	Kasba to Subhasgram (WB)	D/C	22	Zebra	
40	Krishnanagar to Satgachia	D/C	52	Zebra	
41	NJP (WB) to TLDP-III	S/C	80.8	Zebra	
42	NJP (WB) to TLDP-IV	D/C	145	Zebra	
43	New Haldia to KTPS	D/C	56	Zebra	
44	Bidhanagar to Asansol	S/C	114	Zebra	
45	STPS to Asansol	S/C	62	Zebra	
46	STPS to Hura	S/C	45.3	Zebra	
47	Hura to New Bishnupur	S/C	131.8	Zebra	
48	Subhasgram (WB) to Lakshmikantapur	D/C	43	Zebra	
49	Jeerat to Rishra	S/C	70	Zebra	
50	Jeerat to Dharampur	S/C	32.5	Zebra	
51	Dharampur to Rishra	S/C	32.5	Zebra	
52	Malbase to Chukha	S/C	36	Zebra	PGCIL
53	Subhasgram (PG) to Bantala-CLC(wbsetcl)	S/C	20.7	Zebra	WBSETCL
54	Bantala (CLC) to New town	S/C	20	Zebra	
55	Kalyanisweri to Maithon(Pithakari) PGCIL	D/C	7.6	Zebra	PGCIL
56	Maithon(Pithakari) to Dhanbad	D/C	52	Zebra	
57	Mejia to Borjora	D/C	8.5	ACSR Zebra	DVC
58	Mejia to Muchipara (Durgapur)	D/C	31.45	Zebra	
59	Muchipara(Durgapur) - Parulia(DVC)	D/C	14.75	Zebra	
60	Parulia (DVC) to Tumla	3	6	Zebra	
61	Burnpur to IISCO	D/C	1.2	AAAC ZEBRA	
62	Mejia (DVC) to Waria DTPS (DVC)	D/C	42	Zebra	
63	Waria (DTPS) to Parulia (DVC)	D/C	22	Zebra	
64	Parulia (DVC) to Parulia (PG)	D/C	1	Zebra	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
65	Mejia to Kalyanswari	S/C	54.9	Zebra	
66	Mejia to Burnpur	S/C	58.23	Zebra	
67	Burnpur to Kalyanswari	S/C	22	Zebra	DVC
68	Gokarna to Krishnanagar	D/C	105	Zebra	WBSETCL
69	Kharagpur to Vidyasagar Park	D/C	32.5	Zebra	
		132kV			
1	Adisaptagram to Belmuri	D/C	32	Panther	
2	Adisaptagram to BTPS	D/C	10	Panther	
3	Alipurduar to Coochbehar	S/C	19	Panther	
4	Amtala to Debagram	D/C	40.5	Panther	
5	Arambag to Birsingha	D/C	24	Panther	
6	Arambag to Raina	D/C	32	Panther	
7	Arambag to Tarakeswar	D/C	34	Panther	
8	Ashoknagar to Basirhat	D/C	39	Panther	
9	Bagmundi to Purulia(WB)	S/C	69	Panther	
10	Balichak TSS to Pingla	S/C	18	Panther	
11	Bankura to Bankura TSS	S/C	0.6	Panther	
12	Bankura to Bishnupur New	D/C	36.2	Panther	
13	Bankura to Bengal Concast	S/C	3.84	Panther	
14	Bankura to Raghunathpur	D/C	59.6	Panther	
15	Barasat to New Town AA-III	D/C	35	Panther	
16	Barasat to Barasat TSS	S/C	3	Panther	
17	Berhampore to Amtala	D/C	47.3	Panther	
18	Berhampore to Cossimbazar traction	S/C	13	Panther	
19	Bighati to Rishra	D/C	10	Panther	WBSETCL
20	Birpara to Alipurduar	S/C	54	Panther	
21	Birpara to Coochbehar	S/C	67	Panther	
22	Birpara to Birpara (PG)	D/C	0.5	Panther	
23	Bishnupur to (Chandrakonaroad) CK Road	S/C	48	Panther	
24	Bishnupur to Midnapur	S/C	88	Panther	
25	Bishnupur to Modern/ Gaytri (load)	S/C	4	Panther	
26	Bishnupur to New Bishnupur	D/C	5.5	Panther	
27	Bishnupur to New Bishnupur	S/C	3	Panther	
28	Bishnupur to Rohit Ferro	S/C	2.8	Panther	
29	New Bishnupur to Borjora	D/C	44.5	Panther	
30	Borjora to Durgapur (Bidhanagar)	D/C	27	Panther	
31	Bolpur to Durgapur (Bidhanagar)	D/C	71	Panther	
32	Bolpur to Sainthia	D/C	40	Panther	
33	BTPS to Dharampur	3	26	Panther	
34	BTPS to Bighati	D/C	25	Panther	
36	BTPS to Kalyani	S/C	22	Panther	
37	BTPS to Khanyan	S/C	18	Panther	
38	BTPS to Satgachia	S/C	55	Panther	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
39	Chanditala to Rishra	D/C	6	Panther	
40	CK road to Ck road traction	S/C	5	Panther	
41	Contai to Egra	S/C	32	Panther	
42	Contai to New Haldia	S/C	77	Panther	
43	Dalkhola to Raigaunj	D/C	51	Panther	
44	Dalkhola to TCF PS - III	D/C	95	Panther	
45	Dankuni to Hind Motor	S/C	7	Panther	
46	Dankuni to Liluah	S/C	8	Panther	
47	Debagram to Debagram TSS	S/C	6	Panther	
48	Debagram to Katwa	D/C	35	Panther	
49	Dharampur to Kalyani	S/C	10	Panther	
50	Dharampur to Ranaghat	D/C	26	Panther	
51	Dharampur to Titagarh	D/C	29	Panther	
52	Dhulian to Farakka	S/C	22	Panther	
53	Domjur to Jangipara	D/C	17	Panther	
54	Domjur to Uluberia	D/C	27	Panther	
55	Durgapur (Bidhanagar) to DPL	D/C	10	Panther	
56	Durgapur (Bidhanagar) to Mankar	D/C	30	Panther	
57	Durgapur (Bidhanagar) to Ukhra	D/C	22.5	Panther	
58	Egra to New Haldia	S/C	100	Panther	
59	Gangarampur to Balurghat	S/C	35	Panther	
60	Gokarna to Katwa	D/C	57	Panther	
61	Gokarna to Berhampore	D/C	18	Panther	
62	Gokarna to Lalgola	S/C	46.8	Panther	
	Gokarna to Lalgola	S/C	67	Panther	
63	Lalgola to Raghunathganj	S/C	27	Panther	
64	Gokarna to Raghunathganj	S/C	42	Panther	
65	Gokarna to Rampurhat	S/C	63	Panther	
66	Gokarna to Kuli	S/C	23.6	Panther	
67	Haldia to Haldia NIZ	D/C	22	Panther	
68	Haldia NIZ to Rohit Ferro	S/C	2	Panther	
69	Haldia to TATA Power	D/C	6.5	Panther	
70	Haldia to New Haldia	S/C	2	Panther	
71	Haldia NIZ to Maniksia	S/C	1	Panther	
72	Hizli to Midnapur	D/C	25.5	Panther	
73	Egra to Bengal Energy (BEL)	S/C	50.1	Panther	
74	Bengal Energy (BEL) to Hizli	S/C	22.7	Panther	
75	Hind Motor (HM) to Rishra	S/C	13	Panther	
76	Howrah to Liluah I&II	D/C	14	Panther	
77	Howrah to Liluah III	S/C	18	Panther	
78	Howrah to Liluah IV	S/C	24	Panther	
79	HPCL to Haldia	S/C	3	Panther	
80	HPCL to New Haldia	S/C	2	Panther	
81	Jeerat to Ashoknagar	D/C	15	Panther	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
82	Jeerat to Barasat	D/C	24.5	Panther	
83	Jeerat to Bongaon	D/C	36	Panther	
84	Jeerat to Dharampur	D/C	14	Panther	
85	Kalna to Satgachia	D/C	18.75	Panther	
86	Kasba to Salt Lake	S/C	21	Panther	
87	Kasba to KLC	S/C	13	Panther	
	KLC to Salt Lake	S/C	13	Panther	
88	Kasba to Sonarpur	S/C	12	Panther	
89	Katwa to Katwa TSS	S/C	2.4	Panther	
90	Katwa to Satgachia	D/C	45	Panther	
91	Khanyan to Satgachia	S/C	42	Panther	
92	Kharagpur (DVC) to Kharagpur(WB)	S/C	1	Panther	
93	Khargapur (WBIDC) to TATA Metalic	S/C	5	Panther	
94	Khatra to Bishnupur_old	D/C	66.5	Panther	
95	Khejuria to Farakka D/C (Cable)	D/C	2.6	Panther	
96	Kolaghat to KTPS	D/C	4	Panther	DVC
97	Kolaghat to Madras Cement	S/C	5	Panther	WBSETCL
98	Krishnanagar to Bongaon	D/C	53	Panther	
99	Krishnanagar to Debagram	D/C	46	Panther	
100	Krishnanagar to Ranaghat	D/C	33.4	Panther	
101	KTPS to Tamluk	D/C	19	Panther	
102	KTPS to Uluberia	S/C	29	Panther	
	KTPS - Bagnan	S/C	16		
	Bagnan - Uluberia	S/C	21		
103	Kuli to Sainthia	S/C	35.6	Panther	
104	Laxmikantapur to Falta	D/C	34	Panther	
106	Laxshmikantapur to Kakdwip	D/C	53.5	Panther	
107	Liluah to BTPS	S/C	58	Panther	
108	Liluah to Rishra	S/C	19.5	Panther	
109	Liluah to Rishra	S/C	36	Panther	
110	Mahachanda to Mankar	D/C	43	Panther	
111	Mahachanda to Satgachia	D/C	54	Panther	
112	Malda to Balurghat Tap point	S/C	98.4	Panther	
113	Malda to Khejuriaghat	D/C	35	Panther	
114	Malda to Malda (PG)	D/C	7	Panther	
115	Malda to Raigaunj	S/C	85	Panther	
116	Malda to Samsi	S/C	55	Panther	
117	Midnapur to Khargapur (WBIDC)	S/C	18	Panther	
118	Midnapur to Balichak TSS	S/C	26	Panther	
119	Midnapur to Chandrakonaroad (CK Road)	S/C	46	Panther	
120	Midnapur to Jhargram	D/C	48	Panther	
121	Midnapur to Pingla	S/C	41	Panther	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
122	Moinaguri to Birpara	S/C	43	Panther	
	Moinaguri to Mathabhanga	S/C	50	Panther	
	Mathabhanga to Birpara	S/C	83.8	Panther	
123	Moinaguri to Chalsa	S/C	43	Panther	
124	Gokarna to Sonar Bangla	S/C	47.2	Panther	
125	Sonar Bangla to Lalgola	S/C	28.4	Panther	
126	New Town AA-III to New Town AA-I	S/C	8.3	Panther	
127	New Town AA-III to Salt Lake GIS	S/C	15	Panther	
128	New Town AA-I to Salt Lake GIS S/C	S/C	11.1	Panther	
129	NBU to Lebong	S/C	66	Panther	
130	NBU to NJP (PG)	S/C	15	Panther	
131	NBU to Rammam	S/C	69	Panther	
132	NBU to TCF PS - I	S/C	18	Panther	
133	NJP (WB) to Chalsa	S/C	78	Panther	
134	NJP (WB) to Moinaguri	S/C	41	Panther	
135	NJP (WB) to TCF PS - I	S/C	16	Panther	
136	Purulia(WB) to STPS	D/C	35	Panther	
137	Raghunathganj to Dhulian	S/C	22	Panther	
138	Raghunathganj to Farakka	S/C	44	Panther	
139	Raigaunj to Gangarampur	S/C	75	Panther	
140	Rampurhat to Sainthia	S/C	38	Panther	
141	Reshmi to TATA Metalic	S/C	6	Panther	
142	Samsi to Raigaunj	S/C	68	Panther	
143	Satgachia to Debagram TSS	S/C	18	Panther	
144	Siliguri to NJP (WB)	D/C	16	Panther	
145	Tamluk to Haldia NIZ	D/C	46	Panther	
146	Tarakeswar to Belmuri	D/C	18	Panther	
147	TCF PS - I to TCF PS - II	S/C	16	Panther	
148	TCF PS - I to TCF PS - III	S/C	34	Panther	
149	TCF PS - II to TCF PS - III	S/C	20	Panther	
150	Hura to Purulia(WB)	D/C	15.85	Panther	
152	NJP (WB) to NJP (PG)	S/C	10	Panther	
153	NJP (PG) to Melli	S/C	90	Panther	PGCIL
154	NJP (PG) to Kurseong	S/C	31.3	Panther	
155	Kurseong to Rangit	S/C	68	Panther	
156	NJP (WB) to NBU	S/C	10	Panther	
158	Raghunathganj to farakka Ambuja Cement	D/C	5	Panther	WBSETCL
160	NBU to Siliguri (Ujanoo)	S/C	10	Panther	
162	Midnapur to Rashmi	S/C	10	Panther	
165	Crescent power to Asansol	D/C	20	Panther	
167	Raghunathpur to Hura	D/C	33.4	Zebra	
168	Joka to Falta	D/C	28.8	Panther	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
169	Joka to Sonarpur	S/C	18	Panther	
170	Kasba to Joka	S/C	27	Panther	
171	Kolagat(WB) to Kolagat (DVC)	D/C	5	Panther	
172	Waria(DTPS) to ASP	D/C	5	Lark	
173	Waria(DTPS) to Kalipahari	D/C	39.7	Lark	
174	Waria to Burdwan	D/C	69.22	Lark	
175	Belmuri to Burdwan	D/C	51.5	Lark	
176	Belmuri to Howrah	D/C	49.3	Lark	DVC
177	Howrah to Kolaghat	D/C	57.3	Lark	
178	Kolaghat to kharagpur	D/C	69.2	Lark	
179	Waria (DTPS) to Jamuria	S/C	33	AAAC Panther	
180	Borjora to Sonic Thermal	S/C	1.83	AAAC Panther	
181	Mosabani to Kharagpur	D/C	95.2	ACSR LARK	
182	DTPS to DPL	D/C	11		
183	Joka to Sirakol	S/C	17	Lark	DVC/DPL
184	Amtala to Najirpur	D/C	13.35	Panther	
185	Rammam to Rangit	S/C	27	Panther	
186	Laxmikantapur to Sirakol	D/C	35.2	Panther	
187	Siliguri to Siliguri (Ujanoo)	S/C	10	Panther	WBSETCL
188	Dalkhola to Kishengunj	S/C	26	Panther	
189	Lebong(Darjeling) to Rammam	S/C	20	Panther	
190	DPPS to B Zone	D/C	1.6	Panther	
191	DPPS to A Zone	S/C	6.4	Panther	
192	DPPS to C Zone	D/C	4.8	Panther	
193	DPPS to C1 Zone	D/C	5.5	Bison	DPL
194	DPPS to AB Zone	D/C	1.2	Panther	
195	A Zone to Bamunara	D/C	3.6	Panther	
196	BBGS to Chakmir	D/C	20.09	Panther	
197	BBGS to Chakmir	D/C	18.7	ACSR Moose	
198	Chakmir to Majerhat	D/C	6.1	ACSR Moose	
199	Chakmir to Taratala	D/C	5.4	XLPE 630 sqmm	
200	Taratala to BBD Bag	S/C	10.36	XLPE 630 sqmm	
201	Taratala to PRS	S/C	10.96	XLPE 630 sqmm	
202	Majerhat to Taratala	S/C	0.86	XLPE 630 sqmm	
203	Jadavpore to Majerhat	S/C	5.56	XLPE 630 sqmm	
204	Majerhat to Southern	D/C	6.4	XLPE 630 sqmm	CESC
205	Majerhat to PRS	S/C	9	XLPE 400 sqmm	
206	WBSETCL (Howrah) to Southern	S/C	3	XLPE 400 sqmm	
207	Botanical Garden to Southern	D/C	2.2	GF 161 sqmm	
208	WBSETCL (Howrah) to B.Garden	D/C	1.1	XLPE 800 sq.mm(1st circuit) 2 x GF 161 sq.mm. Cu.(2nd circuit)	

Sl.No	Transmission line	Ckt type	Distance (km)	Conductor Type	Owned By
209	BBD Bag to PRS	D/C	1.37	XLPE 630 sq.mm(1st circuit) 2 x GF 161 sq.mm. Cu.(2nd circuit)	
210	East Calcutta to PRS	S/C	6.56	XLPE 630 sqmm	
211	PRS to Park lane	S/C	2.1	XLPE 630 sqmm	
212	East Calcutta to BT road	S/C	9.62	XLPE 800 sqmm	
213	BT road to NCGS	S/C	1.5	XLPE 630 sqmm	
214	BT road to NCGS	S/C	2.5	GF 260 sq. mm. Cu	
215	BT road to Titagarh	S/C	9.3	XLPE 800 sqmm	
216	Dum dum to BT road	S/C	7.5	XLPE 800 sqmm	
217	NCGS to Titagarh	S/C	13.36	XLPE 800 sqmm	
218	WBSETCL (Titagarh) to Titagarh	D/C	0.5	XLPE 400 sqmm	
219	WBSETCL (Lilooah) to Belur	T/C	4.4	GF 225 sq. mm. Al.	
220	WBSETCL (Rishra) to Rishra	D/C	6.4	GF 161 sq.mm. Cu	
221	EMSS to East Calcutta	S/C	7.8	XLPE 800 sqmm	
222	EMSS to PRS	S/C	9.8	XLPE 800 sqmm	
223	WBSETCL (Kasba) to EMSS	T/C	0.4	XLPE 800 sqmm	
224	EMSS to Jadavpore	S/C	11	XLPE 800 sqmm	
225	EMSS to Park lane	S/C	7	XLPE 630 sqmm	
226	EMSS to Patuli	S/C	7	XLPE 800 sqmm	
227	EMSS to DDSS	S/C	17.3	XLPE 800 sqmm	

Table C: State wise list of generators present in the Eastern region grid

Sl.No	Name of the power station	Power station details			Owned By
		No. of units	Capacity of each unit (MW)	Total capacity (MW)	
Bihar					
State Sector					
1	Barauni (BTPS)	2	110	220	BSPGCL
2	Muzaffarpur (Kanti)	2	110	220	Joint venture of NTPC & BSEB
		1	195	195	
3	Eastern gandak canal HEP (Valmikinagar)	3	5	15	BSHPGCL
Central sector					
1	Khalgoan	4	210	2340	NTPC
		3	500		
2	Barh STPP, St-II	2	660	1320	
Jharkhand					
State Sector					
1	PTPS	1	110	110	
2	TTPS	2	210	420	
3	Subernrekha (SHPS)	2	65	130	
DVC					
1	Bokaro 'B'	3	210	630	DVC
		1	500	500	
2	Chandrapur	3	140	920	DVC
		2	250		
3	Koderma TPS	2	500	1000	DVC
4	Maithon RB	2	525	1050	DVC
5	Tiliya	2	2	4	DVC
6	Maithon dam	1	23.2	63.2	DVC
		2	20		
7	Panchet	2	40	80	DVC
8	MGT gen (Gas based)	3	27.5	82.5	DVC
CPP					
1	Jojobera	3	120	427.5	Tata Steel
		1	67.5		
2	Inland Power	1	70	70	
3	Usha Martin Ltd. (Adityapur)	3	30	130	
		1	25		
		1	15		
4	Usha Martin Ltd. (Ranchi)	2	10	20	
5	Rungta mines	2	20	40	
6	ABCIL	2	30	60	

Sl.No	Name of the power station	Power station details			Owned By
		No. of units	Capacity of each unit (MW)	Total capacity (MW)	
IPP					
1	Adhunik Power Co. Ltd.	2	270	540	
2	Maithon RB (MPL)	2	525	1050	Joint venture of DVC & TATA
Odisha					
State sector					
1	Burla power house (Hirakud-I)	2	49.5	275.5	OHPC
		2	32		
		3	37.5		
2	Chiplima power house (Hirakud-II)	3	24	72	OHPC
3	Balimela power house (HPS)	6	60	510	OHPC
		2	75		
4	Rengali power house (HPS)	5	50	250	OHPC
5	Upper Kolab power house (HPS)	4	80	320	OHPC
6	Upper Indravati hydroelectric project (HPS)	4	150	600	OHPC
7	Machhkund power house (HPS)	3	17	115.5	OHPC
		3	21.5		
8	IB thermal power station	2	210	420	OPGC
9	TTPS (NTPC- state dedicated)	4	60	460	NTPC
		2	110		
Central sector					
1	Talcher super thermal power-I	2	500	3000	NTPC
	Talcher super thermal power-II	4	500		
CPP					
1	NALCO (Angul)	10	120	1200	
2	RSP (Rourkela)	2	60	220	
		4	25		
3	ICCL(IMFA), (Choudwara)	2	54	258	
		2	60		
		1	30		
4	HPCL(HINDALCO), (Hirakud)	1	67.5	467.5	
		4	100		
5	KMCL (NINL), (Duburi)	1	24	62.5	
		2	19.25		
6	NBVL (Meramundali)	1	30	94	
		1	64		
7	Bhusan Power & Steel , Jharsuguda	1	60	506	
		1	40		
		3	130		

Sl.No	Name of the power station	Power station details			Owned By
		No. of units	Capacity of each unit (MW)	Total capacity (MW)	
		2	8		
8	Vedanta (Lanjigarh)	3	30	90	
9	Tata sponge iron (Joda)	1	18.5	26	
		1	7.5		
10	Shyam DRI (Pandoli, Sambalpur)	1	33	33	
11	Aarti steel (Ghantikhal, Cuttak)	1	40	40	
12	Bhusan steel and strips (Meramundali)	1	33	410	
		1	77		
		2	150		
13	Jindal stainless Ltd. (Duburi)	2	125	263	
		1	13		
14	Vedanta (Jharsuguda)	9	135	1215	
15	Visa steel (New Duburi)	3	25	75	
16	IFFCO (Paradeep)	2	55	110	
17	SMC power generation Ltd.	1	8	33	
		1	25		
18	Action ispat and power Ltd.	1	12	123	
		1	25		
		2	43		
19	Aryan ispat and power Ltd.	1	18	18	
20	EMAMI	1	15	20	
		1	5		
21	Shree Ganesh	1	32	32	
22	ACC (Baragarh)	1	30	30	
23	Jindal steel and power Ltd. (Angul)	6	135	810	
24	Maithan ispat nigam Ltd. (Jajpur road)	1	30	30	
25	MSP mettallics Ltd.	1	25	25	
26	OCL India Ltd.	2	27	54	
27	FACOR	1	45	45	
		1	55	55	
28	HINDALCO (AAL) (Budhipadar)	4	150	600	
29	Maheswari Ispat Pvt Ltd	2	12	24	
IPP					
1	Meenakshi power (Jayanagar)	3	4	37	
		2	12.5		
2	Odisha power consortium Ltd. (Samal)	4	5	20	
3	Aarati steel (Ghantikhal)	1	50	50	
4	Sterlite energy Ltd. (Jharsuguda)	4	600	2400	
5	GMR Kamalanga	3	350	1050	

Sl.No	Name of the power station	Power station details			Owned By
		No. of units	Capacity of each unit (MW)	Total capacity (MW)	
6	JITPL (Derang)	2	600	1200	
7	Ind-Barath	1	350	350	
Sikkim					
State Sector					
1	LLHP	2	6	12	
2	Meyonchu	2	2	4	
3	Rongali HEP	2	3.125	6.25	
Central sector					
1	Teesta-V	3	170	510	NHPC
2	Rangeet -III	3	20	60	NHPC
IPP					
1	Chuzachen	2	55	110	
2	Jorthang loop	2	48	96	
West Bengal					
State Sector					
1	Bakreswar TPS	5	210	1050	WBPDCL
2	Bandel TPS	4	60	450	WBPDCL
		1	210		
3	Kolaghat TPS	3	210	630	WBPDCL
		3	210	630	
4	Sagardighi TPS	2	300	600	WBPDCL
5	Santaldih TPS	2	250	500	WBPDCL
6	Rammam II hydro	4	12.75	51	WBSEDCL
7	Purulia pumped storage	4	225	900	WBSEDCL
8	Jaldhaka hydro 1	3	9	27	WBSEDCL
9	Teesta canal fall hydro 1	3	7.5	22.5	WBSEDCL
10	Teesta canal fall hydro 2	3	7.5	22.5	WBSEDCL
11	Teesta canal fall hydro 3	3	7.5	22.5	WBSEDCL
Central sector					
1	Farakka	3	200	2100	NTPC
		3	500		
2	Chuka Bhutan, Hydro	4	84	336	Bhutan
3	Tala Bhutan, Hydro	6	170	1020	Bhutan
4	Teesta low dam 3	4	33	132	NHPC
5	Teesta low dam 4	2	40	220	NHPC
Private Sector and DVC					
1	DPL	1	110		DPL
		1	250		
		1	300		
2	Mejia	4	210	1340	DVC

Sl.No	Name of the power station	Power station details			Owned By
		No. of units	Capacity of each unit (MW)	Total capacity (MW)	
		2	250		
3	Waria TPS (DTPS)	1	140	350	DVC
		1	210		
4	Mejia TPS phase-II	2	500	1000	DVC
5	Durgapur steel TPS	2	500	1000	DVC
6	Budge Budge	2	250	500	CESC
		1	250	250	
7	Southern generating station	2	67.5	135	CESC
8	Haldia TPP	2	300	600	CESC
9	Raghunathpur TPS	2	600	1200	DVC
CPP					
1	Tata power	2	45	120	
		1	30		
2	Crescent power	2	20	40	

Table D: State wise list of Bus reactor present in the Eastern region grid

Sl No	Name of the substaion	Voltage level (kV)	Existing Bus reactor details		
			no of units	capacity of each unit (MVAr)	Total capacity (MVAr)
Bihar					
1	Gaya	765	3	240	720
		400	2	125	250
2	Sasaram	765	1	330	330
		400	2	125	250
3	Biharshariff	400	1	125	125
		400	1	50	50
		400	1	80	80
4	Kahalgaon	400	2	50	100
5	Muzaffarpur	400	1	125	125
		400	1	63	63
6	Patna	400	1	80	80
		400	2	125	250
7	New Purnea	400	2	125	250
8	Barh	400	1	80	80
9	Banka	400	1	80	80
10	Lakhisarai	400	1	80	80
Jharkhand					
1	Ranchi (NEW)	400	2	125	250
		765	1	240	240
2	Maithon	400	1	50	50
3	Maithon RB (MPL I & II)	400	2	50	100
4	Jamshedpur	400	2	50	100
5	Ranchi	400	1	80	80
		400	1	125	125
6	Koderma	400	2	50	100
Odisha					
1	Angul	765	1	330	330
			1	330	330
2	Jharsuguda	765	1	240	240
			1	240	240
3	Bolangir	400	1	80	80
4	Rourkela	400	1	50	50
			1	125	125
5	Rengali	33	1	31.5	31.5
6	Jeypore	33	1	31.5	31.5
		400	1	125	125
		400	1	63	63

Sl No	Name of the substaion	Voltage level (kV)	Existing Bus reactor details		
			no of units	capacity of each unit (MVAr)	Total capacity (MVAr)
7	Keonjhar	400	1	80	80
8	Angul	400	3	125	375
9	Jharsuguda	400	2	125	250
10	Indravati	400	1	125	125
Sikkim					
1	Rangpo	400	2	80	160
2	Melli	220	1	31.5	31.5
West Bengal					
1	Farakka	400	2	50	100
2	Parulia	400	1	50	50
3	Bidhannagar	400	1	50	50
4	Bakreswar	400	1	50	50
5	Jeerat	400	1	50	50
6	Arambagh	400	1	50	50
7	Ragunathpur	400	2	50	100
8	Kharagpur	400	1	80	80
9	Binaguri	400	2	125	160
10	Behrampur	400	1	80	80
11	Binaguri	400	2	125	250
12	KTPS	400	2	50	50

Table E: State wise list of Line reactor present in the Eastern region grid

Sl No	Name of the transmission line	Voltage level (kV)	Existing Line reactor details				Remarks
			no of units	capacity of each unit (MVAr)	Total capacity (MVAr)	End	
Bihar							
1	Maithon to Gaya I & II	400	2	50	100	Maithon	Switchable
		400	2	50	100	Gaya	Switchable
2	Sasaram to Fatehpur	765	1	330	330	Sasaram	-
3	Kahalgaon to Maithon-I & II	400	2	50	100	Maithon	-
4	Purnea to Binaguri-I	400	1	63	63	Purnea	-
5	Purnea to Binaguri-III	400	1	63	63	Purnea	-
6	Purnea to Muzaffarpur I & II	400	2	63	126	Purnea	Switchable
			2	63	126	Muzaffarpur	
7	Biharshariff to Sasaram I & II	400	2	63	126	Sasaram	Switchable
8	Sasaram to Allahabad	400	1	63	63	Sasaram	Switchable
9	Sasaram to Sarnath	400	1	63	63	Sasaram	Switchable
10	Muzaffarpur to Gorakhpur I & II	400	2	63	126	Muzaffarpur	Switchable
11	Biharshariff to Balia I & II	400	2	50	100	Balia	-
12	Gaya to Sasaram-Fatehpur	765	1	330	330	Sasaram	-
		765	1	240	240	Gaya	-
		765	1	330	330	Fatehpur	-
13	Banka to Biharshariff I & II	400	2	50	100	Banka	-
14	Biharshariff to Purnea I & II	400	2	80	160	Biharshariff	-
15	Lakhisarai to Biharshariff I & II	400	2	50	100	Biharshariff	-
16	Sasaram to Biharshariff III	400	1	50	50	Biharshariff	-
		400	1	50	50	Sasaram	-
17	Sasaram to Biharshariff IV	400	1	50	50	Sasaram	-
18	Kahalgaon to Biharshariff II	400	1	50	50	Biharshariff	-
19	Barh to Patna I & II	400	2	50	100	Patna	-
20	Lakhisarai to Kahalgaon I & II	400	2	50	100	Lakhisarai	-
21	Malda to New Purnea	400	2	63	126	Malda	-
Jharkhand							

Sl No	Name of the transmission line	Voltage level (kV)	Existing Line reactor details				Remarks
			no of units	capacity of each unit (MVAr)	Total capacity (MVAr)	End	
1	Ranchi (New) to Dharmjaygarh	765	2	240	480	Ranchi	-
2	Ranchi to Sipat-I & II	400	2	80	160	Ranchi	-
3	Maithon to Gaya I	400	1	50	50	Gaya	Switchable
			1	50	50	Maithon	Switchable
	Maithon to Gaya II		1	50	50	Gaya	Switchable
			1	50	50	Maithon	Switchable
4	Maithon RB (MPL) to Ranchi I & II	400	2	50	100	MPL	-
			2	50	100	Ranchi	
5	Maithon to Kahalgaon-I&II	400	2	50	100	Maithon	-
6	Rourkela to Chaibasa I &II	400	2	50	100	Rourkela	Switchable
7	Jamshedpur to Rourkela-I & II	400	2	50	100	Rourkela	Switchable
Odisha							
1	Angul to Jharsuguda	765	1	240	240	Angul	-
			1	240	240	Angul	-
2	Baripada to Keonjhar	400	1	50	50	Baripada	-
3	Jeypore to Gajuwaka I & II	400	2	80	160	Gajuwaka	Switchable
4	Baripada to Mendasal	400	1	63	63	Mendasal	-
			1	63	63	Baripada	
5	Rourkel to Jharsuguda	400	1	63	63	Rourkela	-
6	Rourkel to Sterlite	400	1	63	63	Rourkela	-
7	Meramundali to Angul	400	1	80	80	Meramundali	-
8	Angul to Bolangir	400	1	50	50	Bolangir	-
9	Bolangir to Jeypore	400	1	50	50	Bolangir	-
			1	80	80	Jeypore	
10	Rourkela to Talcher I & II	400	2	50	100	TSTPP	-
11	Keonjhar to Rengali	400	1	63	63	Rengali	-
12	Rengali to Indravati	400	1	50	50	Rengali	-
			1	50	50	Indravati	
13	Rourkela to Chaibasa-I & II	400	2	50	100	Rourkela	-
14	Baripada to Duburi	400	1	63	63	Baripada	-
West Bengal							

Sl No	Name of the transmission line	Voltage level (kV)	Existing Line reactor details				Remarks
			no of units	capacity of each unit (MVAr)	Total capacity (MVAr)	End	
1	Behrampur to Jeerat-I	400	1	50	50	Jeerat	-
2	Sagardighi to Subashgram	400	1	63	63	Sagardighi	-
			1	50	50	Subashgram	
3	Farakka to Parulia-I	400	1	50	50	Farakka	-
4	Bidhannagar to Parulia-I	400	1	50	50	Parilia	-
5	Bakreswar to Arambagh	400	1	63	63	Bakreswar	-
6	Bakreswar to Jeerat	400	1	63	63	Jeerat	-
7	Malda to Purnea	400	2	63	126	Malda	-
8	Binaguri to Bongaigaon- I & II	400	2	63	126	Bongaigoan	
9	Binaguri to Tala I & II	400	2	63	126	Binaguri	-
10	Binaguri to Tala IV	400	1	63	63	Binagiri	-
11	Binaguri to Bongaigaon III & IV	400	2	80	160	Binagiri	Switchable
12	Purnea to Binaguri I & III	400	2	63	126	Purnea	-
13	Ragunathpur to Ranchi	400	1	60	60	Ranchi_PG	-
14	Ragunathpur to Ranchi	400	1	60	60	Ranchi_PG	-

Table F: State wise list of load data considered for the study present in the Eastern region grid

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
Bihar								
1	Arrah	132/33	1	20	20	BSPTCL	14.262	4.45
			3	50	150			
2	Ataula (Arwal)(Karpi)	132/33	2	20	40		27.7	8.468
3	Aurangabad	132/33	2	20	40		26.3	8.492
4	Banjari	132/33	3	20	60		5.8	1.882
5	Banka	132/33	3	20	60		13.6	4.459
6	Barauni TPS	132/33	1	50	50		42.789	13.158
			2	20	40			
7	Barh	132/33	1	20	20		37.8	12.419
			1	50	50			
8	Baripahari	132/33	2	50	100		28.389	8.861
9	Belaganj	132/33	2	20	40		16.301	5.14
10	Bettiah	132/33	2	20	40		32.601	10.237
			1	50	50			
11	Bihta	132/33	3	50	150		72.1	22.453
12	Bikramganj	132/33	2	20	40		20	6.449
			1	50	50			
13	Buxar	132/33	2	20	40		20.375	6.194
			1	50	50			
14	Chandauti (Gaya)	132/33	2	50	100		22.4	7.174
		132/25	2	13.35	26.7		0	0
15	Chhapra	132/33	2	20	40		29.041	8.666
			1	50	50			
16	Darbhanga (old)	132/33	2	50	100		40.751	12.551
17	Dhaka	132/33	3	20	60		17	5.315
18	Dalsingsarai	132/33	2	20	40		23.84	7.448
19	Digha	132/33	3	50	150		50.938	15.765
20	Dumraon	132/33	1	20	20		22.414	6.877
			1	50	50			
21	Ekma	132/33	1	20	20		14.262	4.309
22	Ekanga Sarai (Ekanagar)	132/33	3	20	60		27	8.461
23	Forbeshganj	132/33	1	20	20		59.98	18.202
			1	50	50			
24	Goh	132/33	2	20	40		12	3.843

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
25	Gangwara	132/33	2	50	100		28.7	8.974
26	Gaighat	132/33	2	50	100		58	18.283
27	Hazipur	132/33	3	50	150		58.5	18.037
28	Hulasganj	132/33	2	20	40		14	4.408
29	Harnaut	132/33	2	20	40		10.6	3.447
30	Hathidah	132/33	3	20	60		22.5	7.117
31	Imamganj	132/33	2	20	40		15	4.698
32	Jagdishpur	132/33	2	20	40		20.375	6.412
33	Jandaha	132/33	2	20	40		26.9	8.15
34	Jainagar	132/33	3	20	60		6.1	1.934
35	Jakkanpur	132/33	4	50	200		95.7	30.132
			1	20	20			
36	Jamalpur	132/33	2	50	100		44.825	12.753
37	Jamui	132/33	2	20	40		28.52	9.139
38	Jehanabad	132/33	2	20	40		26.1	8.225
39	Kahalgaon	132/33	2	20	40		30.563	9.839
			2	50	100			
40	Karmnasa	132/33	2	50	100		24.45	7.562
			1	20	20			
		132/25	1	21.6	21.6		6	1.863
			1	20	20			
41	Kataiya	132/33	3	20	60		21	6.49
42	Katihar	132/33	3	20	60		29.2	9.265
			1	50	50			
43	Katra	132/33	3	50	150		50.938	15.634
44	Kusheshwarsthan	132/33	2	20	40		14.262	4.384
45	Kochas	132/33	2	20	40		20.294	6.469
46	Karbigahiya	132/33	4	50	200		28.9	9.226
47	Kudra	132/33	2	20	40		34.638	10.659
48	Khagaria	132/33	2	20	40		34.638	10.372
			1	50	50			
49	Kishanganj	132/33	1	50	50		44.2	13.832
			1	20	20			
50	Lakhisarai	132/33	3	20	60		19.9	6.364
51	Madhubani	132/33	2	20	40		21.6	6.868
52	Masaurhi	132/33	2	20	40		28	8.836
53	Mithapur	132/33	2	50	100		50.938	15.69

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
								6
54	Mohania	132/33	1	50	50		20	6.462
			1	20	20			
55	Motihari	132/33	1	20	20		20.375	6.336
			1	50	50			
56	Masrakh	132/33	2	20	40		30.563	9.624
57	Muzaffarpur	132/33	3	50	150		59.958	18.683
58	Nalanda	132/33	2	20	40		21.5	6.891
59	Naugachhia	132/33	3	20	60		8.149	2.549
60	Nawada	132/33	1	20	20		28.1	8.744
			3	50	150			
61	Pandaul	132/33	2	20	40		20.375	6.254
			1	50	50			
62	Phulparas	132/33	2	20	40		10.188	3.138
63	Purnea	132/33	1	20	20		76.3	24.106
			2	50	100			
64	Rafiganj	132/33	1	50	50		21	6.701
			1	20	20			
65	Rajgir	132/33	2	20	40		14.9	4.902
66	Ramnagar	132/33	2	20	40		8.5	2.674
67	Raxaul	132/33	2	20	40		14.262	4.575
68	Remi nagar (Runni Saidpur)	132/33	2	20	40		8.48	2.732
69	Sherghati	132/33	2	20	40		11.26	3.547
70	SKMCH	132/33	2	50	100		54	16.674
71	Sonebarsa	132/33	2	20	40		14.262	4.422
72	Sabour	132/33	3	50	150		30.563	9.754
73	Saharsa	132/33	1	20	20		18.039	5.733
74	Samastipur	132/33	2	20	40		48.6	15.16
75	Sasaram	132/33	2	50	100		28.4	9.166
76	Shekhpura	132/33	2	20	40		29.1	9.055
77	Sheetalpur	132/33	2	20	40		11.5	3.594
78	Sitamarhi	132/33	3	50	150		20.375	6.227
79	Siwan	132/33	1	20	20		32.601	10.044
			2	50	100			
80	Sonenagar	132/33	1	50	50		40.751	12.677
			1	20	20			
		132/25	1	21.6	21.6		13	4.026
			1	20	20			
81	Sultanganj	132/33	2	20	40		18.337	5.791

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
			2	50	100			
82	Supaul	132/33	3	20	60		23.9	7.414
83	Tehta	132/33	2	20	40		12	3.794
84	Tekari	132/33	2	20	40		16.1	5.054
85	Udaikishanganj	132/33	2	20	40		12.226	3.799
86	Vaishali	132/33	2	20	40		35.154	10.426
87	Wazirganj	132/33	2	20	40		20.375	6.223
88	Arrah Rly	132/25					8	2.505
89	Lakhisarai Rly	132/25					9	2.851
90	Rafiganj Rly	132/25					8.5	2.712
91	Dumarn Rly	132/25					9	2.78
92	Hajipur Rly	132/25					7	2.098
93	Chapra Rly	132/25					7	2.099
94	Kudra Rly	132/25					6.7	2.148
95	Mokama Rly	132/25					7	2.233
96	Railfactory Rly	132/25					20	5.959
97	Khsurupur Rly	132/25					9	2.851
98	Paharpur Rly	132/25					6	2.842
99	KCL Rly	132/25					6	2.844
100	Jhaja Rly	132/25					6	2.858
101	BodhGaya	132/33	1	50	50		44.3	14.18
102	Dehri	132/33	2	50	100		46.864	14.639
103	GopalGanj	132/33	2	50	100		48.9	15.223
104	Begusarai	132/33	3	50	150		34.5	10.808
105	Khagaul	132/33	5	50	250		81	25.774
106	Khagaul Rly	133/25					3.7	1.186
107	Sipar	132/33	2	50	100		50.938	15.936
108	Fatuha	132/33	3	50	150		47.596	14.905
109	Bihar Sarif	132/33	1	20	20		11.274	3.563
110	Madhepura	132/33	2	20	40		30	9.342
			1	100	100			
111	Pussoli New	132/33	2	50	100		90.196	28.779
Jharkhand								
1	Chaibasa	132/33	2	50	100	**JUSNL**	2.635	0.885
2	Lalmatiya	132/33	1	20	120		28.17	9.159

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
			2	50				
3	Adityapur	132/33	4	50	200		81.783	26.69
4	Chakradharpur	132/33	1	20	20		7.27	3.503
5	Dalbhumgarh	132/33	2	50	100		46.344	14.717
		Railway feeder					5	2.341
6	Chaibasa	132/33	1	25	25		14.539	4.584
7	Chandil II/ Maniq	132/33	2				22.718	7.473
8	Deogarh	132/33	3	50	150		50.887	16.349
9	Dumka (Maharo)	132/33	2	50	100		30.896	10.07
10	Garhwa Rd	132/33	1	50	70		18.174	5.772
			1	20				
11	Goielkara	132/33	1	20	20		10	3.217
							0	0
12	Golmuri	132/33	2	50	100		22.718	7.452
13	Gumla	132/33	2	20	40		16.357	5.181
14	Hatia old	132/33	4	50	200		119.04	37.502
15	Tamar	132/33	2	50	100		9.087	2.968
16	Madhupur	132/33	2	50	100		16.357	5.157
17	Jadugoda	132/33	2	20	90		17.265	5.666
			1	50				
18	Jamtara	132/33	1	50	70		22.718	7.245
			1	20				
		Railway feeder					5	2.352
19	Japla	132/33	2	20	40		7.27	2.334
20	Kamdara	132/33	2	20	60		23.626	7.431
			1	20				
21	Kanke	132/33	2	50	100		23.626	7.473
22	Kendposi	132/33	2	20	90		22.718	7.251
			1	50				
		Railway feeder					9	4.238
23	Latehar	132/33	2	50	100		12.722	4.075
24	Lohardaga	132/33	2	50	100		48.169	16.008
25	Namkum	132/33	4	50	200		73.596	23.692
		Railway feeder						
26	Nowamundi	132/33	1	50	50		11.813	3.788

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
27	Nowamundi Tata Steel	132					6.77	2.158
28	Pakur	132/33	2	50	100		18.174	5.912
29	Rajkharsawan	132/33	2	50	100		14.539	4.666
		Railway feeder					11.45	3.716
30	Sahebgunj	132/33	2	50	100		27.261	8.582
31	Daltonganj	132/33	2	50	100		36.348	11.64
32	Saljagiri Rly	132/25	-	-	-		0	0
33	Shankarpur Rly	132/25	-	-	-		6	2.841
34	Tatisiloi Rly	132/25	-	-	-		5.25	2.494
35	Tolra Rly	132/25	-	-	-		12	3.837
36	Lodhma Rly	132/25	-	-	-		1.93	0.901
37	Bakaspur Rly	132/25	-	-	-		11.5	3.628
38	Chakradharpur Rly	132/25	-	-	-		5	2.39
39	Bano Rly	132/25	-	-	-		0	0
40	Umi Rly	132/25	-	-	-		8.5	2.744
41	Patherdih	132/33	2	80	160	DVC	84.23	26.233
			1	50	50			
		132/25					12	5.434
42	Pattratu (DVC)	132/33	1	31.5	31.5		8	2.469
43	Gola	132/33	1	31.5	51.5		8.7	2.762
			1	20				
44	K'Dubi	132/33	2	50	100		30.32	9.676
			1	80	80			
		132/25					12.47	3.963
45	Konar	132/33	1	20	20		6.69	2.142
		132/25					2.02	0.964
46	Biada	132/33	2	80	160		24	7.663
47	BTPS B	132/33	2	50	100		21.6	6.972
48	Dhanbad	220/33	2	80	160		37.9	12.241
49	Jamshedpur	132/33	3	50	150		12.06	3.848
50	Koderma	132/33	1	80	80		46	14.548
			1	50	50		10	3.149
51	Ramgarh	132/33	2	80	160		129.5	40.566
		132/33	1	50	50			
52	Mosabani	132/33	2	20	51.5		18.77	5.896
			1	31.5				
53	Giridhi	132/33	3	80	240		111	34.935

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
54	North Karanpura	132/33	2	50	100		60	18.401
55	Hazaribag	132/33	2	50	100		28.5	8.614
56	Nimghat	132/33	2	31.5	63		40	12.42
57	Putki	132/33	3	80	240		80	25.075
58	Barhi	132/33	1	50	81.5		32	10.139
59			1	31.5				
60	CTPS	132/33	2	80	160		67.77	21.588
61	MHS-RB3	132/33	2	50	100		15.952	5.103
62	Panchet	132/33	1	50	50		0	0
63	Maniq Railway	132					6	1.869
64	ECRly North Karanpura	132					16.2	7.346
65	Nimiaghat Railway	132/25				JUSNL	18.05	5
66	Manoharpur	132/33	2	50	100		6.361	2.041
67	Sikidri	132/33	2	20	40		0	0
Odisha								
1	Mendhasal	220/33	1	20	20		12	3.967
2	Balasore	132/33	2	63	166		50.8	16.549
			1	40				
		Railway Feeder					4.11	1.978
3	Bhadrak	132/33	2	63	166		57.89	18.948
			1	40				
		Railway Feeder					2.425	1.173
4	Bidanasi	132/33	2	63	166		72.6	23.297
			1	40				
5	Budhipadar	132/33	1	20	20		20	6.405
6	Chandaka	132/33	2	63	166		110	35.15
			1	40				
7	Jayanagar	132/33	2	20	52.5		31.3	10.096
			1	12.5				
		Railway Tr					9.262	3.08
		ChakusTr					0	0
8	Joda	132/33	3	20	100		21.21	6.765
			1	40				
9	Narendrapur	220/132	1	100	520		45.6	14.73
			2	160				
		132/33	2	40				
			1	20				

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
		Railway (JagnathTr)					1.5	0.716
10	Paradip	132/33	2	20	52.5		13.14	4.201
			1	12.5				
11	Theruvali	132/33	2	12.5	25		3.92	1.295
12	Balimela	220/33	1	20	60		25.325	8.434
			1	40				
13	Barkote	220/33	2	40	80		24.6	8.048
14	Nayagarh	220/33	1	40	80		44.2	20.471
			2	20				
15	Duburi	220/33	2	40	80		0	0
16	Akhusingh	132/33	2	12.5	25		11	3.501
17	Anandapur	132/33	2	12.5	45		15.4	5.067
			1	20				
18	Angul	132/33	2	40	100		30.5	9.885
			1	20				
19	Argul	132/33	1	40	60		22.169	7.26
			1	20				
20	Atri	132/33	1	20	20		0	0
21	Aska	132/33	3	40	120		57.59	18.327
22	Balugaon	132/33	1	40	72.5		24.48	7.957
			1	20				
			1	12.5				
		Railway feeder (Solar trac)					8.52	4.037
23	Banki	132/33	2	20	40		5.6	1.822
24	Barbil	132/33	2	12.5	25		12.19	3.772
		traction					2.11	0.98
25	Baragarh	132/33	3	40	120		56.2	18.04
26	Baripada	132/33	3	40	120		39	12.587
27	Barpalli	132/33	1	20	60		30	10.01
			1	40				
28	Berhampore	132/33	2	40	100		55.492	17.805
			1	20				
29	Basta	132/33	1	12.5	32.5		15.5	5.063
			1	20				
30	Bhanjanagar	132/33	2	40	96		32	10.29
			1	16				
31	Bhawanipatna	132/33	2	12.5	25		10.9	3.551
32	Bhubaneswar (BBSR)	132/33	3	63	189		77	24.741
33	Boinda	132/33	1	20	45		17.38	5.586

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
			2	12.5				
34	Boudh	132/33	1	20	20		4.468	1.411
35	Bolangir	132/33	2	40	92.5		41.5	13.824
			1	12.5				
36	Brajrajnagar	132/33	1	40	100		36.29	11.664
			3	20				
		132/11	1	12.5	12.5		6.96	2.22
37	Chainpal	132/33	2	40	100		49.93	16.146
			1	20				
38	Chandikhole	132/33	3	20	60		30.5	9.816
39	Chhandpur	132/33	2	12.5	25		10.4	3.459
40	Chhatrapur	132/33	3	20	60		9.44	3.064
		Railway Traction Feeder (Ramba Tr)					5.6	2.656
41	Chhend	132/33	3	40	120		55.45	17.838
		Railway Traction Feeder (Naugaon Tr)					0.56	0.27
42	Choudwar	132/33	1	20	100		0	0
			2	40				
		Railway Traction Feeder (Kendpur Tr)					2.69	0.88
43	Cuttack	132/33	3	40	120		32.37	10.248
44	Dabugaon	132/33	2	12.5	25		9.232	2.859
45	Dhenkanal	132/33	3	40	120		40.43	12.866
		Traction (JorndaTr)					2.62	0.844
46	Digapahandi	132/33	2	20	52.5		21.88	7.147
			1	12.5				
47	Ganjam	132/33	2	12.5	25		5	1.647
48	Ganjam	132					13.75	4.342
49	Jagatsinghpur	132/33	2	20	80		9.169	2.994
			1	40				
		Railway Traction Feeder (Goreknath Tr)					13.933	6.589
50	Jajpur road	132/33	2	40	100		28.89	9.176
			1	20				
51	Jajpur town	132/33	2	40	100		16.49	5.482
			1	20				
52	Jaleswar	132/33	2	31.5	75.5		18.21	5.896
			1	12.5				
		Railway Traction Feeder					4.41	2.102

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
53	Jharsuguda	132/33	1	40	40		16	5.15
		132/11	1	20	20		20	6.383
			1	12.5	12.5			
		Railway Traction Feeder					10	3.265
54	Junagarh	132/33	3	20	60		22.505	7.181
55	Kalarangi	132/33	2	12.5	45		7.54	2.405
			1	20				
56	Kalunga	132/33	2	40	80		21	6.808
57	Kamakshyanagar	132/33	1	20	45		22.169	7.004
			2	12.5				
58	Karanjia	132/33	2	12.5	45		18	5.717
			1	20				
59	Kendrapara	132/33	2	40	92.5		21.06	6.674
			1	12.5				
60	Kesinga	132/33	1	40	80		29	9.417
			2	20				
61	Kesura/Badagada	132/33	1	63	103		20.82	6.727
			1	40				
62	Khariar	132/33	2	40	80		22.8	7.534
63	Khurda	132/33	3	40	120		59	18.672
		Railway Traction Feeder (Kaipad trac)					13.205	4.332
64	Konark	132/33	2	20	40		22.169	7.217
65	Kuchinda	132/33	2	20	40		16.05	5.164
66	Lapanaga	132/33	1	20	20		22.169	7.146
67	Mania	132/33	1	12.5	12.5		0	0
68	Marshaghai	132/33	2	20	40		0	0
69	Mohana	132/33	2	12.5	25		3.075	1.009
70	Nimapara	132/33	2	40	92.5		35.9	11.53
			1	12.5				
71	Nuapara	132/33	2	20	40		13.317	4.266
72	Nuapatna	132/33	1	40	72.5		37	11.503
			1	20				
			1	12.5				
73	Padampur	132/33	1	20	20		10	3.222
74	Parlakhemundi	132/33	3	12.5	37.5		15.26	4.94
75	Patnagarh	132/33	1	40	80		9.69	8.676
			2	20				
76	Pattamundai	132/33	2	20	52.5		28.35	8.947
			1	12.5				
77	Phulbani	132/33	2	12.5	65		12.88	4.209

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
			1	40				
78	Phulnakhara	132/33	2	20	40		16.1	5.118
79	Polasapanga	132/33	1	40	80		30.34	9.52
			2	20				
80	Polasapanga						2.66	0.839
81	Puri	132/33	3	40	120		42	13.502
82	Purusottampur	132/33	2	12.5	25		13.121	4.266
83	Rairakhole	132/33	2	12.5	25		8.37	2.704
84	Rairangpur	132/33	2	20	52.5		22.6	7.123
			1	12.5				
85	Rajgangpur	132/33	3	40	120		40	12.923
		Railway Traction Feeder					3.484	1.678
86	Ranasinghpur	132/33	2	63	166		55.3	17.763
			1	40				
87	Rayagada	132/33	2	12.5	25		12.35	4.018
88	Rourkela	132/33	4	35	140		62.69	20.224
		132/25 Railway Tr	1				3.19	1.037
89	Saintala	132/33	1	10	22.5		1.781	0.571
			1	12.5				
90	Salipur	132/33	2	20	52.5		23.06	7.439
			1	12.5				
91	Sambalpur	132/33	2	31.5	103		70.2	22.656
			1	40				
92	Shamuka	132/33	2	31.5	63		0	0
93	Somnathpur	132/33	1	12.5	12.5		0	0
94	Sonepur	132/33	3	20	60		37.5	12.35
95	Soro	132/33	1	40	80		0	0
			2	20				
97	Sunabeda	132/33	3	12.5	37.5		19.4	6.139
97	Sundargarh	132/33	1	40	60		29.61	9.478
			1	20				
98	Tentulikhunti	132/33	1	20	32.5		15.63	5.008
			1	12.5				
99	Tarkera	132/33	1	12.5	40		0	0
100	Umerkote	132/33	2	20	40		5.2	1.667
101	Bolani	132/11	2	10	20		2.8	0.885

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
102	Laxmipur	220/33	1	20	20		5.124	1.71
103	Katapali	132/33	1	40	80		23.4	7.629
			2	20				
104	BhultaTraction	132					5.285	1.693
105	Meramandali TR	132					7.09	3.389
106	Jakhpur Traction (Dubri)	132					5.2	2.47
107	Dharma Traction	132					2.425	1.173
108	KeonjharTr	132					13.64	1.619
Bulk Load								
109	IMFA1	132					26.6	8.829
110	Damanjod	132					7	2.268
111	IRE	132					4.095	1.32
112	FCI	132					0.61	0.201
113	Baminpl	132					12.6	4.054
114	Balasore Alloy	132					27.65	9.016
115	BirlaTyr	132					3.78	1.819
116	PPL	132					8.82	4.188
117	L&T Cem co	132					12	3.915
118	Power Max	132					3.15	1.502
119	MCL	132					14.017	6.754
120	Chandiposh	220					11.2	5.458
121	J K Paper	132					6.3	3.081
122	FAP-Joda	132					12.285	5.816
123	HAL	132					6.31	2.035
124	BRG	132					23.94	11.447
125	M L Rungta	132					14.49	6.926
126	PPT	132					10.08	4.785
127	RAW MET	132					20.79	9.966
128	Hind Metalic	132					9.45	4.518
129	MESCO	132					3.465	1.645
130	ROHIT	220					35.003	16.705
131	Adhunik	132					31.5	15.068
132	Dahmra Prt	132					6.3	3.037
133	OCL_TA	132					7.56	3.623
134	Saliban (Bhuvi Profile)	132					1.26	0.602
135	ESSAR	220					24.501	11.622
136	IOCL	220					6.3	2.989

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
137	Beekay Steels	132					7.56	3.633
138	Arya	132					6.3	2.932
139	Bansapani	132					12.332	3.85
140	Saintla	132					1.4	0.464
141	Tata Steel	220					9.45	3.063
142	BRPL	132					12.6	5.985
143	MSL	132					3.276	1.557
144	JSPL	220					31.5	10.227
145	BRP-Steel	132					12.6	5.854
Sikkim								
1	Phodong	66/11	1	5	5	**Sikkim Gov**	1.875	0.459
			1	2.5	2.5			
2	Bulbuley	66/11	2	10	20		6.563	1.607
3	Sichey	66/11	2	10	20		11.25	2.734
			1	5	5			
4	Tadong	66/11	3	5	15		6.563	1.603
5	Rongly	66/11	2	2.5	5		1.406	0.347
6	Mamring	66/11	1	10	10		8.906	2.221
			1	7.5	7.5			
			1	15	15			
7	Melli	66/11	2	5	10		2.813	0.708
8	Namchi	66/11	2	2.5	5		1.406	0.354
9	Rabangla	66/11	1	5	5		2.813	0.699
10	Rothak	66/11	2	2.5	5		1.406	0.35
11	Soreng	66/11	2	2.5	5		1.406	0.349
12	Geyzing	66/11	2	2.5	5		1.406	0.354
13	Purano Namchi	66/11	2	7.5	15		3.75	0.935
14	Pakyong	66/11	1	10	10		6.563	1.602
15	Pelling	66/11	1	5	5		2.813	0.703
16	Rhenock	66/11	1	5	5		2.813	0.687
17	Mangan	66/11	2	5	10		3.75	0.914
18	Ranipool	66/11	2	7.5	15		3.75	0.928
19	Topakhani	66/11	1	7.5	7.5		3.75	0.923
		66/11	1	5	5			
West Bengal								
1	Arambagh	132/33	3	50	150	**WBSETCL**	63	20.707
2	Bakreswar	220/33	1	50	50		16.6	5.361
3	Asansol	132/33	3	50	150		114.093	37.5
4	New Bishnupur	132/33	2	31.5	63		24	7.888

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
5	Dalkhola	132/33	3	20	60		29.4	9.663
6	Dharampur	132/33	2	50	100		77	25.309
7	Domjur	132/33	3	50	150		73	23.994
8	Gokarna	132/33	3	50	150		83.7	27.511
9	Howrah	132/25	2	20	40		29.64	8.645
10	Krishnagar	132/33	2	50	100		76.5	25.144
			1	31.5	31.5			
11	Laxmikantpur	132/33	1	31.5	81.5		76.5	25.144
			1	50				
12	Laxmikantpur Rly	132/25	2	12.5	25		2.6	0.855
13	New Haldia	132/33	1	31.5	31.5		35	11.504
		132/33	1	50	50			
14	New Jalpaiguri	132/33	2	50	100		36.901	12.129
15	New town action area-III	220/33	2	50	100		78.713	25.872
16	Rishra	132/33	3	50	150		62	20.378
17	Satgachia	132/33	2	50	131.5		54.619	17.952
			1	31.5				
		Railway						
18	Subhashgram	132/33	2	31.5	63		40.94	13.456
19	Hura	132/33	2	50	100		65	21.364
20	Foundry park	132/33	2	50	100		60	19.721
21	Midnapur	132/33	2	50	100		55	18.078
22	Kolkata leather complex (KLC)	132/33	3	50	150		101.5	33.361
23	Adisapthagram	132/33	2	50	131.5		80	26.295
			1	31.5				
		Railway	2	20	40		25.005	7.293
24	Alipurduar	132/66	2	16	52		35.447	8.884
			1	20				
		132/33	1	31.5	31.5		8.051	2.646
25	Amtala	132/33	1	31.5	31.5		48	15.777
			1	50	50			
26	Asoknagar	132/33	2	50	100		68.217	22.422

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
		132/25	2	7.5	15		0.2	0.066
27	Bagnan GIS	132/33	2	50	100		63.4	20.839
28	Bagmundi	132/33	1	20	20		10.436	5.054
29	Balurghat	132/33	4	12.5	50		31.351	10.304
30	Bankura	132/33	2	50	100		41.7	13.706
		Railway					12	5.812
31	Barasat	132/33	3	50	150		138.534	45.534
		Railway					2	0.969
32	Behala/ Joka	132/33	3	50	150		86.7	28.497
33	Basirhat	132/33	2	50	100		84.38	27.734
34	Belmuri	132/33	2	31.5	63		20	6.574
35	Berhampore	132/33	3	50	150		80	26.295
36	Bighati	132/33	2	50	100		25.92	8.519
37	Birsingha	132/33	2	50	100		43.6	14.331
38	Bishnupur (old)	132/33	1	50	50		40.1	13.18
		132/33	1	31.5	31.5			
39	Bolpur	132/33	3	50	150		56	18.406
40	Bongaon	132/33	3	31.5	94.5		74.515	24.492
41	Barjora	132/33	2	31.5	63		18.511	6.084
42	Chanditala	132/33	2	50	100		42	13.805
43	Chandrakora road	132/33	1	50	81.5		53.8	17.683
			1	31.5				
		Railway					2.9	0.931
44	Contai	132/33	2	50	100		70	23.008
		Railway					0.7	0.325
45	Coochbehar	132/33	3	50	150		73.4	24.125
46	Darjeeling	132/33	3	10	30		10.6	3.484
47	Debogram	132/33	1	20	101.5		39.6	13.016
			1	31.5				
			1	50				
		Railway					1.3	0.63
48	Dhulian	132/33	2	31.5	63		23.2	7.625

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
49	Egra	132/33	3	50	150		50	16.434
50	Falta	132/33	2	31.5	63		68.5	22.515
			1	50	50			
51	Gangarampur	132/33	3	20	72.5		44.951	14.775
			1	12.5				
52	Haldia	132/33	1	50	104		30.184	9.921
			1	31.5				
		132/25	1	10			1.74	0.572
			1	12.5				
53	Haldia NIZ	132/33	2	31.5	63		40	13.147
54	Hizli	132/33	1	31.5	81.5		32.71	10.751
			1	50				
		132/25	2	10	20		13.21	4.342
55	Jangipara	132/33	2	31.5	63		21.72	7.139
56	Jhargram	132/33	1	31.5	31.5		45.02	14.797
			1	50	50			
57	Kurseong	132/33	3	10	30		9.7	3.188
58	Kakdwip	132/33	2	31.5	63		46.4	15.251
59	Kalan	132/33	2	31.5	63		50.295	16.531
60	Kalyani	132/33	1	31.5	81.5		56	18.406
			1	50				
61	Khatra	132/33	2	50	100		22.6	7.428
62	Katwa	132/33	2	31.5	63		65.657	21.58
			1	50	50			
		Railway					0.129	0.062
63	Khanyan	132/33	2	31.5	63		32	10.518
64	Kharagpur	132/33	2	31.5	63			
65	Khejuria GIS	132/33	2	50	100		14.884	4.892
66	Kolaghat	132/33	3	50	150		51	16.763
		132/25	2	12.5	25		17	5.588
67	Lalgola	132/33	2	31.5	63		24	7.888
68	Lilooah	132/33	3	50	150		84.1	27.642
		132/25	2	20	40		7.72	2.537
69	Mahachanda	132/33	2	31.5	63		73.736	24.236
			1	50	50			
70	Mathabhanga	132/33	1	50	50		20	6.368

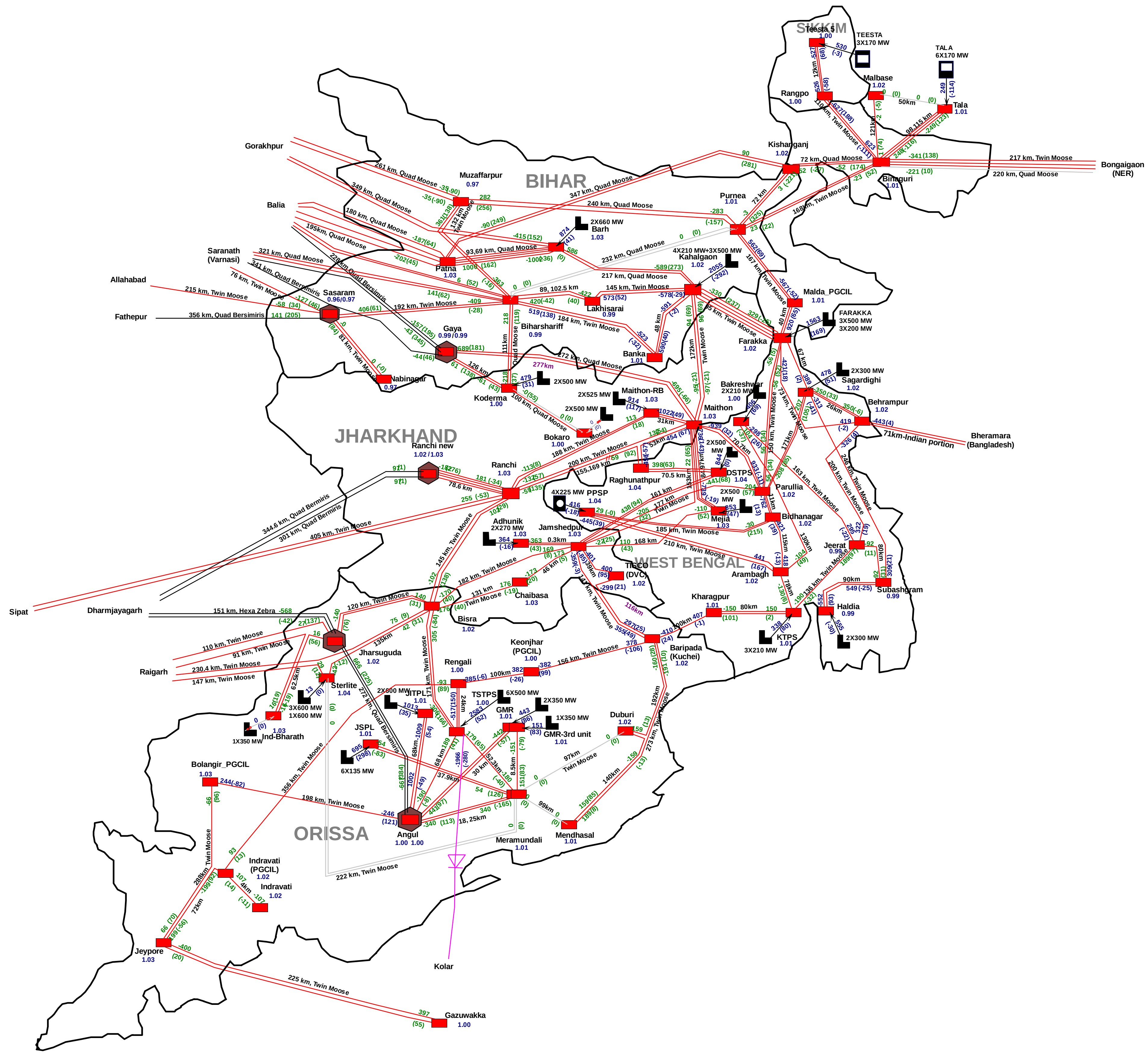
Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
			1	31.5	31.5			
71	Malda	132/33	3	50	150		81	26.623
72	Mahishpota	132/33	2	31.5	63			
73	Mankar	132/33	3	31.5	94.5		66.112	21.73
74	Maynaguri	132/33	1	31.5	141.5		64.554	21.218
			1	50				
			2	30				
75	Nazirpur	132/33	2	31.5	63		18.7	5.901
76	North Bengal university (NBU)	132/33	2	31.5	113		35	11.504
			1	50				
77	New town AA 1	132/33	2	50	100		62.13	20.421
78	Pingla	132/33	3	50	150		72.6	23.862
79	Purulia(WB)	132/33	2	31.5	83		48	15.777
			1	20				
		132/25	2	12.5	25		7	2.301
80	Raghunathganj	132/33	1	31.5	101.5		63	20.707
			1	20				
			1	50				
81	Raghunathpur	132/33	2	31.5	63		23	7.56
82	Raigunj	132/33	1	31.5	96.5		59	19.392
			2	20				
			2	12.5				
83	Raina	132/33	1	50	50		85.57	28.126
84	Rampurhat	132/33	2	50	100		58	19.064
85	Rampurhat Railway	132					7	2.17
86	Ranaghat	132/33	2	50	100		71	23.337
		132/66	2	31.5	63		12	3.752
		132/25	1	12.5	22.5		2.9	0.953
			1	10				
87	Sainthia	132/33	2	50	100		49.6	16.303
88	Salt lake	132/33	3	50	150		85.534	28.114
89	Salt lake GIS	132/33	2	50	100			
90	Samsi	132/33	3	31.5	94.5		30	9.861
91	Siliguri	132/33	2	50	100		44.728	14.701

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
92	Sonarpur	132/33	3	31.5	94.5		65.5	21.529
		132/25	2	20	40		7.8	2.564
93	Tamluk	132/33	2	50	100		61.7	20.28
94	Tarakeswar	132/33	1	31.5	81.5		40.4	13.279
			1	50				
95	Titagarh	132/33	3	50	150		117.124	38.497
96	Titagarh Rly	132/25	2	20	40		19.56	6.429
97	Ujaano (NBU New)	132/33	2	31.5	63		13.866	4.557
98	Ukhra	132/33	2	50	100		67.489	22.183
99	Uluberia	132/33	3	50	150		77	25.309
100	Kuli	132/33	2	50	100		13.7	4.503
101	Food Park	132/33	2	50	100			
102	Birpara	132/66	3	20	60		21.022	6.91
103	Chalsa	132/66	1	20	30		4.473	1.097
			1	10				
		132/33	2	20	40		7.38	2.426
104	Serakol	132/33	2	50	100		32.7	10.34
105	Cossipur Tr	132					2.664	0.876
106	Balichak Tr	132					19.92	6.547
107	Dhatrigram Traction	132					6	2.906
108	A Zone	132/11	1	20	20	DPL	11.64	3.688
		132/11	2	31.5	63			
		132/33	1	50	50		0.003	0.001
109	B Zone	132/11	6	31.5	189		60.36	19.047
		132/33	1	50	50		0	0
110	AB Zone	132/33	1	50	50		42	13.376
111	C Zone	132/11	3	31.5	94.5		16.65	5.286
		132/33	1	50	50		17.59	5.555
112	C1 Zone	132/11	2	31.5	63		3.147	1.005
		132/33	2	50	100		21.8	6.921
113	Bamunara SS	132/34	2	50	100		44.2	13.843
114	Burnpur	220/33	2	50	100	DVC	60	19.721
115	Purulia	132/33	1	50	50		33.32	10.39
116	ASP	132	4	50	200		18.32	5.86

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
117	Jamuria	132/33	2	50	100		45.43	14.435
118	Kalipahari	132/33	2	80	160		50.66	16.031
119	Kalyaneswari	132/33	2	50	100		40	11.701
120	Mejia TPS	220/33	2	80	160		35.11	11.198
121	Barjora	220/33	1	100	100		120.86	38.457
		220/33	1	80	80			
		220/33	1	50	50			
122	Durgapur	220/33	1	50	50		126	39.946
		220/33	2	80	160			
123	DTPS Waria	132/33					30.68	9.78
124	DTPS Waria Rly	132/25					23.75	7.005
125	Belmuri	132/33	1	50	81.5		1.03	0.324
			1	31.5				
126	Belmuri Rly	132/25	2	25	50		5.66	1.86
127	Burdwan DVC	132/33	2	50	180		55	17.297
			1	80				
128	Burdwan Rly	132/25					3.33	1.049
129	Rumkanali Rly	132/25					3	1.417
130	Tamla Rly	220					150	48.868
131	Parulia	220/33					45	14.499
132	EMSS	220/132/33	5	160	800	CESC	83	27.28
133	Belur	132/33	3	50	150		121	39.77
134	BT Road	132/33	2	75	150		72	23.66
135	B.Garden	132/33	2	50	100		103	33.854
136	Titagarh(TRS)	132/33	5	50	250		136	44.7
137	Dum Dum	132/33	2	75	150		44	14.462
138	Park lane	132/33	2	75	150		64	21.036
139	Jadavpore	132/33	2	50	100		78	25.637
			1	55	55		34	11.175
140	Chakmir	132/33	2	55	110		56	18.406

Sl.No	Name of the Sub-Station	Voltage level (kV)	Substation details			Owned By	33kV lump load	
			No. of units	Capacity of each unit (MVA)	Total capacity (MVA)		MW	MVAr
141	Majerhat	132/33	2	75	150		115	37.799
142	BBD Bag	132/33	1	68	136		21	6.902
			1	68			20	6.574
143	PRS	132/33	1	50	175		44	14.462
			1	50			43	14.133
			1	75			34	11.175
144	East Calcutta	132/33	2	50	100		76	24.98
							26	8.546
145	NCGS	132/33	2	50	100		38	12.49
			1	75	75		0	0
			2	50				
146	SRS	132/33	2	55	110		119	39.113
			1	75	75		30	9.861
147	Patuli	132/33	2	75	150		33	10.847
148	WBRS	132/33	2	75	150		51	16.763
149	Park Circus	132/33	1	75	75		0	0
150	JK Nagar						47.5	14.805

ANNEXURE II – POWER MAP OF ER GRID AND ITS CONSTITUENTS STATES AND SCADA RECORD COMPARISON SHEET



LEGEND	Existing
765 kV S/S	(hexagon symbol)
400 kV S/S	(red rectangle)
765 kV line	(black line)
400 kV line	(red line)
Thermal generation	(symbol)
Hydro generation	(symbol)
Pumped storage plant	(symbol)

Display Notation
Injection into the bus : +ve
Drawl away from the bus : -ve
Voltage Mag/(Ang) in pu /degree
Flows in MW and (Mvar)

Eastern Region existing network (MAY-16) geographical map.

					R0	20/06/2016	
APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	REV	DATE	REMARKS

Eastern Regional Power Committee
14, Golf Club Road, Tollygunge,
Kolkata, West Bengal 700033

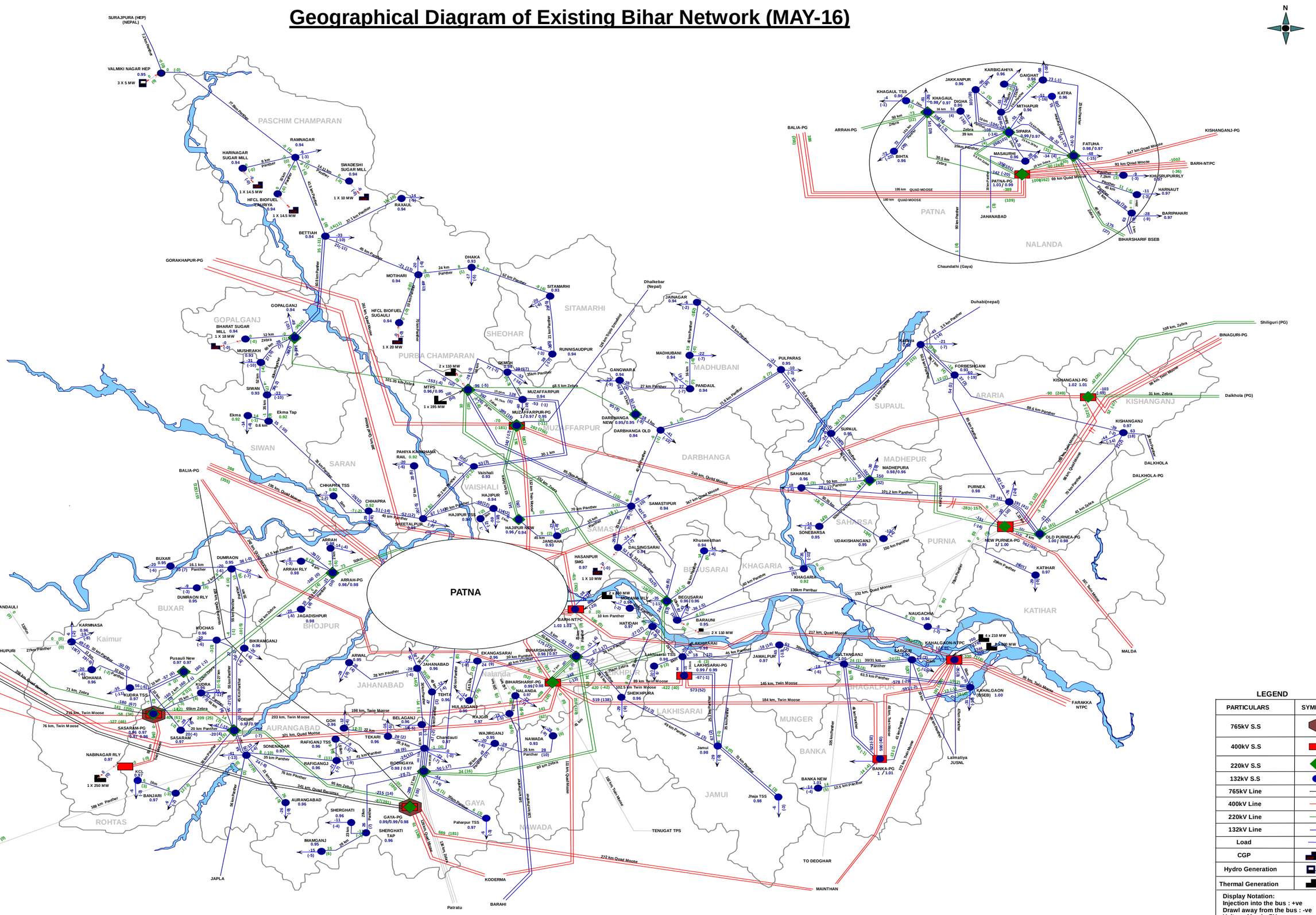
LOA details: ERPC/PR_DBASE/2016/3567 Dated 30 March 2016

Power Research & Development Consultants Private Limited
5, 11th cross, 2nd Stage,
West of chord Road,
Bangalore-560086.INDIA
Tel :+91-80-4245 5555
E-mail:prdc@vsnl.com

DRAWN USING : Mipower TM

DWG. NO. : Geographical Power Map\May-2016\ER

Geographical Diagram of Existing Bihar Network (MAY-16)



LEGEND

PARTICULARS	SYMBOL
765kV S.S	
400kV S.S	
220kV S.S	
132kV S.S	
765kV Line	
400kV Line	
220kV Line	
132kV Line	
Load	
CGP	
Hydro Generation	
Thermal Generation	

Display Notation:
Injection into the bus : +ve
Drawl away from the bus : -ve
Voltage Mag in PU
Flows in MW and (MVAr)

APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	REV	DATE	REMARKS
					R0	20/06/2016	

Bihar state existing network (MAY-16) geographical map.

Eastern Regional Power Committee
14 Golf Club Road, Tollygunge, Kolkata, West Bengal 700033

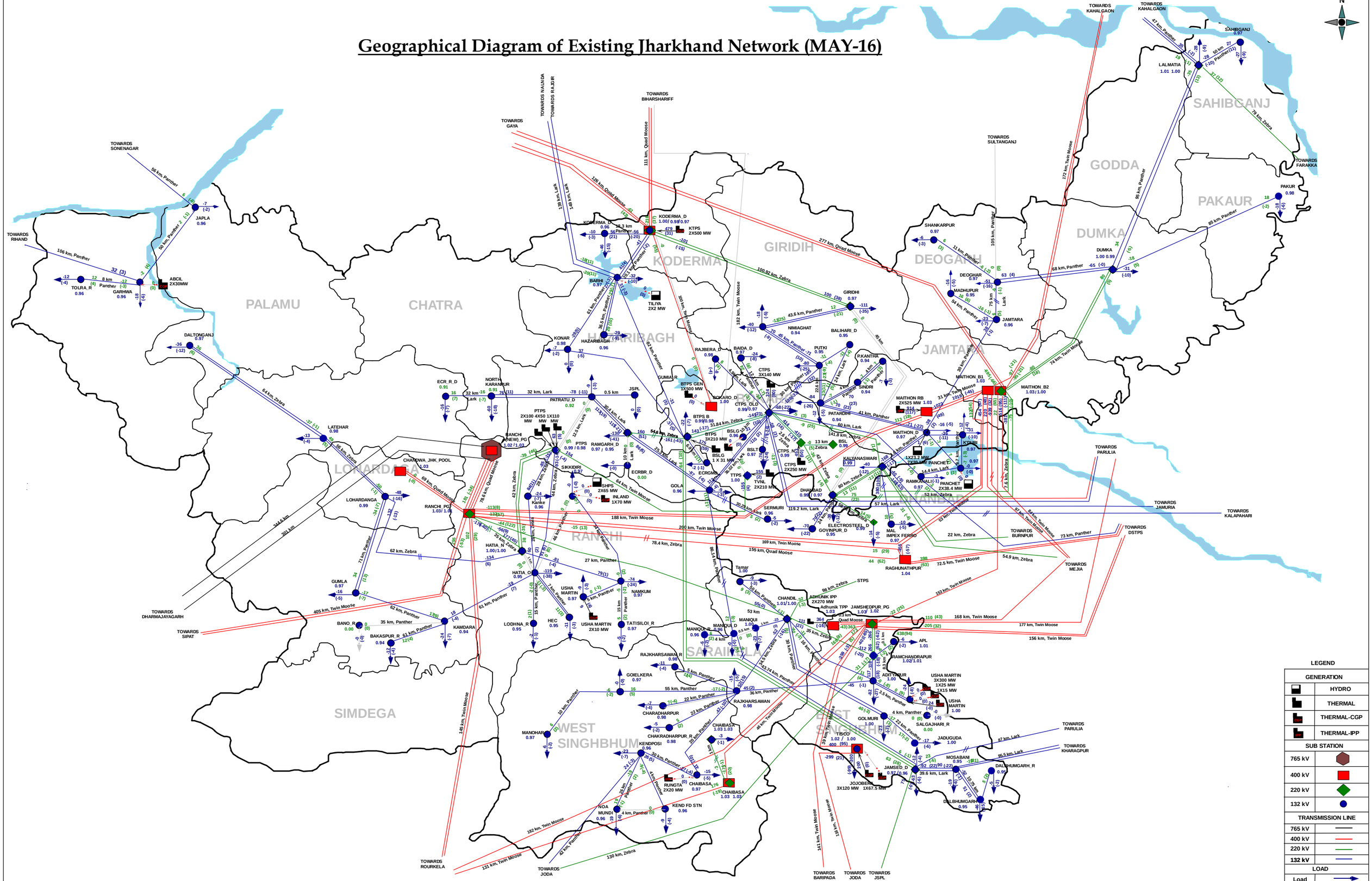
Power Research & Development Consultants Pvt. Ltd.,
#5, 11th Cross, 2nd Stage, West of Chord Road, Bangalore- 560086, INDIA
Ph : +91-080-4245 5555
E-mail : prdc@vsnl.com

LOA details: ERPC/PR_DBASE/2016/3567 Dated 30 March 2016

DRAWN IN : MiPower™

DWG. NO. : Geographical Power Map\ER\May-16\Bihar

Geographical Diagram of Existing Jharkhand Network (MAY-16)



LEGEND

GENERATION	
HYDRO	
THERMAL	
THERMAL-CGP	
THERMAL-IPP	
SUB STATION	
765 kV	
400 kV	
220 kV	
132 kV	
TRANSMISSION LINE	
765 kV	
400 kV	
220 kV	
132 kV	
LOAD	
Load	

APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	REVISION	DATE	REMARKS
					R0	20/06/2016	

Jharkhand state existing network (MAY-16) geographical map.

Eastern Regional Power Committee
14, Golf Club Road, Tollygunge,
Kolkata, West Bengal 700033

LOA details: ERPC/PR_DBASE/2016/3567 Dated 30 March 2016

Power Research and Development Consultants Pvt. Ltd.
#5, 11th Cross, 2nd Stage,
West of Chord Road,
Bangalore- 560086, INDIA
Ph : +91-080-4245 5555
E-mail : prdc@vsnl.com

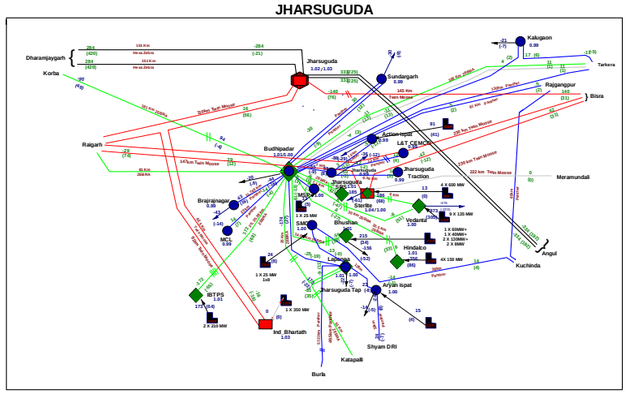
DRAWN IN :MiPower™

DWG. NO. : Geographical Power Map\ER\May-2016\Jharkhand

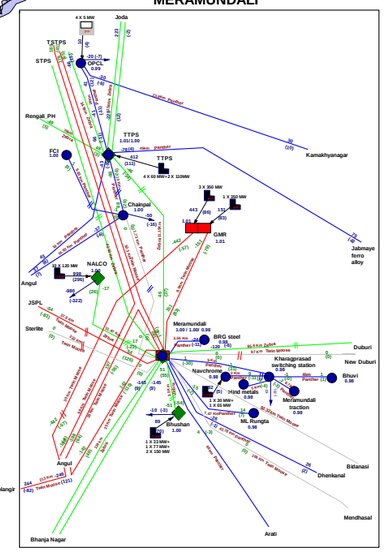
JHARKHAND

WEST BENGAL

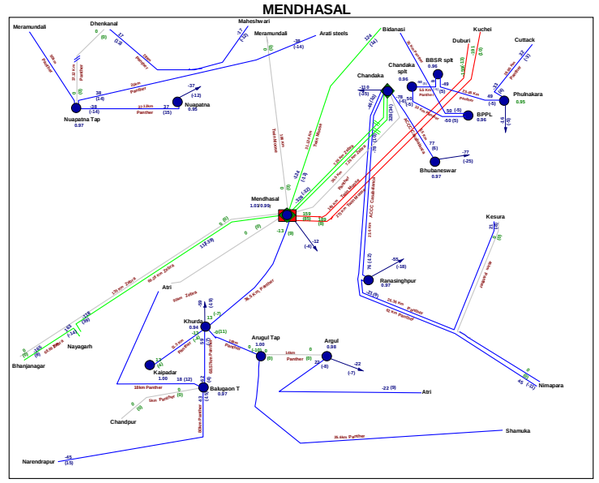
JHARSUGUDA



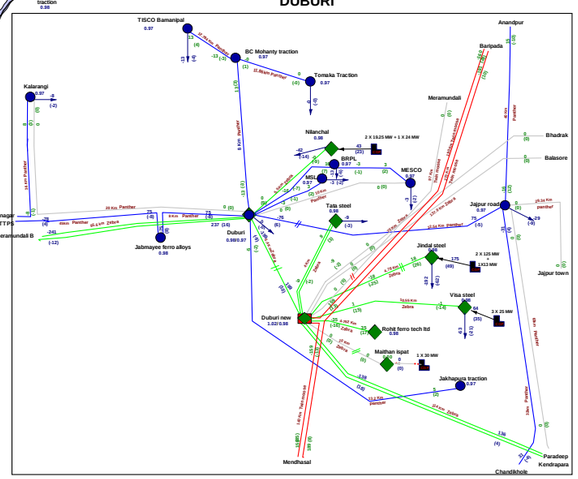
MERAMUNDALI



MENDHASAL



DUBURI



BAY OF BENGAL

LEGEND

GENERATION	
HYDRO	
HYDRO-IPP	
THERMAL	
THERMAL-IPP	
THERMAL-CGP	

SUB STATION	
765 kV	
400 kV	
220 kV	
132 kV	

TRANSMISSION LINE	
HVDC	
765 kV	
400 kV	
220 kV	
132 kV	

APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	REVISION	DATE	REMARKS
					R0	20.06.2016	

Geographical power map of Orissa for MAY-2016 operating network condition

Eastern Regional Power Committee
14, Golf Club Road, Tollygunge,
Kolkata, West Bengal 700033

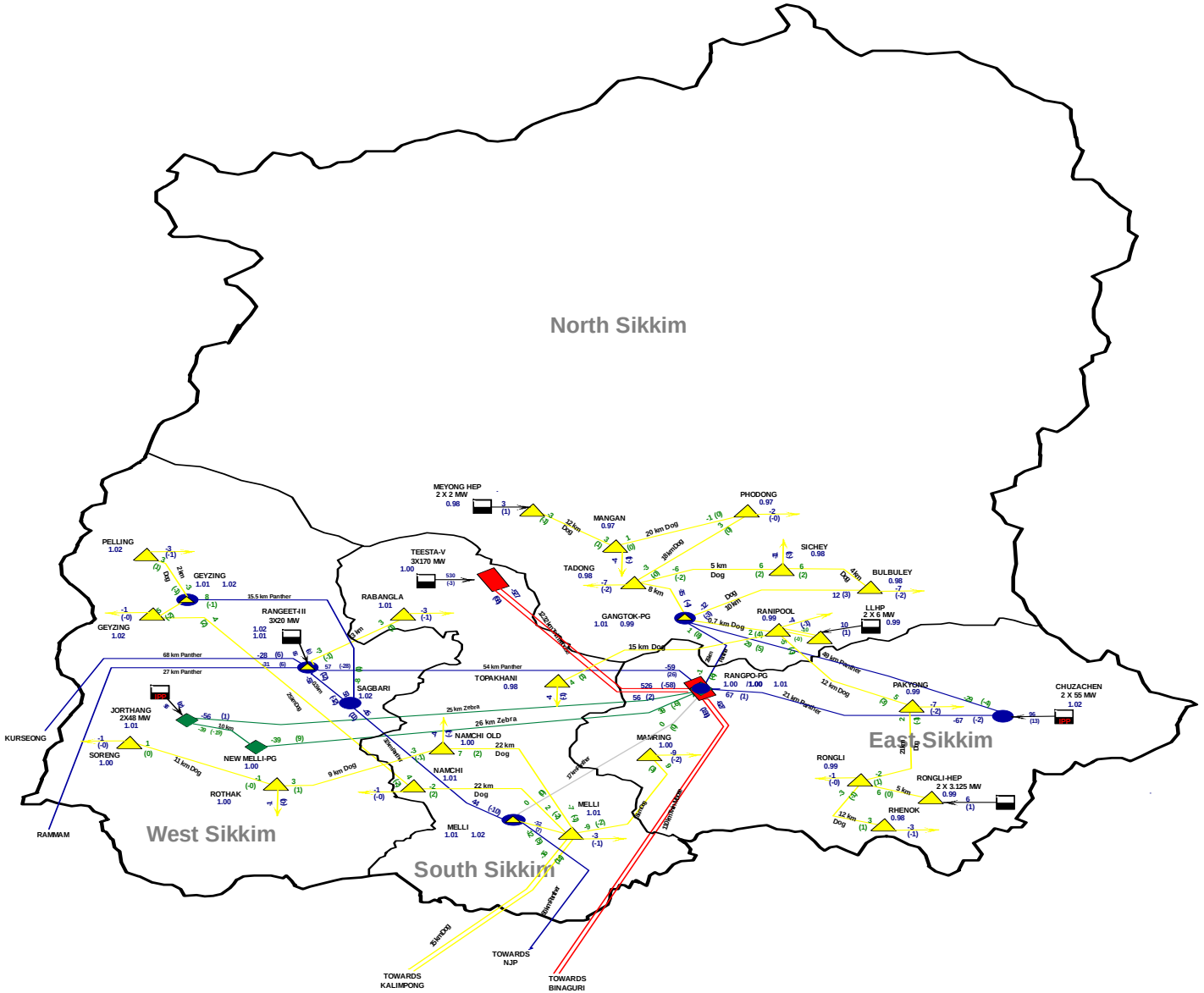
LOA details: ERPC/PR_DBASE/2016/3567 Dated 30 March 2016

Power Research & Development Consultants Pvt. Ltd.,
#5, 11th Cross, 2nd Stage,
West of Chord Road,
Bangalore- 560086, INDIA
Ph : +91-080-2319 2209,2159
Fax: +91-080-2319 2210
E-mail : prdc@vsnl.com

DRAWN IN : MiPower

DWG. NO. : Geographical Power Map\ER\May-2016\Odisha

Geographical Diagram of Existing Sikkim Network (MAY-16)



LEGEND	
PARTICULARS	SYMBOL
400 kV SS	
220 kV SS	
132 kV SS	
66 kV SS	
400 kV Line	
220 kV Line	
132 kV Line	
66 kV Line	
Load	
Hydro Generation	
IPP Hydro Generation	IPP

APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	REV.	DATE	REMARKS
					R0	20/06/2016	

Sikkim state existing network (MAY-16) geographical map.

Eastern Regional Power Committee
14, Golf Club Road, Tollygunge,
Kolkata, West Bengal 700033

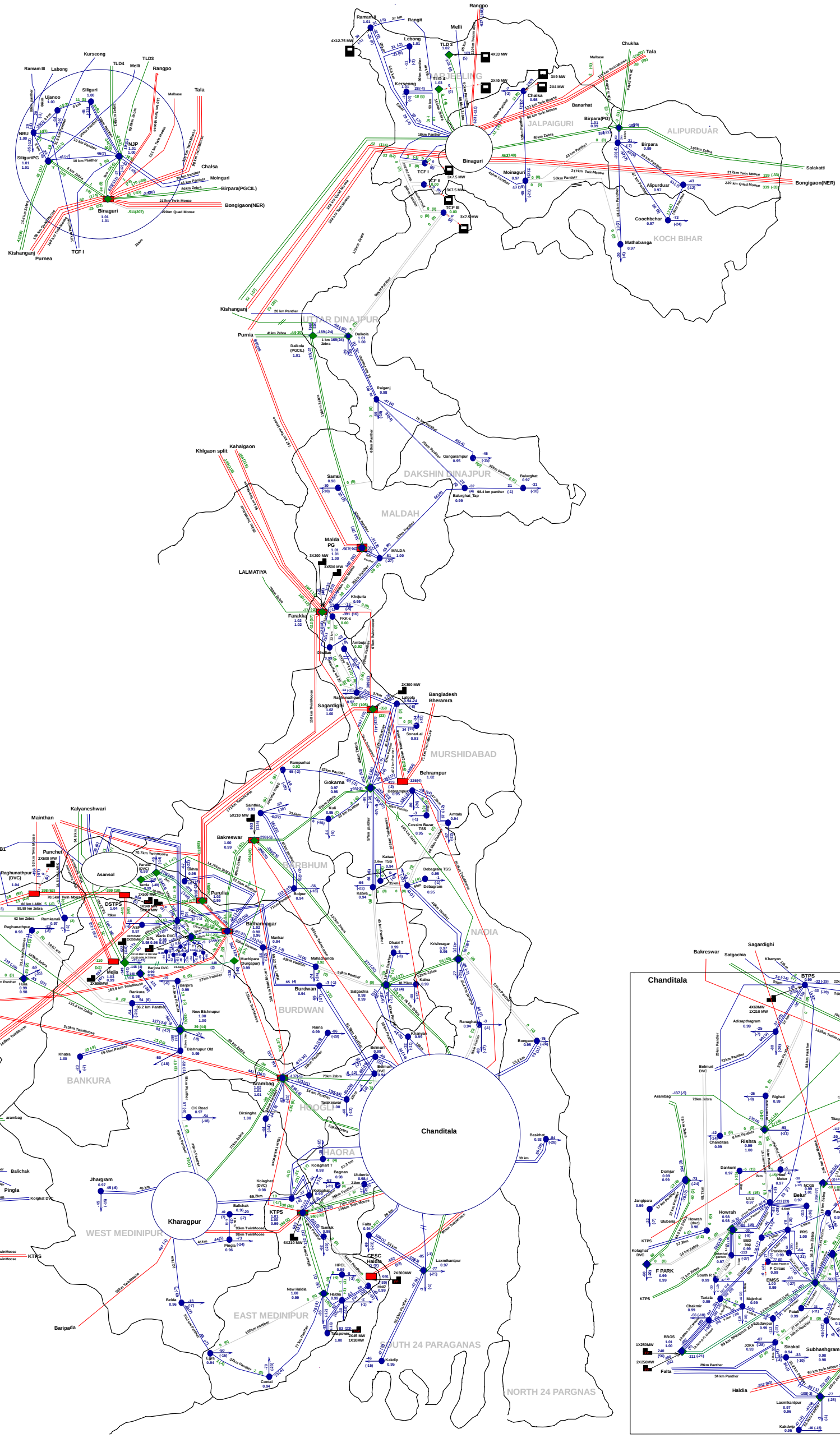
PO details: ERPC/PR_DBASE/2016/3567 Dated 30 March 2016

Power Research and Development Consultants Pvt. Ltd.
#5, 11th Cross, 2nd Stage,
West of Chord Road,
Bangalore- 560086, INDIA
Ph : +91-080-4245 5555
E-mail : prdc@vsnl.com

DRAWN IN : MiPower TM

DWG. NO. : Geographical Power Map\ER\May-2016\Sikkim

Geographical power map of West Bengal (MAY-16)



PARTICULARS	SYMBOL
400 kV S.S	
220 kV S.S	
132 kV S.S	
400 kV Line	
220 kV Line	
132 kV Line	
Load	
Thermal Generation	
Hydro Generation	
IPP	
CGP	

Display Notation
Injection into the bus : +ve
Drawl away from the bus : -ve
Voltage Magl(Ang) in Pu /degree
Flows in MW and (Mvar)

APPROVED	REVIEWED	CHECKED	DRAWN	DESCRIPTION	REV.	DATE	REMARKS
					R0	20.06.2016	

Eastern Regional Power Committee
14, Golf Club Road, Tollygunge,
Kolkata, West Bengal 700033

LOA details: ERPC/PR_DBASE/2016/3567 Dated 30 March 2016

Power Research and Development Consultants Pvt. Ltd.
#5, 11th Cross, 2nd Stage,WOC Road,
Bangalore-560 086, INDIA.
Tel : +91-080-23192159, 23192168,
E-mail : prdc@vsnl.com

DRAWN IN: MiPower™

DWG. NO. : Geographical Power Map\ER\May-2016\West Bengal

Table G: Comparison of 765kV and 400kV bus voltage (simulated result) with SCADA record of Eastern region grid

Sl. No	Bus name	Voltage level (kV)	Voltage in pu		Difference	% Difference
			Recorded	Simulated		
1	Sasaram	765	0.97	0.96	0.009	0.89%
2	Gaya	765	0.98	0.99	-0.010	-0.99%
3	Ranchi New_PG	765	1.02	1.02	-0.001	-0.14%
4	Angul_PG	765	1.00	1.00	-0.007	-0.71%
5	Jharsuguda_PG	765	1.01	1.02	-0.004	-0.37%
6	Sasaram	400	0.96	0.97	-0.009	-0.93%
7	Gaya	400	0.99	0.99	-0.004	-0.36%
8	Purnea_PG	400	1.00	1.01	-0.010	-0.99%
9	Lakhisarai	400	1.01	1.00	0.009	0.92%
10	Muzzafarpur_PG	400	0.98	0.98	-0.002	-0.20%
11	Patna	400	1.03	1.03	-0.001	-0.11%
12	Kishanganj	400	1.04	1.03	0.014	1.31%
13	Banka_PG	400	1.03	1.01	0.019	1.83%
14	Barh	400	1.04	1.03	0.006	0.56%
15	Biharshariff_PG	400	0.98	1.00	-0.016	-1.61%
16	Kahalgaon_NTPC	400	1.01	1.02	-0.006	-0.64%
17	Jamshedpur_PG	400	1.05	1.03	0.015	1.42%
18	Maithon	400	1.03	1.03	0.006	0.61%
19	MPL	400	1.03	1.03	0.005	0.48%
20	Chaibasa_PG	400	1.04	1.03	0.002	0.16%
21	Koderma_D	400	1.00	1.00	0.005	0.50%
22	BTPS_DVC	400	NA	1.00		
23	Ranchi_PG	400	1.04	1.03	0.007	0.70%
24	Chandawa	400	NA	1.033		
25	Adhunik	400	1.03	1.03	-0.005	-0.50%
26	TISCO	400	1.04	1.02	0.012	1.20%
27	Angul_PG	400	1.00	1.00	-0.004	-0.37%
28	Jharsuguda_PG	400	1.03	1.03	-0.001	-0.12%
29	Jaypore_PG	400	1.03	1.03	-0.003	-0.33%
30	Indravati_PG	400	1.01	1.02	-0.013	-1.26%
31	Indravati_Hdro	400	1.04	1.02	0.015	1.42%
32	Rengali_PG	400	1.00	1.00	-0.003	-0.26%
33	GMR_3rd	400	1.01	1.01	-0.002	-0.19%
34	TSTPS	400	0.99	1.00	-0.010	-1.04%
35	Bisra	400	1.02	1.02	-0.006	-0.57%

Sl. No	Bus name	Voltage level (kV)	Voltage in pu		Difference	% Difference
			Recorded	Simulated		
36	Baripada	400	1.01	1.02	-0.003	-0.30%
37	Meramundali	400	1.01	1.01	0.002	0.23%
38	Sterlite	400	1.03	1.04	-0.008	-0.83%
39	Duburi New	400	1.05	1.02	0.023	2.21%
40	Keonjhar	400	1.01	1.00	0.007	0.66%
41	Bolangir	400	1.02	1.03	-0.007	-0.65%
42	IndBharat	400	1.03	1.03	-0.001	-0.11%
43	JITPL	400	1.02	1.01	0.009	0.85%
44	GMR_4	400	1.01	1.01	-0.001	-0.11%
45	Mendhasal	400	0.98	1.01	-0.031	-3.19%
46	JSPL	400	0.99	1.01	-0.017	-1.71%
47	Rangpo_PG	400	NA	1.01		
48	Teesta-5	400	1.00	1.01	-0.010	-1.02%
49	Jeerat	400	0.97	0.99	-0.019	-1.99%
50	Arambag	400	1.03	1.02	0.009	0.83%
51	Kharagpur	400	1.00	1.01	-0.016	-1.61%
52	Raghunathpur	400	1.04	1.04	0.001	0.05%
53	Purulia Pump Storage	400	1.04	1.04	0.001	0.12%
54	Bidhannagar	400	1.03	1.02	0.008	0.80%
55	Kolaghat	400	1.01	1.01	-0.010	-0.96%
56	Bakreswar	400	1.00	1.00	-0.004	-0.45%
57	Sagardighi	400	1.04	1.02	0.018	1.72%
58	Haldia	400	1.00	0.99	0.010	0.99%
59	Parulia	400	1.02	1.02	-0.004	-0.43%
60	Malda	400	1.01	1.02	-0.005	-0.46%
61	Binaguri	400	1.02	1.02	-0.003	-0.26%
62	Subhasgarm_PG	400	0.98	0.99	-0.009	-0.92%
63	Mejia	400	1.04	1.03	0.005	0.51%
64	Farakka	400	1.03	1.02	0.006	0.58%
65	Behrampore_SW	400	1.03	1.02	0.011	1.03%

Table H: Comparison of 765kV and 400kV line flow (simulated result) with SCADA record of Eastern region grid

Sl.No	From Bus Name	To Bus Name	Voltage (kV)	Power flow in MW (forward)		Difference (MW)	% Difference
				SCADA Recorded	Simulated		
765 kV							
1	Fathepur	Sasaram	765	141	141	0	0.0%
2	Jharsuguda	Dharamjaygarh	765	283	284	-1	-0.4%
3	Jharsuguda	Dharamjaygarh	765	283	284	-1	-0.4%
4	Ranchi New	Dharamjaygarh	765	-102	-97	-5	4.9%
5	Ranchi New	Dharamjaygarh	765	-80	-85	5	-6.3%
6	Jharsuguda	Angul	765	-354	-331	-23	6.5%
7	Jharsuguda	Angul	765	-348	-331	-17	4.9%
8	Balia	Gaya	765	-158	-157	-1	0.6%
9	Gaya	Varanasi	765	45	44	1	2.2%
10	Gaya	Varanasi	765	42	43	-1	-2.4%
400 kV							
1	Varanasi	Biharshariff	400	71	71	0	0.0%
2	Varanasi	Biharshariff	400	71	71	0	0.0%
3	Allhabad	Sasaram	400	-58	-58	0	0.0%
4	Balia	Patna	400	-91	-93	2	-2.2%
5	Balia	Patna	400	-91	-93	2	-2.2%
6	Balia	Patna	400	-101	-101	0	0.0%
7	Balia	Patna	400	-105	-101	-4	3.8%
8	Sarnath	Sasaram	400	-128	-127	-1	0.8%
9	Lakhisarai	Kahalgaon	400	-359	-289	-70	19.5%
10	Lakhisarai	Kahalgaon	400	-360	-289	-71	19.7%
11	Biharshariff	Banka	400	-321	-262	-59	18.4%
12	Biharshariff	Banka	400	-316	-262	-54	17.1%
13	Biharshariff	Muzaffarpur	400	159	182	-23	-14.5%
14	Biharshariff	Muzaffarpur	400	159	182	-23	-14.5%
15	Purnea	Biharshariff	400	0	0	0	0.0%
16	Purnea	Biharshariff	400	0	0	0	0.0%
17	Lakhisarai	Biharshariff	400	239	196	43	18.0%
18	Lakhisarai	Biharshariff	400	267	226	41	15.4%
19	Biharshariff	Balia	400	3	3	0	0.0%
20	Biharshariff	Balia	400	-9	-3	-6	66.7%
21	Barh	Kahalgaon	400	-281	-295	14	-5.0%
22	Barh	Kahalgaon	400	-282	-295	13	-4.6%

Sl.No	From Bus Name	To Bus Name	Voltage (kV)	Power flow in MW (forward)		Difference (MW)	% Difference
				SCADA Recorded	Simulated		
23	Barh	Gorakhpur	400	205	207	-2	-1.0%
24	Barh	Gorakhpur	400	207	207	0	0.0%
25	Patna	Kishanganj	400	59	45	14	23.7%
26	Patna	Kishanganj	400	60	45	15	25.0%
27	Patna	Barh	400	-222	-213	-9	4.1%
28	Patna	Barh	400	-224	-213	-11	4.9%
29	Patna	Barh	400	-291	-288	-3	1.0%
30	Patna	Barh	400	-290	-288	-2	0.7%
31	Sasaram	Biharshariff	400	-178	-211	33	-18.5%
32	Sasaram	Biharshariff	400	-178	-199	21	-11.8%
33	Kahalgaon	Banka	400	358	296	62	17.3%
34	Kahalgaon	Banka	400	343	296	47	13.7%
35	Muzaffarpur	Gorakhpur	400	36	35	1	2.8%
36	Muzaffarpur	Gorakhpur	400	33	35	-2	-6.1%
37	Muzaffarpur	Purnea	400	-177	-142	-35	19.8%
38	Muzaffarpur	Purnea	400	-178	-142	-36	20.2%
39	NabinagarRly	Sasaram	400	0	0	0	0.0%
40	NabinagarRly	Sasaram	400	0	0	0	0.0%
41	Gaya	Maithon	400	-373	-348	-25	6.7%
42	Gaya	Maithon	400	-376	-348	-28	7.4%
43	Gaya	Koderma	400	-17	-30	13	-76.5%
44	Gaya	Koderma	400	-21	-30	9	-42.9%
45	Purnea	Kishanganj	400	-36	1.5	-37.5	104.2%
46	Purnea	Kishanganj	400	-35	1.5	-36.5	104.3%
47	Aadhunik	Jamshedpur	400	193	181.5	11.5	6.0%
48	Aadhunik	Jamshedpur	400	185	181.5	3.5	1.9%
49	Ranchi	MPL	400	66	56	10	15.2%
50	Ranchi	MPL	400	66	56	10	15.2%
51	Ranchi	Ranchi New	400	-46	-45	-1	2.2%
52	Ranchi	Ranchi New	400	-47	-45	-2	4.3%
53	Ranchi	Ranchi New	400	-48	-45	-3	6.3%
54	Ranchi	Ranchi New	400	-48	-45	-3	6.3%
55	Ranchi	Maithon	400	149	132	17	11.4%
56	Ranchi	Chandwa	400	0	0	0	0.0%
57	Ranchi	Sipat	400	-127	-127.5	0.5	-0.4%
58	Ranchi	Sipat	400	-131	-127.5	-3.5	2.7%

Sl.No	From Bus Name	To Bus Name	Voltage (kV)	Power flow in MW (forward)		Difference (MW)	% Difference
				SCADA Recorded	Simulated		
59	Maithon	Jamshedpur	400	-17	-21	4	-23.5%
60	Maithon	Mejia B	400	-207	-220	13	-6.3%
61	Maithon	Kahalgaon	400	119	95	24	20.2%
62	Maithon	Kahalgaon	400	122	97	25	20.5%
63	MPL	Maithon	400	490	511	-21	-4.3%
64	MPL	Maithon	400	497	511	-14	-2.8%
65	Jamshedpur	Durgapur (DSTPS)	400	-224	-221	-3	1.3%
66	Jamshedpur	Durgapur (DSTPS)	400	-224	-221	-3	1.3%
67	Jamshedpur	Mejia B	400	-85	-110	25	-29.4%
68	Koderma	Biharshariff	400	96	109	-13	-13.5%
69	Koderma	Biharshariff	400	98	109	-11	-11.2%
70	Koderma	Bokaro (BTPS)	400	1	0	1	
71	Koderma	Bokaro (BTPS)	400	1	0	1	
72	Chaibasa	Jamshedpur	400	189	173	16	8.5%
73	Chaibasa	Bisra	400	-187	-177	-10	5.3%
74	TISCO	Jamshedpur	400	-416	-401	-15	3.6%
75	TSTPS	Bisra	400	202	154	48	23.8%
76	TSTPS	Bisra	400	203	154	49	24.1%
77	Bisra	Jamshedpur	400	176	170	6	3.4%
78	Bisra	Ranchi	400	55	51	4	7.3%
79	Bisra	Ranchi	400	57	51	6	10.5%
80	Bisra	Raigarh	400	-75	-75	0	0.0%
81	Bisra	Sterlite	400	-42	-42	0	0.0%
82	Sterlite	Meramundali	400	0	0	0	0
83	Sterlite	Meramundali	400	0	0	0	0
84	JSPL	Meramundali	400	27	27	0	0.0%
85	JSPL	Meramundali	400	27	27	0	0.0%
86	GMR	Meramundali	400	151	151	0	0.0%
87	Meramundali	Mendhasal	400	0	0	0	0.0%
88	TSTPS	Rengali	400	266	259	7	2.6%
89	TSTPS	Rengali	400	267	259	8	3.0%
90	Rengali	Indravati PG	400	66	93	-27	-40.9%
91	Rengali	Keonjhar	400	410	385	25	6.1%
92	Indravati PG	Jaypore	400	176	199	-23	-13.1%
93	Indravati	Indravati PG	400	117	107	10	8.5%

Sl.No	From Bus Name	To Bus Name	Voltage (kV)	Power flow in MW (forward)		Difference (MW)	% Difference
				SCADA Recorded	Simulated		
	OHPC						
94	Jaypore	Bolangir	400	-54	-66	12	-22.2%
95	Jaypore	Gazuwaka	400	201	200	1	0.5%
96	Jaypore	Gazuwaka	400	196	200	-4	-2.0%
97	Angul	JITPL	400	-525	-504	-21	4.0%
98	Angul	JITPL	400	-526	-504	-22	4.2%
99	Mendhasal	Baripada	400	-197	-191	-6	3.0%
100	Baripada	Jamshedpur	400	-362	-359	-3	0.8%
101	Baripada	TISCO	400	-313	-299	-14	4.5%
102	Baripada	Kharagpur	400	370	410	-40	-10.8%
103	Baripada	Keonjhar	400	-411	-382	-29	7.1%
104	Angul	Meramundali	400	160	143	17	10.6%
105	Angul	Meramundali	400	195	197	-2	-1.0%
106	Bolangir	Angul	400	-212	-244	32	-15.1%
107	TSTPS	Angul	400	-201	-190	-11	5.5%
108	Duburi	Mendhasal	400	161	159	2	1.2%
109	Duburi	Meramundali	400	0	0	0	0
110	Duburi	Meramundali	400	0	0	0	0
111	GMR	Angul	400	222	221	1	0.5%
112	GMR	Angul	400	220	221	-1	-0.5%
113	Sterlite	Raigarh	400	-29	-29	0	0.0%
114	TSTPS	Meramundali	400	-191	-180	-11	5.8%
115	Duburi	Baripada	400	-171	-160	-11	6.4%
116	Ind-Bharath	Jharsuguda	400	15	16	-1	-6.7%
117	Ind-Bharath	Raigarh	400	-16	-16	0	0.0%
118	Jharsuguda	Raigarh	400	-27	-27	0	0.0%
119	Jharsuguda	Bisra	400	87	70	17	19.5%
120	Jharsuguda	Bisra	400	84	70	14	16.7%
121	Teesta-5	Rangpo	400	257	263	-6	-2.3%
122	Teesta-5	Rangpo	400	269	263	6	2.2%
123	Rangpo	Binaguri	400	321	314	7	2.2%
124	Rangpo	Binaguri	400	322	314	8	2.5%
125	Arambag	Bakreswar	400	-77	-103	26	-33.8%
126	Arambag	KTPS	400	131	130	1	0.8%
127	Bidhannagar	Arambag	400	399	421	-22	-5.5%
128	Jeerat	Bakreswar	400	-295	-297	2	-0.7%

Sl.No	From Bus Name	To Bus Name	Voltage (kV)	Power flow in MW (forward)		Difference (MW)	% Difference
				SCADA Recorded	Simulated		
129	Jeerat	Subhashgram	400	227	92	135	59.5%
130	Jeerat	KTPS	400	-245	-190	-55	22.4%
131	Subhashgram	Sagardighi	400	-341	-313	-28	8.2%
132	Behrampur	Farraka	400	-383	-421	38	-9.9%
133	Farraka	Sagardighi	400	325	390	-65	-20.0%
134	Farraka	Kahalgaon	400	-62	-82	20	-32.3%
135	Farraka	Kahalgaon	400	-64	-82	18	-28.1%
136	Farraka	Kahalgaon	400	-55	-82	27	-49.1%
137	Farraka	Kahalgaon	400	-56	-82	26	-46.4%
138	Parulia (PGCIL)	Farraka	400	-41	-56	15	-36.6%
139	Parulia (PGCIL)	Farraka	400	-39	-56	17	-43.6%
140	Farraka	Malda PG	400	506	462	44	8.7%
141	Farraka	Malda PG	400	506	462	44	8.7%
142	KTPS	Kharagpur	400	-41	-74	33	-80.5%
143	KTPS	Kharagpur	400	NA	-77		
144	Haldia	Subhashgram	400	275	276	-1	-0.4%
145	Haldia	Subhashgram	400	276	276	0	0.0%
146	Parulia (PGCIL)	Jamshedpur	400	-186	-205	19	-10.2%
147	Parulia (PGCIL)	Bidhannagar	400	372	381	-9	-2.4%
148	Parulia (PGCIL)	Bidhannagar	400	351	381	-30	-8.5%
149	Parulia (PGCIL)	Maithon	400	-455	-469	14	-3.1%
150	Parulia (PGCIL)	Maithon	400	-457	-469	12	-2.6%
151	Malda	Purnea	400	299	283	16	5.4%
152	Malda	Purnea	400	305	283	22	7.2%
153	Mejia B	Maithon	400	295	259	36	12.2%
154	Mejia B	Maithon	400	295	259	36	12.2%
155	Raghunathpur	Ranchi	400	-30	-15	-15	50.0%
156	Raghunathpur	Ranchi	400	NA	-44		
157	Raghunathpur	Maithon	400	435	456	-21	-4.8%
158	Durgapur (DSTPS)	Raghunathpur	400	194	199	-5	-2.6%
159	Durgapur (DSTPS)	Raghunathpur	400	196	199	-3	-1.5%

Sl.No	From Bus Name	To Bus Name	Voltage (kV)	Power flow in MW (forward)		Difference (MW)	% Difference
				SCADA Recorded	Simulated		
160	PPSP	Arambag	400	225	222	3	1.3%
161	PPSP	Arambag	400	225	222	3	1.3%
162	PPSP	Bidhannagar	400	-6	-14	8	-133.3%
163	PPSP	Bidhannagar	400	-13	-14	1	-7.7%
164	Behrampur	Behramara (Bangladesh)	400	222	222	0	0.0%
165	Behrampur	Behramara (Bangladesh)	400	220	222	-2	-0.9%
166	Behrampur	Jeerat	400	415	326	89	21.4%
167	Sagrdghi	Behrampur	400	237	175	62	26.2%
168	Sagrdghi	Behrampur	400	238	175	63	26.5%
169	Sagrdghi	Parulia (PGCIL)	400	-133	-104	-29	21.8%
170	Sagrdghi	Parulia (PGCIL)	400	-133	-104	-29	21.8%
171	Binaguri	Bongaigaon (NER)	400	209	221	-12	-5.7%
172	Binaguri	Bongaigaon (NER)	400	0	0	0	
173	Binaguri	Bongaigaon (NER)	400	172	170	2	1.2%
174	Binaguri	Bongaigaon (NER)	400	178	170	8	4.5%
175	Binaguri	Purnea	400	32	12	20	62.5%
176	Binaguri	Purnea	400	32	12	20	62.5%
177	Binaguri	Kishanganj	400	28	26	2	7.1%
178	Binaguri	Kishanganj	400	22	26	-4	-18.2%
179	TALA	Binaguri	400	92	78	14	15.2%
180	TALA	Binaguri	400	66	78	-12	-18.2%
181	TALA	Binaguri	400	91	92	-1	-1.1%
182	Malbase	TALA	400	0	0	0	
183	Malbase	Binaguri	400	1	1	0	0.0%

ANNEXURE III – SHORT CIRCUITS STUDY RESULTS

Table I: State wise 3-Ph and SLG results of Eastern region grid

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
Bihar						
1	Sasaram	765	11090.38	8.37	8463.85	6.39
		400	16490.16	23.80	11793.79	17.02
		132	2187.56	9.57	1506.31	6.59
2	Gaya	765	23064.34	17.41	16158.81	12.20
		765	16570.13	12.51	10700.99	8.08
		400	21492.93	31.02	15662.36	22.61
		220	8273.41	21.71	8154.47	21.40
3	Purnea_PG	400	21159.07	30.54	15196.76	21.94
		220	7460.43	19.58	7534.42	19.77
		400	5537.93	7.99	7069.21	10.20
		400	5537.93	7.99	7069.21	10.20
4	Purnea old_PG	220	7312.24	19.19	7083.94	18.59
		132	3153.32	13.79	2959.57	12.95
5	Lakhisarai	400	12870.16	18.58	7565.57	10.92
		132	3182.87	13.92	2054.72	8.99
		132	3749.59	16.40	2965.64	12.97
6	Muzzafarpur_PG	400	17390.77	25.10	11827.77	17.07
		220	7438.81	19.52	7613.50	19.98
		132	713.80	3.12	716.27	3.13
7	Patna	400	20541.72	29.65	13131.28	18.95
		220	8078.21	21.20	7489.65	19.66
8	kishanganj	400	17755.44	25.63	14988.78	21.64
		220	8055.40	21.14	3823.52	10.03
		132	1480.06	6.47	961.37	4.21
9	Banka_PG	400	15812.88	22.83	10166.81	14.68
		132	3721.09	16.28	3133.73	13.71
10	Barh	400	20127.90	29.05	17688.27	25.53
		132	4507.89	19.72	3972.16	17.37
11	Biharshariff_PG	400	29750.57	42.94	20207.97	29.17
		400	29774.95	42.98	20215.28	29.18
		220	11413.77	29.95	10928.05	28.68
12	Biharshariff_PG	220	11310.98	29.69	10520.81	27.61
		132	5061.13	22.14	4317.78	18.89

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
13	Kahalgaon_NTPC	400	30656.81	44.25	29265.46	42.24
		400	30805.79	44.47	29422.19	42.47
		132	4380.21	19.16	3967.92	17.36
14	Bodhgaya	220	7018.91	18.42	5390.21	14.15
		132	4920.88	21.52	3993.58	17.47
15	Dehri	220	3961.86	10.40	2594.85	6.81
		132	2963.32	12.96	2069.24	9.05
17	Fatuha	220	7280.47	19.11	5449.57	14.30
		132	4341.36	18.99	3454.27	15.11
18	Khagaul	220	5015.03	13.16	3442.99	9.04
		132	2534.09	11.08	1993.87	8.72
19	Gopalganj	220	1174.49	3.08	625.00	1.64
		132	959.49	4.20	539.11	2.36
20	Darbhanga	220	1907.10	5.01	1180.63	3.10
		132	1771.91	7.75	1095.47	4.79
21	MTPS	220	5533.49	14.52	4802.23	12.60
		132	2223.55	9.73	1932.26	8.45
22	Pusauli	220	8197.84	21.51	7827.55	20.54
		132	2550.29	11.16	2257.18	9.87
23	Arrah_PG	220	3848.11	10.10	2416.73	6.34
		132	1878.01	8.21	1431.97	6.26
24	Pusauli New	220	7504.39	19.69	6671.91	17.51
		132	1202.63	5.26	677.10	2.96
25	Sipara	220	8022.70	21.06	7364.54	19.33
		132	4016.32	17.57	3481.99	15.23
25	Madhepura	220	2268.51	5.95	1443.79	3.79
26	Hajipur	220	3131.34	8.22	2180.19	5.72
		132	1798.05	7.87	1331.46	5.82
27	Begusarai	220	4046.09	10.62	2569.60	6.74
		132	2517.23	11.01	1812.73	7.93
28	Banka	132	1771.72	7.75	1093.27	4.78
29	Kahalgaon	132	3523.45	15.41	2482.84	10.86
30	Muzzafarpur	132	1807.33	7.91	1302.50	5.70
31	Purnea	132	3092.71	13.53	2823.22	12.35
32	Sugauli	132	688.29	3.01	356.56	1.56
33	Lauriya	132	373.14	1.63	172.48	0.75

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
34	Sonenagar	132	2351.23	10.28	1415.08	6.19
35	Karmansa	132	1420.24	6.21	858.38	3.76
36	Jehanabad	132	1973.63	8.63	1094.27	4.79
37	Rafiganj	132	1434.03	6.27	766.79	3.35
38	Hathidah	132	3314.69	14.50	2008.69	8.79
39	Jamui	132	2433.23	10.64	1492.27	6.53
40	Sheikhpura	132	2143.03	9.37	1205.43	5.27
41	Nawada	132	646.85	2.83	340.34	1.49
42	Jamalpur	132	1445.58	6.32	772.03	3.38
43	Sultanganj	132	2923.21	12.79	1789.41	7.83
44	Sabour	132	3059.77	13.38	1947.99	8.52
45	Dumraon	132	1176.85	5.15	631.16	2.76
46	Jakkanpur	132	2935.13	12.84	2001.58	8.76
47	Saharsa	132	842.86	3.69	449.91	1.97
48	Khagaria	132	746.95	3.27	397.40	1.74
49	Nuagachhia	132	743.06	3.25	397.87	1.74
50	Sitamarhi	132	677.28	2.96	350.47	1.53
51	Samastipur	132	2169.19	9.49	1338.54	5.86
52	Pandauli	132	823.10	3.60	419.76	1.84
53	Hajipur New	132	1843.06	8.06	1391.94	6.09
54	Chhapra	132	747.69	3.27	380.16	1.66
55	Siwan	132	706.20	3.09	351.89	1.54
56	Motihari	132	824.52	3.61	430.09	1.88
57	Betiah	132	736.82	3.22	358.15	1.57
58	Ramnagar	132	409.94	1.79	188.04	0.82
59	Rajgir	132	648.34	2.84	322.75	1.41
60	Darbhanga New	132	1766.57	7.73	1099.80	4.81
61	Katihar	132	986.45	4.32	574.44	2.51
62	Belaganj	132	1796.21	7.86	996.97	4.36
63	Vaishali	132	1410.62	6.17	871.55	3.81
64	Sitalpur	132	1363.50	5.96	815.78	3.57
65	Dhaka	132	683.53	2.99	351.53	1.54
66	Jainagar	132	717.00	3.14	364.54	1.59
67	Madhubani	132	732.58	3.20	366.70	1.60
68	Phulparas	132	1430.70	6.26	811.05	3.55
69	Supaul	132	1631.43	7.14	977.77	4.28

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
70	Mohania	132	1253.36	5.48	718.07	3.14
71	Bikramganj	132	1070.34	4.68	566.91	2.48
72	Forbeshganj	132	1172.23	5.13	649.41	2.84
73	Udakishanganj	132	416.30	1.82	214.76	0.94
74	Baripahari	132	4177.79	18.27	3063.60	13.40
75	Banjari	132	786.83	3.44	410.68	1.80
76	KCL	132	772.24	3.38	402.75	1.76
77	Kataiya	132	1158.71	5.07	637.58	2.79
78	Barauni TPS	132	2075.53	9.08	1355.54	5.93
80	Kudra	132	1381.26	6.04	770.38	3.37
81	Chandauti	132	4067.65	17.79	2766.64	12.10
82	Kochas	132	1299.04	5.68	713.49	3.12
83	Balmikinagar	132	230.60	1.01	109.12	0.48
84	Masaurhi	132	1799.35	7.87	1020.55	4.46
85	Bihta	132	1767.55	7.73	1180.53	5.16
86	Gaighat	132	2622.97	11.47	1671.98	7.31
87	Mithapur	132	2944.24	12.88	1999.68	8.75
88	Rafiganj_R	132	1237.96	5.42	655.96	2.87
89	Arrah	132	1719.81	7.52	1253.42	5.48
90	Lakhisarai_	132	2186.99	9.57	1292.86	5.66
91	Raxaul	132	434.18	1.90	202.37	0.89
92	Runisaudpur	132	790.31	3.46	424.45	1.86
93	SKMCH	132	1550.05	6.78	1050.70	4.60
94	Buxar	132	808.78	3.54	424.35	1.86
95	Aurangabad	132	1467.94	6.42	810.50	3.55
96	Tekari	132	1057.67	4.63	560.05	2.45
97	Goh	132	673.53	2.95	344.54	1.51
98	Arwal	132	847.67	3.71	442.98	1.94
99	Hulasganj	132	1425.97	6.24	805.86	3.53
100	Wajirganj	132	1086.22	4.75	591.82	2.59
101	Nalanda	132	675.31	2.95	337.29	1.48
102	Ekanagarsarai	132	1515.14	6.63	863.27	3.78
103	Digha	132	1705.17	7.46	1118.66	4.89
104	Katra	132	1572.86	6.88	906.75	3.97
105	Gangawara	132	1271.31	5.56	718.12	3.14
106	Madhepura	132	1752.10	7.66	1186.55	5.19

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
107	Sonbarsa	132	565.16	2.47	308.15	1.35
108	Mashrakh	132	552.06	2.42	267.75	1.17
109	Dalsingsarai	132	1502.29	6.57	861.29	3.77
110	Kusheshwarnath	132	507.31	2.22	269.75	1.18
111	Jagdispur	132	852.14	3.73	491.36	2.15
112	harbauth	132	748.06	3.27	384.10	1.68
113	Jandaha	132	1174.17	5.14	678.03	2.97
114	Imamganj	132	656.79	2.87	345.73	1.51
115	Tetha	132	2638.10	11.54	1567.39	6.86
116	Sherghati tap	132	1177.64	5.15	646.11	2.83
117	Sherghati	132	713.23	3.12	377.14	1.65
118	Paharpur	132	1613.24	7.06	919.29	4.02
119	Ekma	132	643.56	2.82	315.14	1.38
120	Rail Pahiya karkhana	132	876.69	3.84	490.03	2.14
Jharkhand						
121	Ranchi New_PG	765	15340.44	11.58	9974.27	7.53
		400	16207.40	23.39	10159.57	14.67
122	Jamshedpur_PG	400	19907.12	28.73	16868.92	24.35
		220	6623.69	17.38	6763.17	17.75
123	Maithon	400	30582.79	44.14	24288.17	35.06
		400	30395.75	43.87	24173.06	34.89
		220	9682.64	25.41	9746.35	25.58
124	MPL	400	18110.29	26.14	16412.06	23.69
125	Chaibasa_PG	400	9324.93	13.46	5557.79	8.02
		220	3271.97	8.59	2644.12	6.94
126	Koderma_D	400	17730.82	25.59	16210.88	23.40
		220	4882.92	12.82	5413.11	14.21
		132	2249.23	9.84	2272.93	9.94
127	BTPS_DVC	400	6179.99	8.92	3778.25	5.45
128	Ranchi_PG	400	20662.26	29.82	12651.63	18.26
		220	4812.28	12.63	4606.78	12.09
129	Chandawa	400	9670.00	13.96	5254.73	7.59
130	Adhunik	400	19830.37	28.62	16805.38	24.26
131	TISCO	400	10263.71	14.82	8184.46	11.81
		132	4793.00	20.97	5449.60	23.84
132	Ramchandrapur	220	6619.80	17.37	6745.21	17.70

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
		132	3075.33	13.45	2739.00	11.98
133	Chandil	220	5197.12	13.64	3749.99	9.84
		132	3923.21	17.16	3034.99	13.28
134	Hatia New	220	4092.56	10.74	3395.33	8.91
		132	2663.49	11.65	2330.73	10.20
135	PTPS	220	3751.53	9.85	3377.32	8.86
		132	2818.88	12.33	2424.55	10.61
136	TTPS	220	2724.18	7.15	3289.07	8.63
137	Lalmatia	220	1737.02	4.56	1216.15	3.19
		132	2162.69	9.46	1384.82	6.06
138	Chaibasa	220	3241.18	8.51	2608.37	6.85
		132	1448.87	6.34	1307.23	5.72
139	Dumka	220	3288.47	8.63	2086.45	5.48
		132	2066.14	9.04	1507.21	6.59
140	CTPS old	220	7944.26	20.85	7562.54	19.85
		132	3983.22	17.42	3568.78	15.61
141	Kalyanaswari	220	9523.83	24.99	8898.35	23.35
		132	4689.11	20.51	4981.35	21.79
142	Jamshedpur_D	220	2881.98	7.56	2322.42	6.10
		132	2871.52	12.56	2744.81	12.01
143	BTPS_D	220	7095.11	18.62	7217.89	18.94
		132	2305.64	10.09	2222.94	9.72
144	CTPS New	220	7868.31	20.65	7733.84	20.30
145	Giridih	220	2046.41	5.37	1825.10	4.79
		132	1575.47	6.89	1708.61	7.47
146	Dhanbad_D	220	6296.94	16.53	5344.23	14.03
		132	1006.05	4.40	978.36	4.28
147	Ramgarh	220	3582.10	9.40	2640.31	6.93
		132	3004.94	13.14	2328.74	10.19
148	Garwah	132	324.31	1.42	157.39	0.69
149	Lahardaga	132	990.66	4.33	624.29	2.73
150	Gumla	132	701.65	3.07	400.07	1.75
151	Kamdara	132	721.08	3.15	400.76	1.75
152	Hatia old	132	2649.27	11.59	2299.45	10.06
153	Namkum	132	1313.24	5.74	985.80	4.31
154	Jmatara	132	1425.37	6.24	869.60	3.80

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
155	Deoghar	132	1198.98	5.24	947.80	4.15
156	Dumka	132	2051.75	8.97	1479.15	6.47
157	Goelkhera	132	542.61	2.37	294.15	1.29
158	Kendposi	132	1100.33	4.81	1048.24	4.59
159	Manique	132	3735.52	16.34	2793.85	12.22
160	Adityapur	132	3149.89	13.78	2390.27	10.46
161	Golmuri	132	1610.60	7.05	918.00	4.02
162	Jaduguda	132	856.89	3.75	444.81	1.95
163	Rajkharsawa	132	1920.22	8.40	1335.36	5.84
164	Noamundi	132	627.15	2.74	426.98	1.87
165	Sikidiri	132	1275.35	5.58	1161.10	5.08
166	Chakradharpur	132	1272.75	5.57	776.76	3.40
167	Bakaspur	132	572.48	2.50	311.06	1.36
168	Kanke	132	1626.66	7.12	1111.72	4.86
169	Chaibasa	132	1443.13	6.31	1301.72	5.69
170	Latehar	132	591.96	2.59	349.43	1.53
171	Japla	132	549.39	2.40	274.36	1.20
172	Sahebganj	132	609.74	2.67	324.94	1.42
173	Pakur	132	387.56	1.70	197.78	0.87
174	Hazaribag	132	863.22	3.78	544.99	2.38
175	Daltonganj	132	405.45	1.77	231.50	1.01
176	Kendposi FD	132	1045.24	4.57	952.70	4.17
177	Tamar	132	687.96	3.01	366.30	1.60
178	Madhupur	132	738.80	3.23	407.38	1.78
179	Manoharpur	132	480.01	2.10	257.78	1.13
180	ECR-Gomia	132	1680.31	7.35	1287.10	5.63
181	Patratu	132	2622.76	11.47	2068.51	9.05
182	Mosabani	132	1532.35	6.70	1264.32	5.53
183	Maithon	132	4561.95	19.95	4561.72	19.95
184	Kumardubi	132	3343.95	14.63	2784.46	12.18
185	Panchet	132	3053.17	13.36	2317.83	10.14
186	Patherdih	132	2803.31	12.26	1841.04	8.05
187	Putki	132	3262.78	14.27	2398.51	10.49
188	Nimiaghat	132	1709.48	7.48	1654.00	7.24
189	Barhi	132	1951.66	8.54	1609.02	7.04
190	Koderma	132	1515.56	6.63	1243.55	5.44

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
191	Konar	132	1353.53	5.92	1005.63	4.40
192	North karanpur_D	132	1304.39	5.71	790.56	3.46
193	Gola	132	2441.39	10.68	1952.05	8.54
194	Hazaribag	132	1054.50	4.61	668.18	2.92
195	Ramkanali_D	132	2549.24	11.15	1901.81	8.32
196	Manique_D_SW	132	3652.48	15.98	2694.56	11.79
197	Biada_D	132	2537.82	11.10	1759.56	7.70
198	BSL_D	132	2233.55	9.77	1850.46	8.09
199	Balihari_D	132	3212.39	14.05	2342.06	10.24
Odisha						
200	Angul_PG	765	23109.91	17.44	19597.52	14.79
		400	27775.77	40.09	23882.10	34.47
201	Jharsuguda_PG	765	27260.73	20.57	18339.32	13.84
		400	21744.49	31.39	14693.88	21.21
202	Jaypore_PG	400	5183.29	7.48	4764.29	6.88
		220	5852.52	15.36	6128.47	16.08
203	Indravati_PG	400	5294.84	7.64	4971.15	7.18
204	Indravati_Hdro	400	5246.34	7.57	5031.08	7.26
205	Rengali_PG	400	19520.39	28.18	15940.60	23.01
		220	8542.98	22.42	8779.07	23.04
206	GMR_3rd	400	18493.03	26.69	16727.46	24.15
207	STPS	400	28775.98	41.54	30758.09	44.40
		220	11418.67	29.97	11053.89	29.01
208	Bisra	400	22164.14	31.99	14231.84	20.54
		220	6620.41	17.38	6679.91	17.53
209	Baripada	400	9455.72	13.65	7763.56	11.21
		220	3655.09	9.59	4134.93	10.85
		132	1602.20	7.01	1783.30	7.80
210	Meramundali	400	25681.70	37.07	23469.65	33.88
		220	17985.48	47.20	18415.72	48.33
		132	3113.80	13.62	3123.00	13.66
		220	17990.87	47.22	18427.08	48.36
211	Sterlite	400	5777.38	8.34	2896.67	4.18
		400	3301.12	4.77	3261.32	4.71
		220	8886.24	23.32	8870.09	23.28
212	Dubri New	400	2770.23	4.00	1932.00	2.79

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
		220	4362.85	11.45	4662.88	12.24
213	Keonjhar	400	5953.81	8.59	4674.01	6.75
		220	2790.35	7.32	3020.53	7.93
214	Bolangir	400	4299.55	6.21	3720.72	5.37
		220	3209.21	8.42	3492.54	9.17
215	IndBharat	400	9640.56	13.92	4968.53	7.17
216	JITPL	400	12857.32	18.56	13345.54	19.26
217	GMR_4	400	18371.60	26.52	15857.89	22.89
218	Mendhasal	400	2777.53	4.01	2860.61	4.13
		220	2143.16	5.63	2678.10	7.03
		132	570.27	2.49	628.33	2.75
219	JSPL	400	15476.38	22.34	14487.08	20.91
220	RSP	220	4939.97	12.96	3993.38	10.48
		132	3365.42	14.72	3529.89	15.44
221	Balimela	220	6797.55	17.84	7338.78	19.26
		220	6875.28	18.04	7488.08	19.65
222	Upper Kolab	220	5825.01	15.29	6122.90	16.07
223	Usileru	220	8079.76	21.20	6625.79	17.39
224	Jaynagar	220	6414.07	16.83	6775.83	17.78
		132	1166.60	5.10	1334.81	5.84
		132	1246.65	5.45	1270.66	5.56
		220	5191.28	13.62	4569.05	11.99
225	Therunali	220	4899.00	12.86	4137.80	10.86
		132	1411.86	6.18	1442.63	6.31
226	Bhanjanagar	220	2798.77	7.35	2411.14	6.33
		132	1553.06	6.79	1684.56	7.37
227	Indravati	220	5850.70	15.36	6837.88	17.95
228	Nayagarh	220	1757.80	4.61	1659.95	4.36
229	Chandaka	220	2084.88	5.47	2574.89	6.76
		132	1422.91	6.22	1832.49	8.02
		132	449.14	1.97	446.34	1.95
230	TTPS	220	13365.25	35.08	11920.96	31.29
		132	3897.52	17.05	4456.80	19.49
231	Tarkera	220	6221.13	16.33	5677.41	14.90
		132	3887.87	17.01	4297.93	18.80
232	Duburi	220	4501.74	11.81	4741.69	12.44

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
		132	2256.59	9.87	2380.72	10.41
233	Joda	220	3152.37	8.27	2640.33	6.93
		132	1713.00	7.49	1818.90	7.96
234	Chandiposh	220	1026.60	2.69	606.95	1.59
235	Balasore	220	1872.50	4.91	1969.76	5.17
		132	1117.86	4.89	1380.63	6.04
236	Bidanasi	220	1441.60	3.78	1578.00	4.14
		132	934.51	4.09	1153.97	5.05
237	Barkote	220	3256.04	8.55	2594.24	6.81
238	Budhipadar	220	13604.89	35.71	13538.21	35.53
		132	4783.87	20.93	4878.64	21.34
239	Katapali	220	4731.66	12.42	3749.40	9.84
		132	3739.31	16.36	3416.30	14.94
240	Narendrapur	220	1349.86	3.54	1462.89	3.84
		132	1161.10	5.08	1405.73	6.15
241	Bolangir New	220	3146.11	8.26	3326.79	8.73
		132	1337.10	5.85	1604.14	7.02
242	Atri	220	802.42	2.11	851.44	2.24
		132	589.02	2.58	701.26	3.07
243	Samangara	220	740.01	1.94	744.92	1.96
		132	676.31	2.96	703.28	3.08
244	Bhadrak	220	1073.50	2.82	1194.70	3.14
		132	881.57	3.86	1128.04	4.93
245	Paradip	220	1663.09	4.37	1613.45	4.23
		132	1214.93	5.31	1405.89	6.15
246	Lakshmipur	220	2556.64	6.71	1841.95	4.83
247	Lapanga	220	7571.07	19.87	5969.46	15.67
		132	4813.19	21.05	4342.01	18.99
248	BPPL	132	509.68	2.23	488.14	2.14
249	Damanjodi	132	521.59	2.28	484.15	2.12
250	Chatrapur	132	1085.43	4.75	1243.03	5.44
251	IRE	132	943.81	4.13	924.33	4.04
252	Aska	132	1208.12	5.28	1360.54	5.95
253	Berhampur	132	1002.21	4.38	1188.64	5.20
254	Ganjam	132	824.65	3.61	802.91	3.51
255	Mohana	132	148.69	0.65	182.23	0.80

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
256	Phulbani	132	359.76	1.57	422.40	1.85
257	Balugaon	132	428.29	1.87	511.48	2.24
258	Khurda	132	249.21	1.09	335.35	1.47
259	Puri	132	685.48	3.00	833.41	3.65
260	Cuttack	132	282.62	1.24	380.43	1.66
261	Nimapada	132	790.32	3.46	947.37	4.14
262	Bhubaneswar	132	1196.75	5.24	1418.69	6.21
263	Chowdhwar	132	1725.64	7.55	1650.41	7.22
264	Dhenkanal	132	1246.51	5.45	1295.31	5.67
265	Chainpal	132	3454.20	15.11	3665.68	16.03
266	Angul	132	2240.52	9.80	2174.07	9.51
267	Nandira (MCL)	132	1420.50	6.21	1023.26	4.48
268	Nuapatna	132	480.39	2.10	545.66	2.39
269	BAMINPL	132	1062.85	4.65	703.33	3.08
270	Jajpur Road	132	1661.47	7.27	1754.64	7.68
271	Kendrapara	132	767.10	3.36	940.58	4.11
272	Jaleswar	132	436.53	1.91	517.76	2.27
273	Baripada	132	1137.05	4.97	1255.43	5.49
274	Rairangpur	132	606.00	2.65	629.49	2.75
275	Palapanga	132	660.18	2.89	728.77	3.19
276	Nalda_R	132	526.47	2.30	440.88	1.93
277	Rourkela	132	3565.70	15.60	3776.15	16.52
278	Grid_Steel	132	1796.10	7.86	1839.06	8.04
279	Jharsuguda	132	2943.00	12.87	2863.69	12.53
280	Brajrajnagar	132	2048.86	8.96	1897.38	8.30
281	Rajgangpur	132	1930.74	8.45	1942.30	8.50
282	Sambalpur	132	1453.77	6.36	1402.11	6.13
283	Burla	132	4840.31	21.17	5072.39	22.19
284	Somnathpur	132	1050.07	4.59	1202.50	5.26
285	Bolangir	132	1337.10	5.85	1604.14	7.02
286	Saintala	132	620.56	2.71	594.44	2.60
287	Khariar	132	234.02	1.02	308.44	1.35
288	Tentulikhunti	132	462.39	2.02	516.44	2.26
289	Kalugaon	132	1949.10	8.53	1701.23	7.44
290	Dighapahari	132	511.65	2.24	553.02	2.42
291	Jagatsinghpur	132	449.55	1.97	528.90	2.31

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
292	Marshaghai	132	779.28	3.41	863.70	3.78
293	Rairakhol	132	255.17	1.12	260.66	1.14
294	FAP_Joda	132	1646.92	7.20	1674.50	7.32
295	Junagarh	132	195.49	0.86	256.20	1.12
296	Sundargarh	132	1768.85	7.74	1465.34	6.41
297	Boinda	132	730.76	3.20	683.50	2.99
298	Chend	132	3115.25	13.63	3101.20	13.57
299	Chandikhol	132	462.29	2.02	528.36	2.31
300	Umerkote	132	231.35	1.01	278.39	1.22
301	Soro	132	480.09	2.10	566.78	2.48
302	Pattamundai	132	562.14	2.46	626.82	2.74
303	Akhusingarh	132	185.77	0.81	231.60	1.01
304	HMSwitch(Kharagprasad)	132	2719.63	11.90	2581.59	11.29
305	Paralakhemundi	132	134.02	0.59	173.02	0.76
306	Sonepur	132	467.82	2.05	535.74	2.34
307	Ranasinghpur	132	873.77	3.82	1077.48	4.71
308	Kalrangi	132	1353.67	5.92	1200.55	5.25
309	Kamakhyanagar	132	1068.21	4.67	940.06	4.11
310	Jajpur	132	774.56	3.39	864.20	3.78
311	Bolani	132	847.89	3.71	767.24	3.36
312	Sunabeda	132	448.99	1.96	454.11	1.99
313	Patnagarh	132	591.29	2.59	680.98	2.98
314	Padampur	132	362.02	1.58	356.63	1.56
315	Bolangir	132	1272.59	5.57	1514.42	6.62
316	EMAMI	132	1019.32	4.46	1128.15	4.94
317	Salepur	132	489.53	2.14	519.68	2.27
318	Balugaon_T	132	548.74	2.40	565.29	2.47
319	Bargarh	132	926.91	4.05	1061.20	4.64
320	Phulnakhara	132	332.23	1.45	412.52	1.80
321	Karanjia	132	478.95	2.10	509.62	2.23
322	Banki	132	461.73	2.02	513.52	2.25
333	Kesinga	132	336.05	1.47	430.28	1.88
		132	375.20	1.64	350.27	1.53
334	Mania	132	944.01	4.13	824.17	3.61
335	Anandpur	132	754.06	3.30	720.51	3.15
336	Barpali	132	446.11	1.95	498.18	2.18

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
337	Bansapanai	132	1529.18	6.69	1445.62	6.32
338	Barbil	132	585.64	2.56	530.45	2.32
339	Saliban	132	1880.51	8.23	1389.10	6.08
340	Purushottampur	132	959.31	4.20	932.21	4.08
341	Chandipur	132	323.72	1.42	376.71	1.65
342	konark	132	563.31	2.46	602.00	2.63
343	Samuka	132	255.39	1.12	316.98	1.39
344	Arugul	132	462.75	2.02	541.40	2.37
345	Nuapara	132	162.22	0.71	205.97	0.90
346	Dabugaon	132	311.22	1.36	356.56	1.56
347	Boudh	132	296.82	1.30	303.76	1.33
348	kuchinda	132	884.75	3.87	754.64	3.30
349	Bhawanipatna	132	241.27	1.06	299.65	1.31
350	Kesura	132	715.47	3.13	849.55	3.72
Sikkim						
351	Rangpo_PG	400	8996.13	12.99	9039.82	13.05
		220	6110.44	16.04	7065.16	18.54
		132	2638.95	11.54	2626.60	11.49
352	Teesta-5	400	8417.42	12.15	8461.46	12.21
353	Jorethang	220	3849.91	10.10	3518.51	9.23
354	New Melli	220	3715.92	9.75	3175.04	8.33
355	Chuzachen	132	1755.10	7.68	1764.47	7.72
356	Rongit	132	1819.02	7.96	1567.25	6.86
		66	147.16	1.29	145.19	1.27
357	Sagbari	132	1801.49	7.88	1538.24	6.73
358	Geyzing	132	1097.06	4.80	740.95	3.24
		66	243.75	2.13	206.44	1.81
359	Gangtok	132	1376.58	6.02	1001.03	4.38
360	Melli	132	1055.61	4.62	650.18	2.84
		66	489.38	4.28	377.88	3.31
361	Gangtok	66	615.44	5.38	541.18	4.73
362	Melli	66	487.29	4.26	375.68	3.29
363	Tadong	66	454.02	3.97	349.78	3.06
364	Bulbuley	66	434.51	3.80	333.53	2.92
365	Sichey	66	426.86	3.73	325.10	2.84
366	Rongli	66	215.87	1.89	128.33	1.12

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
367	Mamring	66	239.99	2.10	164.36	1.44
368	Namchi	66	286.79	2.51	210.50	1.84
369	Rabangla	66	122.23	1.07	108.28	0.95
370	Rohtak	66	173.88	1.52	116.25	1.02
371	Soreng	66	140.91	1.23	93.21	0.82
372	Lower Lagyep	66	594.44	5.20	518.53	4.54
373	Phudong	66	244.16	2.14	162.54	1.42
374	Geyzing	66	243.80	2.13	206.07	1.80
375	Purano Namchi	66	214.83	1.88	145.69	1.28
376	Pakyong	66	375.47	3.29	243.00	2.13
377	Pelling	66	230.12	2.01	190.92	1.67
378	Rhenock	66	164.70	1.44	99.07	0.87
379	Mangan	66	164.41	1.44	102.64	0.90
380	Rnipool	66	597.29	5.23	521.35	4.56
381	Topakhani	66	293.87	2.57	210.83	1.84
382	Meyong	66	139.03	1.22	84.44	0.74
383	Rongli	66	197.50	1.73	115.84	1.01
West Bengal						
384	Jeerat	400	9890.99	14.28	9261.93	13.37
		220	8449.06	22.17	9469.08	24.85
		132	4685.26	20.49	5344.21	23.38
385	Arambag	400	12240.20	17.67	10798.40	15.59
		220	8448.16	22.17	9403.73	24.68
		132	3112.19	13.61	3849.18	16.84
386	Durgapur	400	13762.89	19.87	11317.07	16.34
387	Kharagpur	400	8350.91	12.05	7010.03	10.12
		220	4481.48	11.76	4907.99	12.88
		132	1629.74	7.13	1945.91	8.51
388	Raghunathpur	400	16858.55	24.33	10645.91	15.37
389	Purulia pump storage	400	9759.64	14.09	9835.47	14.20
390	Bidhannagar	400	22012.50	31.77	17152.35	24.76
		220	14019.03	36.79	14347.35	37.65
		132	4875.36	21.33	5513.07	24.11
391	Kolaghat	400	11462.84	16.55	11654.40	16.82
		220	6966.26	18.28	8287.68	21.75
		132	2915.52	12.75	3580.05	15.66

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
392	Bakreswar	400	8679.09	12.53	8613.49	12.43
		220	10357.18	27.18	11172.41	29.32
393	Sagardighi	400	13707.74	19.79	12191.19	17.60
		220	5754.22	15.10	6068.19	15.93
394	Haldia	400	6163.04	8.90	6339.28	9.15
395	Parulia	400	24883.89	35.92	19320.75	27.89
		400	24883.43	35.92	19321.79	27.89
		220	10418.45	27.34	10459.15	27.45
		220	10418.45	27.34	10459.16	27.45
396	Malda	400	17037.15	24.59	12725.34	18.37
		220	5649.09	14.83	6006.94	15.77
		132	2165.00	9.47	2590.45	11.33
397	Binaguri	400	22899.47	33.05	17039.18	24.60
		220	8204.04	21.53	8510.82	22.34
398	Subhasgarm_PG	400	7947.96	11.47	8453.12	12.20
		220	6796.84	17.84	8344.18	21.90
399	Mejia	400	15535.66	22.42	14233.02	20.54
400	Farakka	400	28366.03	40.94	28158.69	40.65
		220	4810.14	12.62	5391.35	14.15
401	Dharampur	220	4204.04	11.03	3607.58	9.47
		132	4568.84	19.98	4335.24	18.96
402	Domjur	220	4116.48	10.80	4041.15	10.61
		132	1315.88	5.76	1713.53	7.50
403	Gokarna	220	5821.19	15.28	5602.86	14.70
		132	3498.95	15.30	4254.70	18.61
404	Howrah	220	4338.23	11.39	4478.61	11.75
		132	3088.12	13.51	3888.45	17.01
405	Kasba	220	5784.10	15.18	6028.93	15.82
		132	3736.98	16.35	4728.08	20.68
406	Laxmikantapur	220	2919.29	7.66	3041.19	7.98
		132	1556.26	6.81	2024.48	8.86
407	Midnapur	220	4180.41	10.97	4107.26	10.78
		132	2283.62	9.99	2835.16	12.40
408	New Jalpaigudi	220	7130.89	18.71	6930.65	18.19
		132	3455.40	15.11	4034.70	17.65
409	New Haldia	220	3050.29	8.01	2809.64	7.37

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
		132	2079.23	9.10	2375.80	10.39
410	Rishra	220	4495.80	11.80	4026.91	10.57
		132	3439.19	15.04	4096.13	17.92
411	Satgachia	220	5065.43	13.29	4424.93	11.61
		132	2980.44	13.04	3385.75	14.81
412	Santhaldih	220	6883.33	18.07	7604.78	19.96
		132	1420.36	6.21	1548.97	6.78
413	Asansol	220	2569.28	6.74	2351.07	6.17
		132	1420.46	6.21	1677.35	7.34
414	krishnagar	220	3780.55	9.92	3415.07	8.96
		132	2013.26	8.81	2445.49	10.70
415	Bisnupur	220	4271.87	11.21	4023.79	10.56
		132	2303.10	10.07	2837.05	12.41
416	Calcutta Leather Complex	220	4640.43	12.18	4420.92	11.60
		132	2459.69	10.76	2892.82	12.65
417	Subhasgarm	220	6730.55	17.66	8174.73	21.45
		132	1839.42	8.05	2255.57	9.87
418	New Town Action Area-3	220	5700.07	14.96	5699.78	14.96
		132	3065.88	13.41	3361.59	14.70
419	Hura	220	2486.79	6.53	2356.67	6.19
		132	1241.88	5.43	1554.68	6.80
420	Foundary Park	220	3998.80	10.49	3985.90	10.46
		132	1541.59	6.74	1900.49	8.31
421	Dalkhola	220	6673.28	17.51	4990.69	13.10
		132	2065.86	9.04	2381.20	10.42
422	DTPS (Waria)	220	12054.13	31.64	10611.34	27.85
		132	5787.79	25.32	6089.08	26.63
423	Barjora	220	8284.78	21.74	7817.30	20.52
		132	1861.50	8.14	1836.79	8.03
424	Parullia_D	220	10541.30	27.67	10505.63	27.57
425	J K Nagar	220	3455.56	9.07	3084.05	8.09
426	Durgapur(Muchipara)	220	8669.28	22.75	7784.47	20.43
427	Burnpur	220	4793.86	12.58	3811.24	10.00
428	Mejia	220	11722.36	30.76	13001.52	34.12
429	DPL	220	10524.67	27.62	10565.31	27.73
		132	5731.68	25.07	6503.87	28.45

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
430	BBGS_C	220	2665.18	6.99	2672.03	7.01
		220	3192.48	8.38	3548.07	9.31
		132	3261.76	14.27	4042.61	17.68
		132	2156.21	9.43	2801.88	12.26
431	EMSS_C	220	3776.10	9.91	4438.56	11.65
		220	2665.40	7.00	2675.21	7.02
		132	3728.81	16.31	4718.78	20.64
		132	3728.81	16.31	4718.79	20.64
		132	2209.87	9.67	2899.99	12.69
432	NCGS_C	220	3261.47	8.56	3859.69	10.13
		132	2063.15	9.02	2772.28	12.13
		132	2063.15	9.02	2772.28	12.13
433	Birpara	220	6116.90	16.05	5192.24	13.63
		132	2133.43	9.33	2494.51	10.91
434	Siliguri	220	7400.39	19.42	6970.25	18.29
		132	3384.59	14.80	3679.11	16.09
435	Dalkhola	220	6858.89	18.00	5101.76	13.39
436	Adisaptagram	132	3700.91	16.19	3556.32	15.56
437	Alipurduar	132	766.92	3.35	867.27	3.79
438	AshokNagar	132	2512.45	10.99	2465.08	10.78
439	Balurghat	132	323.31	1.41	390.03	1.71
440	Bankura	132	1146.47	5.02	1198.69	5.24
441	Barasat	132	2759.80	12.07	2649.49	11.59
442	Basithpur	132	1135.43	4.97	1167.95	5.11
443	Joka	132	935.37	4.09	1144.83	5.01
444	Berhampore	132	1948.48	8.52	2104.13	9.20
445	Birpara	132	2117.40	9.26	2458.13	10.75
446	Bishnupur	132	2206.97	9.65	2573.81	11.26
447	Bolpur	132	1338.92	5.86	1476.77	6.46
448	Bongaon	132	2109.85	9.23	1927.40	8.43
449	C k Road	132	1120.90	4.90	1105.97	4.84
450	Lebong	132	1175.68	5.14	771.35	3.37
451	Debagram	132	943.83	4.13	891.96	3.90
452	Dhulian	132	1291.98	5.65	1261.32	5.52
453	Egra	132	531.51	2.33	680.82	2.98
454	Falta	132	1032.11	4.51	1219.59	5.33

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
455	Haldia	132	2076.85	9.08	2332.76	10.20
456	Hizlee	132	1343.36	5.88	1391.26	6.09
457	Kalyani	132	2890.23	12.64	2438.48	10.67
458	Katwa	132	1932.84	8.45	1837.36	8.04
459	Khanyan	132	2155.38	9.43	1749.58	7.65
460	Kolaghat	132	2638.64	11.54	2990.45	13.08
461	Lilooah	132	2983.59	13.05	3501.08	15.31
462	Malda	132	1981.49	8.67	2261.09	9.89
463	Mankar	132	1740.02	7.61	1731.18	7.57
464	Myanaguri	132	1541.40	6.74	1590.36	6.96
465	North Bengal University	132	2892.02	12.65	2985.15	13.06
466	Pingla	132	1043.51	4.56	1190.99	5.21
467	Purulia	132	883.09	3.86	996.99	4.36
468	Raiganj	132	827.29	3.62	921.41	4.03
469	Raina	132	1409.21	6.16	1405.34	6.15
470	Rampurhat	132	532.63	2.33	629.85	2.76
471	Ranaghat	132	1096.02	4.79	1280.76	5.60
472	Mathabang	132	402.40	1.76	481.36	2.11
473	SaltLake	132	2767.12	12.10	2810.83	12.30
474	Samsi	132	331.36	1.45	421.32	1.84
475	Siliguri	132	2387.14	10.44	2392.79	10.47
476	Sonarpur	132	1804.06	7.89	1812.36	7.93
477	Tamluk	132	2107.87	9.22	2067.20	9.04
478	Tarkeshwar	132	2212.97	9.68	2036.41	8.91
479	Titagarh	132	1734.11	7.59	1839.99	8.05
480	Ukhra	132	2104.07	9.20	1914.94	8.38
481	Uluberia	132	918.46	4.02	1102.08	4.82
482	Sirakol	132	1031.63	4.51	1195.17	5.23
483	Cossipur	132	1212.68	5.30	910.98	3.99
484	Balichak	132	1144.29	5.01	988.40	4.32
485	TCF-1	132	2045.44	8.95	1542.36	6.75
486	Hind Motor	132	1429.73	6.25	1308.00	5.72
487	Dankuni	132	1892.00	8.28	1700.40	7.44
488	Debagram	132	831.10	3.64	710.10	3.11
489	Balurghat	132	378.42	1.66	299.12	1.31
490	Modern	132	1828.15	8.00	1727.70	7.56

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
491	Jangipara	132	1040.41	4.55	1145.71	5.01
492	Chanditala	132	2754.46	12.05	2828.83	12.37
493	Gangarampur	132	359.18	1.57	435.24	1.90
494	Birsingha	132	1636.79	7.16	1613.93	7.06
495	Coochbehar	132	741.47	3.24	914.17	4.00
496	Belmuri	132	2285.20	10.00	2012.31	8.80
497	Barjora	132	1025.81	4.49	993.22	4.34
498	Chalsa	132	981.62	4.29	912.01	3.99
499	Mechand	132	898.39	3.93	999.77	4.37
500	Raghunathpur	132	833.70	3.65	908.51	3.97
501	Amtala	132	892.26	3.90	1019.63	4.46
502	Contai	132	563.20	2.46	676.14	2.96
503	Haldia NIZ	132	1790.69	7.83	1677.74	7.34
504	Jhargram	132	972.11	4.25	998.89	4.37
505	Lalgola	132	1697.85	7.43	1534.30	6.71
506	Najirpur	132	778.62	3.41	871.18	3.81
507	Bighati	132	3343.57	14.63	3238.90	14.17
508	RMBLK	132	1632.73	7.14	1415.23	6.19
509	TMBL	132	1515.55	6.63	1246.59	5.45
510	Farakka	132	1569.67	6.87	1624.71	7.11
511	Khatri	132	787.26	3.44	869.84	3.81
512	Kalna	132	1773.84	7.76	1623.67	7.10
513	Kakdwip	132	765.43	3.35	795.34	3.48
514	Kurseong	132	1280.64	5.60	775.06	3.39
515	Bagnan	132	1368.52	5.99	1371.94	6.00
516	Sonarlal	132	1225.11	5.36	814.42	3.56
517	Saintia	132	1176.18	5.15	1250.45	5.47
518	New Town Action Area-1	132	2580.89	11.29	2507.19	10.97
519	Ujanu	132	2204.40	9.64	2186.57	9.56
520	BEL CCp	132	318.53	1.39	386.59	1.69
521	Belmuri	132	607.02	2.66	670.57	2.93
522	Burdwan	132	976.00	4.27	930.38	4.07
523	Bagmundi	132	351.92	1.54	331.01	1.45
524	Kharagpur	132	1243.36	5.44	763.17	3.34
525	Howrah	132	903.00	3.95	551.18	2.41
526	Kalapahari	132	3012.97	13.18	1929.11	8.44

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
527	Purulia	132	1583.27	6.93	957.90	4.19
528	Bandel	132	5514.05	24.12	6067.58	26.54
529	Jamuria	132	1314.99	5.75	708.51	3.10
530	ASP	132	4315.88	18.88	3530.58	15.44
531	DPL A Zone	132	3066.36	13.41	2557.08	11.19
532	DPL B Zone	132	5238.93	22.92	5564.73	24.34
533	DPL AB Zone	132	5301.85	23.19	5483.33	23.98
534	DPL C Zone	132	4329.29	18.94	4006.90	17.53
535	DPL C1 Zone	132	4179.30	18.28	3717.45	16.26
536	Bamunara	132	2709.31	11.85	2095.90	9.17
537	NCGS_C	132	2063.15	9.02	2772.28	12.13
538	SRS_C	132	2205.26	9.65	2788.90	12.20
		132	3001.87	13.13	3781.58	16.54
539	TRS_C	132	1926.62	8.43	2563.48	11.21
		132	1926.62	8.43	2563.48	11.21
540	Majerhat_C	132	2394.33	10.47	3100.16	13.56
541	BT Road_C	132	1684.82	7.37	2134.58	9.34
		132	2064.17	9.03	2777.26	12.15
542	Princep Street_C	132	1903.50	8.33	2451.19	10.72
		132	2938.77	12.85	3637.48	15.91
		132	2143.95	9.38	2556.63	11.18
		132	2153.14	9.42	2802.91	12.26
543	East calcutta_C	132	1933.47	8.46	2496.90	10.92
		132	1892.81	8.28	2433.58	10.64
544	Rishra_C	132	2945.45	12.88	3514.61	15.37
545	Taratala_C	132	2390.51	10.46	3096.63	13.55
546	Chakmir_C	132	2453.50	10.73	3160.96	13.83
547	Jadavpur_C	132	2832.09	12.39	3503.94	15.33
		132	2176.43	9.52	2780.65	12.16
548	BBD Bag_C	132	2106.72	9.22	2733.15	11.96
549	Botanical garden_C	132	3052.64	13.35	3845.30	16.82
550	Belur_C	132	2823.95	12.35	3330.48	14.57
551	Park Lane_C	132	2083.59	9.11	2704.07	11.83
		132	2083.58	9.11	2704.06	11.83
552	DumDum_C	132	2069.91	9.05	2779.66	12.16
553	Patuli_C	132	3123.62	13.66	3905.15	17.08

Sl. No	Substation Name	Rated Voltage (kV)	3-Ph to Ground fault		SLG fault	
			Fault MVA	Fault Current (kA)	Fault MVA	Fault Current (kA)
554	Park Circus_C	132	3331.54	14.57	4175.28	18.26
555	Majerhat_C	132	2575.23	11.26	3169.82	13.87
556	Kalingpong	66	335.15	2.93	233.74	2.05
557	Alipurduar	66	224.81	1.97	59.18	0.52
558	Jali	66	254.51	2.23	325.34	2.85
		66	255.75	2.24	310.00	2.71
559	Chalsa	66	282.26	2.47	272.06	2.38