



YEAR BOOK 2013-14

***With Standard Construction
Practices & Technical Data
for Distribution Works***



March 2015

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Chapter-1

An Account of Growth of Power Sector in J&K State.

The State of Jammu & Kashmir is located in the Extreme North of India and is bound on the North by China and on the South by Himachal Pradesh and Punjab and on the west by Pakistan. The State has a Population of 1,25,48,926 with 20,15,088 households (14,97,920 rural and 5,17,168 urban) as per 2011 Census.

The state is traversed by three main rivers i.e. Indus, Jhelum and Chenab. The Indus traverses through Ladakh, while the Jhelum flows through Kashmir and Chenab drains Jammu

The average rainfall is about 100 Cms

There are huge Glaciers in the state and the existence of high mountains with glaciers and rainfall makes it haven for hydel generation

As per preliminary survey an estimated potential of 16400 MWs of power has already been identified while the actual potential is much more.

The state of Jammu and Kashmir was the second, next only to the state of Mysore State in having Hydro Power, as far back as the 1st decade of this Century.



1.1 CHRONOLOGY OF IMPORTANT EVENTS IN J&K POWER SYSTEM

▣ 1905

- 4x1 MVA, 2.3KV, 25 Hz Mohra Power Project commissioned
- Head 430 feet (131 mtrs.), Pelton Wheel Turbine.
- 2nd in India after Mysore
- Constructed by General Electric (GE), America

Commissioned in 1905, Moharra Power Station served to light thousands of Kashmiri homes besides a small number of small industrial units comprising rice huskers, flour and oil grinders, bandsaws, silk reeling, weaving, spinning and the like. The only available route to Kashmir Valley those days was Jhelum Valley road (Muzzafarabad road) along the banks of river Jhelum. Heavy equipments could be easily transported to Mohra on this road. No formal transport was available other than some horse driven carts and the only navigable area at that time was from Khannabal to Khadinyar.

25 Hz, AC power generated at 2300 Volts was stepped upto 30 kV for its transmission to Sopore, Baramulla and Srinagar. 30/2.3 kV Receiving Sub Stations were in operation at Silk Factory and Narwara in Srinagar, at Amargarh in Sopore and in Baramulla. 2.3 kV Supply was also available at Pampore, Pattan, Tangmarg and Gulmarg

Mohra was the only source of power supply in Kashmir Valley till the year 1955. In June, 1955, 2x3 MW Ganderbal Hydel Project was Commissioned. The Mohra however continued generating till July 1959 when it was struck by the unprecedented floods in Jhelum. The flood waters hit the power plant, shearing its building longitudinally into two halves.

▣ 1948

- Work started for construction of Ganderbal Power Plant
The Sindh Valley Multipurpose Project with its power plant at Ganderbal had been investigated in the forties. Civil works were entrusted to the Irrigation Department while its electric works were to be done by the then Electrical and Mechanical Department. Construction of Civil Works had been taken in hand in 1948. The electro-mechanical plant of 2x3 MW Capacity was ordered from M/s Associated Electrical Industries Calcutta who supplied the Electrical Equipment of M/s Metropolitan Vickers and matching Hydro Equipment made by Escherwyss, Switzerland

▣ **1954**

- Electrification in Anantnag, Khanabal, Bijbehara and Awantipora town started.
- Extension of 33 kV transmission line from Srinagar to Anantnag.
- 66 kV line (on wooden poles) from Pathankote (Punjab) Grid station to Canal (Jammu) sub station was commissioned.
- A real boost to power availability in the state.

▣ **1955**

- Ganderbal Project commissioned by the then President of India, Dr Rajendra Prasad.
- Srinagar city was divided into two Zones , Zone 1 receiving 25 Hz, 230 V, 3Ø supply from Mohra and zone 2 receiving 50 Hz, 400-230 V, 3Ø supply from Ganderbal .

▣ **1957**

- A project report for adding 9 MW to Ganderbal Project was approved.
- Mohra Power project was revived and its frequency was changed from 25 Hz to 50 Hz in order to meet the problem of severe over loading .

▣ **1961**

- Additional 9 MW Units of Ganderbal project commissioned.
- Old Mohra closed and abandoned.
- Ganderbal was the lone source of power

▣ **1962**

- New Mohra (9MW) commissioned and synchronized through 66 kV over headline (on wooden poles) with Ganderbal.
- Local Grid to which two sources were connected came into existence for the first time in the state. (It was an extremely exciting event for the Engineers).
- New 66kV transmission line from Sarna (Punjab) to Canal Sub Station (Jammu) on steel poles was commissioned.
- New transmission line from Samba to Gladni

▣ **1964**

- Mini Hydel project (2× 350 kW) at Rajouri commissioned

▣ **1965**

- Mini Hydel project (2× 350 kW) at Bhaderwah commissioned

▣ **1967-68**

- 132 kV Transmission line between Kalakote – Janipur (Jammu) and Chenani was constructed by M/s Kamani Engineers and Electric Department along with 22.5MVA, 132 / 66 kV Grid station at Janipora.

▣ **1969-70**

- Three units (3x7.5 MW) of Kalakote commissioned.
- Grid operation became a reality in Jammu region

▣ **1971-75**

- Chenani power plant (3x5 MW) commissioned.
- Parallel operation or synchronization with Punjab Grid between two generating station of state in Jammu on one side and Punjab on the other was established.
- Jammu became surplus while Kashmir had shortage.
- Constitution of Jammu and Kashmir Electricity Board in pursuance of J&K Electricity Supply Act 1971.
- Upper Sindh-I (2x11.3 MW) commissioned.

▣ **1976-80**

A major event in the 1970s was interconnection of Kashmir and Jammu through 132 kV Udampur Srinagar Double Circuit Line (CSTL).At Banihal Tunnel, one circuit was laid overhead crossing Pir Panchal Top and 2nd through Banihal Tunnel as Gas Filled Cables

- Advantages resulting from this interconnection:
 - Boosted generation Capability.
 - Stabilized the supply frequency.
 - Reliable Power Supply.
 - Increased efficiency of the system.
 - Faults reduced to a large extent.
- Formation of POWER DEVELOPMENT DEPARTMENT headed by the Commissioner and Secretary to Govt.

▣ **1981-84**

- 2X120 MVA, 220/132kV Grid Sub Station at Udampur Commissioned.

▣ **1985-1990**

- 120MVA, 220/132kV and 2X20 MVA, 132/33kV Grid Sub Station at Gladni (Jammu) commissioned on energization of single circuit Sarna – Gladni Transmission Line.

- Salal HEP (Phase-I) of 345 MW commissioned in 1987.
- Stakna (4 MW) at Leh commissioned.
- Salal - Gladni 220 kV Single Circuit Transmission line no. 1 and line no. 2 energized.
- Gladni - Miran Sahib 132 kV Double Circuit line and Grid Sub Station at Bari Brahamna and Miran Saheb commissioned.
- 35 MVAR Shunt at Pampore (supplied by Crompton & Greaves).
- Series Capacitor Bank at Wanpoh (supplied by BHEL). These measures were taken to increase the transmission capacity of 132 kV CSTL from 60 MW to 155 MW.
- With the Commissioning of Salal(HEP) which was thought to make up for the power deficit of the Kashmir Valley also, department felt handicapped because in spite of surplus power in Jammu region there was no adequate transmission facilities to Kashmir Valley in addition to Udampur-Bemina 132-KV line, which could not carry more than 70 MW , while as deficit in the valley was around 300 MW.
- To overcome this problem, various options were considered like
 - Reactive compensation (installation of 33 kV shunt capacitors at various Grid Stations and Series compensation (Installation of Series Capacitor bank) of the line.
 - Lower Jhelum Hydel Project (105 MW) was commissioned.
- ▣ **1990-2000**
- Karnah HEP (2 MW) commissioned in 1991.
- 220kV Double Circuit Kishenpore – Pampore Transmission Line (KPTL) commissioned in 1996 to overcome constraints in power transmission to Kashmir Valley.
- 345 MW Salal-II, commissioned in 1998.
- 220 kV Double Circuit Kishenpore – Pampore Transmission Line (KPTL) commissioned in 1996 to overcome constraints in Power Transmission to Kashmir Valley. 220/132kV Pampore Grid Station Commissioned in 1996.
- 220/132/33 kV Grid station at Zainakote commissioned in 1998.
- 480 MW, Uri-I alongwith its transmission system viz. 630MVA, 400/220 kV Wagoora Grid Sub Station and 400kV Uri- Wagoora line commissioned in 1997.
- ▣ **2001-2011**
- USHP-II, 105 MW Power Project commissioned at Kangan
- 400 kV Inter-regional Transmission Line between Kishenpur and Srinagar commissioned by PGCIL
- First ever Tariff Order for electricity determined and issued by JKSERC in March 2007.

- J&K PDD launched its website under URL:in 2007.
- 390 MW Dulhasti Power Plant commissioned in 2007.
- 450 MW Baglihar HEP commissioned in October, 2008.
- Computerized billing of consumers of Jammu & Srinagar city completed in 2007-08.
- 160 MVA,220/132 kV Barn Grid Sub Station commissioned in 2008.
- 100MVA 132/33KV Grid station Bari-Brahmana-II Commissioned in 2008
- 20 MVA , 132/33 kV Draba Grid Station commissioned in 2008.
- 50MVA132/33 kV Grid Station Khanmoh Commissioned in April-2009
- 50 MVA 132/33 kV Gangyal Grid Station Commissioned in March-2009
- 50MVA132/33 kV Grid Station Tethar Commissioned in Oct -2009
- 50MVA132/33 kV Grid Station Mahanpur Commissioned in Aug -2009
- Second Tariff Order for electricity issued by JKSERC in Sep.2009.
- Third Tariff Order issued by SERC in April 2010
- Electricity Act 2010 notified by GoJ&K in April 2010
- 120 MWs HEP SEWA II on Ravi Basin commissioned in September 2010.

▣ **2011-2014**

- 320 MVA,220/132 Grid station Mirbazzar commissioned in 12/2011
- 320 MVA+100MVA,220/132/33 Grid station Budgam commissioned in 12/2011
- 320 MVA+100MVA,220/132/33 Grid station Bishnah commissioned in 2011
- 120 MVA+20MVA,220/132/33 Grid station Ramban commissioned in 2011
- 50MVA 132/33kV Grid station Lissar commissioned in 5/12/2011
- 50MVA 132/33kV Grid station Vilgam commissioned in 02/2011
- 50MVA 132/33kV Grid station Magam commissioned in 2/2012

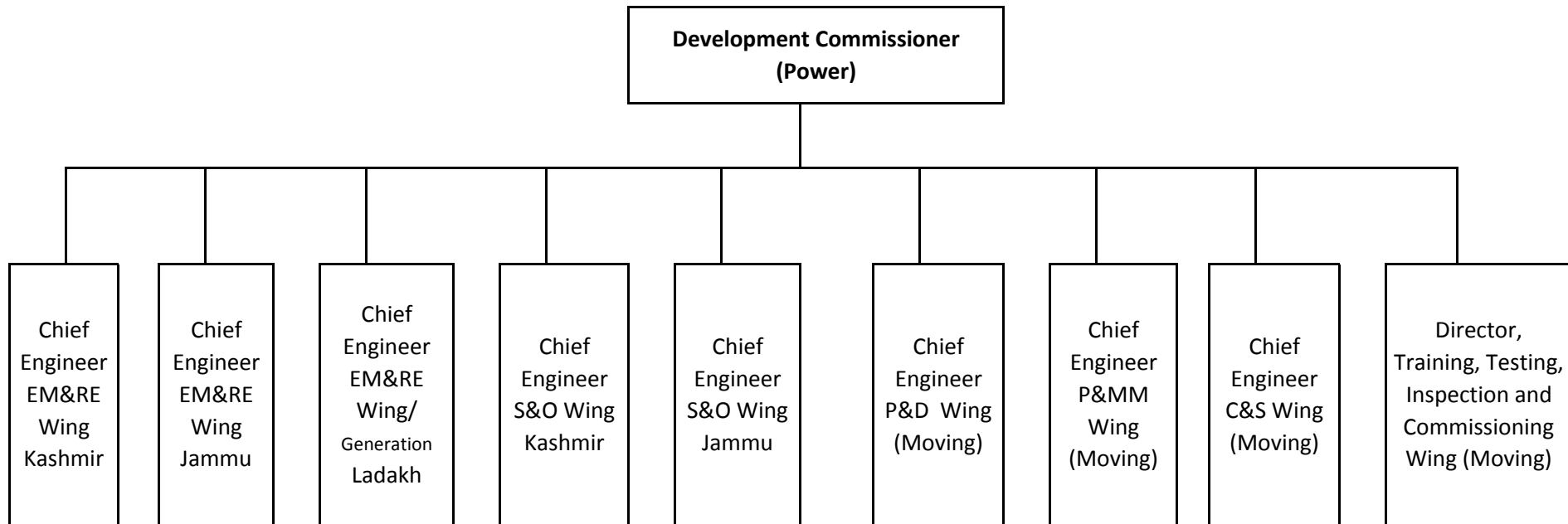
- 50MVA 132/33kV Grid station Katra commissioned in 2011
- 20MVA 132/33kV Grid station Chandak commissioned in 2/2012
- 50MVA 132/33kV Grid station Pounichak commissioned in 2/2012
- 1.26 MWHEP Sanjak on Indus Basin commissioned in September 2011.
- 4thTariff Order issued by SERC in April 2012
- 20MVA 132/33kVJourianGrid Sub Station Commissioned in 2012
- 50MVA 132/33kV Shopian Grid Sub Station Commissioned in 3/2013

- 3-year Multiyear tariff from 2013-14 to FY2015-16 filed and tariff order for 2013-14 (5thTariff Order) issued by SERC in April 2013
- 160 MVA, 220/132/33kV Grid Substation Delina commissioned on 1-6-2013
- Tariff order for 2014-15 (6thTariff Order) issued by SERC in June 2014
- 220kV Zainakote- Amargarh line commissioned on 1-6-2013
- Second circuit of 132KV Lassipora – Shopian line (28.5 Ckt. Km) Commissioned on 2 April 2013

Chapter-2

Organizational Structure, Profile and Details of Manpower

2.1 - Organizational Structure



2.2 -PROFILE OF VARIOUS WINGS OF POWER DEVELOPEMENT DEPARTMENT

▣ Maintenance & RE Wings

- Overall distribution at 66 & 33 kV level and below.
- Setting up, maintenance and operations of 66-33/11-6.6 kV Sub-transmission systems
- Setting up, maintenance and operations of 11kV/433V distribution system
- The billing of energy to consumers and collections
- The face of PDD in dealings with individual consumers.

▣ System and Operation Wings

- Overall transmission above 66 / 33 kV level.
- Setting up, maintenance and operations of 220/132/33 kV Grid stations
- Setting up, maintenance and operations of 220KV and 132 kV transmission lines.

▣ Planning & Design Wing

- Technical study and approval of Projects
- Setting up standards of quality control for projects
- Procurement process of equipment for Grid stations and transmission lines above 66/33 KV

▣ Procurement and Material Management Wing

- Procurement of line material and equipment for the Sub-transmission level and below.
- Maintaining inventory of material for M&RE wings in its stores

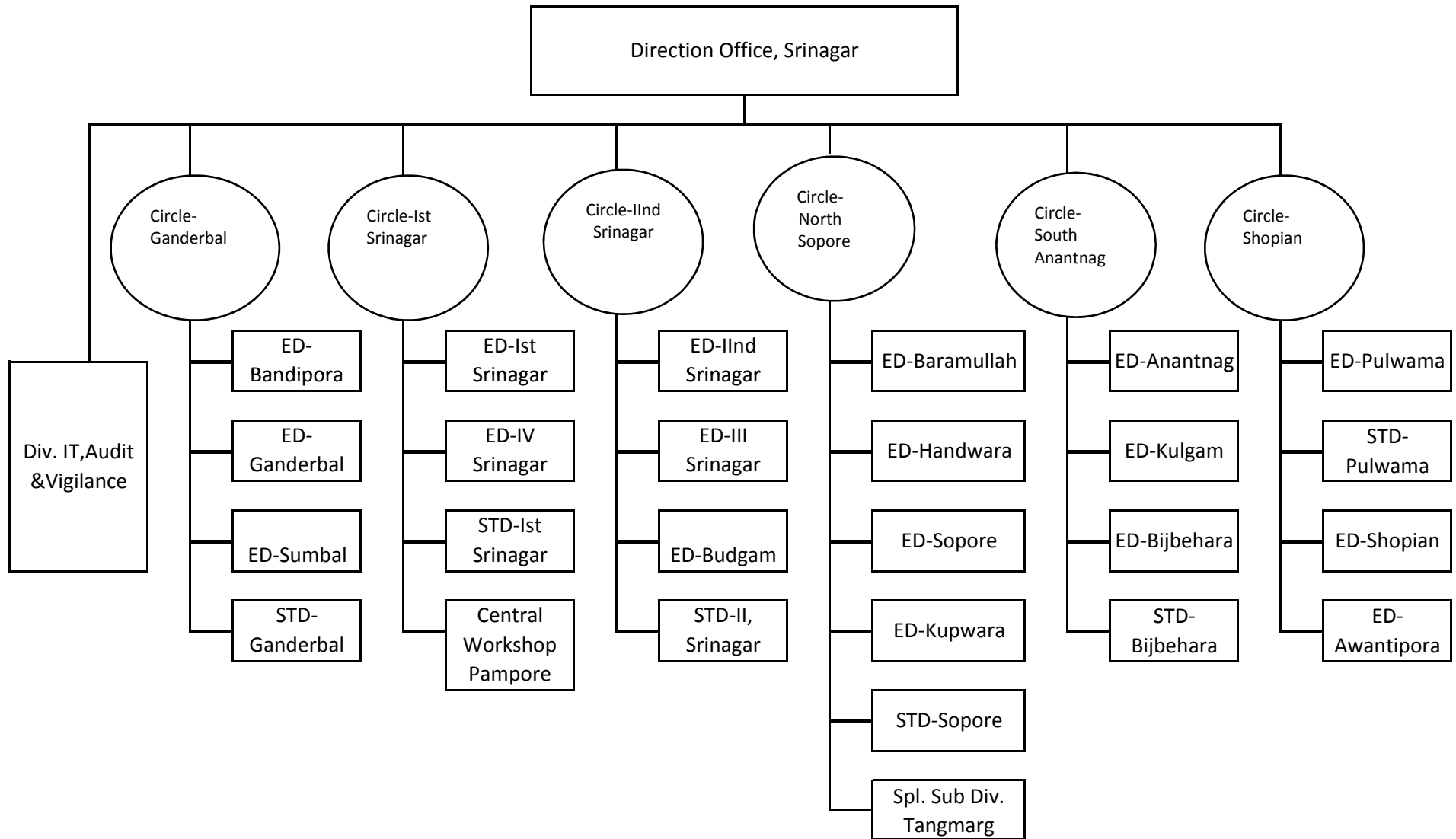
▣ **Commercial and Survey Wing**

- Power Purchases
- Scheduling at merit order
- Power arrangements under exchange with other states and agencies.
- Setting up, maintenance and operations of Communication network between different Grids and power plant
- Enforcement of power curtailments as per schedule for strict grid discipline
- Managing operations of the SLDC and Sub LDC
- Testing of Electric Protection for all electric installations

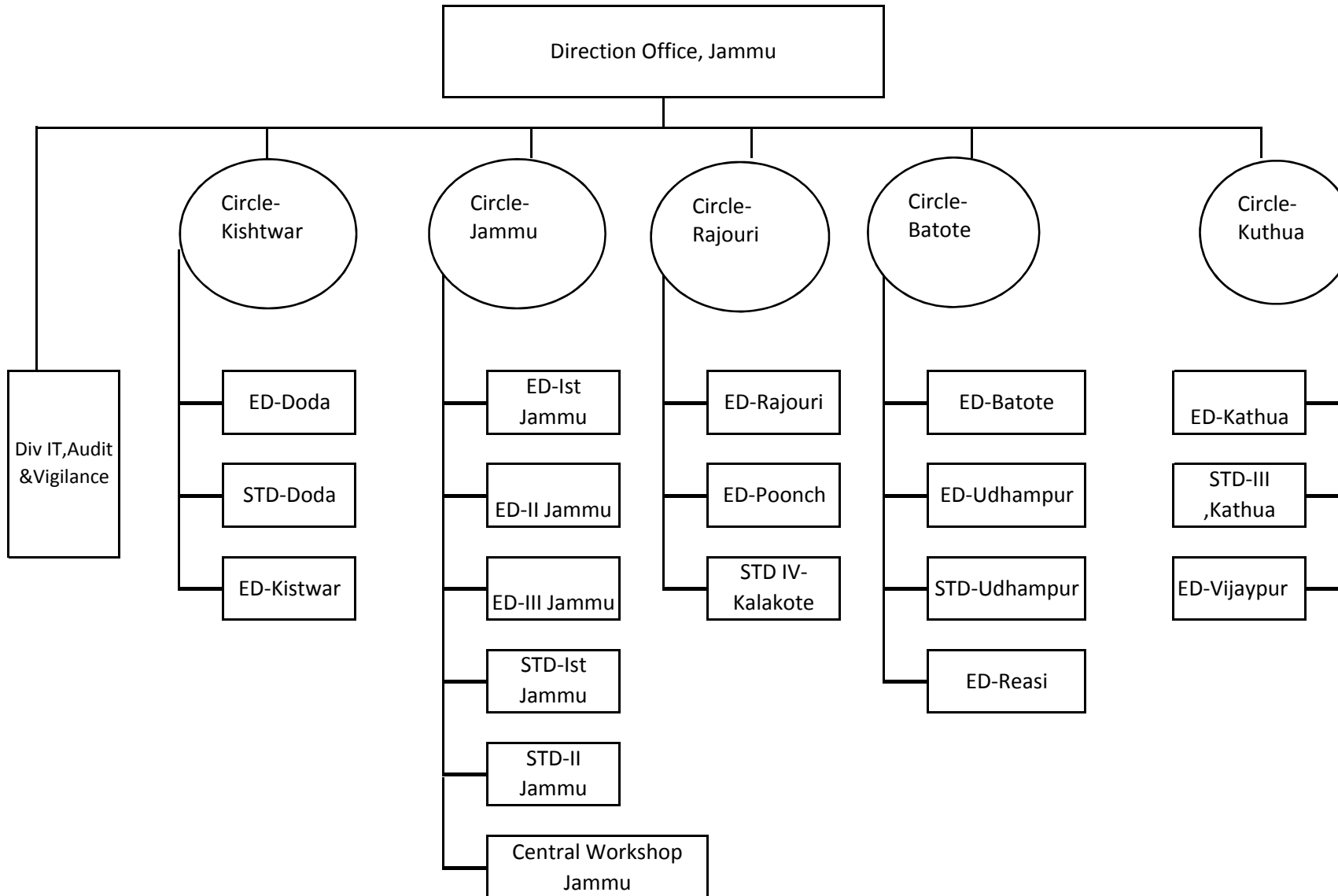
▣ **Training, Testing, Inspection and Commissioning Wing**

- Arranging training for the staff
- Technical Inspection of all new electric installations before their commissioning
- Setting Standards for Electric Contractors and issuing licenses after assessing their abilities
- Technical Investigation of all electric accidents
- Electrical testing and commissioning .

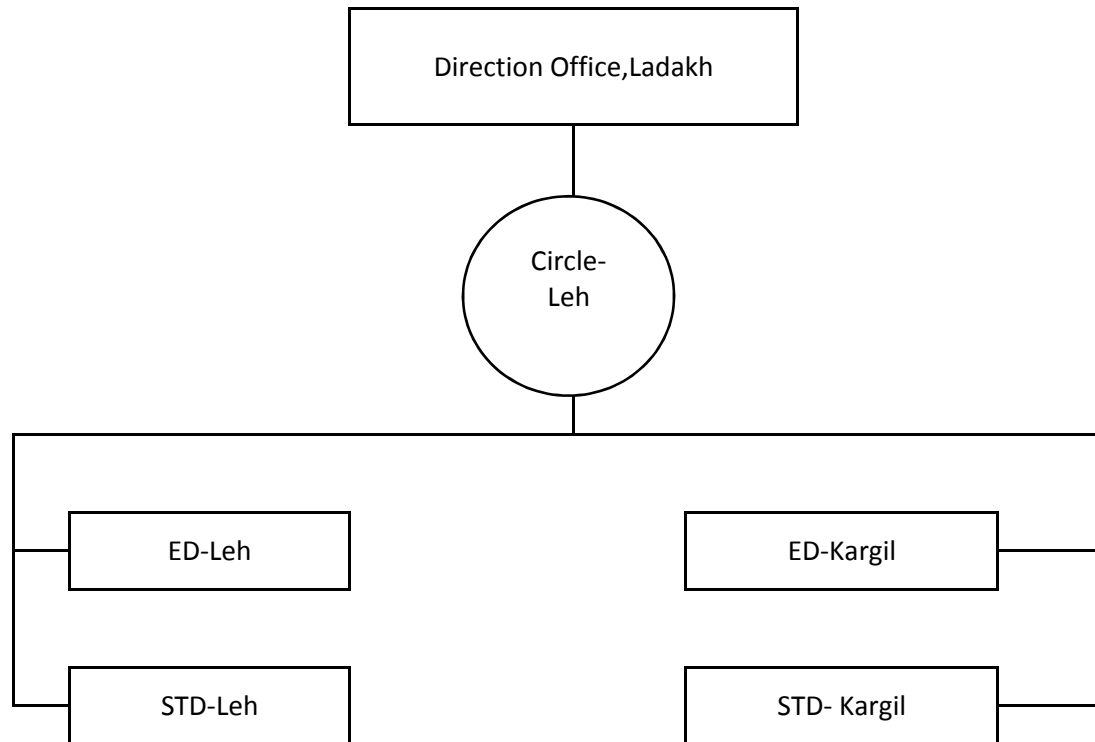
2.3- Organizational Structure,EM&RE Wing, Kashmir



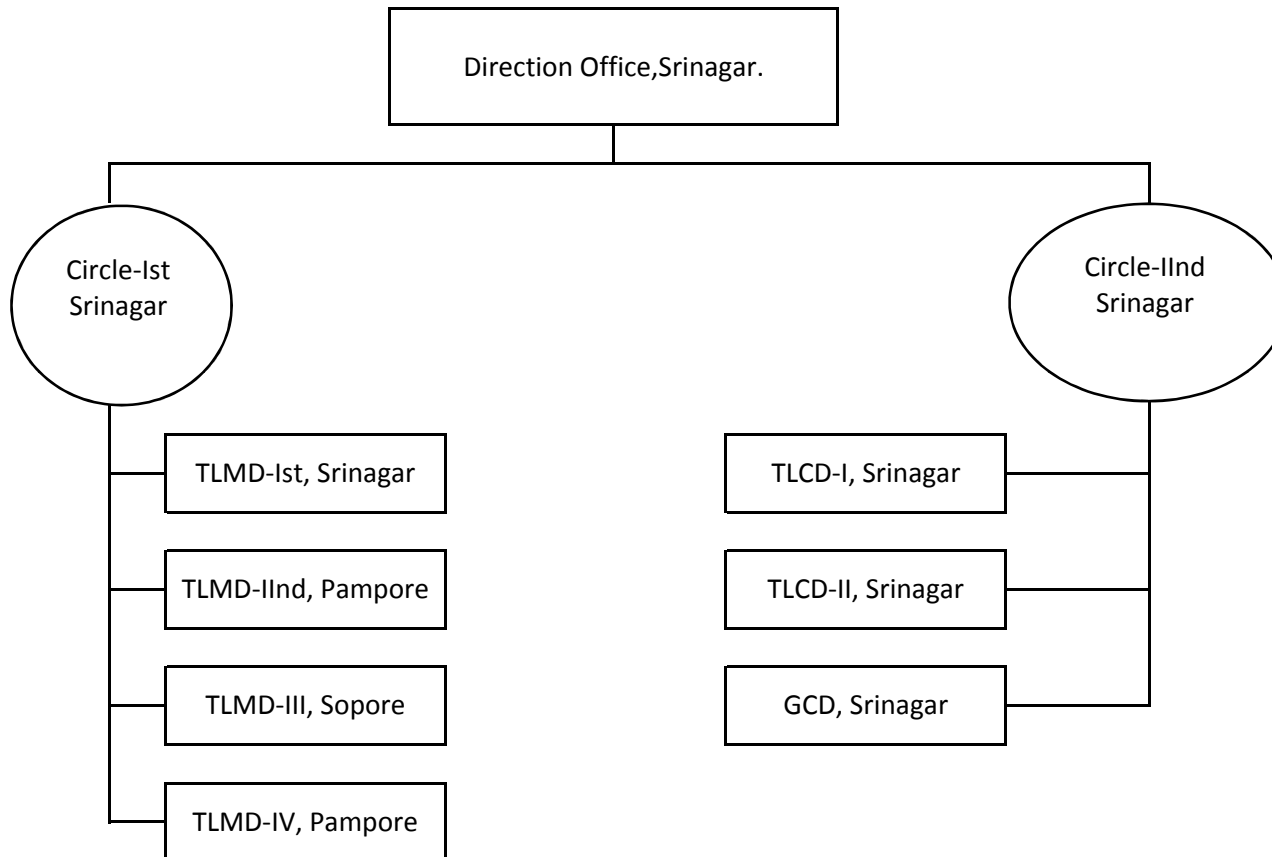
2.4- Organizational Structure,EM&RE Wing, Jammu



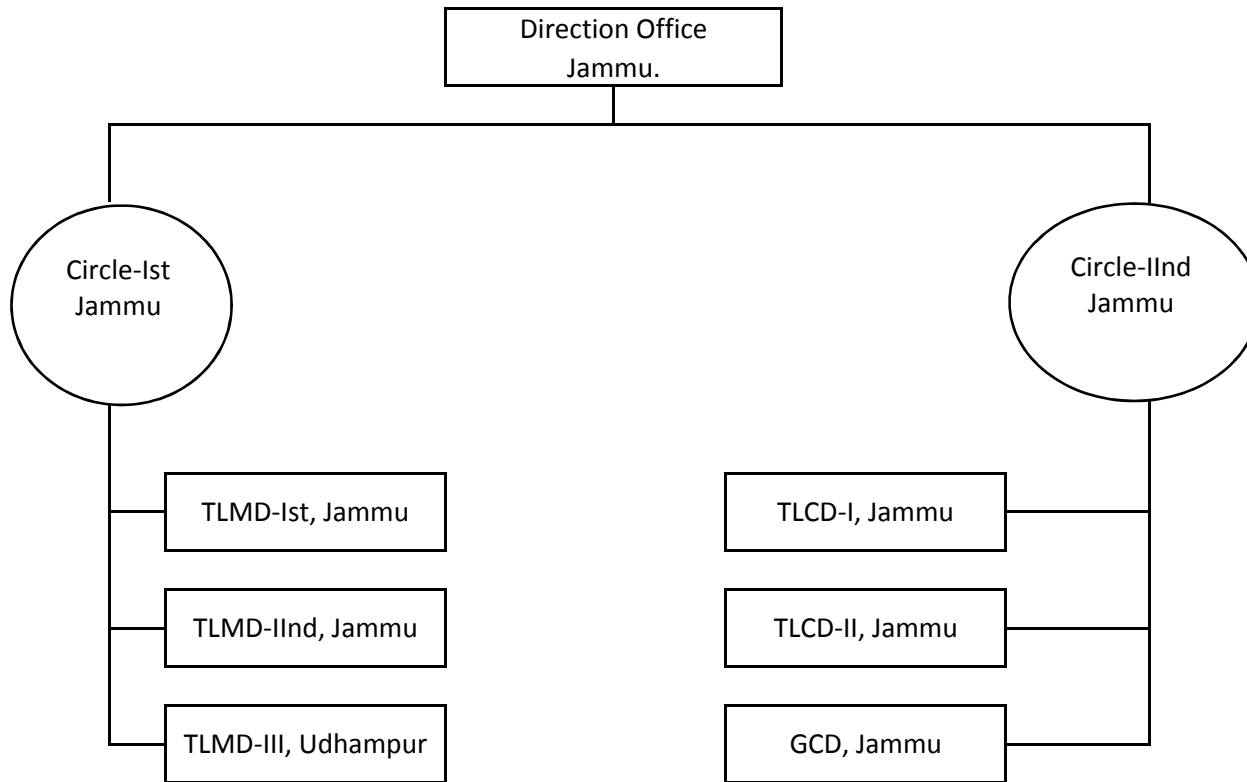
2.5- Organizational Structure,EM&RE Wing, Ladakh



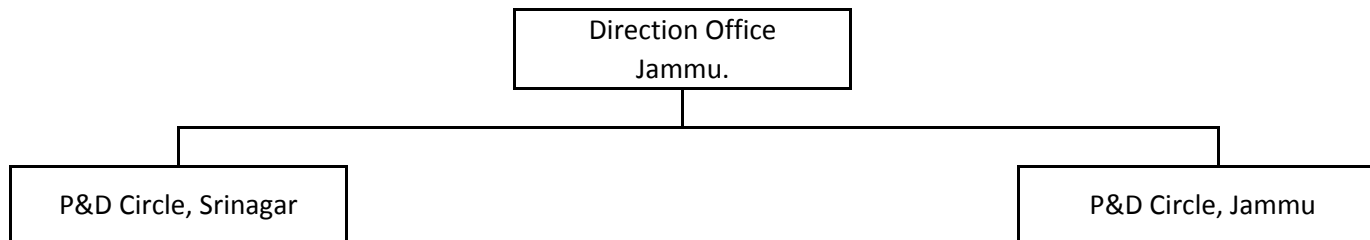
2.6- Organizational Structure,S&O Wing, Kashmir



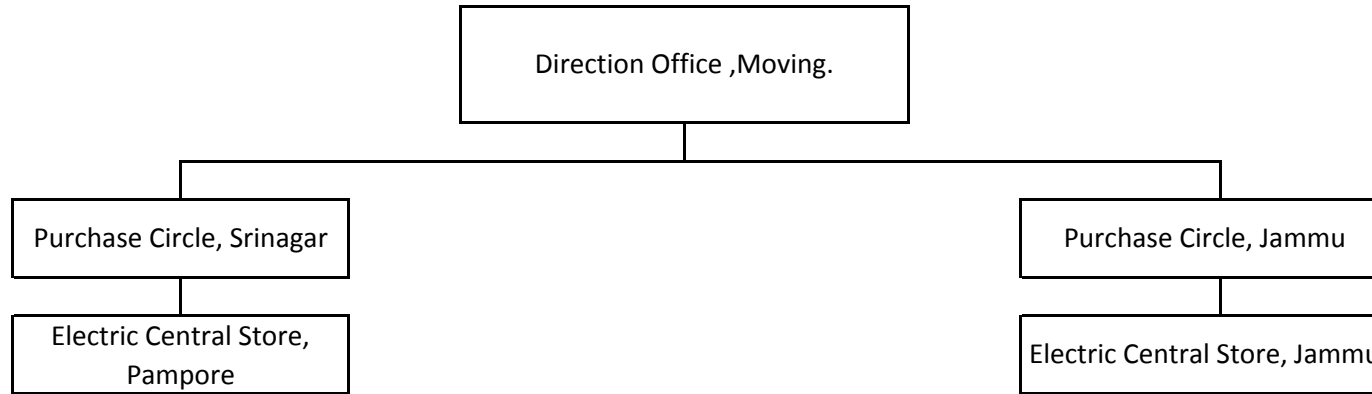
2.7- Organizational Structure,S&O Wing, Jammu



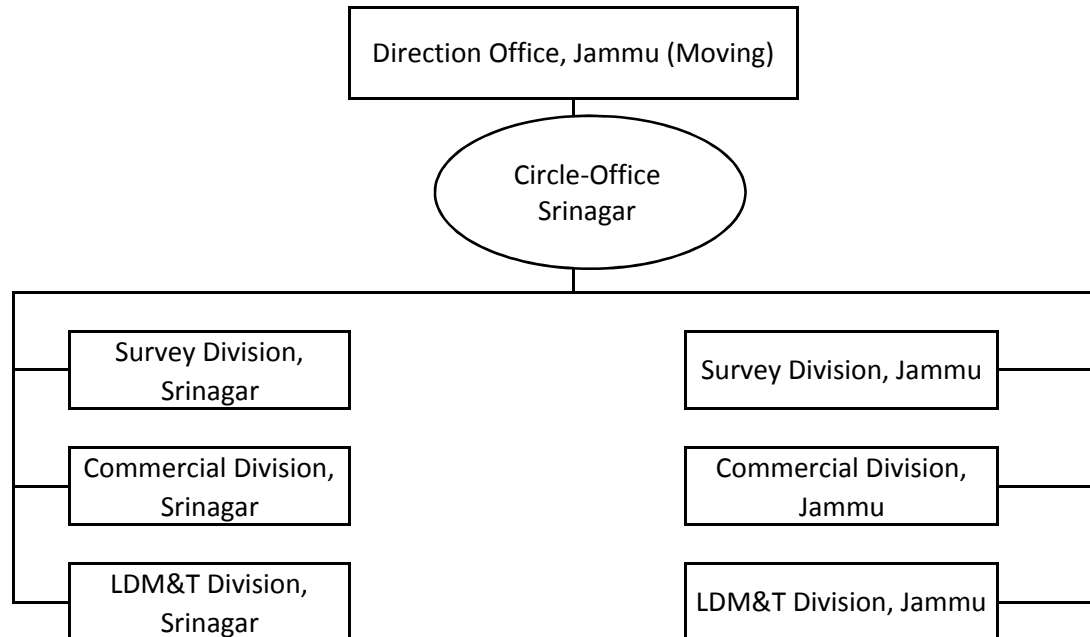
2.8- Organizational Structure,Planning & Design Wing.



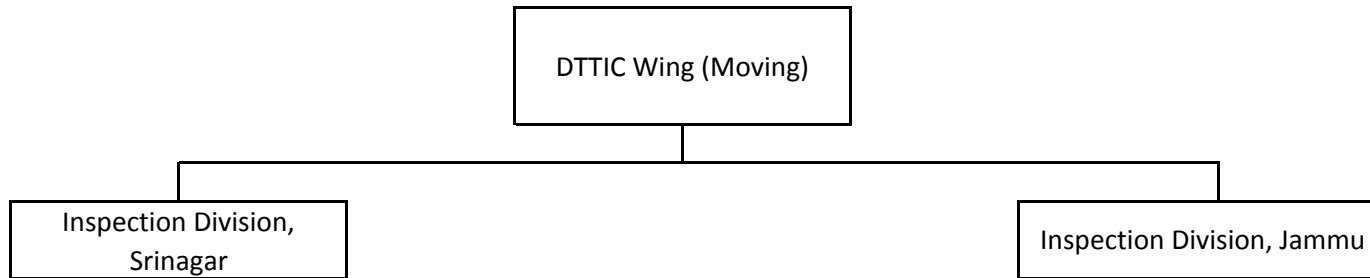
2.9- Organizational Structure Procurement & Material Management Wing.



2.10- Organizational Structure,Commercial & Survey,Jammu.

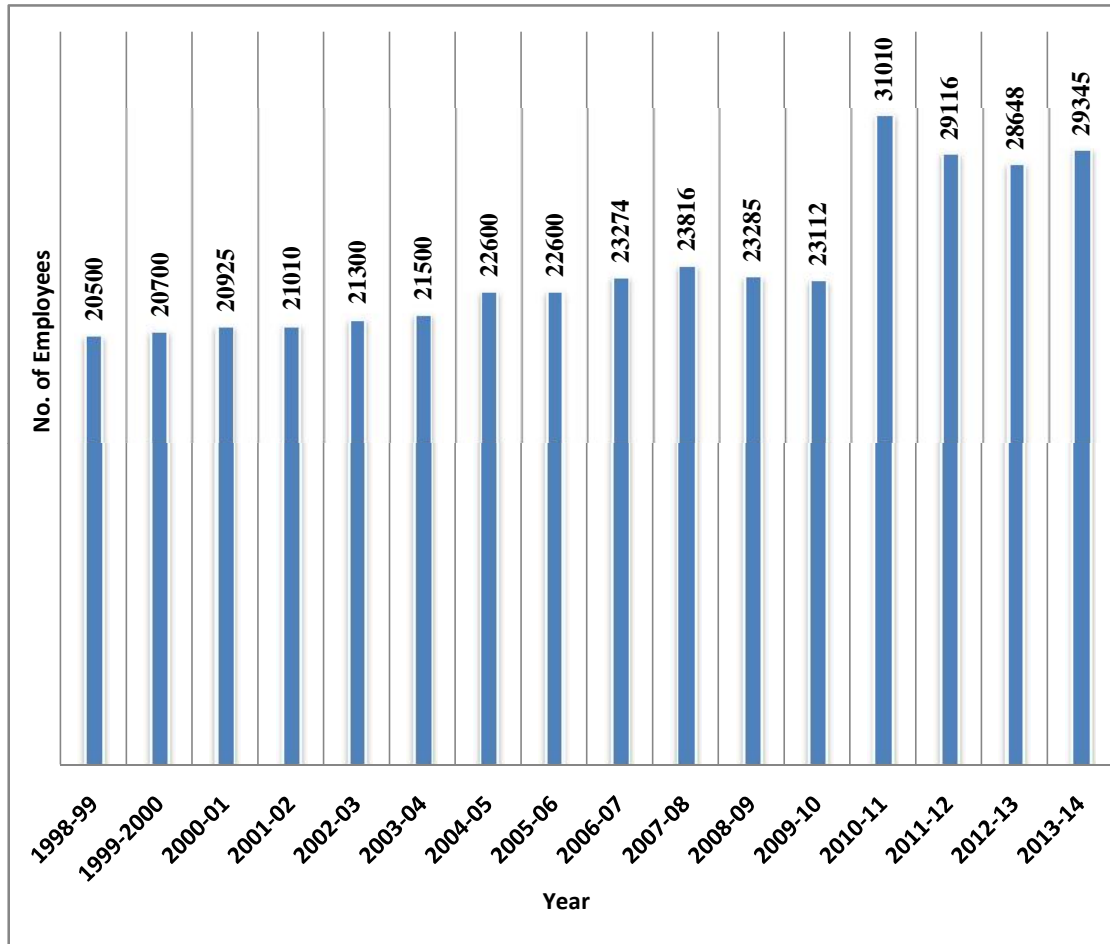


2.11- Organizational Structure, Training, Testing, Inspection and Commissioning Wing



2.12 - Year Wise Statement of No. of Employees

S.No.	Year	No. of Employees
1	1998-99	20500
2	1999-2000	20700
3	2000-01	20925
4	2001-02	21010
5	2002-03	21300
6	2003-04	21500
7	2004-05	22600
8	2005-06	22600
9	2006-07	23274
10	2007-08	23816
*11	2008-09	23285
*12	2009-10	23112
*13	2010-11	31010
14	2011-12	29116
15	2012-13	28648
16	2013-14	29345



(Note: This includes 13182 No DRW/need base labourers)

**2.13 STATEMENT SHOWING CATEGORYWISE SANCTIONED/EXISTING STRENGTH (GAZETTED/
NON-GAZETTED) OF VARIOUS WINGS OF J&K PDD AS ON 31-3-2014**

Category of Post	DCP Office		M&RE Wing				S&O Wing				P&MM Wing		C/S wing J&K		P&D Wing Jammu		Dir. TTIC Wing		Total		
	J&K		Kmr.		Jammu		Kmr.		Jammu		J&K		J&K		J&K		J&K		J&K		
	S	E	S	E	S	E	S	E	S	E	S	E	S	E	S	E	S	E	S	E	
Development Commissioner Power	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Chief Engineer	0	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	0	0	7	6	
Superintending Engineer	0	0	7	7	5	5	2	2	2	2	2	2	1	1	2	2	1	1	22	22	
Executive Engineer	2	2	31	23	21	19	8	8	7	7	8	6	6	5	5	5	2	2	90	77	
Special Mobile Magistrate	0	0	3	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	6	4	
Asstt. Ex. Engineer C/ E /M	2	2	132	118	108	100	29	25	28	27	23	21	17	15	9	7	7	7	355	322	
Asstt. Engineer (E / C/M)	0	0	109	40	94	43	20	13	18	29	1	0	1	1	0		4	4	247	130	
Jr. Engineer including contractual.	3	3	499	309	366	338	136	121	135	94	35	32	56	39	17	8	4	4	1251	948	
Jr. Engineer Civil	1	0	8	2	8	4	8	1	7	3	0	0	0	0	0	0	0	0	32	10	
Senior Foreman	0	0	31	15	27	9	12	3	6	5	0	0	0	0	0	0	0	0	76	32	
Tech-I	0	0	114	67	118	76	28	5	29	15	0	0	11	0	0		4	1	304	164	
Tech-II	0	0	223	77	122	49	26	8	28	18	0		11	0	0	0	6	2	416	154	
Tech-III	0	0	2116	1596	1289	863	223	213	266	112	0	0	38	33	0	0	8	6	3940	2823	
Tracer	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	0	
Tech-IV/Helper/Lineman/SBA/Bill Distributor/Tech-V/Gate Keeper/Store Attendant	0	0	3380	2305	1905	1889	419	392	440	395	0	1	63	24	0	0	0	0	6207	5006	
Attendant	0	0	164	101	1473	1195	0	0	0	0	0	0	4	1	0	0	0	0	1641	1297	
Meter Reader	0	0	497	387	158	21	1	0	1	0	0	0	0	0	0	0	0	0	657	408	
workssupervisor	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	1	
Sr. Surveyour	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2	2	
Survey Supervisor	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	6	0	
Jr. Survey Supervisor	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	2	1	
Survey Asstt.	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2	2	
Electric Mistry	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	
Centrifuge driver	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	
Diesel Engine Driver	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	

Engine Mechanic	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	2	1
Geological Asstt.	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0
Chief Accounts Officer	0	0	1	1	1	1	0	0	1	0	1	0	0	0	0	0	0	0	4	2
Sr. Law Officer/Law Officer/Legal Asstt	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Adm. Officer	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3	2
Accounts Officer /Rev. Officer	1	1	3	1	3	2	1	1	0	0	3	3	2	1	1	1	0	0	14	10
Head Computer	1	1	1	1	1	0	1	0	1	1	1	1	0	0	1	1	1	0	8	5
Dy. Director	1	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	5	4
Asstt. Director	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pvt. Secretary	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Asstt. Accounts Officer	1	0	30	22	20	20	8	7	7	7	7	6	3	2	1	0	0	0	77	64
Section Officer	1	1	4	3	4	2	1	1	1	1	1	1	2	1	1	0	0	0	15	10
Sr. Stenographer	1	0	1	1	1	1	1	1	1	1	1	0	0	1	0	0	0	0	6	5
Statistical Officer	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	5	5
Jr. Stenographer	1	2	8	0	6	3	3	2	2	2	4	2	1	0	3	0	1	0	29	11
Head Asstt.	3	4	28	22	27	26	11	10	10	7	7	6	12	8	3	2	3	3	104	88
Rev. Superintendent	0	0	21	14	15	13	0	0	0	0	0	0	0	0	0	0	0	0	36	27
Sr. Asstt.	7	7	218	182	98	75	36	33	32	28	31	24	32	22	20	12	6	5	480	388
St. Asstt.	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	5	5
Accounts Asstt.	1	0	23	4	19	17	7	2	7	6	12	2	1	0	1	0	0	0	71	31
Jr. Asstt.	15	10	438	355	295	193	53	21	45	25	52	24	52	16	30	14	11	9	991	667
Rev. Examiner	0	0	0	0	45	34	0	0	0	0	0	0	0	0	0	0	0	0	45	34
Head Draftsman	1	0	5	2	20	19	2	2	7	7	3	3	1	1	1	1	1	1	41	36
Draftsman	0	0	34	13	24	21	10	2	9	9	17	2	6	2	9	2	3	2	112	53
Driver / Chauffer	2	2	111	70	61	50	25	17	26	18	9	4	14	5	3	2	3	1	254	169
Orderlies / Chowkidar / Jamadar / Dak Runner	16	16	546	299	356	316	61	50	73	67	61	50	46	15	30	23	12	9	1201	845
Computer Operator	0	0	7	4	12	10	0	0	1	2	0	1	10	8	0	0	0	0	30	25
Computer Assistants	0	0	14	0	0	0	0	0	0	0	0	0	21	1	0	0	0	0	35	1
Cleaner	0	0	3	3	22	7	6	1	5	2	4	1	1	0	0	0	0	0	41	14
Lineman Grade I	0	0	398	325	0	0	21	0	0	0	0	0	0	0	0	0	0	0	419	325

Lineman Grade II	0	0	2877	1922	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2877	1922
Land Collector	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	1
Naib Tehsildar	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
Patwari	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	2	1
Total	65	56	12092	8299	6735	5428	1164	944	1203	896	284	193	434	209	138	81	77	57	177536	129304	
DRW/CL/Need basis	0	0	0	6900	0	5107	0	861	0	298	0	9	0	7	0	0	0	0		13182	
Grand Total	130	112	24184	23498	13470	15963	2328		2406	2090	568	395	868	425	276	162	154	114		29345	

Chapter-3
INFRASTRUCTURE AVAILABLE AS ON 31-03-2014

3.1-a) Abstract of Transformaton Capacities in J&K State

S #	Description	Jammu		Kashmir		Ladakh		Total	
		No	MVA	No	MVA	No	MVA	No	MVA
1	220/132kV Grid Stations	6	2030	5	1700	0	0	11	3730
2	132/66-33kV Grid Stations	29	1902	26	2261	0	0	55	4163
3	66/33/11kV Sub Stations	2	60	0	0	0	0	2	60
	66/11kV Sub Stations	34	349.45	0	0	10	81.9	44	431.35
	66/6.6 kV Sub Stations	2	20	0	0	0	0	2	20
4	33/11kV Sub Stations	213	1700.7	221	2563.75	0	0	434	4264.45
	33/6.6kV Sub Stations	6	37.9	7	77.6	0	0	13	115.5
	33/0.4kV Sub Stations	1	5	7	62.55	0	0	8	67.55
5	11/0.43kV Sub Stations	24243	2525.509	22186	3076.11	721	68.872	47150	5670.491
	6.6/0.43kV Sub Stations	97	11.81	517	80.85	0	0	614	92.66
6	11/6.6kV Feeders	889		772		40	0		1701

3.1-b) Abstract of Line Length of Transmission & Distribution Lines in J&K State.

S #	Description	Ckt.Km			Total Ckt.Km
		Jammu	Kashmir	Ladakh	
1	220 Line Length (Km)	516.1	288	0	804.1
2	132 Line Length (Km)	1134.194	818.6	0	1952.794
3	66kV Line Length (Km)	227.8	0	206.27	434.07
4	33k/22V Line Length (Km)	2329.83	1865.98	35	4230.81
5	11kV Line Length (Km)	19248.454	12447.5	1308.78	33004.734
6	6.6kV Line Length (Km)	158.57	279.9	0	438.47
7	LT Line Length (Km)	42684.247	28385.3	2190.3	73259.847

3.2 - Details of 220/132kV Transformation Capacity in Jammu & Kashmir

a) Kashmir Region

S. No.	Name of the Grid Sub Station	Transformation Capacity			Date of Commissioning	Name of the scheme under which Sub Station Constructed	No .of outgoing 132 kV feeders	Remarks
		No	MVA / Tfm	Total (MVA)				
1	Pampore	9 +1(spare)	50	450	Jully-1996	220 kV Kishanpur-Pampore Transmission Line Project	4	
2	Zainakote	9+1(spare)	50	450	Dec.1998	300 MVA 220/132 kV Grid Station at Zainkote with 220 kV D/C Wagoora-Zainkote Transmission Line	6	The Sub Station is having 33kV level also
3	Mir Bazzar	6+1(spare)	53.33	320	Dec,2011	PMRP	8	
4	Budgam	6+1(spare)	53.33	320	Dec,2011	PMRP	0	The Sub Station is having 33kV level also
5	Delina (Amargarh)	1	160	160	Jun-13	PMRP	2	
Total				1700			20	

b) Jammu Region

S No.	Name of the 220/132 KV Grid sub station	Capacity			Date of commissioning of Grid Station	Name of the scheme under which substation constructed	No. of outgoing 132 KV feeders	Remarks
		No.	MVA / X-MVA	Total MVA				
1	Gladni	3+1 spare	133.33	400	1985	State Sector	7	
		3phx2	160+150	310	2009 & 2008			
2	Udhampur	6+1 spare	40	240	1981	State Sector	5	
3	Hira Nagar	3+1 spare	66.67	200	2001	State Sector	4	
		3+1 spare	40	120	1996			
4	Barn	2(3Ph)	160	320	2008	PMRP	2	
5	Bishnah	2(3ph)	160	320	2011	PMRP	1	
6	Ramban	3+1 spare	40	120	2011	PMRP	2	
Total				2030			21	

3.3-Details of 132/33 kV Transformation Capacity in Kashmir Region

S.No	Name of the Grid Sub Station	Transformation Capacity			TOTAL (MVA)	Date of Commissioning / Name of the scheme under which Sub Station Constructed	No. of 33 kV 33 kV	Remarks
		No	MVA / Tfm.	Total (MVA)				
1	Bemina	3	50	150	185.64	1973	6	6x5.94MVA Taken out
		6	5.94	35.64				
2	Wanpoh	1	50	50	120	1973	6	
		2	20	40				
		2	15	30				
3	Amargarh	1	50	50	95	1977	6	
		1	20	20				
		2	12.5	25				
4	Habak	2	50	100	120	1981	6	
		1	20	20				
5	Pampore	9+1(S)	16.66	150	200	1982	10	50MVA capacity added during 2007-08
		1	50	50				
6	Pattan	3	2x50+1x20	120	120	1987	4	60MVA added during 2011-12 RE sector
7	Cheshmashahi	1	50	50	105	1987	4	
		2	20	40				
		1	15	15				
8	Rawalpora	1	50	50	110	1993	6	
		3	20	60				
9	Arampora	2	20	40	90	1995	3	
		1	50	50		50MVA added in 2009-10		
10	Wanganpora	6+1	25	200+25	200	1996	5	
		1	50					

11	Zainkote	3 +1	25	100	75	Dec.1998/ Const.of 300 MVA 220/132kV Grid Stn Zainkote	3	
12	Awantipora	3+1	25	75+25	125	1999/Const.of 75 MVA 50MVAadded in 2009	6	Added by virtue of Deposit contribution.
		1	50	50				
13	Lassipora	3+1	25	100	75	05.04.2003/Const.of 75 MVA 132/33 kV G/Stn.Lassipora		
14	Badampora	1	50	50	66	16.10.2004/Const.of 36 MVA 132/33kV G/Stn.Badampora	1	Augmented to 66MVA replacing 20MVA transformer by 50MVA transformer during
		1	16	16				
15	Kangan	1	20	20	20	29.04.2006/Const. of 20 MVA 132/33kV G/ Stn.Kangan	3	
16	Sheree	1	50	50	50	06.05.2006/Const.of 50 MVA 132/33 kV G/ Stn. Sheree	3	
17	Mattan	1	50	50	50	23.09.2006/Const. of 50 MVA 132/33 kV G/Stn. Mattan	2	
18	Kulgam	2	20	40	40	02.12.2006/Const. of 40 MVA 132/33 kV G/Stn. Kulgam	1	
19	Khonmoh	1	50	50	50	10-02-2009	3	Under PMRP
20	Tethar	1	50	50	50	28-05-2009	3	Under PMRP
21	Budgam	2	50	100	100	PMRP- 12/2011	4	Under PMRP
22	Lissar	1	50	50	50	PMRP- 5/12/2011	3	Under PMRP
23	Vilgam	1	50	50	50	PMRP- 22/12/2011	3	Under PMRP
24	Magam	1	50	50	50	PMRP- 21/12/2011	4	Under PMRP
25	Shopian	1	50	50	50	PMRP- 30/03/2011	4	Under PMRP
26	Delina (Amargarh)	1	50	50	50	PMRP- 1/06/2013	2	Under PMRP
Total					2296.64		101	

3.4 - Details of 132/33 kV Transformation Capacity in Jammu Region

S.No	Name of the 132/66/33 KV Grid Sub- station	Capacity			TOTAL (MVA)	Date of Commissioning / Name of the scheme under which Sub Station Constructed	No. of outgoing 66/33 KV feeders	Remarks
		No.	MVA /Tfm	Total				
A.	132/66 KV							
1	Kathua	2	50	120	120	1994 State sector	3	
		1	20					
2	Hira Nagar	1	50	72.5	72.5	1990 State sector	3	
		3	7.5					
3	Samba	2	50	100	100	2001 State sector	2	
B.	132/33 KV							
1	Gladni	3	50	150	150	1985 State sector	5	
2	Bari Brahmana	2	50	131.5	131.5	1988 State sector	6	(132/33 KV) 50
		1	31.5				1	(132/11) 31.5
3	Miran Sahib	1	50	90	90	1989 State sector	4	
		2	20					
4	Janipur	2	50	100	100	1967 State sector	7	1 no. 50 MVA Xmer is under outage & replaced b 31.5 MVA Xmer.of Jhajjar Kotli G/Stn.
5	Canal	2	50	100	100	1993 State sector	6	
6	Akhnoor	1+1	20+50	70	70	1979 State sector	6	
7	Jhajjar Kotli	2	31.5	63	63	1977 State sector	7	1 no. 31.5 MVA Xmer replaced by 15 MVA Xmer & shifted to Janipur G/Stn.
8	Udhampur	1	50	70	70	1981 State sector	4	
		1	20					
9	Batote	1+1	15+20	35	35	1978	4	

10	Khellani	2	20	40	40	1995-96 State sector	2	
11	NHPC (Kishtwar)	1	20	20	20	NHPC	1	
12	Sidhra	2	20	40	40	1995 State sector	3	1x20MVA damaged
13	Barn	1+1	20+50	70	70	2005 PMRP	2	
14	Rajouri	3	20	60	60	1994-95 State sector	5	
15	Kalakote	1	50	50	50	1987 State sector	1	
16	Bari-Brahmana-II	2	50	100	100	2008 PMRP	2	
17	Draba (Poonch)	1	20	20	20	2008 State sector	1	
18	Gangyal	1	50	50	50	2009 PMRP	3	
19	Mahanpur	1	50	50	50	2009 State sector	3	
20	Bishnah	2	50	100	100	2011 PMRP	2	
21	Ramban	1	20	20	20	2011 PMRP	3	
22	Katra	1	50	50	50	2011 PMRP	3	
23	Chandak	1	20	20	20	2011 PMRP	2	
24	Pounichak	1	50	50	50	2011 PMRP	1	
25	Jourian	1	20	20	20	2012 REC	1	
26	Kishtwar	2	20	40	40	2012 PMRP	3	
Total					1902		96	

3.5 -Details of Transmission Lines at 220kV level Jammu & Kashmir regions

S.No.	Name of the Double / Single ckt line	Total Circuit kms.	Date of Commissioning	Name of the scheme under which Line Constructed	Remarks
a) Kashmir Region					
1	Kishenpur-Pampore(Pampore-Tethar Section) D/C Line	147	July.1996	220 kV Kishanpur-Pampore Transmission Line Project	LILO at Mir Bazar
2	Wagoora-Zainkote D/C Line	58	Dec.1998	300 MVA 220/132 kV Grid Station at Zainkote with 220 kV D/C Wagoora-Zainkote Trans. Line	LILO at Budgam
3	Zainakote-Amargarh D/C	85	Jun-13	160MVA,220/132kV G/station Amargarh with 220kV D/C Zainakote Amargarh transmission line	Under PMRP
4	Budgam Loop-in(S/C)	3	05-08-2012	320MVA,220/132kV G/station Budgam with 220kV S/C tap from 220kV Wagoora-Zainkote transmission line	Under PMRP
Total		293			

b) Jammu Region

S.No.	Name of the Double / Single ckt line	Total ckt. Kms.	Date of commissioning	Name of the scheme under which line constructed	Remarks
1	220 KV D/C KPTL upto Tather	204	1996	State sector	
2	220 KV S/C Udampur - Sarna	124	1983	State sector	
3	220 kV D/C Kishanpur-Barn	74.8	2008	PMRP	
4	220KV D/C Miran-Sahib Bishnah	19.46	2010	PMRP	
5	220KV D/C Hiranagar- Bishnah	89.846	2011	PMRP	
6	220KV LILO Ramban	4	2011	PMRP	
Total		516.106			

3.6- Details of Transmission Lines at 132kV level in Kashmir Region

S.No.	Name of the Double/Single Circuit Transmission Line	Total Circuit kms.	Date of commissioning	Name of the scheme under which Line Constructed	Remarks
1	D/C CSTL		1973	Construction of 132 kV Chenani-Srinagar Transmission Line	
i	Bemina-Rawalpora-Pampore	50.4			
ii	Pampore-Awantipora-Wanpoh	80.74			
iii	a. Wanpoh-Tether (D/C)	76			
	b. Wanpoh-Tether (S/C over Pir top)	4			
2	Single Circuit USHP-I – Habak	50	1975	21.6 MW USHP Sumbal	
3	D/C LJHP -Amargarh-Pattan- Zainakote	153.6	1977	105 MW LJHP Gantmulla	
4	D/C Pampore – Chesmashahi	27.7	1987		
5	D/C Chesmashahi – Habak	30	1987		
6	D/C Amargarh - Arampora (Kupwara)	68	1995		
7	D/C Bemina -Wanganpora- Habak	20.6	1996		
8	D/C Bemina – Zainakote	19	Jan.1998		
9	D/C Zainakote – Wanganpora	21.7	Dec.1998		
10	D/C USHP-II – Habak	49.4	June.2002	105 MW USS-II Kangan	
11	S/C Awantipora - Lassipora	24.7	05.04.2003	132 kV ALTL	S/C line on D/C towers
12	D/C Ganderbal –Badampora	17	16.10.2004	132 kV GBTL	
13	LILO of LJTL at Sheree	1.5	06.05.2006	Const. of 50 MVA 132/33 kV G/ Stn. Sheree	
14	D/C Wanpoh-Mattan	19.2	23.09.2006	Const. of 50 MVA 132/33 kV G/Stn. Mattan	Conductor on II circuit laid for 7Kms upto Lissar tapping point.
15	S/C Wanpoh-Kulgam	11.3	02.12.2006	Const. of 40 MVA 132/33 kV G/Stn. Kulgam	S/C line on D/C towers
16	LILO of Pampore-C/Shshi Line for Khammd	7.4	28-05-2010	PMRP	.
17	LILO of CSTL at Tethar	0.9	10-02-2010	PMRP	
18	132kVD/C Lisser Line	26	2011	PMRP	
19	132kV S/C Arampora-Vilgam Line	18.4	2011	PMRP	
20	132kV D/C Pattan-Magam Line	14.12	2011	PMRP	
21	132kV D/C Lassipora Shopian Line	29	30.03.2013	PMRP	
	Total	19695.84			

3.7 - Details of Transmission Lines at 132kV level in Jammu Region

S.No.	Name of the Double / Single ckt line	Total ckt. Kms.	Date of commissioning	Name of the scheme under which line constructed	
1	132 KV D/C Ring Main around Jammu city	136.56	2000	State sector	
2	132 KV D/C Udampur - Bemina upto Thather (CSTL)	166	1974	State sector	
3	132 KV S/C Janipur – Kalakote	77	1968	State sector	
4	132 KV S/C Chenani-Udampur-J. Kotli	52.5	1967	State sector	
5	132 KV S/C Janipur – Gladni	7.7	1985	State sector	
6	132 KV D/C Gladni - Hira Nagar	84.46	1987	State sector	
7	132 KV D/C Hira Nagar – Kathua	76	1990-91	State sector	
8	132 KV D/C Gladni - Bari Brahmana	30.12	1987	State sector	
9	132 KV D/C Bari Brahmana - Miran Sahib	27.76	1988	State sector	
10	132 KV D/C Miran Sahib – Canal	32.18	1988	State sector	
11	132 KV D/C Barn – Janipur	29.58	2005	State sector	
12	132 KV D/C Kalakote – Rajouri	57	1994	State sector	
13	132 KV D/C Tapline for Samba	3.62	2001	State sector	
14	132 KV D/C Tapline for Grid Stn B.B-II	5.4	2007	PMRP	
15	132 KV D/C Rajouri –Draba Line	70.24	2008	PMRP	
16	LILO 132 kV for Gangyal	2	2009	PMRP	
17	132KV D/C Barn-Siot along with LILO (Akhnoor Section)	38.2	2010	PMRP	
18	132KV D/C Barn-Siot (Akhnoor - Kalakote Section)	107.74	2011	PMRP	
19	132kV D/C Barn-Katra	60.74	2011	PMRP	
20	132 KV D/C LILO of Main Ring to Pounichak	5.16	2011	PMRP	
21	132kV S/C Draba-Chandak	28.6	2011	PMRP	
22	132 KV D/C LILO of CSTL for Ramban	7	2011	PMRP	
23	132KV S/C Bran-Jorian	28.51	2012	REC	
	Total	1134.07			

3.8- (A) Assets of Power Grid Corporation of India under operation in J&K.

1	400/220KV KISHENPUR SUBSTATION		
	ICTs	MVA	Total
	KISHENPUR, 315MVA ICT-I (3 x 105MVA)	315	945
	KISHENPUR, 315MVA ICT-I (3 x 105MVA)	315	
	KISHENPUR, 315MVA ICT-II (3 x 105MVA)	315	
	BUS REACTORs	MVAR	
	1X 63 MVAR BUS REACTOR	63	143
	1X 80 MVAR BUS REACTOR	80	
2	400/220KV WAGOORA SUBSTATION		
	ICTs	MVA	
	WAGOORA, 315MVA ICT-I (3 x 105MVA)	315	1260
	WAGOORA, 315MVA ICT-II (3 x 105MVA)	315	
	WAGOORA, 315MVA ICT-III (3 x 105MVA)	315	
	WAGOORA, 315MVA ICT-IV (3 x 105MVA)	315	
	BUS REACTORs	MVAR	
	1X 50 MVAR BUS REACTOR	50	
3	400/220KV SUBSTATION SAMBA JAMMU(2x315MVA)	630	630
4	400/220KV SUBSTATION NEW WANPOH(2x315MVA)	630	630

3.8 - (B) POWERGRID LINES UNDER O&M IN J&K. (As on 3/2014)

S.No	Name of The Line	Line Length (In Kms)	Hilly (In Kms)	Plain (In Kms)
400 KV TRANSMISSION LINES				
1	400KV DULHASTI-KISHENPUR S/C	119.72	119.72	0
2	400kV CHAMERA-II- KISHENPUR	134.81	134.81	0
3	400KV URI-WAGOORA -I	94.99	58	36.99
4	400KV URI-WAGOORA -II	94.99	58	36.99
5	800KV KISHENPUR-MOGA-I	275.38	152.31	123.07
6	800KV KISHENPUR-MOGA-II	287.12	145.96	141.16
7	400KVUri-II-Wagoora	105	84	21
8	400KVUri-I- Uri-II	10.45	10.45	0
9	400kV Kishenpur - Samba I	34.82	30	4.82
10	400kV Kishenpur - Samba II	34.82	30	4.82
11	400 kV WANPH-WAGOORA-I	57	0	57
12	400 kV WANPH-WAGOORA-II	57	0	57
13	400 kV Kishenpur-Wanpoh-I	129.76	0	129.76
14	400 kV Kishenpur-Wanpoh-I	130.25	0	130.25
220 KV TRANSMISSION LINES				
1	220KV HIRANAGAR-SARNA S/C	45.29	0	45.29
2	220KV JAMMU-HIRANAGAR S/C	45.93	25.93	20
3	220KV KISHENPUR-SARNA I	103.64	83.64	20
4	220KV KISHENPUR-SARNA II	103.64	83.64	20
5	220KV KISHENPUR-UDHAMPUR -I	22.04	22.04	0
6	220KV KISHENPUR-UDHAMPUR -II	22.04	22.04	0
7	220KV SALAL-JAMMU-I S/C	56.33	56.33	0
8	220KV SALAL-JAMMU-II S/C	62.42	62.42	0
9	220KV SALAL-KISHENPUR-I	56.8	56.8	0
10	220KV SALAL-KISHENPUR-II	56.8	56.8	0

11	220KV SALAL-KISHENPUR-III	58.7	58.7	0
12	220KV SALAL-KISHENPUR-IV	58.7	58.7	0
13	220KV WAGOORA-PAMPORE-I	10.29	0	10.29
14	220KV WAGOORA-PAMPORE-II	10.29	0	10.29
Total		2279.02	1410.29	868.73
132 KV TRANSMISSION LINES				
1	132 KV Sewa-II - Hiranagar ckt-I	78.48	78.48	0
	132 KV Sewa-II - Hiranagar ckt-II	78.48	78.48	0
2	132 KV Sewa-II - Mahanpur ckt-II	31.25	31.25	0
3	132kV Mahanpur - Kathua	21.5	21.5	0
4	132kV Sewa -II - Kathua	53	53	0
Total		6305.04	6305.04	0

3.9 Circle-wise HT/LT Ratio at Distribution Level

S.No.	Name of Circle	HT/LT Ratio
1	Circle-Ist, Jammu	01:03.0
2	Circle-2 nd Kuthua	01:02.2
3	Circle Rajouri	01:02.1
4	Circle Batote	01:01.8
5	Circle Kishtwar	01:01.5
6	Circle-I, Srinagar	01:01.9
7	Circle-2, srinagar	01:02.4
8	Circle-Ganderbal	01:02.3
9	Circle-South Bijbehara	01:02.4
10	Circle-South Pulwama	01:02.2
11	Circle-North, Sopore	01:02.1
12	Circle-Leh, Ladakh	01:01.6

3.10- Capacity wise List of 66-33/11-6.6 KVA Sub-Station of Elect. Maintt. & RE Wing, Jammu.

S.No.	Name of Receiving Station	Voltage	Capacity MVA														Total MVA	No. of Feeders
			1.3	1.6	2	2.5	3	3.15	4	5	6	6.3	10	15	20	31.5		
STD-1 Jammu																		
1.	New Sectetarait	33/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	0	0	20	9
2.	Residency	33/11 KV	0	0	0	0	0	0	0	0	0	1	1	0	0	0	16.3	6
3.	Wazarat	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	4
4.	Medical	33/11 KV	0	0	0	0	0	0	0	0	0	1	2	0	0	0	26.3	8
5.	Parade	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	2
6.	Canal	33/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	0	0	20	7
7.	Company Bagh	33/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	0		20	4
8.	Sheetli	33/11 KV	0	0	0	0	0	0	0	0	0	3	2	0	0	0	38.9	5
9.	Nagrota	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	8
10.	Dhounthaly	33/11 KV	0	0	0	0	0	0	0	0	0	1	1	0	0	0	16.3	6
11.	Jindhrah	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0		6
12.	Jajjar Kotli	33/11 KV	0	0	0	0	0	1	0	0	0	0		0	0	0	3.15	3
13.	Dansal	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
14.	Janipur	33/11 KV	0	0	0	0	0	0	0	0	0	0	3	0	0	0	30	11
15.	Denis gate	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	2
16.	Purkhoo	33/11 KV	0	0	0	0	0	0	0	0	0	2	0	0	0	0	12.6	4
17.	Shamachak	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	1
18.	Akhnoor	33/11 KV	0	0	0	0	0	0	0	0	0	2	0	0	0	0	12.6	8
19.	Jourian	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	3
20.	Pahariwala	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
21.	Khour	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
22.	Barmal	33/11 KV	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4	2
23.	Sohal Bhalwal	33/11 KV	0	0	0	0	0	0	0	0	0	1	1	0	0	0	16.3	3
24.	Sarote	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
25.	Tanda	33/11 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	3
26.	Maira Mandrian	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
27.	Chowki Choura	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
28.	Pargwal	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	3
29.	Balli Gulaba	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	3

30.	Subash Nagar	33/11 KV	0	0	0	0	0	0	0	0	0	1	1	0	0	0	16.3	4
31.	Roop Nagar	33/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	0	0	20	3
32.	Bantalab	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	6
33.	Thather	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	3
34.	Bhalwal	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	3
35.	Marh	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
36.	Gajansoo	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
37.	Toph Sherkhania	33/11 KV	0	0	0	0	0	0	0	0	0	1	1	0	0	0	16.3	6
38.	Muthi	33/11 KV	0	0	0	0	0	0	0	0	0	0	3	0	0	0	30	5
39.	Talab Tillo	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
40.	Udhwywala	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	3
41.	Kanachak	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
42.	Batera	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
43.	Machillian	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
44.	Gharata	33/11 KV	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4	2
45.	Bohri	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	2
46.	Nagrota-II (jagti)	33/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	0	0	20	4
47.	Superspeciality Hospital	33/11 KV	0	0	0	0	0	0	0	0	0	2	0	0	0	0	12.6	1
48.	Ranjan	33/6.6 KV	0	0	0	2	0	0	0	0	0	0	0	0	0	0	5	2
49.	Trilokpur	33/6.6 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	1
50.	Gho Manhasan	33/6.6 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	4	2
51.	Pallanwalla	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
52.	Kaleeth	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
53.	Jugwan	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
54.	Pargwal-II	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
55.	Chak Mahal	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
	Total		0	0	0	2	0	13	3	1	0	27	33	0	0	0	563.05	192
STD-II, Jammu																		
1	Samba-I	66/11 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	3
2	Samba-II	66/11 KV	0	0	0	0	0	0	1	1	0	0	0	0	0	0	9	4
3	IGC Samba-I	66/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	0	0	20	8
4	IGC Samba-II	66/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	0	0	20	8
5	Bainglad	66/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	3
6	Chatha	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	5
7	Parladpur	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	3
8	Gadigarh	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	3

9	Satwari	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	6
10	Military Cantt	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	3
11	Sunderpur	33/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	0	0	20	5
12	Badyal Brahmana	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
13	Rangpur Mulana	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	3
14	Chakroi	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
15	Bishnah	33/11 KV	0	0	0	0	0	0	0	0	0	2	0	0	0	0	12.6	3
16	Chak Hasla	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
17	Salehar	33/11 KV	0	0	0	0	0	0	0	0	0	2	0	0	0	0	12.6	5
18	Miran Sahib	33/11 KV	0	0	0	0	0	0	0	0	0	2	0	0	0	0	12.6	7
19	Shatraiyan	33/11 KV	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4	2
20	Kullian	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
21	Chak Shera	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	4
22	Suhagpur	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
23	Biaspur	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	3
24	Nandpur	33/11 KV	0	0	0	0	0	0	0	0	0	2	0	0	0	0	12.6	5
25	Seora	33/11 KV	0	0	0	0	0	0	0	0	0	2	0	0	0	0	12.6	4
26	Ashok Nagar	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	3
27	JDA Complex	33/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	0	0	20	6
28	Railway Complex	33/11 KV	0	0	0	0	0	0	0	0	0	1	1	0	0	0	16.3	6
29	Nanak Nagar	33/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	0	0	20	7
30	Gangyal	33/11 KV	0	0	0	0	0	0	0	0	0	0	3	0	0	0	30	5
31	Trikuta Nagar	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	5
32	Channi Himmat	33/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	0	0	20	7
33	Transport Nagar	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	5
34	Bathindi	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	4
35	Babliana	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	5
36	Sainik Colony	33/11 KV	0	0	0	0	0	0	0	0	0	2	0	0	0	0	12.6	3
37	Sidhra	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	4
38	Malhori Jagir	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	1
39	Greater Kailash	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	4
40	BB-II	33/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	0	0	20	5
41	BB-I	33/11 KV	0	0	0	0	0	0	0	0	0	0	3	0	0	1	61.5	8
42	Raya	33/11 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	3
43	Birpur Complex	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	3
44	Smailpur	33/11 KV	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4	3
45	Ramgarh	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	4
46	Vijaypur	33/11 KV	0	0	0	0	0	0	0	0	0	2	0	0	0	0	12.6	3

47	Gurha	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	3
48	Mandal	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
49	Kartholi	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	4
50	Rangoor	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	3
51	Jakh	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	3
52	Sarore	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	3
53	Birpur RatnuChak	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	3
54	Sai Kalan	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
55	Makwal	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
56	Boria	33/11 KV	0	0	0	0	0	2	0	0	0	0	0	0	0	0	6.3	2
57	Bahu Fort	33/6.6 KV	0	0	0	0	0	0	0	0	0	2	1	0	0	0	22.6	5
58	Bari Brahamana	33/11Kv	0	0	0	0	0	0	0	0	0	0	0	0	0	1	31.5	4
59	Shahstri Nagar	33/11Kv	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	2
	Total		0	0	0	0	0	4	3	3	0	35	35	0	0	2	683.1	226
STD-III, Kathua																		
1	Hatli Village	66/33/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	0	0	20	4
2	Hiranagar	66/33/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	1	0	40	3
3	Hiranagar-II	66/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	3
4	Hatlimore	66/11 KV	0	0	0	0	0	1	0	0	0	0	1	0	1	0	33.15	11
5	Keerian Gandval	66/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	2
6	Lakhanpur	66/11 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	3
7	Basantpur	66/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	2
8	C.T.M	66/11 KV	0	0	0	0	0	0	0	0	0	0	1	1	0	0	25	1
9	Knit Fab	66/11 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	1
10	Industry	66/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	0	0	20	4
11	Nagri	66/11 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	5
12	Palli	66/11 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	4
13	Nanan	66/11 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	2
14	Changran	66/11 KV	0	0	0	0	0	0	0	1	0	0	1	0	0	0	15	3
15	Taraf Pajwal	66/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	5
16	Ghagwal	66/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	3
17	Chann Arorian	66/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	2
18	Marheen	66/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	4
19	Nichila	66/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	3
20	Rajpura	66/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	3
21	Sherpur	66/11 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	1
22	Pharapur	66/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	3

23	Hatlimore-II (Khrote More)	66/11 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	5
24	Govindsar	66/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	4
25	Govindsar (IID)	66/11 KV	0	0	0	0	0	0	0	0	0	0	0	0	1	0	20	4
26	Barnoti	66/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	2
27	Palli-II	66/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
28	Lift Irrigation, Lakhanpur -I	66/6.6 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	1
29	Lift Irrigation, Lakhanpur -II	66/6.6 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	1
30	Lift Irrigation, Basantpur-I	66/6.6 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	1
31	Lift Irrigation, Basantpur-II	66/6.6 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	1
32	Challan Prajali	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
33	Phinter	33/11 KV	0	0	0	0	0	0	0	1	0	1	0	0	0	0	11.3	6
34	Ramkot	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	3
35	Kalyal	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	4
36	Mahanpur	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
37	Basohli	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	5
38	Bhoond	33/11 KV	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2.5	3
39	Bani	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	3
40	Bagan	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	1
41	Machaddi	33/11 KV	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1.6	2
42	Martha Nagrota	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	1
	Total		0	1	0	1	0	8	0	13	0	5	19	1	3	0	390.8	125
STD-IV, Kalakote																		
1	Kalakote	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	5
2	Siot	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
3	Sunderbani	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	5
4	Phall	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
5	Sunderbani-II (Phall)	33/11 KV	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2.6	2
6	Nowshera	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	9
7	Chowki-Hundan	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
9	Marchola	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
10	Mogla	33/11 KV	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1.6	2
11	Kheora	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	7

12	Thudi	33/11 KV	0	0	0	0	0	0	0	1	0	1	0	0	0	0	11.3	9
13	Darhal	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
14	Manjakote	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	4
15	Thannamandi	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	4
16	Dhanwan	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	3
17	Dhangri	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	1
18	Kotranka	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	3
19	Darhali Bridge	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
20	Palma	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	3
21	Sial Sui	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
22	Kamsar	33/11 KV	0	0	0	0	0	0	0	0	0	1	1	0	0	0	16.3	4
23	Haveli	33/11 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	3
24	Gulpur	33/11 KV	0	2	0	0	0	0	0	0	0	0	0	0	0	0	3.2	3
25	Jhallas	33/11 KV	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1.6	4
26	Chandak	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
27	Mandi	33/11 KV	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2.5	4
28	Lassana	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
29	Surankote	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	3
30	J.W.G	33/11 KV	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2.5	2
31	Draba	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	2
32	B.G	33/11 KV	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1.6	3
33	Mendhar	33/11 KV	0	0	0	0	0	2	0	0	0	0	0	0	0	0	6.3	3
34	Mankote	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
35	Jhallas-II	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
36	Budhal	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	3
37	Bandi Chechian	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
38	Solki	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	3
39	Loran	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
40	Chatral	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
41	Rajal	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	1
42	Qila Dharal	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
43	Lift Irr. Rajal	33/6.6 KV	0	0	0	2	0	0	0	0	0	0	0	0	0	0	5	1
44	Jhulla (LC Fence)	33/11 KV	0	2	0	0	0	0	0	0	0	0	0	0	0	0	3.2	1
45	MES Rajouri	33/11 KV	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2.5	1
46	Baba Ghulam Shah (University)	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	1
47	Kalakote-II	33/6.6 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	2
48	Gambhir	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	0

49	JWG-II	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3.15	1
50	Tredu	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3.15	0
51	Laroka	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	6.3	0
52	Kandi Parori	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3.15	0
	Total		2	7	0	6	0	19	0	3	0	18	3	0	0	0	0	247.05	134
STD-V Udhampur																			
1	Dairy farm	33/11 KV	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	16.3	10
2	Devik	33/11 KV	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	12.6	7
3	Dhar Road	33/11 KV	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	12.6	6
4	Ramnagar	33/11 KV	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	8.8	6
5	Phalatta	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	6.3	6
6	Jakhani	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	6.3	3
7	Battal Ballian	33/11 KV	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	16.3	6
8	Staney	33/11 KV	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	13.45	4
9	Chenani	33/11 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	5	5
10	Pathi	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3.15	3
11	Battal	33/11 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	5	4
12	Dhuna	33/11 KV	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1.6	2
13	Jib	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3.15	3
14	Katra	33/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	20	9
15	Tarakote	33/11 KV	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	12.6	4
16	Reasi	33/11 KV	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	12.6	7
17	Pouni	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	6.3	3
18	Panthal	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	6.3	6
19	Dharmari	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3.15	4
20	SMVD University	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3.15	3
21	Dharmound	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	6.3	4
22	Meetra (Ramban)	33/11 KV	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	9.45	7
23	Ramsoo	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3.15	3
24	Banihal	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	6.3	7
25	Assar	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3.15	3
26	Patnitop	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3.15	3
27	Tethar	33/11 KV	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	4	3
28	Sangaldan	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3.15	4
29	Sarhbaga	33/11 KV	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2.5	3
30	Johnu	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3.15	3
31	Chowki	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3.15	4
32	Basantgarh	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3.15	4

33	Gool	33/11 KV	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2.5	2
34	Arnas	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	3
	Total		0	1	0	3	0	14	2	2	0	19	4	0	0	0	230.9	154
STD-VI Doda																		
1	Doda	33/11 KV	0	0	0	0	0	0	0	0	0	2	0	0	0	0	12.6	8
2	Thathri	33/11 KV	0	0	0	0	0	0	0	0	0	0	1	0	0	0	10	4
3	Prem Nagar	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	4
4	Bhalla	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	3
5	Gandoh	33/11 KV	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	4
6	Bhaderwah	33/11 KV	0	0	0	0	0	0	0	1	0	1	0	0	0	0	11.3	6
7	Ganika	33/11 KV	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2.5	3
8	Changa	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	2
9	Bhatyas	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	3
10	Dallian (Bhaderwah)	33/11 KV	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4	3
11	Sappa (Army)	33/11 KV	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3.15	1
12	Kishtwar	33/11 KV	0	0	0	0	0	0	0	0	0	0	2	0	0	0	20	6
13	Mandal	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	4
14	Dedpeth	33/11 KV	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6.3	3
15	Doda-II (Behli Ghat)	33/11 KV	0	0	0	0	0	0	1	0	0	0	0	0	0	0	4	4
	Total		0	0	0	1	0	5	2	2	0	5	3	0	0	0	97.75	58
	G.Total		2	9	0	13	0	63	10	24	0	109	97	1	3	2	2202.65	889

3.11- Capacity wise List of 66-33/11-6.6 KVA Sub-Station of Elect. Maintt. & RE Wing, Kashmir.

A) 33/11kV

STD - Ist Srinagar

S #	Sub Station	Capacity (MVA)						Total MVA	No. of Out-going
		2.5	3.15	4	5	6.3	10		
1	Ahmad Nagar	0	0	0	0	1	0	6.3	2
2	Awanta Bhawan	0	0	0	0	2	0	12.6	2
3	B.A.M. Khan	0	0	0	0	3	0	18.9	4
4	Bagwanpora	0	0	0	0	0	2	20	2
5	Balhama	0	0	0	0	1	0	6.3	4
6	Barbarshah	0	0	0	0	0	2	20	2
7	Brane	0	0	0	0	0	2	20	3
8	Buchwara	0	0	0	0	0	2	20	2
9	Centaur	0	0	0	0	2	0	12.6	4
10	Fateh kadal	0	0	0	0	0	2	20	4
11	Habak	0	0	0	0	3	0	18.9	3
12	Harwan	0	0	0	0	3	0	18.9	2
13	Illahi Bagh	0	0	0	0	2	0	12.6	2
14	Kathidarwaza	0	0	0	0	3	0	18.9	4
15	Kawdara	0	0	0	0	0	2	20	3
16	Khanyar	0	0	0	0	1	2	26.3	5
17	Khayam	0	0	0	0	0	2	20	4
18	Lal Bazar	0	0	0	1	0	1	15	3
19	Mughal Masjid	0	0	0	0	0	2	20	11
20	Nedous	0	0	0	0	2	0	12.6	2
21	Nishat	0	0	0	0	0	2	20	4
22	Basantbagh	0	0	0	0	0	2	20	3
23	Omer Hair	0	0	0	0	2	0	12.6	2
24	Rainawari	0	0	0	0	0	2	20	4

25	Shalimar	0	0	0	0	2	0	12.6	3
26	Sidco Food Park Sidco K	0	0	0	0	1	0	6.3	2
27	Sonwar	0	0	0	0	0	2	20	4
28	Soura	0	0	1	0	1	2	30.3	5
29	T.R.C.	0	0	0	0	0	2	20	6
30	Tailbal (Burzahama)	0	0	0	1	1	0	11.3	1
31	Zakoora	0	0	0	1	0	1	15	3
32	Zoonimar	0	0	0	0	1	0	6.3	1
33	Hazratbal	0	0	0	0	2	0	12.6	3
34	Khanmoh phase III	0	0	0	0	0	1	10	2
Total		0	0	1	3	33	33	556.9	111
STD - IInd Srinagar									
1	B.K.Pora	0	0	0	0	2	0	12.6	3
2	Baghi-Mehtab	0	0	0	0	2	1	22.6	4
3	Batmalloo	0	0	0	0	0	2	20	2
4	Beerwah	0	0	0	1	1	0	11.3	6
5	Bemina-IIInd	0	0	0	0	1	2	26.3	4
6	Bemina-Ist	0	0	0	0	2	0	12.6	5
7	Bone & Joint Hospital	0	0	0	0	2	0	12.6	4
8	Brenwar	0	0	0	0	1	0	6.3	2
9	Budgam	0	0	1	0	0	2	24	7
10	Chadoora	0	0	0	0	2	1	22.6	5
11	Chanapora	0	0	0	0	0	2	20	5
12	Chari Shareef	0	0	0	0	2	0	12.6	6
13	Danderkhah	0	0	0	0	2	0	12.6	3
14	Exhibition	0	0	0	0	0	2	20	4
15	Ichgam	0	0	0	0	1	0	6.3	2
16	J V C (Bemina III)	0	0	0	0	0	1	10	2
17	Jawaharnagar	0	0	0	0	0	2	20	2
18	K.P.Bagh	0	0	0	0	2	0	12.6	4
19	Karan Nagar	0	0	0	0	0	2	20	7
20	Khag	0	0	0	0	1	0	6.3	3

21	Khan Sahib	0	0	0	0	1	0	6.3	4
22	Khanda	0	0	0	0	1	0	6.3	1
23	Kremshore	0	0	0	1	0	1	15	4
24	M.R.Gunj	0	0	0	0	2	0	12.6	5
25	Magam	0	0	0	1	1	0		3
26	Nagam	0	0	0	1	1	0	11.3	2
27	Narbal	0	1	0	0	2	0		5
28	Peerbagh	0	0	0	0	2	0	12.6	3
29	Rajbagh	0	0	0	0	0	2	20	4
30	Rangreth	0	0	0	0	0	2	20	4
31	Rawalpora	0	0	0	0	0	2	20	4
32	Rakhi Arth	0	0	0	0	0	2	20	0
33	Safa Kadal	0	0	0	0	1	2	26.3	4
34	Shalitore	0	0	0	0	0	2	20	3
35	Shalteng	0	0	0	0	2	0	12.6	5
36	Shariefabad	0	1	0	0	1	0	9.45	1
37	Shreen bagh	0	0	0	0	2	0	12.6	4
38	Silk Factory	0	0	0	0	3	0	18.9	5
39	Syed Hamid pora	0	0	0	0	2	0	12.6	3
40	Wadwan	0	0	0	0	2	0	12.6	2
41	Wanganpora	0	0	0	0	1	0	6.3	1
42	Zainakoot	0	0	0	0	1	1	16.3	8
43	Narkara	0	0	0	0	0	1	10	1
44	Bakshipora	0	0	0	0	1	0	6.3	1
45	PC Depot	0	0	0	0	2	0	12.6	2
46	Kanir	0	0	0	0	1	0	6.3	2
Total		0	2	1	4	50	32	665.3	161

STD - Sopore

1	Arampora	0	0	0	0	2	0	12.6	2
2	Audoora	0	0	0	0	1	0	6.3	4
3	Baramulla-II	0	0	0	0	1	1	16.3	3
4	Baramulla-Ist	0	0	0	0	0	2	20	7
5	Chakloo Rafiabab	0	0	0	0	1	0	6.3	2
6	Chandoosa	0	0	0	0	1	0	6.3	3
7	Chogul	0	0	0	0	1	0	6.3	3
8	Cable car	0	1	0	0	0	0	3.15	2
9	Dooru Sopore	0	0	0	0	1	0	6.3	2
10	Drugmulla	0	0	0	0	1	0	6.3	3
11	Drungbal	0	0	0	0	1	0	6.3	2
12	Ganapora	0	0	0	0	1	0	6.3	3
13	Gulmarg	0	0	1	0	0	0	4	4
14	Hadipora	0	1	0	0	0	0	3.15	1
15	Hamray	0	0	1	0	1	0	10.3	4
16	Handwara	0	0	0	1	0	1	15	6
17	HardIchloo	0	0	0	0	1	0	6.3	2
18	Kangamdar (Pattan)	0	0	0	0	1	0	6.3	3
19	Kanilbagh	0	0	0	0	1	0	6.3	3
20	Khumriyal	0	0	0	0	1	0	6.3	4
21	Kralpora	0	0	0	0	0	1	10	4
22	Kreeri	0	0	0	0	1	0	6.3	1
23	Krusan	0	0	0	0	0	1	10	4
24	Kunzar	0	0	0	0	1	1	16.3	3
25	Ladoora	0	2	0	0	0	0	6.3	4
26	Malpora Narwah	0	0	0	0	1	0	6.3	3
27	Nowpora	0	0	0	0	1	0	6.3	3
28	Nowshera	0	0	1	0	0	0	4	2

29	Panzipora Tarzoo,Sopore	0	0	0	0	1	0	6.3	3
30	Pattan	0	0	0	0	0	2	20	6
31	Rampora Uri	0	0	0	0	1	0	6.3	2
32	Rohama	0	0	0	0	0	1	10	3
33	Sangrama	0	1	0	0	1	0	9.45	3
34	Seeloo	0	0	0	0	0	1	10	5
35	Sheeri	0	0	0	1	0	0	5	3
36	Singhpora	0	0	0	0	2	0	12.6	3
37	Sopore- 2nd	0	0	0	0	1	1	16.3	5
38	Sopore-1st	0	0	0	0	0	2	20	7
39	Tangdar	0	0	0	0	1	0	6.3	4
40	Tangmarg	0	1	0	0	0	1	13.15	5
41	Tikker Kupwara	0	0	0	0	0	2	20	8
42	Trehgam	0	0	0	0	1	0	6.3	2
43	Uri Salamabad	0	0	0	0	0	1	10	5
44	Wagoora	0	1	0	1	0	0	8.15	5
45	Watlab	0	0	0	0	1	0	6.3	3
46	Watrigan	0	1	0	0	1	0	9.45	5
47	Willgam (Doolipora)	0	0	1	0	1	0	10.3	3
48	Zachaldara	0	1	0	0	1	0	9.45	3
49	Magam Handwara	0	0	0	0	1	0	6.3	2
50	Lassipora Sogam	0	0	0	0	1	0	6.3	2
51	Boniyar	0	0	0		2	0	12.6	3
Total		0	9	4	3	36	18	466.15	177
STD - Ganderbal									
1	Ajas	0	0	0	1	0	0	5	3
2	Aloosa	0	0	0	0	1	0	6.3	2
3	Ajar Bandipora	0	0	0	0	2	1	22.6	6
4	Panzigam Bandipora	0	0	0	0	1	0	6.3	3
5	Mansbal	0	0	0	0	1	0	6.3	3
6	Markundal	0	0	0	0	2	0	12.6	5

7	Nadihal	0	1	1	0	0	0	7.15	2
8	Shadipora	0	0	1	0	1	0	10.3	3
9	Hajin	0	3	0	0	0	0	9.45	4
10	Ganderbal	1	0	0	0	2	0	15.1	5
11	Manigam	0	0	0	0	1	0	6.3	4
12	Mansbal	0	0	0	0	1	0	6.3	3
13	Nagbal	0	0	0	0	1	0	6.3	1
14	Alesteng	0	0	0	0	1	0	6.3	2
15	Tulla Bagh	0	0	0	0	1	0	6.3	3
16	Ganda Singh	0	1	0	0	0	0	3.15	2
17	Lar	0	0	0	1	1	0	11.3	4
18	Kheer Bhawani	0	1	0	0	0	0	3.15	2
19	Doderhama	0	0	0	0	3	0	18.9	5
20	Khurhama	0	0	0	0	2	0	12.6	4
21	Kangan	0	0	0	0	0	1	10	4
22	Wussan	0	0	0	0	0	1	10	3
23	Gagangeer	0	1	0	0	0	0	3.15	1
24	Naidkhai	0	0	0	0	1	0	6.3	3
25	Preng Madwan	0	0	0	0	1	0	6.3	3
Total		1	7	2	2	23	3	217.45	80
STD Pulwama									
1	Lassipora	0	0	0	0	0	1	10	3
2	Pulwama	0	0	0	0	1	2	26.3	7
3	Keegam	0	0	0	0	1	0	6.3	2
4	Shadimargh	0	0	0	1	1	0	11.3	4
5	Mitrigam	0	1	0	0	1	0	9.45	3
6	Reshipora	0	0	0	0	1	1	16.3	4
7	Landoora	0	0	1	0	1	0	10.3	4
8	Shopian(Gagren)	0	0	0	0	2	0	12.6	4
9	Pinjoora	0	0	0	0	1	0	6.3	2

10	Batpora	0	0	0	0	1	0	6.3	3
11	Chowdrigund	0	0	0	0	1	0	6.3	3
12	Konibal	0	0	1	0	1	0	10.3	4
13	Lethpora	0	0	0	1	0	1	15	3
14	Kakapora	0	0	0	0	1	0	6.3	2
15	Newa	0	0	1	0	1	0	10.3	3
16	Tral	0	0	0	0	0	2	20	5
17	Lurgam	0	0	0	0	2	0	12.6	3
18	Lalgam	1	1	0	0	0	0	5.65	2
19	Chewa	0	0	0	0	1	0	6.3	3
20	Awantipora	0	0	0	0	1	1	16.3	7
21	Naroo	0	1	0	0	1	0	9.45	3
22	KachachKoot	0	0	1	0	1	0	10.3	3
23	Nowgam Panzgam	0	2	0	0	0	0	6.3	3
24	Khellan	0	0	0	0	1	0	6.3	2
Total		1	5	4	2	21	8	256.55	82
STD - Bijbehara									
1	Achabal	0	0	0	0	2	0	12.6	4
2	Aishmuqam	0	0	0	0	1	0	6.3	4
3	Akura	0	0	0	0	1	0	6.3	3
4	Arwani	0	0	0	0	1	0	6.3	3
5	Ashajipora	0	0	0	0	0	2	20	4
6	D.H.pora	0	0	0	0	0	1	10	4
7	Dialgam	0	0	0	0	1	0	6.3	3
8	Dooru	0	0	0	1	0	1	15	4
9	Harnag	0	0	0	0	2	0	12.6	4
10	Hiller	0	0	0	0	1	0	6.3	3
11	Hiller Dooru	0	0	0	0	1	0	6.3	3
12	Hutmurah	0	0	0	0	2	0	12.6	3
13	Janglat Mandi	0	1	0	0	1	0	9.45	3
14	Khiram	0	0	0	0	2	0	12.6	2

15	Kokernag	0	0	0	0	1	1	16.3	3
16	Kulgam	0	0	0	0	0	2	20	6
17	Kund	0	1	0	0	0	0	3.15	2
18	Malaknag	0	0	0	0	1	0	6.3	3
19	Mattan, Gopalpora	0	0	0	0	1	0	6.3	3
20	Mir Bazar	0	0	0	0	2	0	12.6	6
21	Nai Basti, Anantnag	0	0	0	0	1	0	6.3	3
22	Nillow	0	0	0	0	2	0	12.6	3
23	Nowgam (Chowgund)	0	1	0	0	0	0	3.15	2
24	Nowgam (Shangus)	0	0	0	0	1	1	16.3	3
25	Pahalgam	0	0	0	0	1	0	6.3	6
26	Qaimoh	0	0	1	0	0	1	14	3
27	Qazigund	0	0	0	0	0	1	10	4
28	Salia	0	0	0	0	1	0	6.3	2
29	Saller	0	0	0	0	1	0	6.3	3
30	Sangam	0	0	0	0	0	2	20	4
31	Sarnal	0	0	0	0	0	2	20	7
32	Shankerpora	0	0	0	0	1	0	6.3	3
33	Sicop Bijbehara	0	0	0	0	1	0	6.3	4
34	Veeri, Bijbehara	0	0	0	0	1	0	6.3	3
35	Yaripora	0	0	0	0	2	0	12.6	3
36	Zirpora	0	0	1	0	0	0	4	2
37	Devsar	0	0	0	0	1	0	6.3	2
38	Marhama	0	0	0	0	1	0	6.3	3
Total		0	3	2	1	34	14	376.65	130
Grand Total		2	27	15	16	199	108	2563.75	749

B) 33/6.6kV								
STD-Ist, Srinagar								
S #	Sub Station	Capacity (MVA)					Total MVA	No. of Out-going feeders
		3.15	3.75	4	5	6.3		
1	Badami Bagh	0	0	0	0	2	12.6	4
2	Khonmoh	1	0	0	0	1	9.45	4
3	Pantha Chowk	0	0	0	1	1	11.3	2
Total		1	0	0	1	4	33.35	10
STD-Pulwama,								
S #	Sub Station	Capacity (MVA)					Total MVA	No. of Out-going feeders
		3.15	3.75	4	5	6.3		
1	Pampore-I	0	1	1	0	2	20.35	6
2	Pampore-II	0	0	0	1	1	11.3	3
3	Khrew	0	0	0	0	1	6.3	2
4	Wuyan	0	0	0	0	1	6.3	2
Total		0	1	1	1	5	44.25	13
Grand Total		1	1	1	2	9	77.6	23

CHAPTER 4
4.1- GENERATING PLANTS - INSTALLED CAPACITY

A) STATE SECTOR

i) UNDER POWER DEVELOPMENT CORPORATION		
PARTICULARS	UNIT	TOTAL INSTALLED CAPACITY
HYDRO	MW	759.96
TOTAL NO. OF HYDEL PROJECTS	No	20
THERMAL	MW	175MW
TOTAL NO. OF THERMAL PROJECTS (Operated only in case of emergency in view of high per unit generation cost)	No	2
ii) UNDER POWER DEVELOPMENT DEPARTMENT		
DIESEL	MW	33.662

B) CENTRAL SECTOR

HYDRO	MW	2009
TOTAL NO. OF HYDEL PROJECTS	No	7

C) INDEPENDENT POWER PRODUCERS

HYDRO	MW	42.5
TOTAL NO. OF HYDEL PROJECTS	No	4

POWER PLANTS UNDER OPERATION IN THE STATE

Name of Power Plant	Configuration	Installed Capacity in MW
<u>A) STATE SECTOR</u>		
Jhelum River Basin		
Lower Jhelum	3 x 35	105
Upper Sindh-I	2x11.3	22.6
Ganderbal	2x3+2x4.5	15
Upper Sindh-II	3x35	105
Pahalgam	2 x 1.5	3
Karnah	2x1	2
Sub-Total		252.6
Chenab Basin		
Chenani-I	5x4.66	23.3
Chennai-II	2x1	2
Chenani-III	3x2.5	7.5
Bhaderwah	2 x 0.5	1
Baglihar	3x150	450
Sub-Total		483.8
Ravi Basin		
Sewa-III	3x3	9
Indus Basin		
Iqbal	3x1.25	3.75
Hunder	2x0.20	0.4
Sumoor	2x0.05	0.1
Igo-Mercellong	2x1.50	3
Haftal	2x0.50	1
Marpachoo	3x0.25	0.75
Bazgo	2x0.15	0.3
Stakna (with J&KPDD)	2x2	4
Sanjak	1.26	1.26
Sub-Total		14.56
G.Total		759.96

B) INDEPENDENT POWER PRODUCERS (IPP)		
Athwattoo	2X5	10
Branwar	3X2.5	7.5
Tangmargh	2X5	10
Dunadi Nallah	3X5	15
TOTAL		42.5
C) CENTRAL SECTOR		
Salal HEP	6x115	690
Uri –I	4x120	480
Dul-Hasti	3x130	390
Sewa-II	2X60	120
Chtak	4x11	44
Nimo bazgo	3x15	45
Uri –II	2X120	240
TOTAL		2009
Note: Out of 450 MW Bhagliar project only 225 MW power is available to J&K PDD		

4.2 UPCOMING POWER PLANTS IN THE STATE

Name of Power Project	Capacity (MW)	Location	Status
(A) STATE SECTOR (JKSPDC)			
Sawalkote	1856	Ramban	DPR clearance by CEA under process. Award likely in Sep-2014
Baglihar Stage-II	450	Chanderkoot, Ramban	Under construction likely to be commissioned in 2020 (84months)
Kirrthai-I	390	Thatri Kishtwar	Tendered out
Kirrthai-II	990	Thatri Kishtwar	Tender being floated.
New Gander bal	93	Ganderbal	Tendered out- expected commissioning 2017
Lower Kalnai	48	Thatri Kishtwar	Tendered out, likely to be awarded .LoI issued 12-09-2013, (commissioning 48 months)
Parnai	37.5	Poonch	Likely to be awarded by Nov-2013,(Commissioning 57 months)
Pahalgam (3rd Unit)	1.5	Pahalgam	Commissioned in June 2013
Total	3866		
B) Chenab Valley Power Projects Joint Venture (NHPC 49%, JKSPDC 49% and PTC 2%)			
PakulDul	1020	Kishtwar	Re-tendered t (Commissioning 72months +1year)
Kiru	660	Kishtwar	Re-tendered (Commissioning 72 months +1year)
Kwar	560	Kishtwar	Re-tendered (Commissioning 72 months +1year)
Total	2240		
C) CENTRAL SECTOR (NHPC)			
Kishenganaga	330		Commissioning, 2016
Uri-II	240		Commissioning, 2013

Nimo Bazgo	45	Commissioning, 2012
Chutak	44	Commissioning, 2012
Total	659	
IPP MODE		
Ratle	850	Allotted to IPP GVK. Scheduled commissioning 2017
Small Projects under execution	93	Total 8 Nos
Bids opened for small projects in 09/2012	131	Total 5 Nos
RFP for small projects to be received on 15/10/2012	114	Total 13 nos
Total	1188	
Grand Total	7953.00 MW	

4.3 - GENERATION IN LADAKH, GUREZ, MACHAL & KARAN (Owned by JKPDD)							
S.No	Diesel Generator Station	2011-12		2012-13		2013-14	
		Installed Capacity (MW)	Energy Generated (MU)	Installed Capacity (MW)	Energy Generated (MU)	Installed Capacity (MW)	Energy Generated (MU)
a	Ladakh	30.25	23.76	30.38	16.08	30.404	12.25
b	Gurez	2.39		2.402		2.738	
c	Machal	0.26		0.26		0.26	
d	Karan	0.26		0.26		0.26	
Total		33.15	23.76	33.302	16.08	33.662	12.25

4.4 - LIST OF THE DG SETS WITH INSTALLED CAPACITIES IN LEH DISTRICT

AS ON 31-03-2014

S #	Name of the D.G station/Location	No. of Units (Nos.)	Capacity of each Unit (KVA)	Total Installed Capacity (KVA)
1	4.5 MVA Choglamsar	3	1500	4500
	Aux DG at P/H II	1	40	40
2	4 MW Choglamsar	5	750	3750
		3	1500	4500
	Aux DG at 4.5 MVA	1	40	40
3	1 MW Leh	2	750	1500
4	Nyoma	1	160	160
5	Tangtse	1	250	250
6	Chumathang	1	160	160
7	Kungjam	1	160	160
8	Hemis	1	75	75
9	Anlay	1	160	160
10	Rongo	1	75	75
11	Tsaga	1	75	75
12	Korzok	1	82.5	82.5
13	Kharu	1	750	750
14	Puga	1	40	40
15	Chushul	1	160	160
16	Phobrang	1	30	30
17	Saspol	1	160	160
18	Temisgam	1	160	160
19	Alchi	1	160	160
20	Tia	1	160	160
21	Khaltsi	1	250	250
22	Lamayuru	1	160	160
23	Domkhar	1	160	160
24	Skurbuchan	1	250	250
25	Hemis-shukpachan	1	160	160
26	Achinathang	1	200	200
27	Wanla	1	320	320
28	Manque	1	100	100

29	Sku Kaya	1	30	30
30	Rumbak	1	10	10
31	Hanu	1	125	125
32	Bema	1	75	75
33	Nemo	1	750	750
34	Kanji	1	100	100
35	Deskrit-I	1	750	750
36	Deskrit-II	1	250	250
37	Deskrit-III	1	160	160
38	Turtuk	1	125	125
39	Panamok	1	160	160
40	Bogdang	1	75	75
41	Chamshain	1	75	75
42	Tigger	1	320	320
43	Tyakshi	1	160	160
44	Charasa	1	30	30
45	Kuri	1	30	30
46	Murji	1	15	15
47	Tongsted	1	30	30
48	Nungsted	1	15	15
49	Khemi	1	15	15
50	Gonbo	1	12.5	12.5
51	Burma	1	15	15
52	Chulungkha	1	35	35
53	Hundri	1	35	35
54	Udmaroo	1	30	30
55	Tangyar	1	35	35
56	Khalsar	1	25	25
57	Khardong	1	125	125
58	Waris	1	15	15
59	Tsati	1	30	30
60	Khema	1	30	30
61	Garari	1	5	5
Total				22440

**4.5 - LIST OF THE DG SETS WITH INSTALLED CAPACITIES IN KARGIL DISTRICT
AS ON 31-03-2014**

S.N o.	Name of the D.G station/Location	No.of Units(Nos.)	Capacity of each Unit (KVA)	Total Installed Capacity (KVA)
1	New DG Stn. Khurbathang	2	750	1500
	New DG Stn. Khurbathang	3	1500	4500
	Auxillary	1	40	40
2	Mulbeck	1	250	250
3	Sharqole	1	320	320
4	Khangral	1	320	320
5	Haniskot	1	75	75
6	Chiktan	1	160	160
7	Hagnis	1	250	250
8	Shakar	1	320	320
9	Y-Kharboo	1	75	75
10	Sanjak	1	75	75
11	Garkone	1	75	75
12	Batalik I & II	1	160	160
		1	75	75
13	Silmoo	1	200	200
14	Paduk I & II	1	250	250
		1	250	250
15	Junkhore	1	160	160
16	Sani	1	160	160
17	Karsha	1	320	320
18	Parkachik	1	160	160
19	Panikhar	1	250	250
20	Nam-Suru	1	250	250
21	Purtikchey	1	160	160
22	Sangrah	1	250	250
23	Sankoo I & II	1	320	320
		1	250	250
24	Lankarchey	1	320	320
25	Stakpa	1	160	160
26	Saliskote	1	250	250

27	Trespone I & II	1	250	250
		1	250	250
28	Drass I, II , III , IV	1	250	250
		1	320	320
		1	250	250
		1	250	250
29	Thasgam	1	160	160
	Pandrass	1	75	75
	Matayeen	1	75	75
	Tambis	1	320	320
30	Barsoo	1	160	160
31	Phev	1	320	320
32	Kharboo	1	200	200
33	Khar chey Khar	1	200	200
34	Zanqla	1	200	200
35	Abran	1	380	380
Total		50		15565

**4.6 - LIST OF THE DG SETS WITH INSTALLED CAPACITIES IN GUREZ, MACHAIL AND KERAN
(AS ON 31-03-2014)**

S.No	Name of the D.G station/Location	No. of Units (Nos.)	Capacity of each Unit (KVA)	Total Installed Capacity (KVA)
A Gurez				
1	Kanzalwan	1	320	320
2	Dawar	1+1	250+320	570
3	Wanpora	1	250	250
4	Tarbal	1	100	100
5	Bagtoor	1	100	100
6	Nayal	1	75	75
7	Achoora	1	82.5	82.5
8	Churwan	1	200	200
9	Burnai	1	82.5	82.5
10	Bodugam	1	200	200
11	Gujran	1	75	75
12	Zedgay	1	25	25
13	Koraqbal	1	62.5	62.5
14	Khprihaijin	1	20	20
15	Hassangam	1	100	100
16	Purana Tulal/Sheikhpora	1	320	320
17	Buglender	1	320	320
18	Neeru	1	100	100
19	Baduaab	1	100	100
20	T.Kilshay	1	160	Expected to be commissioned on 8/2014
21	Abdullain	1	160	Expected to be commissioned on 8/2014
Total				3422.5
B Machil				
	Machil	1	320	320
C Keran				
	Keran	1	320	320
Toal				4062.5

4.7 Entitlement from CPSUs and Other External Sources

Jammu and Kashmir Share in CPSUs and Joint Ventures (JVs) as on 9-12-2014

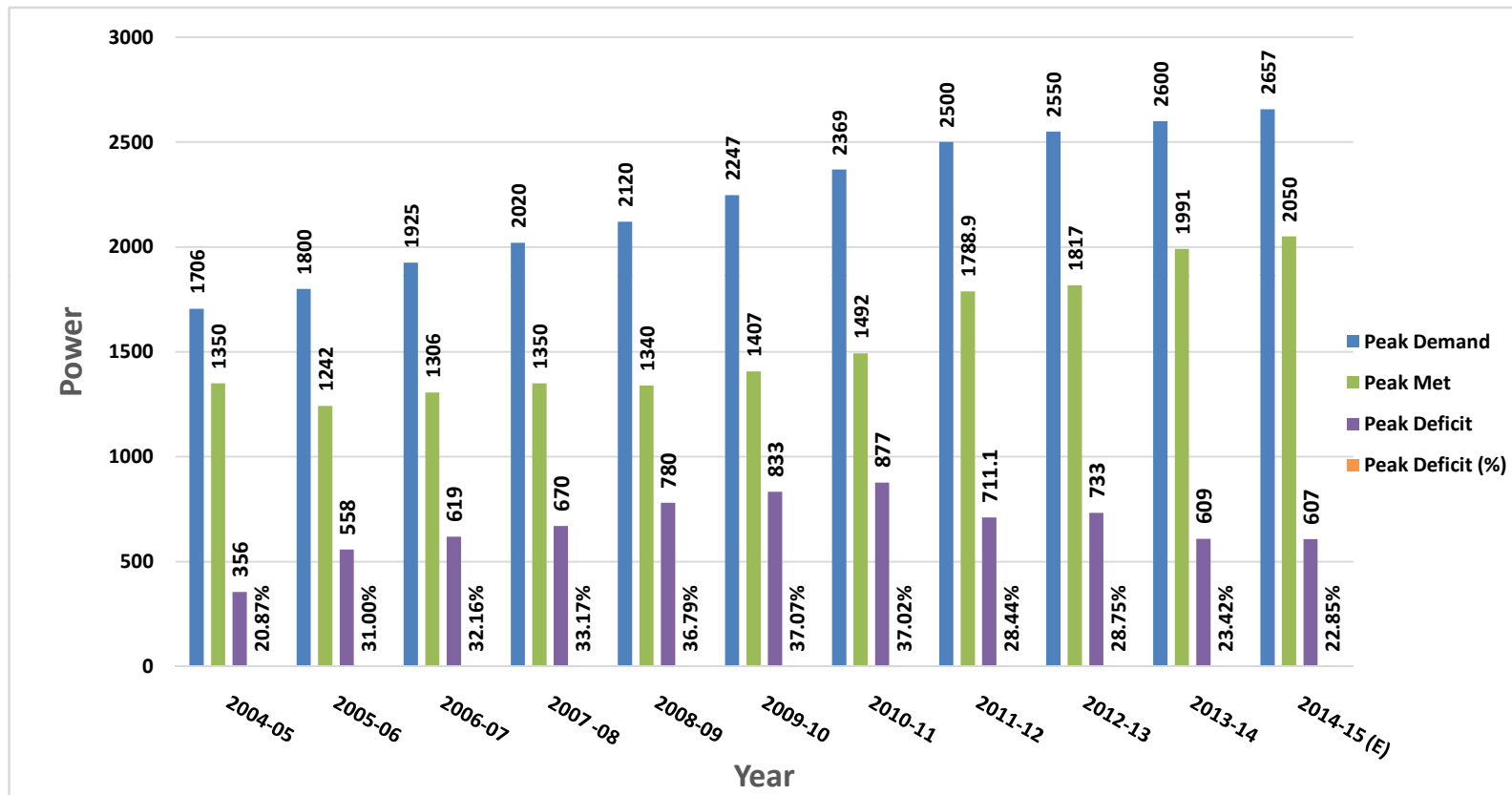
S.No.	Name of Power Plant	Installed Capacity (MW)	%age share for J&K	Share in MWs	%age Share in MWs	Share in MWs	Total Share
1	2	3	Firm		Non-Firm		
	<u>NTPC</u>						
1	Anta	419	6.92	29	3.43	14	43
2	Auraiya	663	6.64	44	2.38	16	60
3	Dadri (G)	830	6.75	56	1.6	13	69
4	Dadri stage-II	980	0	0	1.46	14	14
5	Unchahar-1	420	3.33	14	0.5	2	16
6	Unchahar-2	420	7.14	30	1.57	7	37
7	Unchahar-3	210	6.19	13	1.55	3	16
8	Rihand-1	1000	7	70	1.3	13	83
9	Rihand-2	1000	9.4	94	1.41	14	108
10	Rihand-3	1000	6.56	66	1.58	16	82
11	Singrouli	2000	0	0	1.31	26	26
12	Jhajjar	1500	0	0	1.74	26	26
13	Koteshwar	400	4.52	18	2.26	9	27
	Sub-Total	10842	64.45	434	22.09	173	607
	<u>NPC</u>						
1	NAPP	440	7.5	33	3.33	15	48
2	RAPP-B3-B4	440	7.95	35	0	0	35
3	RAPP-C	440	0	0	12.74	56	56
	Sub total		15.45	68	16.07	71	139
	<u>NHPC</u>						
1	Salal	690	34.39	237	0	0	237
2	Tanakpur	94	7.68	7	0	0	7
3	Chamera I	540	3.9	21	0	0	21
4	Chamera II	300	6.33	19	4.11	12	31
5	Chamera III	231	6.9	16	3.42	8	24
6	Uri-I	480	33.9	163	0	0	163

7	Uri-Ii	240	20.33	49	15	36	85
8	Dhaulinganga	280	6.07	17	3.42	10	27
9	Dul hasti	390	21.15	82	3.42	13	95
10	Sewa-2	120	19.17	23	3.42	4	27
11	PARBATI-III	520	6.9	36	3.42	18	54
	Sub total		166.72	670	36.21	101	771
D- Eastern Region							
1	FAKKA	1600	0.85	14	0	0	14
2	KHLGN-I	840	3.68	31	0	0	31
3	KHLGN-II	1500	2.87	43	2.69	40	83
4	TECHR	1000	0	0	0	0	0
5	MEJIA-6	250	0	0	0	0	0
	Sub total	5190	7.4	88	2.69	40	128
	TEHRI	1000	4.8	48	2.26	23	71
	Tala	1020	0	0	1.77	18	18
	Sub total	2020	4.8	48	4.03	41	89
SJVNNL							
	N-JHAKHARI	1500	7	105	2.27	34	139
	RAMPUR	343	7.12	24	2.09	7	31
	Sub total	1843	14.12	129	4.36	41	170
Additional Power Allocated by Hon'ble PM w.e.f 9-07-2013.							
1	KAPP	440	0	0	0.89	3.92	3.92
2	KORBA	2100	0	0	1.02	21.46	21.46
3	KORBA-3	500	0	0	1.58	7.91	7.91
4	MOUDAI-I	500	0	0	1.58	7.91	7.91
5	SIPAT-I	1980	0	0	1.58	31.33	31.33
6	SIPAT-II	1000	0	0	1.31	13.11	13.11
7	TAPP-3&4	1080	0	0	1.33	14.34	14.34
8	VINDRACHAL-1	1260	0	0	1.27	16.05	16.05
9	VINDRACHAL-2	1000	0	0	1.29	12.95	12.95
10	VINDRACHAL-3	1000	0	0	1.31	13.11	13.11
11	VINDRACHAL-4	500	0	0	1.58	7.91	7.91
	Sub total	11360	0	0	14.74	150	150
	G.Total	31255	272.94	1437	100.19	617	2054

4.8 - Demand And Availability Scenario Peak (POWER)

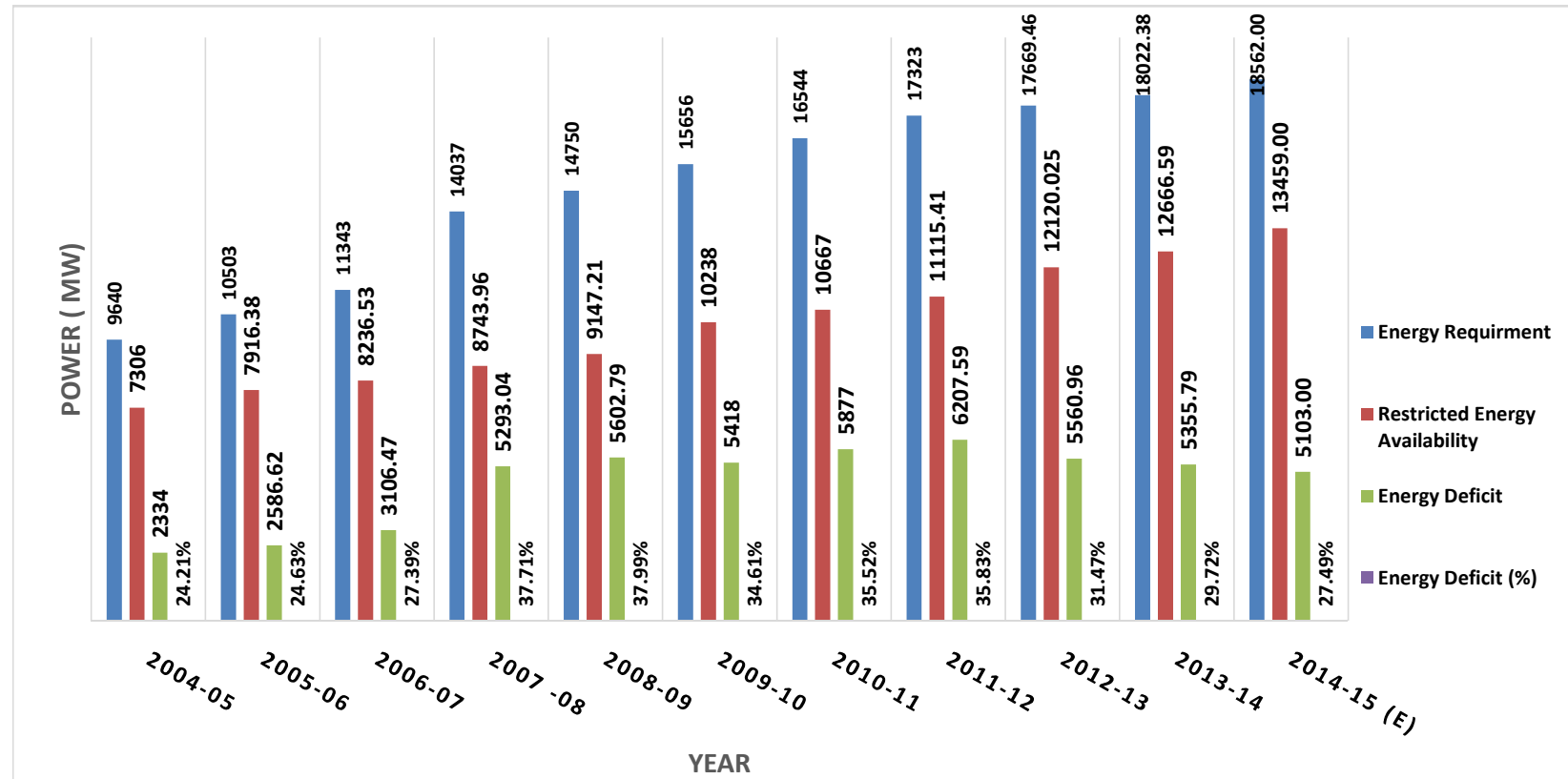
(MW)

Year	2004-05	2005-06	2006-07	2007 -08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15 (E)
Peak Demand	1706	1800	1925	2020	2120	2247	2369	2500	2550	2600	2657
Peak Met	1350	1242	1306	1350	1340	1407	1492	1788.9	1817	1991	2050
Peak Deficit	356	558	619	670	780	833	877	711.1	733	609	607
Peak Deficit (%)	20.87%	31.00%	32.16%	33.17%	36.79%	37.07%	37.02%	28.44%	28.75%	23.42%	22.85%



4.9- Demand And Availability Scenario (ENERGY)

YEAR	2004-05	2005-06	2006-07	2007 -08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15 (E)
Energy Requirement	9640	10503	11343	14037	14750	15656	16544	17323	17669.46	18022.38	18562.00
Restricted Energy Availability	7306	7916.38	8236.53	8743.96	9147.21	10238	10667	11115.41	12120.03	12666.59	13459.00
Energy Deficit	2334	2586.62	3106.47	5293.04	5602.79	5418	5877	6207.59	5560.96	5355.79	5103.00
Energy Deficit (%)	24.21%	24.63%	27.39%	37.71%	37.99%	34.61%	35.52%	35.83%	31.47%	29.72%	27.49%



4.10-Seasonal Power Deficit (Minimum-Maximum) (MWs)

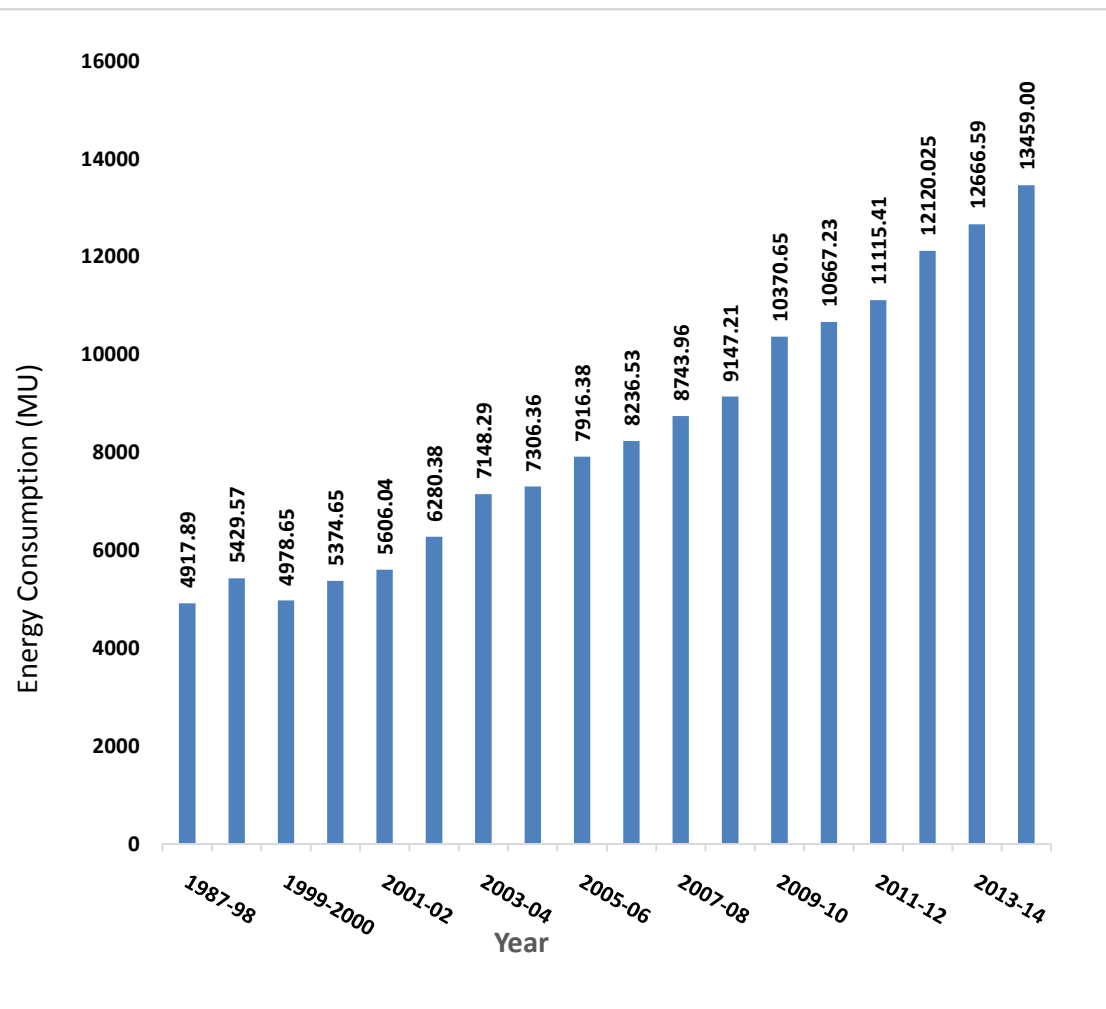
S.No.	Particular	Year 2012-13(A)		Year 20 13-14(A)		Year 2014-15(E)	
		Summer	Winter	Summer	Winter	Summer	Winter
I.	Unrestricted Demand	2400	2550	2500	2600	2500	2650
II.	Restricted Demand	1712	1817	1819	1991	1950	2200
III.	<u>Power Availability</u>						
	(i) Self Generated	250-425	100-350	250-425	100-350	250-425	100-350
	(ii) CPSUs	850-1350	750-1250	875-1030	1004-1455	900-1200	1100-1650
	Total (i+ii)	1100-1775	850-1600	1125-1455	1104-1805	1150-1625	1200-2000
IV.	Deficit(-)	+63 to-612	-217 to-967	-364 to -694	-186 to-887	-325 to -800	-200 to -1000

*Summer = 8 hours curtailment

Winter = 10 hours curtailment

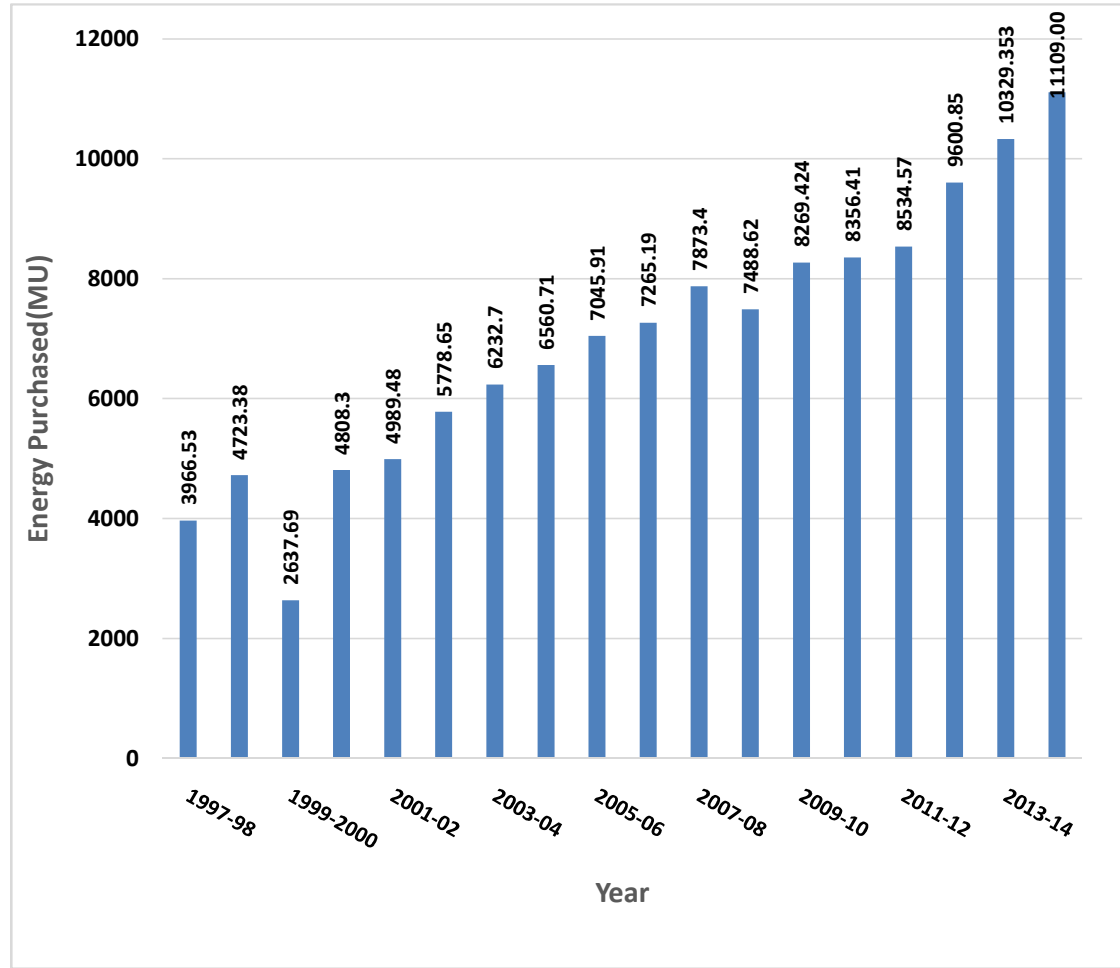
4.11 - Year-wise Statement of Energy Consumption

S.No	Year	Energy Purchased (MU)
1	1987-98	4917.89
2	1998-99	5429.57
3	1999-2000	4978.65
4	2000-01	5374.65
5	2001-02	5606.04
6	2002-03	6280.38
7	2003-04	7148.29
8	2004-05	7306.36
9	2005-06	7916.38
10	2006-07	8236.53
11	2007-08	8743.96
12	2008-09	9147.21
13	2009-10	10370.65
14	2010-11	10667.23
15	2011-12	11115.41
16	2012-13	12120.025
17	2013-14	12666.59
18	2014-15 (E)	13459.00



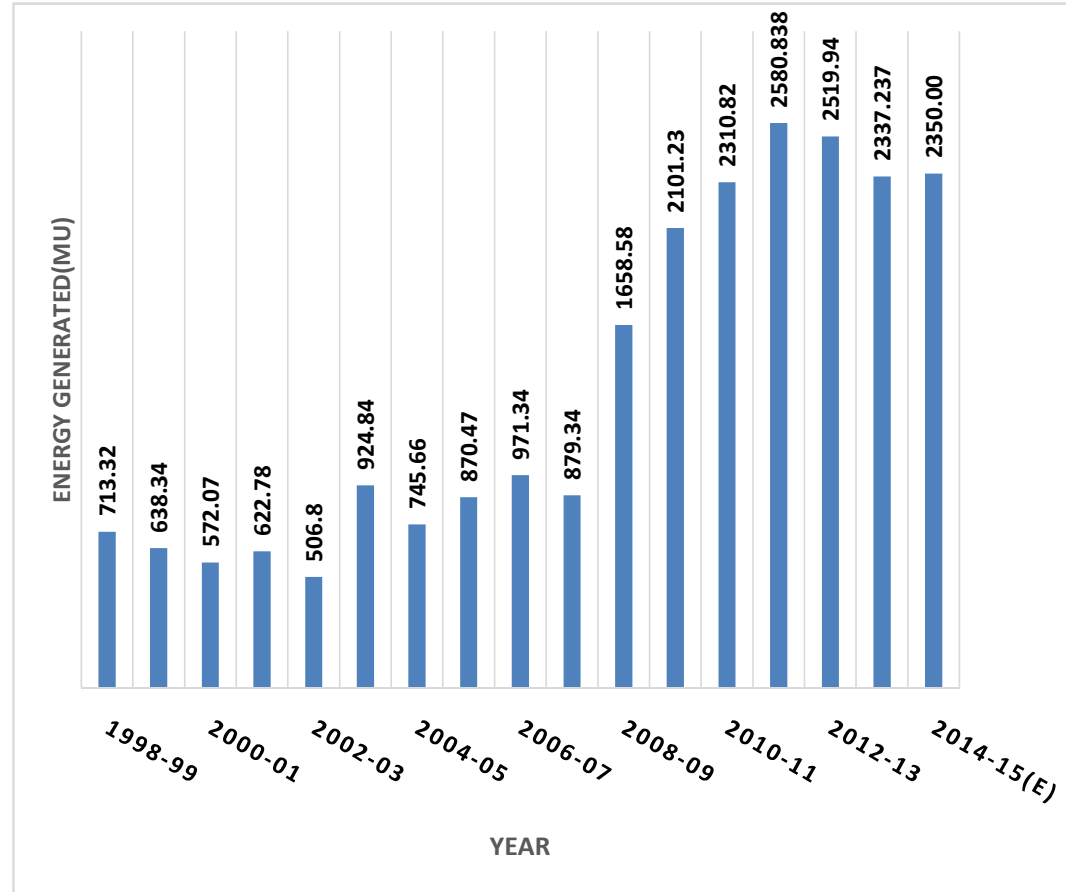
4.12 -Year-wise Statement of Energy Purchased from Northern Grid

S.No	Year	Energy Purchased (MU)
1	1997-98	3966.53
2	1998-99	4723.38
3	1999-2000	2637.69
4	2000-01	4808.3
5	2001-02	4989.48
6	2002-03	5778.65
7	2003-04	6232.7
8	2004-05	6560.71
9	2005-06	7045.91
10	2006-07	7265.19
11	2007-08	7873.4
12	2008-09	7488.62
13	2009-10	8269.424
14	2010-11	8356.41
15	2011-12	8534.57
16	2012-13	9600.85
17	2013-14	10329.353
18	2014-15 (E)	11109.00



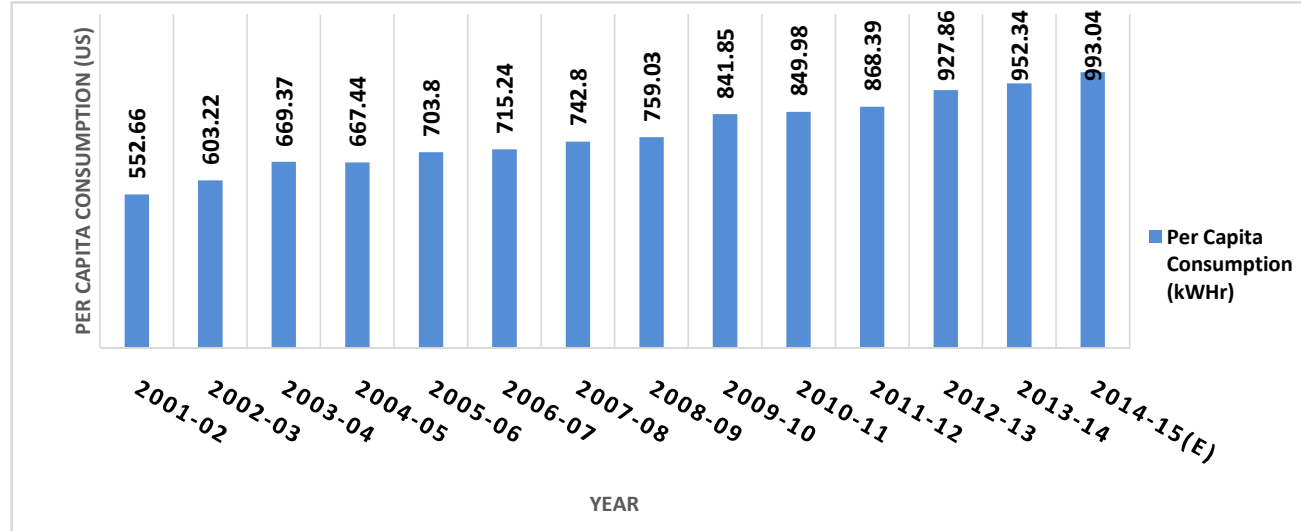
4.13 -Year Wise Statement of Self-Generated Energy of State Available to PDD

S.No	Year	Energy (MU)
1	1998-99	713.32
2	1999-2000	638.34
3	2000-01	572.07
4	2001-02	622.78
5	2002-03	506.8
6	2003-04	924.84
7	2004-05	745.66
8	2005-06	870.47
9	2006-07	971.34
10	2007-08	879.34
11	2008-09	1658.58
12	2009-10	2101.23
13	2010-11	2310.82
14	2011-12	2580.838
15	2012-13	2519.94
16	2013-14	2337.237
17	2014-15(E)	2350.00



4.14 - Gross Per Capita Power Consumption of Jammu & Kashmir State

S.No	Year	Consumption (MU)	Population (Million)	Per Capita Consumption (kWhr)
1	2001-02	5606.04	10.14	552.66
2	2002-03	6280.38	10.41	603.22
3	2003-04	7148.29	10.68	669.37
4	2004-05	7306.36	10.95	667.44
5	2005-06	7916.38	11.25	703.8
6	2006-07	8236.53	11.52	715.24
7	2007-08	8752.75	11.78	742.8
8	2008-09	9147.217	12.05	759.03
9	2009-10	10370.65	12.32	841.85
10	2010-11	10667.23	12.55	849.98
11	2011-12	11115.41	12.8	868.39
12	2012-13	12120.025	13.05	927.86
13	2013-14	12666.59	13.30	952.34
14	2014-15(E)	13459.00	13.55	993.04



4.15 -Calculation of Gap between Average Cost of Supply(ACS) and Average Revenue Realized (ARR) and AT&C Losses

S.N O	ITEM	Unit	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15 (E)
1	Self-Generation in State	MU	924.84	745.66	870.47	971.34	870.56	1649.1	2101.2	2310.8	2580.8	2519.94	2337.237	2350.00
2	Import from CPSUs	MU	6232.7	6560.7	7045.9	7265.2	7873.4	7776.5	8269.4	8356.4	8534.6	9600.085	10329.35	11109.00
3	Total Energy (1+2)	MU	7157.5	7306.4	7916.4	8236.5	8744	9425.6	10371	10667	11115	12120.03	12666.59	13459.00
4	Billed Energy	MU	3718.8	3856	4188.6	4030.8	3331.6	3478	3833	4041.1	4267	5163.02	5754.354	6372.00
5	Billing Efficiency (4/3x100)		51.96	52.78	52.91	48.94	38.1	36.9	36.96	37.88	38.39	42.64	45.43	47.34
6	Energy Costs													
7	i. Power Purchased from CPSUs incl U.I &RE	Cr.	1343.2	1339.6	1671.5	1415.5	1744.3	1459.5	1996.7	2157.6	3051	3489.75	3989.207	4320.31
8	ii. Power Purchased from State	Cr.	107.72	103.88	124.76	129.86	81.43	324.18	546.7	639.53	710.75	592.233	482.457	522.50
9	Total Power Purchase Cost (6+7)	Cr.	1450.9	1443.5	1796.3	1545.3	1825.8	1783.7	2543.4	2797.2	3761.8	4081.983	4471.664	4842.81
10	i. O&M	Cr.	26.27	32.43	28.28	28.78	41.27	43.34	55.35	48.72	58.96	55.32	46.36	53.47
11	ii. Establishment	Cr.	115.07	155.59	123.93	211.52	288.95	237.58	339.04	410.82	536.39	515.98	459.58	502.77
12	iii. Depreciation	Cr.	49.1	55.1	57.15	58.52	62.58	68.94	82.73	87.85	105.14	179.6	143.49	202.2
13	iv. Intrest	Cr.	22	32.89	22.67	21.46	16.97	14.37	14.97	11.2	15.76	25.88	16.14	18.16
14	Total Cost of Supply(9+10+11+12+13)	Cr.	1663.3	1719.5	2028.3	1865.6	2235.5	2147.9	3035.5	3355.8	4478	4858.763	5137.234	5619.37
15	Cost of Supply* (After losses i,e on billed energy) (14/4)	Paisa/ U	474.05	447.27	445.93	484.25	462.83	671.01	606.97	791.94	830.41	941.07	892.8	881.9
16	Average Cost of Supply** (Before Losses i,e on input energy) ACS (14/3) *100	Paisa/ Unit	250.85	232.39	235.34	256.22	226.5	255.67	235.06	292.7	314.59	400.89	405.57	417.52
17	Pure Revenue Billed or Assessed (Gross)	Cr.	446.44	549	543.7	590.59	592.53	816.24	829.5	928	1180.7	1682.44	1757.17	1845.03
18	Average Revenue Realised (ARR) (17/3)	Paisa/ U	71	77	74	74	72	971	90.99	89.48	110.68	138.8149	138.72	137.09

19	Gap between ACS and ARR (16-18)	Paisa/Unit	179.82	155.68	161.1	181.79	154.44	158.59	144.07	203.22	203.9	262.0723	266.85	280.43
20	Revenue Realised (without ED)	Cr.	293.65	308.67	341.47	371.54	393.41	591.97	628	702.3	802.82	1419.29	1667.404	1777.41
21	Average Tariff	Rs./Unit	1.34	1.41	1.41	1.41	1.47	2.45	2.385	2.42	2.53	3.86	3.56	3.34
22	Collection Efficiency (20/17*100)	%	65.78	56.22	62.95	63.06	66.28	69.74	75.71	75.68	68	84.36	94.05	96.34
23	Energy Realised (4x22)/100	MU	2191.4	2189.2	2421.8	2635	2676.3	2416.2	2633.1	2902.1	3173.2	4355.473	5412.20	6138.47
24	T&D Losses ((3-4)/3*100)	%	47.08	48.04	47.22	47.09	51.06	61.9	63.1	63.04	61.612	57.40	54.57	52.66
25	AT&C Losses	%	65.14	69.41	66.85	66.71	67.51	72.37	72.06	72.794	71.452	64.06	57.27	54.39

4.16 -BIFURCATION OF LOSSES FOR 2013-14

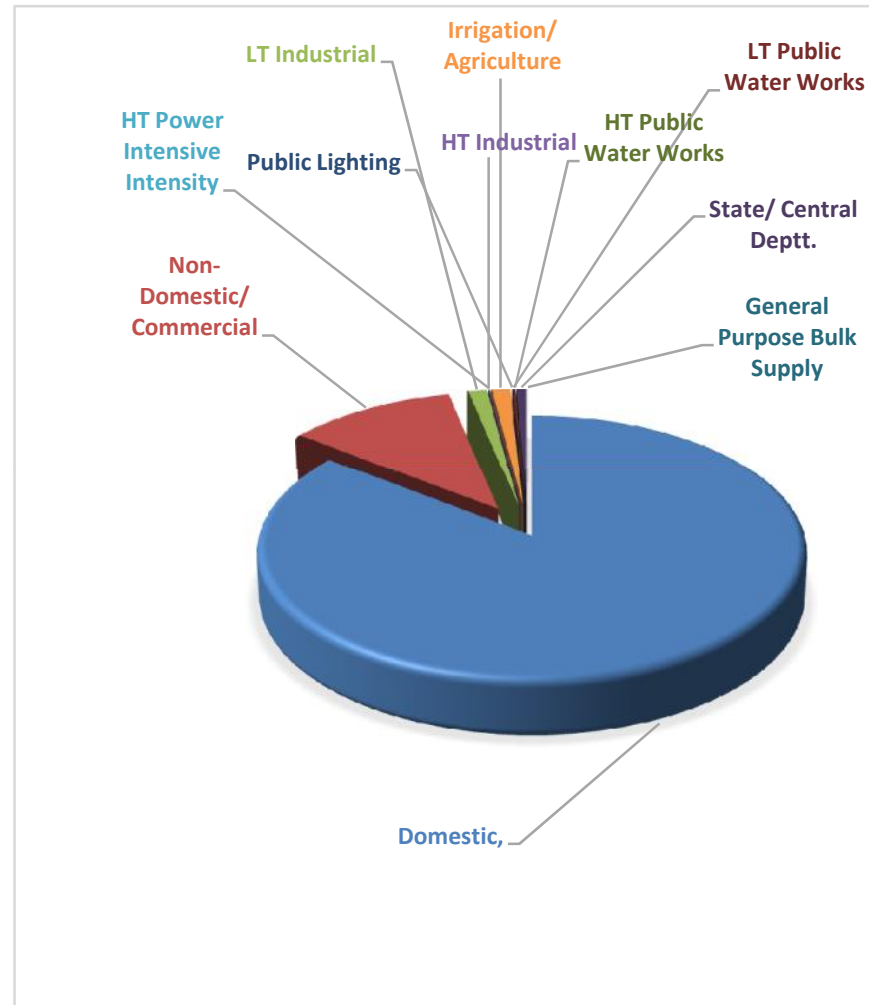
S#	Parameters	Unit	
A	ENERGY PURCHASED FROM CPSUs	MU	10329.353
B	SELF GENERATION OF THE STATE	MU	2337.237
C	TOTAL ENERGY INPUT(A+B)	MU	12666.59
D	INTER STATE TRANSMISSION LOSSES i.e. POOL LOSSES (@ 3.6 % OF A)	MU	371.86
E	NET ENERGY INPUT TO THE STATE (C-D)	MU	12294.73
F	INTRA STATE TRANSMISSION LOSSES i.e. LOSSES AT 200/132 kV LEVEL	MU	568.2
G	TOTAL TRANSMISSION LOSSES (D+F)	MU	940.06
	TOTAL Tr. LOSS	%	7.42
H	ENERGY AVAILABLE FOR DISTRIBUTION AT 33 kV LEVEL (C-G)	MU	11726.53
I	ENERGY BILLED(I)	MU	5754.354
J	DISTRIBUTION LOSSES (H-I)	MU	5972.18
K	DISTRIBUTION LOSSES % of energy w.r.t energy available to distribution J/CX100	= %	50.93
L	DISTRIBUTION LOSSES % of energy with w.r.t input Energy=(C-I)/C*100	%	47.15

Chapter 5

5.1- Electricity Consumers, Connected Load and Revenue Realization.

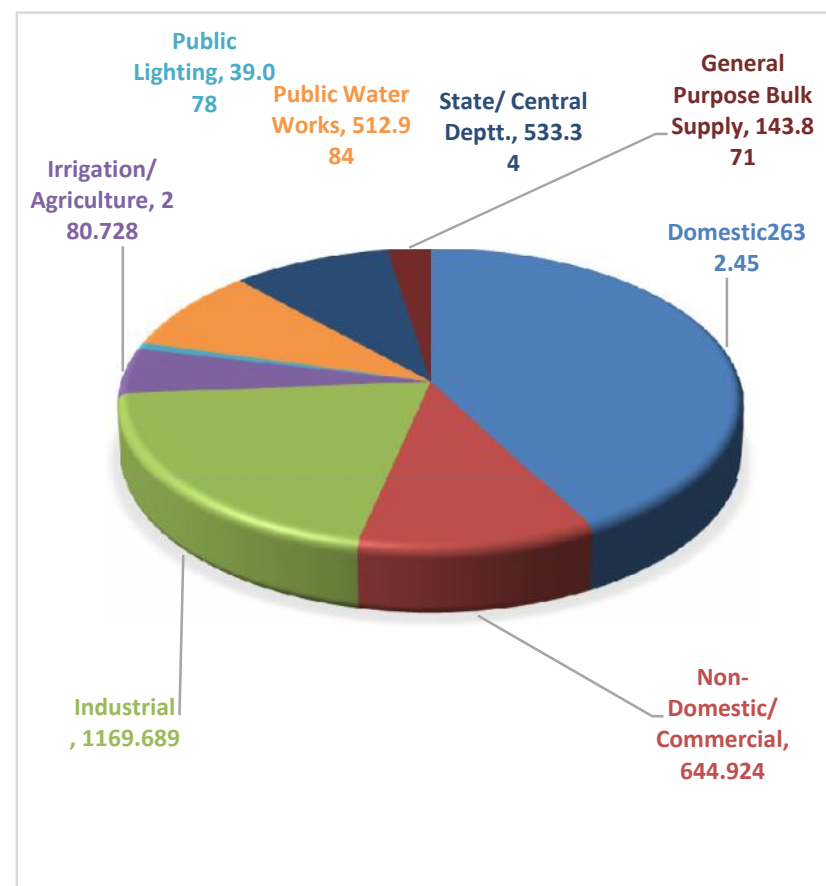
Statement Showing Category Wise Number of Consumers as on 31-03-2014

S.No	Category	Jammu (No.)	Kashmir (No.)	Ladakh (No.)	Total (No.)
1	Domestic	631900	680685	33436	1346021
2	Non- Domestic/ Commercial	87426	83725	3353	174504
3	LT Industrial	9184	10016	168	19368
4	HT Industrial	563	145	0	708
5	HT Power Intensive Intensity	13	0	0	13
6	Irrigation/ Agriculture	18373	504	0	18877
7	Public Lighting	184	75	0	259
8	LT Public Water Works	1646	542	1	2189
9	HT Public Water Works	28	110	4	142
10	State/ Central Deptt.	5708	4416	472	10596
11	General Purpose Bulk Supply	92	46	0	138
	Total	755117	780264	37434	1572815



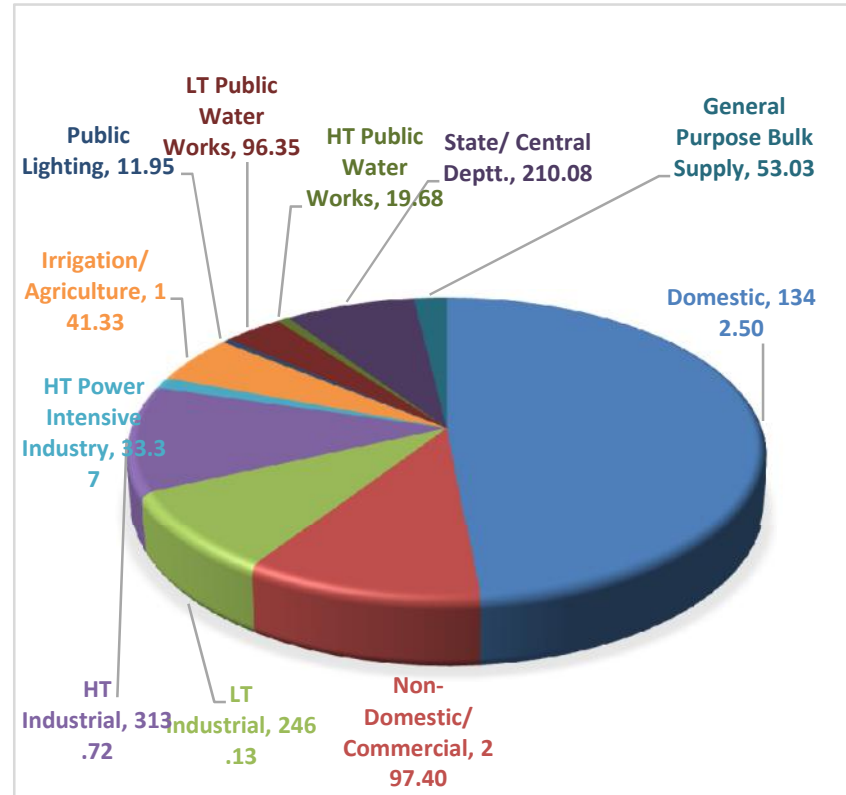
5.2- Energy Consumption (Billed) for 2013-14

S.No	Category	Jammu (MU)	Kashmir (MU)	Ladakh (MU)	Total
1	Domestic	913.46	1477.26	39.02	2429.74
2	Non- Domestic/ Commercial	344.867	292.727	7.33	644.924
3	Industrial	890.007	277.862	1.82	1169.69
4	Irrigation/ Agriculture	201.037	79.691	0	280.728
5	Public Lighting	34.011	5.067	0	39.078
6	Public Water Works	424.351	85.503	3.13	512.984
7	State/ Central Deptt.	346.61	180.8	5.93	533.34
8	General Purpose Bulk Supply	111.394	32.477	0	143.871
Total		3265.74	2431.39	57.23	5754.35



5.3 - Statement Showing Category Wise Connected Load (MW) as on 31-03-2014

S.No	Category	Jammu	Kashmir	Ladakh	Total
1	Domestic	758.37	572.58	11.55	1342.50
2	Non- Domestic/ Commercial	162.87	131.07	3.46	297.40
3	LT Industrial	152.58	92.89	0.67	246.13
4	HT Industrial	253.51	60.22	0.00	313.72
5	HT Power Intensive Industry	33.37	0.00	0.00	33.37
6	Irrigation/ Agriculture	97.03	44.30	0.00	141.33
7	Public Lighting	9.29	2.66	0.00	11.95
8	LT Public Water Works	72.94	23.36	0.05	96.35
9	HT Public Water Works	7.84	9.60	2.24	19.68
10	State/ Central Deptt.	115.86	92.98	1.23	210.08
11	General Purpose Bulk Supply	37.26	15.77	0.00	53.03
Total		1700.91	1045.44	19.19	2765.54

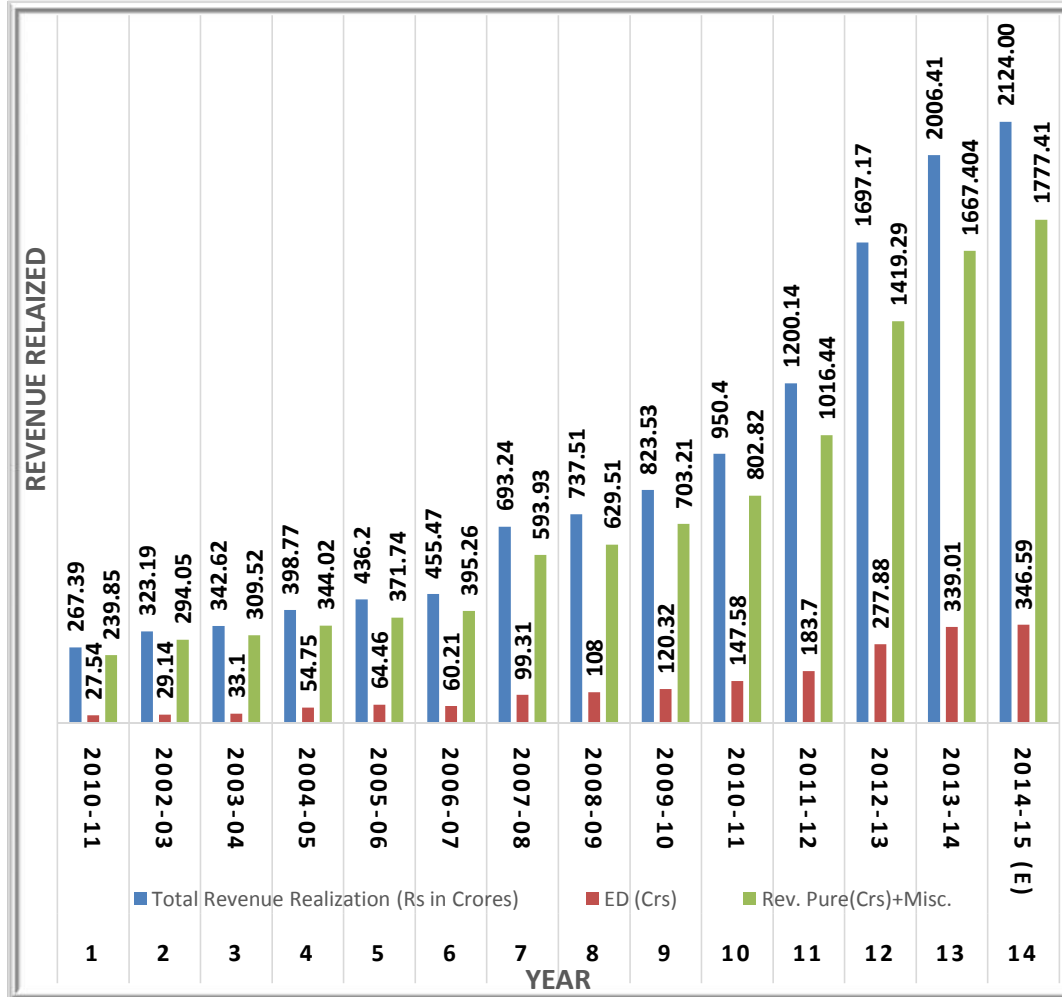


5.4 - Metering Status as on 31-03-2014

Description	Jammu	Kashmir	Ladakh	Total
Total Consumers	755117	780264	37434	1572815
Electronic Meters	424353	313224	12731	750308
Percentage Electronic Metering	56.20	40.14	34.01	47.70
Electromechanical Meters	60872	0	0	60872
Percentage Electromechanical Metering	8.06	0.00	0.00	3.87
Total meters	485225	313224	12731	811180
Total Percentage Metering	64.26	40.14	34.01	51.58

5.5-Statement showing year wise Revenue Realization(J&K)

	Year	Total Revenue Realization (Rs in Crores)	ED (Crs)	Rev. Pure(Crs) +Misc.
1	2010-11	267.39	27.54	239.85
2	2002-03	323.19	29.14	294.05
3	2003-04	342.62	33.1	309.52
4	2004-05	398.77	54.75	344.02
5	2005-06	436.2	64.46	371.74
6	2006-07	455.47	60.21	395.26
7	2007-08	693.24	99.31	593.93
8	2008-09	737.51	108	629.51
9	2009-10	823.53	120.32	703.21
10	2010-11	950.4	147.58	802.82
11	2011-12	1200.14	183.7	1016.44
12	2012-13	1697.17	277.88	1419.29
13	2013-14	2006.41	339.01	1667.404
14	2014-15 (E)	2124.00	346.59	1777.41



**5.6-Category-wise Revenue Realized for the year 2010-11 to 2013-14 in respect of
Elect. Maintt. & RE Wings.**

S.No	Category of Consumers	2011-12			2012-13			2013-14		
		Pure Revenue	Electricity Duty	Total	Pure Revenue	Electricity Duty	Total	Pure Revenue	Electricity Duty	Total
1.	Domestic	245.21	52.56	297.77	325.55	73.75	399.3	405.97	89.25	495.23
2.	N. Domestic/ Commercial	104.75	22.61	127.36	144.39	32.6	176.99	177.71	39.07	216.78
3.	Irri/Agriculture	35.24	7.89	43.13	56.08	9.04	65.12	45.04	9.78	54.82
4.	State/Central	237.9	14.13	252.03	409.25	54.45	463.7	524.94	88.63	613.57
5.	Public Lighting	0.06	0.01	0.07	0.19	0.04	0.23	0.17	0.03	0.20
6.	L.T Industrial	45.04	9.71	54.75	55.85	12.76	68.61	57.62	12.66	70.28
7.	H.T Industrial	167.02	27.42	194.44	209.95	47.07	257.03	242.02	53.13	295.15
8.	Power Intensive Industries	30.18	9.73	39.91	34.13	7.59	41.72	41.48	9.11	50.59
9.	L. T Public Water Works	92.36	19.05	111.41	108.3	24.17	132.47	93.09	20.44	113.53
10.	H. T Public Water Works	19.93	12.53	32.46	27.43	6.28	33.71	22.76	5.15	27.91
11.	Gen. Purpose Bulk Supply	36.53	8.07	44.6	44.51	10.13	54.64	51.57	11.76	63.33
	Total	1014.22	183.71	1197.93	1415.63	277.88	1693.51	1662.38	339.01	2001.38
	Rev. Misc.			2.29			3.66			5.03
	Grand Total			1200.22			1697.17			2006.41

5.7- Category-wise Revenue Realized for the year 2011-12 to 2013-14 of M&RE Wing Jammu

(Amount--Crores)

S.No.	Category of Consumers	2011-12			2012-13			2013-14		
		Pure Revenue	Electricity Duty	Total:	Pure Revenue	Electricity Duty	Total	Pure Revenue	Electricity Duty	Total
1.	Domestic	92.71	20.54	113.25	126.74	28.2	154.94	162.01	35.56	197.57
2.	N. Domestic/ Commercial	53.42	11.83	65.25	73.37	16.32	89.69	91.98	20.19	112.17
3.	Irri/Agriculture	22.18	4.91	27.09	24.25	5.39	29.64	25.8	5.56	31.36
4.	State/Central	147.46	5.06	152.52	262.51	33.07	295.58	310.8	53.29	364.09
5.	Public Lighting	0.06	0.01	0.07	0.19	0.04	0.23	0.11	0.02	0.13
6.	L.T Industrial	31.47	6.97	38.44	39.17	8.72	47.89	40.17	8.82	48.99
7.	H.T Industrial	123.83	27.42	151.25	156.02	34.71	190.73	178.25	39.13	217.38
8.	Power Intensive Industries	30.18	6.69	36.87	34.13	7.59	41.72	41.48	9.11	50.59
9.	L. T Public Water Works	77.89	17.25	95.14	80.81	17.98	98.79	79.97	17.56	97.53
10.	H. T Public Water Works	11.77	2.61	14.38	10.94	2.44	13.38	12.14	2.66	14.8
11.	Gen. Purpose Bulk Supply	21.44	4.75	26.19	33.61	7.48	41.09	36.91	8.10	45.01
		612.41	108.04	720.45	841.74	161.94	1003.68	979.62	200.00	1179.62
	Rev.Misc.				1.61		1.61			0.9
	G.T						1005.29			1180.52

5.8 Category-wise Revenue Realized for the year 2011-12 to 2013-14 of M&RE Wing Kashmir

S.No.	Category of Consumers	2011-12			2012-13			2013-14		
		Pure Revenue	Electricity Duty	Total:	Pure Revenue	Electricity Duty	Total:	Pure Revenue	Electricity Duty	Total
1 .	Domestic	152.50	32.02	184.52	198.81	45.55	244.36	237.59	52.11	289.70
2 .	N. Domestic/ Commercial	51.33	10.78	62.11	71.02	16.28	87.30	82.42	18.09	100.51
3 .	Irrigation/Agriculture	13.06	2.74	15.80	31.83	3.65	35.49	19.24	4.22	23.46
4 .	State/Central	90.44	9.92	100.36	146.74	21.38	168.12	209.30	35.09	244.39
5 .	Public Lighting	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.01	0.07
6 .	L.T Industrial	13.57	2.98	16.55	16.68	4.04	20.72	17.26	3.79	21.05
7 .	H.T Industrial	43.19	90.70	52.26	53.94	12.36	66.30	63.77	14.00	77.77
8 .	Power Intensive Industries	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 .	L. T Public Water Works	14.47	3.04	17.51	27.49	6.19	33.68	13.12	2.88	16.00
10 .	H. T Public Water Works	8.16	1.80	9.96	16.49	3.40	20.33	10.62	2.49	13.11
11 .	Gen. Purpose Bulk Supply	15.09	3.32	18.41	10.90	2.65	13.55	14.66	3.66	18.32
	<i>Total:-</i>	401.81	75.67	477.48	573.89	115.94	689.84	668.04	136.34	804.38
	Rev. Miscl.						2.05			4.13
	Grand Total						691.89			808.51

**5.9-Category-wise Revenue Realized for the year 2013-14 in respect of Elect. Maintt. & RE Wing
Ladakh**

S.No	Category of Consumers	2013-14		
		Pure Revenue	Electricity Duty	Total
1 .	Domestic	6.3709	1.5844	7.9553
2 .	N. Domestic/ Commercial	3.3106	0.786	4.0966
3 .	Irrigation/Agriculture	0	0	0
4 .	State/Central	4.8447	0.2485	5.0932
5 .	Public Lighting	0	0	0
6 .	L.T Industrial	0.1902	0.0476	0.2378
7 .	H.T Industrial	0	0	0
8 .	Power Intensive Industries	0	0	0
9 .	L. T Public Water Works	0	0	0
10 .	H. T Public Water Works	0	0	0
11 .	Gen. Purpose Bulk Supply	0	0	0
	Total:-	14.7164	2.6665	17.3829
	Rev. Misc.			0.0271
	Grand Total			17.41

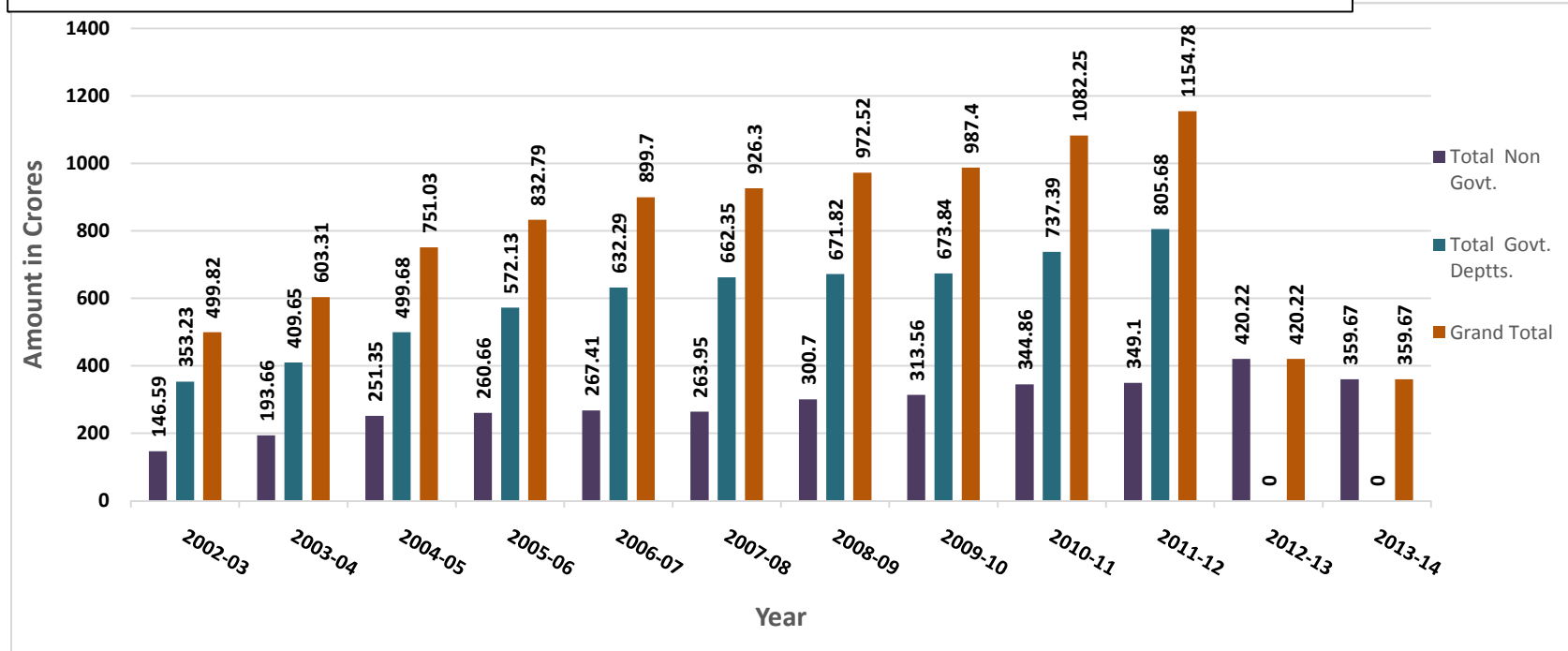
5.10 - CATEGORYWISE SUBSIDY COMPONENT FOR 2013-14

S. #	Category	Energy billed				Per unit Cost of supply (Rs)	Cost of Supply (Crs)				Tariff	Revenue Billed(Crs)				Subsidy (Crs)			
		Jammu	Kashmir	Ladakh	Total (MU)		Jammu	Kashmir	Ladakh	Total (Crs)		Jammu	Kashmir	Ladakh	Total (Crs)	Jammu	Kashmir	Ladakh	Total (Crs)
1	Domestic	913.46	1477.26	39.02	2429.74	8.93	815.50	1318.83	34.84	2169.16	1.82	166.25	268.86	7.10	442.21	649.25	1049.97	27.73	1726.95
2	Commercial	344.87	292.73	7.33	644.93	8.93	307.88	261.34	6.54	575.76	3.49	120.36	102.16	2.56	225.08	187.52	159.17	3.99	350.68
3	LT Industrial	165.66	130.60	1.82	298.08	8.93	147.89	116.59	1.62	266.11	3.05	50.53	39.83	0.56	90.91	97.37	76.76	1.07	175.20
4	HT Industrial	612.69	147.27	0.00	759.96	8.93	546.98	131.48	0.00	678.46	3.49	213.83	51.40	0.00	265.22	333.15	80.08	0.00	413.23
5	HT Power Intensive	111.66	0.00	0.00	111.66	8.93	99.69	0.00	0.00	99.69	3.80	42.43	0.00	0.00	42.43	57.26	0.00	0.00	57.26
6	Irrigation/Agr	201.04	79.69	0.00	280.73	8.93	179.48	71.14	0.00	250.62	1.68	33.77	13.39	0.00	47.16	145.70	57.76	0.00	203.46
7	Public lighting	34.01	5.07	0.00	39.08	8.93	30.36	4.53	0.00	34.89	5.00	17.01	2.54	0.00	19.54	13.36	1.99	0.00	15.35
8	LT Public Water Works	348.22	49.24	0.07	397.53	8.93	310.87	43.96	0.06	354.90	5.47	190.48	26.93	0.04	217.45		17.03	0.02	17.05
9	HT Public Water Works	76.13	36.25	3.06	115.44	8.93	67.97	32.36	2.73	103.06	4.60	35.02	16.68	1.41	53.10	32.95	15.69	1.32	49.96
10	State Central Deptt	346.61	180.80	5.93	533.34	8.93	309.44	161.41	5.29	476.14	6.07	210.39	109.75	3.60	323.74	99.05	51.66	1.69	152.41
11	General Purpose Bulk	111.39	32.47	0.00	143.86	8.93	99.45	28.99	0.00	128.44	5.12	57.03	16.62	0.00	73.66	42.41	12.36	0.00	54.78
Total		3265.74	24313.80	57.23	5754.35		29282.23	21800.97	51.09	5188.32		1137.10	648.16	15.26	1800.51	1658.01	1522.47	35.83	3216.32

5.11 - Arrears of Non Govt. and Govt. Consumers From 2002-03 to 2013-14

S.No	Year	Jammu (A)			Kashmir (B)			Ladakh (C)			Total		Grand Total
		Non Govt.	Govt. Deptts.	Total (A)	Non Govt.	Govt. Deptts.	Total (B)	Non Govt.	Govt. Deptts.	Total (A)	Non Govt.	Govt. Deptts.	
		2	3	4=2+3	5	6	7=5+6				8=2+5	9=3+6	
1	2002-03	18.54	239.76	258.3	128.05	113.47	241.52				146.59	353.23	499.82
2	2003-04	37.39	282.3	319.69	156.27	127.35	283.62				193.66	409.65	603.31
3	2004-05	81.21	311.51	392.72	170.14	188.17	358.31				251.35	499.68	751.03
4	2005-06	101.7	377.31	479.01	158.96	194.82	353.78				260.66	572.13	832.79
5	2006-07	101.72	424.46	526.18	165.69	207.83	373.52				267.41	632.29	899.7
6	2007-08	74.84	443.65	518.49	189.11	218.7	407.81				263.95	662.35	926.3
7	2008-09	95.12	448.74	543.86	205.58	223.08	428.66				300.7	671.82	972.52
8	2009-10	121.59	445.01	566.6	191.97	228.83	420.8				313.56	673.84	987.4
9	2010-11	149.36	505.86	655.22	195.5	231.53	427.03				344.86	737.39	1082.25
10	2011-12	151.6	572.15	723.75	197.5	233.53	431.03				349.1	805.68	1154.78
11	2012-13	151.6	0	151.6	268.62	0	268.62				420.22	0	420.22
12	2013-14	188.37	0	188.37	171.3	0	171.3	5.72	0	5.72	359.67	0	359.67

Note:- As per Govt decision the arrears of Government departments have been squared up)



Chapter-6

Schemes under implementation

6.1-RGGVY:

- RGGVY-I is basically a scheme for 100% Rural Electrification
- 14 Schemes covering whole of J&K State were submitted to REC at a total estimated DPR (Detailed Project Report) cost of Rs. 1051.73crores. All these schemes have been sanctioned by REC at a cost of Rs. 940.06 crores and Rs 797.71crores have been released ending 3/2013, against which an amount of Rs 791.73 has been spent ending 11/2014.
- Above RGGVY Schemes envisages electrification of 283no. virgin villages, un-electrified villages and de-electrified villages, which are financially viable for electrification within the Grid System.
- 295221 No. Rural Household connections are proposed to be provided under these RGGVY schemes.
- 136747 No. BPL households are earmarked to be electrified free of cost and 5889 no. already electrified villages to be covered for intensive electrification under the scheme.
- As per guidelines of RGGVY, the execution of work for 7 districts each has been ensured to NHPC and J&KSPDC as under:-
NHPC: Udampur, Kathua, Jammu, Srinagar, Budgam, Leh and Kargil.
J&KSPDC: Kupwara, Anantnag, Doda, Baramullah, Pulwama, Rajouri and Poonch.

6.2 - Districts wise REC Sanctioned/Approved Cost, Amount Released By REC, Expenditure under RGGVY.

(Rs in Lacs)

S.No.	District	Actual DPR	REC Sanctioned/Approved revised cost	Amount Released by REC	Expenditure ending 11/2014
Sanctioned Schemes.					
(A) JAMMU					
1	Rajouri	6910.41	7996.87	7008.00	7009.00
2	Udhampur	5602.00	5034.66	4531.19	3714.00
3	Kathua	5477.07	3776.26	3398.61	3269.00
4	Jammu	5174.05	3546.21	3104.33	3273.00
5	Doda	7251.65	5739.87	5115.83	4658.00
6	Poonch	5476.32	2659.67	2381.35	2381.00
	Sub-Total	35891.50	28753.54	25539.31	24304.00
(B) KASHMIR					
1	Kupwara	2426.35	3366.3	2986.74	2137.00
2	Anantnag	5830.00	7373.89	6621.00	6619.00
3	Baramullah	3392.40	2285.46	2008.89	1805.00
4	Pulwama	4057.83	2737.57	2463.00	2090.00
5	Budgam	917.00	1603.3	1386.00	1294.00
6	Srinagar	1389.00	1697.68	1485.27	1373.00
	Sub-Total	18012.58	19064.2	16950.90	15318.00
(C) LADAKH					
1	Leh	26645.27	30891.00	26508.00	25160.000
2	Kargil	24623.46	16697.17	14331.18	13896
	Sub-Total	51268.73	47588.17	40839.18	39056.000
	Grand	105172.81	95405.91	83329.39	78678.00

6.3 -Project Wise Physical Progress(Achievement) of Electrification of Villages & Households under RGGVY of X & XI Plan (As on 30/11/2014)

S.No	Name of the Project	Name of Implementing Agency	Date of Sanction	Date of Award	Sanctioned Cost (Rs.Lakhs)	Funds Released (Rs.Lakhs)	Revised Coverages				Cummulative Achievements			Energisation of UE Villages	% UE wrt Rev Cov	% IEV wrt Rev Cov	% BPL wrt Rev Conv
							UE Villages	IE Villages	Total Habitations	BHL HHs	UE Villages	IE Villages	BPL HHs				
1	2	3	4	5	6	7	8	9	10	11	16	17	18	19	20	21	22
Jammu & Kashmir X Plan																	
1	Kupwara	JKSPDCL	31-10-2005	14-07-2008	3366.30	2986.74	41	94		6000	28	81	4800	25	68.3	86.2	80.0
1	Total JKPCD				3366.30	2986.74	41	94		6000	28	81	4800	25	68.3	86.2	80.0
2	Kathua	NHPC	12-12-2006	03-04-2007	3776.26	3398.61	44	504		6461	44	504	6461	44	100.0	100.0	100.0
3	Udhampur	NHPC	12-12-2006	06-04-2007	5034.66	4531.19	18	346		11751	18	346	11751	11	100.0	100.0	100.0
2	Total NHPC				8810.92	7929.80	62	850		18212	62	850	18212	55	100.0	100.0	100.0
3	Total (J&K)				12177.22	10916.54	103	944		24212	90	931	23012	80	87.4	98.6	95.0
Jammu & Kashmir XI Plan																	
1	Budgam	NHPC	25-Mar-08	13-10-2009	1603.3	1358.19	8	60		2811	8	48	2262	8	100.0	80.0	80.5
2	Jammu	NHPC	05-03-2008	04-04-2008	3546.21	3104.85				6314		847	6314			100.0	
3	Kargil	NHPC	08-04-2008	17-10-2008	16697.17	14331.18	25			1250	25		1082	20	100.0	0.0	86.6
4	Leh	NHPC	08-04-2008	17-10-2008	30891.2	26508.54	35			3000	24	8	2424	11	68.6	40.0	80.8
5	Srinagar	NHPC	25-03-2008	02-03-2009	1697.68	1485.27	5	95		2272	5	89	2272	5	100.0	93.7	100.0
5	Total NHPC				54435.56	46788.03	73	155		15647	62	992	14354	44	84.9	640.0	91.7
6	Doda	JKSPDCL	05-03-2008	26-12-2009	5739.87	5115.83	20	134		8404	17	128	5237	14	85.0	95.5	62.3
7	Aanantnag	JKSPDCL	05-03-2008	11-12-2008	7373.89	6619.99	5	436		13062	5	433	12278	5	100.0	99.3	94.0
8	Baramullah	JKSPDCL	05-03-2008	07-01-2010	2285.46	2008.89	14	167		5642	14	163	3028	11	100.0	97.6	53.7
9	Poonch	JKSPDCL	01-09-2008	26-12-2009	2659.67	2381.35	1	104		1328	1	103	1328	1	100.0	99.0	100.0
10	Pulwama	JKSPDCL	05-03-2008	07-01-2010	2737.54	2463.78	15	198		6599	14	190	5279	9	93.3	96.0	80.0
11	Rajouri	JKSPDCL	05-03-2008	26-12-2009	7996.87	7009.97	6	242		5127	6	235	4563	6	100.0	97.1	89.0
6	Total NHPC				28793.3	25599.81	61	1281		40162	57	1252	31713	46	93.4	97.7	79.0
11	Total (J&K XI Plan)				83228.86	72387.84	134	1436	0	55809	119	2244	46067	90	88.8	156.3	82.5
14	Total (J&K X&XI Plan)				95406	83304	237	2380	0	80021	209	3175	69079	170	88.2	133.4	86.3

6.4- Restructured- Accelerated Power Development and Reforms Programme(R-APDRP)

Introduction

The Govt. of India has proposed to continue R-APDRP during the XI Plan with revised terms and conditions as a Central Sector Scheme. The focus of the programme shall be on actual, demonstrable performance in terms of sustained loss reduction. Establishment of reliable and automated systems for sustained collection of accurate base line data, and the adoption of Information Technology in the areas of energy accounting will be essential before taking up the regular distribution strengthening projects

- R- APDRP is a scheme to bring down T&D losses to 15% within project period of 5 years with minimum target of 3% p.a.
- The scheme is divided in two parts, PART-A and PART-B. Part-A is to cover Ring Fencing, Feeder Metering, DT Metering, application of Information Technology and Supervisory Control and Data Acquisition / DMS in Distribution Sub Sector. Part-B is aimed to strengthen Distribution System in the identified project areas.
- For Part-A of the scheme : M/s CMC Ltd, New Delhi has been appointed as IT consultant, M/s Prominent Engineers & Traders, Haryana awarded the contract for Boundary Metering / Ring Fencing, M/s Wipro Ltd appointed as Information Technology Implementation Agency (ITIA) and M/s NDPL New Delhi appointed as SCADA consultant.
- The Power Finance Corporation (PFC) will be the Nodal Agency for the operationalisation and implementation of the R-APDRP programme under the overall guidance of the Ministry of Power (MoP).
- Gol will provide 100% loan for part A of the R-APDRP schemes and 90% loan for part B of the R-APDRP.
- Under R-APDRP, 30 towns have been identified as project areas in J&K state with population of above 10,000 as per 2001 census. Gol has sanctioned Rs 191.25 crores for part-A and Rs 1665.27 crores for part-B of R-APDRP scheme. The DPR for SCADA / DMS for Jammu and Srinagar cities has been approved by Gol at an estimated cost of Rs. 52.89 crores.

R-APDRP

Salient features

Part-A (IT)

Date of Sanction: **Dec-09**
No. of Towns covered: **30**
Data Center (DC) at: **Srinagar**
Disaster Recovery (DR) Center at: **Jammu**
Sanctioned Cost (Central Assistance): **151.99 (Revised)**
Fund released by GoI / PFC: **46.50 Crores**
Revised date of Completion: **November 2014**
Name of IT Consultant: **M/S CMC Ltd. New Delhi**
Name of Information Technology: **M/S Wipro Ltd**

Implementation Agency (ITIA)

Date of LOA: **20th January, 2011**
Date of Agreement: **30th May 2011.**

Part-A (SCADA)

Name of SCADA Implementing Agency: **M/Schneider Electric India**
No. of Towns covered: **2 (Jammu and Srinagar)**
Sanctioned Cost: **Rs. 52.89 Cr**
Date of LOA: **LOI issued on 8th July 2013.**
Name of SCADA Consultant: **M/S Tata Power Delhi Distribution Ltd.**

Part B

Sanctioned Cost: **Rs. 1665.27 Cr**

Part-A of R-APDRP:-

Covers establishment of Base Line Data for accurate measurement of losses at various levels and improving customer services for the utilities

(i). Activities include

- Consumer Survey, Indexing, Asset Mapping
- GIS Mapping of the entire distribution network of identified project areas
- Automatic Meter Reading (AMR) on DT & Feeder
- Automatic Data Logging for all Distribution Transformers and Feeders
- Asset mapping of the entire distribution network at and below the 33kV transformers and includes the Distribution
- Feeder Segregation / Ring Fencing.
- Adoption of IT applications for redressal of consumer grievances,
- Adoption of IT applications for meter reading, billing & collection. Energy accounting & auditing and MIS

List of towns approved for R-APDRP.

S	Name of town	Revised sanctioned cost of Part-A. (Rs. Crores)	Appraised cost for part-B (Rs. Crores)
A. Kashmir Province			
1	Srinagar	85.31	669.36
2	Anantnag	1.23	31.54
3	Bandipore	0.5	8.4
4	Baramulla	1.19	32.8
5	Bijbehara	0.53	8.62
6	Budgam	0.63	10.15
7	Dooru-Verinag	0.55	4.54
8	Ganderbal	0.56	15.96
9	Handwara	0.49	7.39
10	Kargil	0.61	7.9
11	Kulgam	0.62	6.16
12	Kupwara	0.58	7.39
13	Leh	0.74	9.3
14	Pattan	0.45	4.57

S	Name of town	Revised sanctioned cost of Part-A. (Rs. Crores)	Appraised cost for part-B (Rs. Crores)
15	Pulwama	0.68	11.79
16	Shopian	0.46	6.65
17	Sopore	1.33	36.38
18	Sumbal	0.55	4.7
19	Tral	0.43	5.96
Total Kashmir		97.44	889.56
B- Jammu Province			
1	Jammu	45.16	610.48
2	Akhnoor	0.33	13.64
3	Baderwah	0.56	6.75
4	Doda	0.7	7.28
5	Kathua	1.66	62.41
6	Kishtwar	0.56	7.42
7	Poonch	0.88	7.74
8	Rajouri	1.82	11.72
9	Ranbir Singh Pora	0.76	12.36
10	Samba	0.56	10.08
11	Udhampur	1.56	25.83
Total Jammu		54.55	775.71
Total J&K PDD		151.99*	1665.27

(ii). Implementation status of part A R-APDRP.

Milestones	Status
Part-A (IT)- 30 Towns	
DC Commissioning along with HW, OS & availability of network connectivity	*DC Commissioned with HW /SW installation complete.
	MPLS connectivity provided on Bharti-Airtel Network.
	Fixtures and Furniture to be put in place for whole building

GIS survey & validation	
(Asset mapping & Consumer indexing)	Asset Mapping - 100% Completed and 97.54% validated by Utility.
(Asset mapping & Consumer indexing)	Consumer Indexing- 100% Completed and 90.52% validated by Utility
Meters & Modem Installation at DTs, Feeders, Boundary points, HT Consumers etc.	Ring Fencing / Feeder meters- 16/30 towns.
	Leh /Kargil -yet to award.
	DT Meters- One town in Kashmir Completed. DT metering under progress in Srinagar Town. 629 Meters installed.
	Sumbal town 35 out of 42 DT meters installed.
	Modem installation- Installation completed in Pilot town of Pattan. A total of 281 Modems installed
Baseline reports	Reports submitted -11 towns
	Accepted by PFC- 11 towns.
	Under Preparation - 1 Town (Sopore)
Go-Live	Pattan completed. R. S. Pura under progress
Part-A SCADA (2 Towns)	
Sanction / Awards of SCADA towns	Award placed in September'13. Kick-off meeting held in November 2013. Site Survey completed. IO List/GTP of Servers being reviewed for approval.

iii). Financial component of part A R-APDRP

Items	Financial (Rs. in crores)
Total estimated cost IT (<i>Basic/implementation Revised</i>)	191.57/ 200.66
GOI loan through PFC	151.99
State component	48.85
Funds released by PFC so far	46.5
Total estimated cost of SCADA excluding Civil	52.89
Funds released by GOI through PFC loan for SCADA	10.2

(iv). Approved Project Costs:**Central Assistance**

Funded by PFC	Rs. 151.99 crores
IT consultant cost	Rs. 0.68 crores
System/DT metering	Rs. 21.21 crores
Set up cost ITIA	Rs. 121.84 crores
Bandwidth Charges for 1 st year	Rs. 3.12 crores
Facility Management Charges for 1 st year	Rs. 5.14 crores

State Assistance

Funding under State grant	Rs. 48.67 crores
Civil infrastructure	
Data Center (DC) with Sub Station	Rs. 10.59 crores
Disaster Recovery Center (DR)	Rs. 4.68 crores
Up gradation of SDO's	Rs. 4.82 crores
Bandwidth for 4 years (2 nd to 5 th year)	Rs. 12.49 crores
Facility Maintenance System FMS) for 4 years (2 nd to 5 th year)	Rs. 17.27 crores

(v). Milestone Achievements of Part-A R-APDRP.

S.	Item	Date of appointment/ Sanction/award	Original date of Completion	Agency/ Contractor	Remarks
1	Date of appointment of IT consultant by PDD	Jul-09	Jun-13	JKPDD	Contract extended upto November 2014
2	Date of sanction of PART-A by GOI (Basic)	26 th Nov. 2009	Nov-12	MoP/GoI/ PFC	Revised by GOI to November 2014

3	Date of Revised sanction of PART-A by GOI	8 th Dec. 2010	8 th Dec. 2013	JKPDD/MoPGoI/PFC	Revision was necessitated post receipt of bids
4	Date of Award of ITIA	26 th Feb. 2011	Aug-12	Wipro	
5	Readiness of DC	Jun-11	Nov-12	JKPCC	(Sever floor handed over in March 2013) Buildings is complete since August 2013 but requires furniture and ancillaries
6	Date of Award of Ring Fencing Contract	9 th Dec 2010	01-05-2011	Prominent	Work yet to be completed
7	Date of Award of Feeder Metering contract (33kV 11kV, HT Consumers)	10 th Oct 2011	01-12-2011	Prominent	Work yet to be completed
8	Date of Award of DT Metering Contract	23rd April 2013	22nd August 2013	Marib Constructions	Primary delay due to non-availability of LT cables
9	Date of Award of SCADA Consultant	15th Feb 2011	14th Feb 2014	Tata Power -DDL (NDPL)	Required to be extended
10	Date of Award for SCADA implementation	Srinagar: 4th September 2013 Jammu :18th October 2013	Srinagar: 3th March 2015 Jammu : 17th April 2015	Schneider Electric	Project completion depends on readiness of SCADA buildings and related Part-B works

Part-B of R-APDRP:-Part-B is aimed to strengthen Distribution System in the identified project areas

Summary of major works under part B R-APDRP:-

S #	Particular	Unit	Qty.
1	Creation of 33/11 kV Receiving stations	Nos	9
2	Augmentation of 33/11 kV Receiving station	Nos	31
3	Laying of 33 kV line (New)	Kms	40.4
4	Reconductoring of 33kV lines	Kms	219
6	Laying of 11kV lines (New)	Kms	547.16
7	Laying of 11kV cable (New)	Kms	995.95
8	11 kV line Conductorng	kms	657.02
9	HVDS Units (New) as replacement of	Nos	17281
10	Existing D.T.'s to be taken out and replaced	nos	1865
11	No of substation to be added (New creations)	Nos	493
12	No of substation augmentations	Nos	212
13	LT AB Cable (New/Replacement)	kms	3971.51
14	Replacement of Damaged Service line	Nos	59561
15	Mobile service centres	Nos	29

i). Financial component of part B R-APDRP.

S.	Items	Financial (Rs. in crores)
1	Total estimated cost (<i>Sanctioned DPRs</i>)	1665.27
2	GoI loan through PFC	1498.75
3	State share component @10%	166.52
4	Funds released by PFC so far	472.39

(ii) Part B implementation.

For execution of Part-B of the programme in 2 cities and 28 towns have been divided into nine clusters, four in Jammu Division and five in Kashmir Division

S.	Name of the town under R-APDRP (PART-B)	Project cost
		(Rs in Crore)
A	Jammu Division	
1	Cluster-VI	260.47
	Jammu City(left Tawi River)	
2	Cluster-VII	349.85
	Jammu city (Right bank of Tawi River)	
3	Cluster-VIII	79.59
	Poonch, Rajouri, Akhnoor, Udhampur, Doda, Bhaderwah, Kishtwar.	
4	Cluster-IX	85.73
	Towns of Kathua, Samba and R.S.Pura.	
	Total (A)	775.64
B	Kashmir Division	
1	Cluster-I	340.89
	Srinagar City (left river) including towns of Pulwama and Budgam.	
2	Cluster-II	372.33
	Srinagar City (right river) also including towns of Ganderbal&Tral.	
3	Cluster-III	57.51
	Towns falling in south Kashmir including towns of Bijbehara, Anantnag, Dooru-Veerinag, Kulgam and Shopian.	
4	Cluster-IV	101.63
	Towns falling in north Kashmir including towns of Baramulla, Sopore, Handwara, Kupwara, Bandipore, Sumbal and Pattan.	

5	Cluster-V	17.2
	Ladakh including towns of Leh and Kargil.	
	Total (B)	889.56
	G. Total (A+B)	1665.2

Status of Contract Award: PART-B.

A	Jammu Division, Cluster-I (Jammu City: Left of Tawi River)			
	Tender No. CE/P&D/RAPDRP/JMU/01 of 2014 dated 30.09.2013			
	Estimated Value	Quoted Price % above estimated Value	Contract Value (RsCrore)	Contract Awarded to
	260.47	0.95	262.94	Ircon International Ltd.
B	Jammu Division, Cluster-II (Jammu City: Right of Tawi River)			
	Tender No. CE/P&D/RAPDRP/JMU/01 of 2014 dated 4.12.2013			
	Estimated Value	Quoted Price % above estimated Value)	Contract Value (RsCrore)	Contract Awarded to
	349.84	-4.74	333.26	Ircon International Ltd.
C	Jammu Division, Cluster-III (Kathua, Samba and R.S pura)			
	Tender No. CE/P&D/RAPDRP/JMU/01 of 2014 dated 4.12.2013			
	Estimated Value	Quoted Price in % above	Contract Value (Rscore)	Contract Awarded to
	85.73	0	85.73	M/s EMC Ltd. Kolkata
D	Jammu Division ,Cluster-IV (Akhnoor, Rajouri, Poonch, Udhampur, Doda, Kishtwar and Baderwah)			
	Tender No. CE/P&D/RAPDRP/JMU/01 of 2014 dated 4.12.2013			
	Estimated Value	Quoted Price in % above	Contract Value (Rscore)	Contract Awarded to
	79.58	4.96	83.53	Ircon International Ltd.
E	Kashmir Division, Cluster-I (Srinagar left of river, Budgam&Pulwama towns)			
	Tender No. CE/SOK/RAPDRP/KMR/C1 of 2013 dated 26.12.2013			
	Estimated Value	Quoted Price in % above	Contract Value (Rscore)	Contract Awarded to
	340.37	4	353.98	M/s EMC Ltd. Kolkata

F	Cluster-II (Srinagar right of river, Tral&Ganderbal towns)			
	Tender No. CE/SOK/RAPDRP/KMR/C2 of 2014 dated 01.01.2013			
	Estimated Value	Quoted Price in % above	Contract Value (Rscore)	Contract Awarded to
	368.4	-3.5	355.51	M/s EMC Ltd. Kolkata
G	<p>For remaining three clusters of North Kashmir, South Kashmir and Leh&Kargil, the bids were invited on 11.01.2014 but there was no response despite extension of time lines on three occasions.</p> <p>Due to no response to the e-NIT in respect of these three clusters, the Contract Committee-I in its meeting held on 23/04/2014 decided that town-wise NITs shall be floated instead of cluster-wise tendering to have a better response. Accordingly e-NITs were issued on 17-05-2014 for Anantnag, Baramulla, Dooru-Verinag, Pattan, Sopore, Kargil&Leh and on 19-05-2014 for Bijbehara, Bandipore, Handwara, Kulgam, Kupwara, Shopian&Sumbal respectively. However single bids were received for Anantnag, Bijbehara, Kulgam, Shopian and Dooru-Verinag towns with high rates quoted and no bids were received for remaining towns. According the Contract Committee-I in its meeting held on 20/10/2014 after taking into consideration the exorbitant rates quoted by single bidders for five towns and nil response for remaining towns cancelled all the tenders for 14 towns and it was decided, that the department shall proceed as per the guidance of Secretary Power GoI specified during review meeting held in SKICC on 05/07/2014 that <i>“JKPDD may take up its own the works under R-APDRP part B in respect of 14 towns in Kashmir where no response has been received despite repeated bids through normal tendering process. MoP’s role is limited to sanctioning of DPR. State to follow its own norm and procedure regarding bidding and award of contract”</i>. The key material for all these 14 towns shall be arranged by P&MM Wing of the department and works shall be got carried out departmentally by EM&RE Wing Kashmir and accordingly the sanction was accorded vide Government no 190-PDD of 2014, dated 30-09-2014.</p>			

6.5 - Progress of Part-B R-APDRP.

A) Jammu.

- a. *M/s Ircon International Ltd, the contractor for Cluster I,II & IV has achieved the following progress.*
- Completed survey of all the 22 existing 33/11 kV substations of Cluster I,II& IV. They have submitted SLDs of 17 substations of Cluster I & II which has been approved. Out of 05 substations in Cluster-IV, SLDs of 04 has been approved and the balance has been submitted for approval.
 - Out of 141 no. 11 kV Feeders in the project areas of Cluster I,II& IV have completed survey of 90 Feeders.
 - Have submitted SLDs of 48 no. 11 kV Feeders including HVDS and AB cabling. Out of these 11 SLDs have been recommended by PMA and 05 have been approved by IKPDD.
 - Have started survey of 33 kV lines where thickening of conductor is to be carried out.
 - Have started the civil works of 33/11 kV additional transformers at substation Nanak Nagar, Railway Complex, Trikuta Nagar, Transport Nagar and ChanniHimmat.
 - Have started the civil works for augmentation of 33/11 kV substations at Gadigrah, Greater Kailash and Sainik Colony.
 - Have erected 10 MVA Power Transformer at 33/11 kVGadigrah and Nanak Nagar substations.
 - Have started civil work of New 33/11 kV Manda substation.
 - Have started erection work of one Feeder (RC-I) of Cluster-I and two Feeders (C-22 and R-7) of Cluster-II.

Mobilization Advance:-

M/s has been paid First Mobilization Advance for all the 3 Clusters as :-

Cluster-I	Rs 13.15 Crs.
Cluster-II	Rs 16.66 Crs
Cluster-IV	Rs 4.18 Crs

M/s EMC Ltd has been paid First Mobilization Advance of Rs 4.29 Crs for Cluster-III.

B) Kashmir.

- a. *M/s EMC Ltd, the contractor for Cluster I & II has achieved the following progress.*

Mobilization Advance:-

M/s EMC has been paid First Mobilization Advance of Rs 35.474 Crs for Cluster-I & II.

6.6-Hon'ble Prime Ministers Reconstruction Programme.

The Hon'ble Prime Minister during his visit of J&K in November, 2004 announced a Re-construction Plan infrastructure for J&K and the objective of Schemes under the Re-Construction program is develop infrastructure at 220KV and 132KV level by way of construction/ Augmentation of Grid Stations, construction of New lines and thickening of Conductor of Existing lines. Originally the project was estimated to cost of Rs. 707.00 Crores based on cost data 2003. the project was scrutinized by CEA and on their observations , the project was revised to the cost of Rs. 1006.51 crores The CEA subsequently advised to revise the Project Report necessitated due to further cost escalation during the intervening period. Accordingly, the revised project amounting to Rs. 1351.00 Crores was furnished to CEA for approval and finally the Project Report was approved for 1350.00 Crores. Out of this cost, an amount of Rs. 1133.23Crores has been spent ending 03/2014

The Scheme envisages construction/ augmentation of following transformation and Transmission capacities.

- Construction of 7 No. new 220/132 KVA, Grid sub Stations of 1880 MVA capacity.
- Augmentation of 1 No. , 220/13 KVA, Grid Sub Station of 150 MVA Capacity.
- Construction of 22 No., 132/33 Grid Sub Stations of 1180 MVA Capacity.
- Augmentation of 4 No. 132/66-33 Grid Sub Stations of 160 MVA Capacity.
- Laying of 373.5 Km of 220KV, D/C, Transmission Lines.
- Laying of 446.35 Km of 132KV, D/C, S/C transmission Lines.

Besides, the Scheme includes other works like Stringing of II Circuit of existing 220KV, D/C Transmission Lines (40.40 Km), Stringing of II Circuit of 132 KV, D/C, Transmission lines (21.00 Km), thickening of conductor etc.

6.7 - New / Augmentation of Grid Stations in Kashmir Division:

Kashmir Division:

- Budgam(320/100MVA)
- Mirbazar(Anantnag)
- Amargarh(320MVA)
- Aluestangh(320/100 MVA)
- Shopian(50MVA)
- Bandipor(50MVA)
- Lissar(50MVA)
- Khanmoh(50MVA)
- Banihal(Tether)(50MVA)
- Vilgam
- Magam(50MVA)and
- Augmentation of Zanakote / Pampore Grid Stations.

Jammu Division:

- 2 No. in Bishna(2X160MVA and 100MVA)
- 2 No. in Ramban(3X40 MVA and 20 MVA)
- Kishtwar(2x160MVA)
- Kattra(1x50MVA)
- Bhalessa(20MVA)
- Poonicheck(50MVA)
- Battalmanwal(50MVA)
- Chandak,Siot(20MVA)
- Baribrahmna-II(2x50MVA)
- Gangyal(1x50MVA)
- Siot((50MVA)
- Augmentation of Kathua, Samba and Hiranagar Grid Stations.

The first ever State owned 132 KV Transmission Line from Ramban to Kishtwar and Rajouri-Poonch, ring around Jammu cities are included in the package which are based on Technical requirement and survey done by CEA. The power requirements under the Plan for Industries have been given due focus and priority.

6.8 - Achievements ending 03/2014

Jammu

- 220/132 kV, 320MVA Barn Grid Sub Station Commissioned alongwith allied 132/33kV, 40 MVA transformer.
- 220/132 kV,320 MVA Bishnah Grid Sub Station Commissioned.
- 220/132 kV,120 MVA Ramban Grid Sub Station Commissioned.
- 132/33kV, 100 MVA BariBrahamana-II Grid Sub Station Commissioned.
- 132/33kV, 50 MVA Gangyal Grid Sub Station Commissioned.
- 132/33kV, 50 MVA Katra Grid Sub Station Commissioned.
- 132/33kV, 100 MVA Bishnah Grid Sub Station Commissioned.
- 132/33kV, 50 MVA Pounichak Grid Sub Station Commissioned.
- Augmentation of 132/66 KV Grid Sub Station Kathua from 70 MVA to 100 MVA completed
- Augmentation of 132/66 KV Grid Sub Station Samba from 50 MVA to 100 MVA
- Augmentation of 132/33 KV Grid Sub Station Hira Nagar from 42.5 MVA to 72.5 MVA
- 220 kV D/C Burn-Kishenpur Transmission Line completed.
- 220 kV D/C MiranSahab-Bishnah.Transmission Line commissioned .
- LILO of 220 kV KPTL for Ramban Grid commissioned.
- 220 kV D/CBishnah-Hiranagar Transmission Line completed.
- 132kV D/C Rajouri-Draba Line Commissioned
- LILO of 132 kV, Gladni-Miran Sahib Transmission Line for Grid Station Gangyal
- 132 kV Barn-Siot-kalakote Transmission Line commissioned
- LILO of 132 KV D/C , Gladni-Hiranagar Transmission Line for Grid Station Bari Brahma-II completed.
- 132 KV D/C Barn-Katra Transmission line completed.
- 132 kV S/C Draba- Chandak Transmission line commissioned.
- LILO of 132 kV S/C of Ring Main to Pounichak commissioned.
- LILO of CSTL-I for Ramban Grid Sub Station commissioned.
- Stringing of conductor on II circuit of 132KV Burn-Reasi Transmission line completed.
- LILO of 132 KV D/C, CSTL-I for G/Stn Ramban completed.
- Reconductoring and stabilization of 132KV S/C Gladni-Janipur transmission line completed
- Reconductoringof 132KV D/C Ring main around Jammu city completed
- 132/33kV, 20 MVA Chandak Grid Sub Station Commissioned.

Kashmir

- 220/132 kV,320 MVA Mirbazar Grid Sub Station Commissioned.
- 220/132/33 kV,320 MVA+100MVA Budgam Grid Sub Station Commissioned.
- 132/33kV, 50 MVA Lissar Grid Sub Station Commissioned.
- 132/33kV, 50 MVA Vilgam Grid Sub Station Commissioned.
- 132/33kV, 50 MVA Magam Grid Sub Station Commissioned.
- Augmentation of 220/132KV Grid Sub Station Zainakote from 300 MVA to 450 MVA
- Augmentation of 132/33KV Grid Sub Station Pampore from 150 MVA to 200 MVA
- Construction of 50MVA,132/33KV Grid station Tethar completed & Commissioned in 10/09
- Construction of 50MVA,132/33KV Grid station Khonmoh completed & Commissioned in 5/09
- LILO of Pampore-Cheshmashahi line for Khonmoh Grid station.
- LILO of CSTL at Tethar for Grid station Tethar.
- 132 kV D/C –Lissarline completed.
- 132 kV S/C Arampora- Vilgam line completed.
- 132 kVPattan-Magam line completed
- 132 /33kV 50 MVA Shopian Grid Sub Station Commissioned
- 132 kV D/C Lassipora-Shopian line completed.
- 160 MVA, 220/132/33 kV Grid Substation Delina commissioned .85 circuit Km of
- 220kV D/S Zainakote- Amargarh(85ckt kM) line also commissioned

Chapter-7

7.1- Annual Performance 2013-14

- Peak demand met increased from 1817 MW during 2012-13 to 1998 MW during 2013-14, increase of 9.05%.
- Peak deficit reduced from 28.75% during 2012-13 to 23.15% during 2013-14, reduction of 5.60%.
- Energy supplied increased from 12120 MU during 2012-13 to 12666.59 MU during 2013-14, increase of 4.31%.
- Energy deficit reduced from 31.41% during 2012-13 to 29.72% during 2013-14, reduction of 1.69%.
- Per capita consumption has gone up from 927 Units to 952.34 units, increase of 2.57%.
- 4817 number new distribution transformers were installed during 2013-14 and 398 numbers were augmented.
- Damage rate of distribution transformers brought down from 35.96% during 2012-13 to 24.13% during 2013-14, reduction of 11.83%.
- 20 No. Receiving Stations of 147.10 MVA capacity constructed during the year.
- Another 21 number Receiving Stations augmented, resulting in addition of 92.60 MVA Capacity.

- 85219 no. new consumers added during the year which includes addition of new consumers and regularization of existing consumers.
 - 456.58 MW load added to the system by way of regularization of existing load and addition of new load.
 - 220/132 Grid Substation Delina commissioned resulting in addition of 160 MVA capacity at 220kV/132kV level and 50 MVA at 132/33kV level. Further 85 circuit Km of 220kV Zainakote-Amargarh line also commissioned.
 - Second circuit of 132KV Lassipora – Shopian line 28.5 Ckt. Km Commissioned
 - Second circuit of 132kV, 20 kM Awantipora – Lasipora line commissioned.
 - Electrification of left out un-electrified /de-electrified /partially electrified villages and hamlets has been taken up under RGGVY schemes sanctioned for all districts of the State at a cost of Rs.954.01 crore.Phase-I of the scheme has been closed under which 1820 New Distribution Transformers, 2226 Kms of HT Line and 779 Kms of LT line have been added.
- Under RGGVY-II,
- Scheme for up-gradation of Central workshop and creation of regional workshops at Anantnag, Baramulla, Pulwama, Ganderbal, Samba, Doda, Udhampur, Ramban, Rajouri districts for prompt repairs of Damaged Distribution Transformers got approved from REC.
 - A 220kV transmission line between Alsteng and Leh has been approved by Gol for providing grid connectivity to Ladakh Region at a cost of Rs. 1788.41 Crores. The line is in the tendering process by PGCIL.

- Most of the state is presently dependant on connectivity through 400kV Kishenpore Grid Sub Station. In order to reduce dependence on this grid substation and to have alternate supply for reliability and to meet the growing energy demand of the state, on insistence of State govt. the interstate transmission system is being strengthened by taking up *Jalandhar-Samba-Amargarh (Sopore) 400kV Double Circuit Line along Mughal Road*. The project also includes establishing of *400kV Grid Sub Station at Amargarh (Sopore)* .The decision regarding implementation of project was taken on 25th TCC and 28th NRPC meeting held on 25th and 26th April 2013. The project is now at the award stage as Lol stands issued in favour of M/s Sterlite Grid Limited New Delhi on *Tariff Based Competative Bidding* process. With the implementation of the project *400kV state ring* will become a reality thereby improving reliability of supply in both Jammu and Kashmir Regions.

7.2 - PERFORMANCE REPORT OF DISTRIBUTION FOR 2013-14

S.No	Particulars	Unit	2011-12			2012-13			Growth	2013-14				Growth
			Jammu	Kashmir	Total	Jammu	Kashmir	Total		Jammu	Kashmi	Ladakh	Total	
1.	Revenue Billed (Pure)	Cr.	790.90	637.78	1428.68	1010.05	672.39	1682.44	17.76	1005.95	734.11	17.11	1757.17	4.25
2.	Revenue Realization (Pure)	Cr.	612.41	401.75	1014.16	841.74	573.90	1415.64	39.59	979.62	668.04	14.74	1662.40	14.84
3.	Collection efficiency (2/1*100)	%	77.43	62.99	140.42	83.34	85.35	84.14	-56.28	97.38	93.73	80.95	94.61	11.06
4.	Electricity duty billed	Cr.	130.18	90.66	220.84	166.89	119.62	286.51	29.74	199.73	139.06	2.66	341.45	16.09
5.	Electricity duty realized	Cr.	108.04	75.66	183.70	161.94	115.92	277.86	51.26	200.00	136.34	3.57	339.91	18.25
6.	Revenue Misc. Realized	Cr.	0.87	1.42	2.29	1.61	2.05	3.66	59.83	0.90	4.13	0.00	5.03	27.24
7.	Total Revenue (2+5+6)	Cr.	721.32	478.83	1200.15	1005.29	691.87	1697.16	41.41	1180.50	808.47	17.42	2006.39	15.41
	Arear realization from NHPC	Cr.				169.09				96.00			96.00	
	Arear realization from Baglihar (Excluding ED)									105.36			105.36	
	Total					1174.38	691.87	1866.25		1381.86	808.47	17.42	2207.75	15.47
8.	Energy Input (Grid Level from C&S)	MU	4969.25	6136.09	11105.33	5240.70	6879.33	12120.03	9.14	5539.00	7005.48	122.11	12666.59	4.32
9.	Energy billed	MU	2350.00	1917.00	4267.00	2871.02	2292.00	5163.02	21.00	3265.74	2431	57.23	5754.35	10.28
10.	T&D Losses (8-9)	MU	2619.25	4219.09	6838.33	2369.68	4587.33	6957.01	1.71	2273.26	4580.77	52.37	6906.40	50.60
11.	T&D Losses % (10/8x100)	%	52.71	68.76	61.58	45.22	66.68	57.40	4.18	41.04	65.39	42.89	54.52	2.88
12.	Energy Realized (9x3/100)	MU	1819.65	1207.56	3027.21	2392.60	1956.27	4348.88	43.66	3180.18	2272.63	56.45	5444.01	20.12
13.	AT&C Losses (8-12/8x100)	%	63.38	80.32	72.74	54.35	71.56	64.12	8.62	42.59	67.56	53.77	57.02	-12.45
14.	Average Tariff billed/ unit	Rs.	3.37	3.33	6.69	3.52	2.93	3.26	-51.31	3.08	3.02	2.99	3.05	-6.71
15.	New Meters installed	No.	51967	58591	110558	71677	35580	107257	-2.9858	49519	4918	6418	60855	-76.25
16.	Defective Meters replaced	No.	9302	28590	37892	5323	14665	19988	-47.25	0	2767	70	2837	-604.55
17.	Inspections conducted	No.			0	23700	49689	73389		71248	33070	1536	105854	30.67
18.	Fine imposed	Cr.	8.5	1.51	10.01	11.8	2.58	14.38	43.6563	9.46	2.859	0.01	12.329	-16.64
19.	Fine Recovered	Cr.	6.13	0.63	6.76	8.78	1.08	9.86	45.858	8.1	1.299	0.01	9.409	-4.79
20.	Disconnections effected	No.	1362	53360	54722	6450	58696	65146	19.049	1236	59550	332	61118	-6.59
21.	New Connections added	No.	12033			66747	38124	104871	190.6	46508	36836	1875	85219	-23.06
22.	Connections regularized	No.	6656	35978	54667	33454	20535	53989		15731	23206	158	39095	-38.10

23 .	Load regularized (New + Illegal)	MW	58.90			89.23				58.52	52.26	2.62	113.40	
24 .	Load added (Agreement revised)	MW	82.31	89.74	230.94	241.40	175.75	506.38	119.26	245.59	78.40	19.19	343.18	-10.91
25 .	Cumulative connections at the end of the year	No.	608407	723629	1332036	708608	781988	1490596	11.9036	755116	780264	37434	1572814	-10.91
26 .	Cumulative Load at the end of the year	MW	1064.04	758.28	1822.317	1384.66	967.398	2352.06	29.0696	1700.907	1045.4	23.9	2770.247	15.10
27 .	Total Distribution Transformers	No.	19685	19815	39500	22265	21548	43813		24243	22703	721	47667	8.09
28 .	Transformers damaged	No.	7620	8540	16160	7753	7992	15745		5286	6097	118	11501	-36.90
29	Damage rate	%	38.7097	43.09866	40.91139	34.8215	37.0893	35.9554		21.80	26.86	16.37	24.13	-49.02
30	New 33/11 KV , 66/11kV, 11/.4kV Sub-Sations added	No./ MVA	8 / 33.7	6/48.35	14/82.05	1 / 6.30	4/22.05	5/28.35		8/52.05	6/44.65	6/50.4	20/147.10	
31	Augmentation of 33/11 KV Sub-Stations	No./ MVA	12 / 78.05	10/ 41.3	22/119.3 5	6 / 28.45	9/45.20	15/73.65		8/27.15	12/ 67.75	0	21/92.60	
32	New distributions transformers added	No./ MVA	1120 / 141.204	1499 / 103.6	2619/ 244.804	2580 / 330.629	1733 / 143	4313/ 473.629		2495/ 217.10	2291/ 130.27	31/ 5.38	4817 /352.75	
33	Augmenttion of distribution Transformers									50/7.50	348/26.39		398/33.89	

Chapter 8

STANDARD CONSTRUCTION PRACTICES & TECHNICAL DATA FOR TRANSMISSION & DISTRIBUTION WORK

IMPORTANT NOTES:-

Since errors and omissions in this chapter cannot be ruled out, standard drawings, tables & other data in this section are for guidelines only.

- i. Practicing Engineers are requested to refer to the original source of data. The DCP's office does not bare any responsibility for any damage or loss which may occur as a consequence of implementation of any erroneous drawing or data in this section
- ii. Any suggestions for rectification/improvement may please be emailed at dcpjkd@yahoo.com

8.1 - RECOMMENDED TYPE AND SIZE OF MULTI-CORE CABLES

REC CONSTRUCTION STANDARD F-8

Distribution Transformer Capacity in kVA	Type	Size (Nominal Area of Cross Section)
25	PVC Insulated and Sheathed Un-Armoured four core Aluminium Cable	16mm ²
63	PVC Insulated and Sheathed Un-Armoured four core Aluminium Cable with reduced neutral conductor	70mm ²
	OR	
	PVC Insulated and Sheathed Armoured three core solid Aluminium Conductored Cable .	70mm ²
100	PVC Insulated and Sheathed Un-Armoured four core Aluminium Cable with reduced neutral conductor	120mm ²
	OR	
100	PVC Insulated and Sheathed Aluminium three core solid Aluminium Conductored Cable .	120mm ²

Note:

- 1 The cable would be laid in air
- 2 In case of PVC armoured cables, aluminum amour shall serve as neutral for 63 and 100 KVA distribution transformer centers.
- 3 Size of reduced neutral conductor shall comply with the main -neutral conductor combination as per IS:1554 (Part-I)-1976
- 4 Type and size of single core cables which can be used for the same purpose are given in REC construction standard F-18

RECOMMENDED TYPE AND SIZE OF SINGLE CORE CABLES
REC CONSTRUCTION STANDARD
F-18

Distribution Transformer Capacity in kVA	Type	Size (Nominal Area of Cross Section)
25	PVC Insulated and Sheathed Un-Armoured Alumunium Conductor Cable	10mm ²
63	PVC Insulated and Sheathed Un-Armoured Alumunium Conductor Cable	50mm ²
100	PVC Insulated and Sheathed Un-Armoured Alumunium Conductor Cable	120mm ²

Note:

- 1 The cable would be laid in air.
- 2 The cables shall be as per IS:1554(part-1)-1976
- 3 Type and size of single core cables which can be used for the same purpose are given in REC construction standard F-8

Recommended cable dimensions for service lines

Max.Load Current Marked on Meter	Copper Conductor- Cross Section	Aluminum Conductor- Cross Section	Type of Cable	Insulation peel off length (mm)	Remarks
10A	4.0mm ²	N/A	Single / multi core	As recommended by meter manufacturer or measured terminal hole depth +2.0mm	Reference standard: IS7098 (Part-1) and IS:1554 (Part-1)
20A	6.0mm ²	N/A	Single / multi core		
30A	10mm ²	16mm ²	Single / multi core		
60A	16mm ²	25mm ²	Single / multi core		
80A	25mm ²	N/A	Minimum -25mm ²		
100A	35mm ²	N/A	Minimum -35mm ²		

Notes:

- ✓ Always use multi-strands conductor instead of solid conductor
- ✓ Manufacturer's instruction should be followed while using lugs for terminations
- ✓ Do not use any lugs for floating cage type terminals

8.2 CURRENT RATING OF DISTRIBUTION & POWER TRANSFORMERS

Voltage Ratio: 11/433 kV

Transformer Capacity kVA	11 kV side	LV Side
16	0.84	21.33
25	1.31	33.34
63	3.31	84.00
100	5.25	133.34
250	13.12	333.35
400	21.00	533.36
630	33.07	840.05
1000	52.49	1333.41

Voltage Ratio: 33/11 kV

Transformer Capacity MVA	33 kV side	11 kV Side
1.0	17.50	52.49
3.2	55.11	165.34
5.0	87.48	262.44
6.3	110.22	330.67
10.0	174.96	524.88

Voltage Ratio: 132/33 kV

Transformer Capacity MVA	33 kV side	11 kV Side
20.0	87.48	349.92
50.0	218.70	874.80

Voltage Ratio: 220/ 132 kV

Transformer Capacity MVA	33 kV side	11 kV Side
150	393.66	656.1

8.3 FUSE RATING:

The size of tinned copper fuse wire for use on HV and LV side of the transformer should be as follows:

3 phase Transformer Capacity in kVA	Size of T. C. - Fuse	
	11 KVLV	
	mm(SWG)	mm (SWG)
25	0.160(38)	0.800(21)
50	0.244(34)	1.25(18)
63	0.224(34)	2 of 1.25(18)
75	0.224(34)	2 of 1.25(18)
100	0.315(30)	2 of 1.40(17)

The size of tinned copper fuse wire if used at 33 KV and 11 KV side of the transformer shall be as follows: -

3 Phase Transformation Capacity (kVA)	Size of T.C Fuse Wire	
	33 kV/mm (SWG)	11kV/mm (SWG)
5000	1.80(15)	-
3150	1.25(18)	-
1600	0.80(21)	-
630	0.63(23)	0.90(20)

Source: RE Standards

8.4 CT RATIOS APPLICABLE FOR HT METERING

S.No	CT Ratio (Amps)	Suitability for maximum loading in kVA (with 20% extended range of CT)		
		For 11kV Supply	For 33 kV Supply	For 132 kV Supply
1	2.5/5	Above 10 upto 40	-	-
2	5/5	Above 40 upto 80	-	-
3	7.5 /5	Above 80 upto 120	-	-
4	10/5	Above 120 upto 160	Above 300 upto 480	
5	15/5	Above 160 upto 240	Above 480 upto 715	
6	20/5	Above 240 upto 320	Above 715 upto 955	
7	25/5	Above 320 upto 400	Above 955 upto 1195	
8	30/5	Above 400 upto 475	Above 1195 upto 1430	
9	50/5	Above 475 upto 795	Above 1430 upto 2385	Upto 10000
10	75/5	Above 795 upto 1190	Above 2385 upto 3575	Above 10000 upto 14200
11	100/5	Above 1190 upto 1590	Above 3575 upto 4765	Above 14200 upto 19000
12	150/5	Above 1590 upto 2380	Above 4765 upto 7145	Above 19000 upto 28500
13	200/5	Above 2380 upto 3175	Above 7145 upto 9525	Above 28500 upto 38100
14	250/5	-	Above 9525 upto 11910	Above 38100 upto 47600
15	300/5	-	-	Above 47600 upto 57000

CT RATIOS APPLICABLE FOR LT METERING for DT's

S.No	Load in kVA	Recommended CT Ratio (Amps)
1	Above 10kVA upto 30 kVA	50/5
2	Above 30 kVA upto 47kVA	75/5
3	Above 47kVA upto 63kVA	100/5
4	Above 63kVA upto 94kVA	150/5
5	Above 94kVA upto 125kVA	200/5
6	Above 125kVA upto 187kVA	300/5
7	Above 187kVA upto 250kVA	400/5
8	Above 250kVA upto 310kVA	500/5
9	Above 310kVA upto 375kVA	600/5

ECONOMICAL DESIGNS FOR PRESTRESSED CONCRETE POLES

8.5

Factor of safety = 2.5

Concrete Grade M - 420

Cost Ratio

= 11 (Av. Cost stipulations)

Diameter of Prestressing Wires = 4 mm

Length Of Pole (L)	Load (kg)	Bottom depth (cm)	Top Depth (cm)	Breadth (cm)	No. of Tension Wires per pole	No. of untensioned Wires per pole	Length Of Each untensioned wire (M)	Config. type Ref. Drg. 1	Concrete Qty. M3/pole	Steel Qty. Kg/pole	Relative cost	Suitability in angle locations					
												LT lines				11 KV lines	
												KB1	KB2	KB3	KB4	KB3	KB4
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
7.5	140	25.5	10.5	8.5	8	2	4.54	1	0.115	6.81	0.190	22.2	10.2	9.6	5.3	6.0	3.0
	200	27.5	14.5	8.5	12	2	3.73	3	0.134	9.61	0.240	48.6	24.1	21.3	12.7	13.5	7.7
8.0	140	27.5	10.5	9.0	8	2	4.72	1	0.137	7.24	0.216	24.3	11.4	10.5	5.9	6.8	3.5
	200	29.0	14.5	9.0	12	2	3.96	3	0.157	10.25	0.269	52.4	26.0	23	13.7	14.7	8.5
9.0	140	27.0	10.5	10.0	10	2	4.48	2	0.169	9.76	0.276	27.4	13.0	11.9	6.8	7.5	4.0
	200	31.5	11.5	10.5	12	2	4.47	4	2.203	11.54	0.300	37.6	18.4	16.5	9.6	11.1	6.2

NOTE : $KB_1 = 16 \text{ mm}^2, \text{C.E.}$
 $KB_2 = 30 \text{ mm}^2, \text{C.E.}$ } AAC

$KB_3 = 20 \text{ mm}^2, \text{C.E.}$
 $KB_4 = 30 \text{ mm}^2, \text{C.E.}$ } ACSR

Source:- RE Stds.

8.6 SPECIFICATION OF SWAGED TYPE STEEL TUBULAR POLES AS PER IS2715 WIDELY USED IN J&K POWER DEVELOPMENT DEPARTMENT

Designation	Over all length L	Planting depth	Load applied from top at a distance of	Hgt. above ground H	Length			Outside diameter and thickness of sections			App. Wt of Pole	Breaking Load	Crippling Load	Working Load		Load for permanent set not exceeding 13 mm	Load for temporary deflection of 157.5 mm
					Btm h3	Mdl h2	Top h1	Btm h3	Mdl h2	Top h1				Col 14(2)	Col 13 (2.5)		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
(m)	m	m	m	m	m	m	m	mm	mm	mm	kg	(kg)	N	n	N	N	N
410SP								139.7	114.3	88.9		4630	(kg)	(kg)	(kg)	(kg)	(kg)
-8								x	x	x		-472	-335	-168	-189	-229	-151
	7.5	1.25	0.3	6.25	4.5	1.5	1.5	4.85	3.65	3.25	103						
410SP								139.7	114.3	88.9		5100	3620	1810	2040	2480	1600
-9								x	x	x		-520	-369	-185	-208		-163
	7.5	1.25	0.3	6.25	4.5	1.5	1.5	5.4	3.65	3.25	110						
410SP								139.7	114.3	88.9		4440	3160	1580	1770	2160	1280
-14								x	x	x		-453	-322	-161	-181	-220	
	8	1.5	0.3	6.5	4.5	1.75	1.75	4.85	4.5	3.25	111						
410								139.7	114.3	88.9		4890	3470	1740	1960	2380	1380
SP-15								x	x	x		-499	-354	-177	-200	-243	-140
	8	1.5	0.3	6.5	4.5	1.75	1.75	5.4	4.5	3.25	119						
410										114.3							
SP-31								165.1 x 4.50	139.7 x 4.50	x							
	9	1.5	0.3	7.5	5	2	2			3.65	147	5070 (517)	3600 (367)	1800 (184)	2030 (207)	2460 (251)	1360 (139)
410										114.3							
SP-32								165.1 x 4.85	139.7 x 4.50	x							
	9	1.5	0.3	7.5	5	2	2			3.65	154	5430 (554)	3850 (393)	1930 (197)	2180 (222)	2640 (269)	1430 (146)

410										114.3							
SP-33										x							
	9	1.5	0.3	7.5	5	2	2	165.1 x 5.40	139.7 x 4.50	3.65	154	6000 (612)	4270 (435)	2130 (217)	2410 (245)	2910 (297)	1540 (157)
410										139.7							
SP-55										x							
	11	1.8	0.6	9.2	5.6	2.7	2.7	193.7 x 4.85	165.1 x 4.50	4.5	227	6370 (650)	4530 (462)	2260 (231)	2550 (260)	3100 (316)	1270 (130)
410										139.7							
SP-56										x							
	11	1.8	0.6	9.2	5.6	2.7	2.7	193.7 x 5.40	165.1 x 4.50	4.5	241	6990 (713)	4820 (502)	2480 (253)	2790 (285)	3400 (347)	1370 (140)
410										139.7							
SP-57										x							
	11	1.8	0.6	9.2	5.6	2.7	2.7	193.7 x 5.90	165.1 x 4.85	4.5	256	7620 (777)	5410 (552)	2710 (276)	3050 (311)	3710 (378)	1470 (150)
410										165.1							
SP-71										x							
	13	2	0.6	11	5.8	3.6	3.6	219.1 x 5.60	193.7 x 4.85	4.5	333	7720 (787)	5480 (559)	2740 (279)	3090 (315)	3750 (382)	1160 (118)
410										165.1							
SP-72										x							
	13	2	0.6	11	5.8	3.6	3.6	219.1 x 5.90	193.7 x 4.85	4.5	343	8120 (828)	5770 (588)	2880 (294)	3250 (331)	3940 (402)	1190 (121)
410										165.1							
SP-75										x							
	14.5	2	0.6	12.5	6.5	4	4	219.1 x 5.60	193.7 x 4.85	4.5	370	6750 (688)	4790 (488)	2390 (244)	2700 (275)	3780 (334)	775 (79)
410										165.1							
SP-76										x							
	14.5	2	0.6	12.5	6.5	4	4	219.1 x 5.90	193.7 x 4.85	4.5	380	7100 (724)	5040 (514)	2520 (257)	2840 (290)	3450 (352)	794 (81)
410										165.1							
SP-79										x							
	16	2.3	0.6	13.7	7	4.5	4.5	219.1 x 5.60	193.7 x 4.85	4.5	405	6130 (625)	4350 (444)	2180 (222)	2450 (250)	2980 (304)	569 (58)
410										165.1							
SP-80	16	2.3	0.6	13.7	7	4.5	4.5	219.1 x 5.90	193.7 x 4.85	165.1	416	6440 (657)	4570 (466)	2280 (233)	2580 (263)	3130 (319)	568 (60)

RECOMMENDED SHADES FOR PAINTING ST POLES

- 1 Poles should be painted in Silver or orange only, as these colours are conspicuous and therefore safe for traffic and pedestrians. Paint the poles with black and yellow strips upto the height of 180 CM, so as to protect them against the possible damage during the night by fast moving vehicles.
- 2
- 3 Green paint is not recommended, since it conveys safety and is used to identify earth conductors

8.7 WEIGHT PER METER FOR VARIOUS TYPES OF STEEL

MS Flat		Rolled MS Equal Angles		MS Channel		MS Round		MS Plate		MS Chequre Plate	
Dimensions (MM)	Weight (Kg/mtr.)	Dimensions (MM)	Weight (Kg/mtr.)	Dimensions	Weight (Kg/mtr.)	Diameter	Weight (Kg/mtr.)	Thickness	Weight (Kg/Sq.mtr.)	Thickness	Weight (Kg/Sq.mtr.)
25x5	0.98	40x40x5	2.97	75x40x6	5.7	8.0	0.39	5.0	39.2	1.8	14.15
40x5	1.57	40x40x6	3.52	75x40x7.3	6.8	10.0	0.62	7.0	55	2.0	15.7
50x5	1.96	50x50x5	3.80	100x50x6	7.9	12.0	0.89	10.0	78.5	3.15	24.75
80x5	3.13	50x50x6	4.47	100x50x7.5	9.2	20.0	2.47	12.0	94.2	5.0	39.29
100x5	3.92	65x65x5	4.50	125x65x5	12.7	25.0	3.85	14.0	109.9	6.0	47.1
25x6	1.18	65x65x6	5.40	150x75x5.4	16.5	40.0	10.00	16.0	125.6	7.0	61.1
40x6	1.89	75x75x6	6.85	-	-	-	-	-	-	-	-
50x6	2.37	75x75x8	9.03	-	-	-	-	-	-	-	-
80x6	3.79	90x90x10	11.00	-	-	-	-	-	-	-	-
100x6	4.74	100x100x10	13.50	-	-	-	-	-	-	-	-

8.8 - RATING OF CAPACITORS FOR kVAR COMPENSATION

S.No	Rating of Individual Induction Motor	kVAR Rating of LT Capacitor
2	Above 5 BHP to 7.5 BHP	2
3	Above 7.5 BHP to 10 BHP	3
4	Above 10 BHP to 15 BHP	4
5	Above 15BHP to 20 BHP	5
6	Above 20 BHP to 30 BHP	6
7	Above 30 BHP to 40 BHP	7
8	Above 40 BHP to 50 BHP	8
9	Above 50 BHP to 100 BHP	9
10	Above 100 HP	As Approved by the Utility

8.9 - Extracts from Record note of meetings of Coordination Committee constituted vide Development Commissioner (Power) communication no. DC/PD/TO-I/51/1659-1667 Dated 17-6-2005

A) Pole Erection

- The planting depth of poles up to and including 9Mtr. Shall be 1500mm (REC Construction standards).
- The planting depth of poles of 11Mtr. Length shall be 1.83 Mtr. (One – sixth of pole length) (CBIP publication no 58).
- PCC Poles shall be provided with base plates as per REC construction drawing no. K-1.
- Base Plates for steel tubular poles shall be provided with a hole and shall be welded to pole bottom.
- Steel tubular poles shall be provided with steel pole cap.
Drilling of holes in steel tubular shall be avoided as far as possible. Back up clamps shall be used to fix cross arms/ cross
- braces.
All HT/LT poles shall be earthed as per REC standard drawing no. J-1. (REC construction drawings, J&K PDD Earthing
- Booklet Page No. 12)
- At tension points PCC poles shall be installed in Transverse/ Lateral Position.
- The Steel Tubular poles shall be concrete bottomed.
- Earthing spiral shall be kept outside concrete portion.
- Two pole, Three pole and four pole structures shall be provided with cross bracings as per REC construction drawing no. A-21.
- The 33kV, 11kV and LT poles at angle locations (greater than 50°), dead ends, tap off and tension points shall be provided with guys.
- Various accessories of guys shall be as per REC construction drawing no. G-1.
- Accessories of guys shall be assembled as per REC construction drawing no. G-3.

- Accessories of guys shall be assembled as per REC construction drawing no. G-3.
- The no. of guys for various angle locations shall be as per REC Construction Standard G-5 to G-9.
- The guy angle shall be 30 °to 45 °as per REC construction drawing no. G-3.
- Anchor plate (or guy stone) shall be provided as per REC construction drawing no. K-1 and K-4.
- Turn buckle shall be mounted at the pole end of the guy and guy wire shall be so fixed that the turn buckle is half way in the working position thus giving the maximum movement for tightening or loosening.
- Minimum two no. Guys shall be provided to two-pole structure of each distribution sub station.
- For two pole tension points minimum four guys along the line two in each direction shall be provided.
- Storm guys shall be provided for each section of line because Kashmir Valley is in wind zone of 75 Kg/m² (greater than 50 Kg/cm²). (CBIP Publication no. 88 Page 123)
- Fixing of guys to trees, buildings, structures, poles, pipe lines etc. Shall not be allowed in any case whatsoever.

- with the guy wire and continues to be in contact and if the line does not trip then the bottom portion of the guy wire would have no voltage due to the insulation provided by the guy insulator. The insulator is fixed between the guy wire almost in middle. The bottom portion of the wire thus gets insulated. Any human being or animal if coming in contact with the bottom portion of the guy-wire will be provided safety. No guy insulator shall be installed less than 2.6m from

Two types of insulators are standardized:

- (i) A type for 415/240 V lines
- (ii) C type for 11kV lines.

Two C-type insulators are used in series for 33kV lines.

- The minimum failing load for A type insulator is 44kN and for C type insulator is 88 kN. If space for installation of normal guys is not available then fly guy, bow guy and strut shall be used as per REC construction standard no. G-4.

C) ACSR for Overhead Lines

Nomenclature/ Dimensions:

The conductors shall be specified by their code names and the cross sectional area shall be mentioned in sq. mm only.

Equivalent copper area in sq. inch is no longer being used. Given below is an example to convert conductor sizes into sq. mm if it is given in equivalent copper area in sq. inch:

Size of ACSR Dog in equivalent Copper area = 0.1 inch²

$$= 0.1 \times 25.4 \times 25.4 = 64.51 \text{ mm}^2$$

Conductivity of Copper = 1.6 X Conductivity of Aluminum (for same area of copper)

Therefore cross sectional area of ACSR Dog in sq. mm = 1.6 X 64.51=100 mm² (Approx)

Following table gives technical details of conductors widely used in Sub Transmission and Distribution networks:

Code Name of ACSR	Equivalent Copper Area (Inch ²)	Nominal Al. Area (in mm ²)	Stranding and wire diameter (mm)		Approx. Mass (Kg/Km)	Calculated Resistance at 20 ^o C (Ohm/Km)	Approx. calculated breaking load KN	Current rating for Ambient Temperature of 35 ^o C (Amp)
			Al	Steel				
Squirrel	0.02	20	6/2.11	1/2.11	85	1.394	7.61	110
Weasel	0.03	30	6/2.59	1/2.59	128	0.9289	11.12	145
Rabbit	0.05	50	6/3.35	1/3.35	214	0.5524	18.25	200
Racoon	0.08	80	6/4.09	1/4.09	319	0.3712	26.91	255
Dog	0.1	100	6/4.72	7/1.57	394	0.2792	32.41	305
Leopard	0.125	125	30/2.36	7/2.36	603.8	0.2221	56.56	380
Wolf	0.15	150	30/2.59	7/2.59	727.4	0.1844	67.59	420
Deer	0.4	400	30/4.27	7/4.27	1971	0.0673	178.5	806
Zebra	0.4	400	54/3.18	7/3.18	1621	0.0674	131.9	1063
Moose	0.5	500	54/3.53	7/3.53	1999	0.05595	159.6	1204

REC Specification 1/1971 (Revised 1993) Table-II, IS 398 -1961

The design of conductor shall be based on Voltage Regulation, Thermal rating and mechanical loading. The conductor for overhead lines shall be designed with following regulation: Page 121

Nominal Voltage of Line	Voltage regulation
33kV	9%
11kV	9%
LT Lines	6%

(CBIP Publication no 198 page 10)

The calculation for voltage regulation shall be based on KW-KM for 1% voltage drop to be taken from following REC Construction Standards:

Nominal Voltage of Line	Reference to REC Construction Standard for KW-Km
33kV	M-12
11kV	A-9
LT Lines	B-9

KW - Km for ACSR Conductor for 1 % Voltage Regulation

Name	Conductor Size	11Kv Line			33 kv Line		
		0.8	0.9	1.0	0.8	0.9	1.0
Squirrel	6/1/2.11	611.42	64.36	772.32	5470.6	5792.4	7079.6
Weasel	6/1/2.59	804.5	901.04	1094.12	7240.5	8045	9975.8
Rabbit	6/1/3.35	1126.3	1287.2	1796.6	9654	11263	16090
Mink	6/1/3.66	1287.2	1415.92	2156.06	11263	12872	19308
Dog	6/1/4.72//7/1.57	1609	1962.98	3218	14481	17699	28962
Wolf	30/7/2.66	2156.06	2574.4	4633.92	19308	23169.6	41834
Panther	30/7/2.79	2316.96	2896.2	5792.4	20917	26065.8	51488

8.10 General Guidelines for execution of electrical works:

A) Control Cables/C&R Panels:

- No openings shall be left in the panels, marshalling kiosks, terminal boxes etc. Special care shall be taken in sealing outdoor cubicles to ensure IP 55 protection. All spare holes in gland plates for cable entry shall be sealed.
- The punches in gland plates shall be made by hole punching machine or some other approved mechanical means. Making of holes by welding shall not be allowed. Contractor shall replace gland plates in which holes have been made with welding machines immediately at his cost.
- Outdoor cables lying on the yard metal without any protection shall not be acceptable. Cables to equipments like CTs, PTs, CBs, Transformers shall be routed through cable trays, conduits etc.
- Cables without glands shall not be allowed.
- Contractor shall ensure that space heaters, thermostats, lights, sockets in all cubicles are working.
- Contractor shall provide inter-panel and panel to equipment cable cores with tube type cross ferrules printed by ferrule printer. The ferrules shall have address of the terminal block and terminal of the panel in which terminated and address of panel / equipment , terminal block and terminal of other side.
“Cross Ferruling is a global standard for identification of cable cores in a substation. Suppose a cable core is to be connected from 5th terminal of Terminal Block No. X2 of Control Panel K1 to the 2nd terminal of Terminal Block X3 of another panel R1. The cross ferrule in panel K1 will be “5-X2-K1-R1-X3-2”. 5 is to be kept towards terminal block and 2 side away from the terminal block in K1. Similarly the cross ferrule in panel R1 for the same core will be 2-X3-R1-K1-X2-5. 2 side is to be kept towards terminal block and 5 away from terminal block in R1. Similarly the practice is to be followed for panel to equipment wiring. Cross ferrule is very convenient for identification of cores and fault finding. Earlier ring type PVC ferrules were used for identification of cores. Electronic ferrule printers are now available which print ferrules on PVC tubes. The electronic printer can be hooked on to the computer and ferrules can be printed from the cable schedules directly from the computer” .
- Cable entries to the panels shall be from the bottom. Cable gland plate fitted on the bottom of the panel shall be connected rigidly to the earthing of the panel/station through a flexible braided copper conductor.
Wire termination shall be made with solder-less crimping type and tinned copper lugs which firmly grip the conductor and insulation. Insulated sleeves shall be provided at all the wire terminations. Engraved core identification plastic ferrules marked to correspond with panel wiring diagram shall be fitted at both ends of each wire. Ferrules shall fit tightly on the wire and shall not fall off when the wire is disconnected from the terminal blocks.

- All wires directly connected to trip circuit breaker or device shall be distinguished by **the addition of red coloured "T" lettered ferrule.** Number 6 and 9 shall not be included for ferrule purpose.
- CT and VT secondary neutral or common lead shall be earthed at one place only at the terminal blocks where they enter the panel
- For all single core cables, gland plates shall be of non-magnetic material.
- The cable opening and cable entries for cables terminating to the panels shall be sealed with fire sealing materials.
- At least one (1) core shall be kept as spare in each copper control cable of 4C, 5C or 7C size whereas minimum number of spare cores shall be two (2) for control cables of 10 core or higher size.
- Looping of earth connections shall be such that it would not result in loss of earth connections to other devices when the loop is broken. However, looping of earth connection between equipment to provide alternative paths to earth bus shall be provided
- For control cables only round wire armouring shall be used.
- Not more than 2 wires shall be connected to any terminal.
- Disconnecting type terminal blocks shall be provided for Current Transformer and Voltage Transformer secondary leads. All CT secondary leads shall be provided with short circuiting and earthing facilities.
- The terminal blocks shall be fully enclosed with removable covers of transparent, non-inflammable, non-deteriorating type plastic material.
- At least 20% spare terminals shall be provided at each panel and these spare terminals shall be uniformly distributed on all terminal blocks.
- All panels shall be equipped with an earth bus securely fixed. Location of earth bus shall ensure no radio interference for effectively earthed systems under various switching conditions of isolators and breakers. The material and the size of the bus bar shall be at least 25X6 sq.mm perforated copper with threaded holes at a gap of 50 mm with the provision of bolts and nuts for connection with cable armours and mounted equipment etc. for effective earthing. When several panels are mounted adjoining each other, the earth bus shall be made continuous.
- Panels shall be provided with two separate and distinct earthing terminals suitable to receive the earthing conductors of size 50 X 8 mm GS flat.
- All panel doors, removable covers and plates shall be gasketed all round with EDPM/ Neoprene gaskets.
- Cable gland shall be dust tight, screw or double compression type and made up of brass. The glands shall have provision for securing armour of the cable separately and shall be provided with earthing tag.
- All cubicles shall be provided with a thermostatically controlled space heater, interior lighting facilities and one single-phase power outlet (3 pin) with socket. All indicating and control devices shall be mounted on the front door.

- The bay marshalling kiosks shall be provided with danger plates and a diagram showing the numbering/connection/ferruling by pasting the same on the inside of the door.
- Aluminium conductor XLPE insulated armoured cables shall be used for main power supply purpose from LT Auxiliary Transformers to control room, between distribution boards and for supply for colony lighting from control room.
- Aluminium conductor PVC insulated armoured power cables shall be used for various other applications in switchyard area/control room except for control/protection purposes.
- Separate cables shall be used for AC & DC.
- Progressive sequential marking of the length of cable in metres at every one metre shall be provided on the outer sheath of all cables.

B) Laying of ACSR

- For 11kV lines, at straight runs and light angles (0° to 10°) pin insulators shall be used. The conductor shall be tied to the insulator at the top groove at straight runs and to side groove on top of insulator through helically formed fittings (REC Construction drawing no. C-3 and C-4).
- Tying of conductor to insulator skirt shall not be allowed in any case whatsoever. It reduces the creepage path of insulator and causes surface flashover and earth fault in dirty, humid and rainy conditions and leads to premature failure of insulator.
- Use of pin insulator at sharp angles, tap off points and dead ends for taking conductor load shall not be allowed in any case whatsoever. Pin insulator is not designed for such applications.
- At sharp angles, tap off points and dead ends disc insulators shall be used *as per REC Construction drawing no. C-5*.
- Tension points caused by ascend or descend of terrain shall be provided with disc insulators.
- The shackle insulators at straight runs shall be installed such that D-fitting of insulator is at right angles to the conductor and at dead ends the D-fitting is in line of the conductor. This will require installation of poles in such a way that holes provided for fixing insulators are at right angles to the conductor at straight runs and in line to the conductor at tension points and dead ends. (*REC Construction drawing no. D-6*).
- Conductor joints shall be crimped. Crimping sleeves shall be used for this purpose as per REC construction drawing no. E-26.
- The conductor shall be strung at specified sag and tension as per REC construction drawing no. E2 to E22. The sag chart pertaining to 100Kg/m^2 wind zone shall be used from REC standards.
- 11kV main lines in Srinagar City and Towns shall be constructed with ACSR Dog (100 mm^2). However the tap lines and in rural areas lower sizes of ACSR can be used.

c) Clearances of Sub Transmission and Distribution Lines

The clearances of 33KV, 11KV and LT lines from ground and from buildings shall be as per J&K Electricity Rules which are as under:

(a) **Minimum clearance above ground of the lowest conductor:**

Line Voltage (Phase to Phase)	Clearance across street (Mts)	Along Street (Mts)	Elsewhere than,along or across any street (Mts)
LT Line	5.791	5.486	4.572
11kV Lines	6.069	5.791	4.572
33kV Lines	6.965	6.965	5.182

(b) **Clearance from buildings**

Where an electrical line passes above or adjacent to or terminates on any building, the following minimum clearance from any accessible point, on the basis of maximum sag shall be observed:

S.No	Line Voltage (Phase to Phase)	Vertical Clearance from highest point of building (Mts)	Horizontal Clearance from nearest point of building (Mts)
1	LT Lines	2.439	1.219
2	11kV Lines	3.658	1.319
3	33 kV Lines	3.658	1.529

Note: The horizontal clearances shall be measured when the line is at a maximum deflection from the vertical due to wind pressure.

(c) **Phase to Phase Clearances**

The phase-to-phase clearances of 33kV, 11kV and LT lines shall be as per Rural Electrification Corporation Construction Standards, which are as under:

S.No	Line Voltage (Phase to Phase)	Minimum Phase to Phase Clearance (mm)	Preferred Configuration
1	LT Lines	300	Vertical
		400	Horizontal
2	11kV Lines	1070	Triangular on V-Cross Arm
3	33 kV Lines	1525	Triangular on V-Cross Arm

The preferred configuration for LT lines is vertical due to economic considerations.

D) 11kV/ 433V Distribution Sub Station Installation

(a) Clearances:

As per REC standard specification no. F-1, F-2, F-3 and F-4 and TATA Consultants report on remodeling of distribution scheme in SrinagarCity, following clearances shall be maintained for 11/0.433kV Sub Stations:

Description	Pole Mounted Transformer	Pad Mounted Transformer	References
Capacity	Up to and including 250kVA	Above 250KVA	TATA Consultants report, Drg. No. 7-3
Phase to Phase spacing of down conductors	760mm	460mm	REC Standards Drg. No. F1,F2,F3 and F4, TATA Consultants report, Drg. No. 7-3
Phase to ground clearance of down conductors (Horizontal)	460mm	460mm	REC Standards Drg. No. F1,F2,F3 and F4, TATA Consultants report, Drg. No. 7-3
HT terminal of 11kV bushing upto ground	5440 mm	2200 mm	REC Standards Drg. No. F1,F2,F3 and F4, TATA Consultants report, Drg. No. 7- 4

Note : The transformer jumpers and bushing terminals of pad mounted transformers shall be insulated with PVC sleeves or coated with epoxy compound

(b) Earthing:

- 1 Three independent earths shall be provided to 11/0.433kV Sub Stations as per REC Construction Drawing no. F-5 and F-10
- 2 To one of the earth electrodes one direct connection shall be provided from three Lightning Arresters
- 3 To each of remaining two electrodes
 - a) one separate connection from the neutral of the transformer.
 - (b) one separate connection from the transformer body and the handle of 11kV AB switch.
 - (c) one separate connection from the earthing of poles.
- 4 The earthing electrodes shall be 2.5meter perforated GI pipe 40mm dia or 20mm GI rod as per REC construction drawing no. J-1

(c) 11kV Air Break Switches:

11kV link sets shall not be used henceforth. The link sets are a safety hazard. Instead 3-phase gang operated Air Break Switches shall be used. The air break switches shall be installed as per REC Construction Drawing no. F-2, F-3 and F-4

E) Earthing of 33/11kV Sub Stations

- An earth mat shall be laid inside 33/11kV sub station designed as per standard practice. The earth mat shall be designed so that step and touch potential is kept within 32 volts.
- The minimum size of steel electrodes shall be 22mm dia and 3 mtrs long buried in ground at a minimum depth of 750mm.
- The number of electrodes required in a sub station may be selected in such a way that each rod does not carry more than 500 Amps of ground fault current. The number of electrodes may have to be increased if the combined earthing resistance exceeds 2
- The electrodes shall be uniformly distributed within the sub station area. Spacing between the electrodes shall be more than twice the depth of the electrodes driven below ground level so as to keep resistance to minimum.
- The top end of the earth electrode shall be interconnected with steel flat of minimum size of 50X6 mm.
- Separate earthing electrodes shall be driven for neutral point of power and auxiliary power transformers and for each lightning arrester. These electrodes shall be interconnected to main earth mat.
- An earth ring shall be formed around sub station at a distance of 2 meters to earth the sub station fencing. This ring shall be interconnected to the main mesh. Alternate fencing posts shall be earthed.
- Sufficient risers shall be provided to earth non current carrying parts such as tank of power transformer, frame work of circuit breaker, Isolator operating handle, all steel structures, power cable sheath and armour. Each connection shall be made in duplicate so as to ensure that at least one safety earth remains in case any one of the two fails.
- The risers to equipment or risers to steel structure shall not be welded. All these connections shall be bolted. The risers shall be connected to steel structures through bolts/nuts of minimum size of 16mm and the riser to equipment connection shall be
- The risers shall not be embedded in concrete.
- All welded mesh joints shall be painted with red lead and aluminum and later coated with bituminous.
- The power cables shall be grounded at one end only. If the cables are grounded at both ends, the induced currents flow through a continuous loop formed by armor/ sheath through ground and may damage the cable and/or termination due to overheating.
- Crushed rock may be used as surface layer as it provides high resistivity, keeps away the reptiles and also avoids formation of
- Crushed rock of size 3cm to 5cm to a depth of approximately 10 cm may be spread in the yard area. Electric equipments and structures supporting live conductors may be surrounded by a surface layer of crushed rock within a distance of above two meters. This is so as a person is not likely to be exposed to touch voltage when he is two meters away from any live equipment or structure with yard.

(**Source** : REC Earthing Manual; PDD Earthing Booklet; PDD Const. Practice)

F) Electrical Clearances in 33/11kV Sub Stations (Receiving Stations)

- Minimum phase – phase clearance of 33kV Bus shall be 1200mm .(REC Construction Drawing no. L-1)
- Minimum phase – column clearance of outermost conductors of 33kV Bus shall be 1050mm. (REC Construction Drawing no. L-1)
- Minimum Phase to ground clearance of 33kV Bus shall be 4500mm .(REC Construction Drawing no. L-1)
- Minimum ground clearance of HV terminal of 33KV Circuit Breaker and 33/11kV Transformer shall be 3660mm.
- Minimum phase – phase clearance on 11kV gantry shall be 900mm .(REC Construction Drawing no. L-1)
- Minimum distance from 33kV switchyard up to control room shall be 7500mm (REC Construction Drawing no. L-1)
- Minimum spacing between 11kV panels and control room wall shall be 1000mm(with back door open)

Tilting of V-Cross Arms

Some field engineers have approached the committee with complaint regarding tilting of V-Cross Arms at angle locations. The committee examined the issue and following clarifications are hereby given:

- The tilting problem has been noticed mostly at angle locations more than 10^0 .
- The committee has recommended V-Cross arm for tangent locations (straight runs) and light angles (upto 10^0)only. For angle locations 10^0 to 60^0 two pole structure shall be used and for angle locations 60^0 to 90^0 4 pole structure shall be used.(KEECC Record note no dated 09-07-2005) (REC Construction Drawing no. A-10)
- At some locations the cross arms have slipped and/ or tilted because back clamp for the cross arm was not fabricated as per REC Construction drawing no. K-2. Please note 20mm gap is to be left between the cross arm and back clamp after firm tightening
- Still if the field engineers have apprehensions that the cross arm may slip/ tilt they can use supporting braces as per enclosed drawing (CBIP publication no 88 page 58)
- Standardized V-Cross arm has been in use in the country since September 1972. This cross arm is considered to be the best choice of power engineers all over the country in view of its advantage of reducing the bird faults considerably. Due to this advantage Central Board of Irrigation and Power has also upheld its use. TATA consultants have also recommended its use in Srinagar and Jammu Cities. REC has again standardized this cross arm for RGGVY Schemes (REC Guide Line for RGGVY Schemes- Attachment-I)

- Since Kashmir Valley is gifted with vast variety of birds some of which are large sized like crows, Kites, Vultures etc. the bird faults are very common here. The bird sits on the flat cross arm and its beak or tail touches the live conductor resulting in earth fault. This problem was not widespread earlier because wooden poles and wooden cross arms were used in Sub Transmission and Distribution System in Kashmir Valley. These poles/ cross arms provided sufficient insulation to ground. Ever since the wooden poles and wooden cross arms have been replaced by Steel/PCC poles and steel cross arms, the occurrence of bird faults has become a regular feature reducing reliability of power supply.
- The V-cross arm has been designed in such a way that bird cannot sit on it due to its slanting design.
- Under the circumstances the committee considers the V-Cross Arm is the best choice for Sub Transmission and Distribution System in KashmirValley for reliability and safety of the system.

HVDS (High voltage distribution system)

HVDS stands for High Voltage System. In this system high voltage line is drawn as near the load as possible and small capacity distribution transformer is installed. This system is best suited to meet scattered rural loads. The advantages of this system are:

- (i) Reduction in losses because LT line length is reduced.
- (ii) Improvement in voltage at the consumers premises.
- (iii) Theft of energy by direct tapping of long LT lines eliminated.
- (iv) Frequent faults on LT side are reduced.
- (v) Failure of Transformers prevented because transformer is feeding 3-5 consumers and these consumers have sense of belonging of the transformer and they take care of the transformer.

REC specification no. 50/1987 specifies the Single Phase Distribution Transformers. Fig.1, Fig.2, Fig.4 and fig.5 attached to this specification gives the connection diagram of the single phase transformers. In each drawing continuous 11kV neutral is shown on HT side connected to the transformer. In order to accomplish this scheme a continuous neutral shall have to be run on existing poles from the star point of 33/11kV Power Transformer right up to the distribution sub station.

The prevailing practice of HVDS in KashmirValley is to use a single conductor for HVDS transformer. The other terminal of HT winding of the single-phase transformer is grounded locally. This connection is nothing but Single Wire Earth Return System (**SWER**).

REC specification no 14/1979 specifies SWER distribution transformers. This specification was issued for gaining experience only. REC did not issue any construction standard for SWER system till 1994. The REC standards available with the committee are amended up to 30-07-1994.

The committee tried to obtain information from World Wide Web on SWER systems and following are the findings:

- REC has recently issued Standard Technical Specification (Specification No. 75/2005) for 5kVA HVDS Transformers, wherein it has been made clear that ***in case of single phase $11/\sqrt{3}$ HVDS transformers, 3 ph., 4 Wire system at 11kV (with separate neutral wire running continuously from 33/11kV sub-station) shall be adopted and proper earthing of neutral wire separately at both ends shall be ensured***. In view of this development the committee decided to issue following guideline for construction of HVDS substations:
 - The standard rating of HVDS transformers shall be 5, 6.3, 10 & 16kVA for $11/\sqrt{3}$ (Phase to Neutral) transformers and 10 & 16kVA for 11kV (Phase to Phase) transformers. (*REC Specification no. 50/1987 & 75/2005*)
 - The 3 phase and 2 phase HVDS transformers shall be fed from 3 wire 11kV system in conventional manner. However in case of single phase HVDS transformers ($11/\sqrt{3}$ kV primary), 3 Ph, 4 wire system at 11kV with separate neutral wire running continuously from 33/11kV sub-station shall be adopted and proper earthing of neutral wire separately at both ends shall be ensured. (*REC Specification no. 50/1987 & 75/2005*)
 - The transformers shall be mounted on single poles. The neutral wire shall be of minimum size ACSR/AAAC recommended for 11kV by REC (eg ACSR 7/2.11mm, 20mm² aluminum area) (*REC Specification no. 1/1970 revised 1993 & A-32, F-13& F14*)
 - The neutral shall be run on LT shackle insulators installed on 11kV pole directly through D-clamps. The point of attachment of neutral wire shall be 800mm below lowermost 11kV phase conductors. (*REC Specification no. A-16*)
 - The single phase HVDS transformers shall be distributed equally on the 3 phases of 11kV system to ensure balancing of load at 33/11kV sub station feeding the single phase HVDS system.

METER INSTALLATION

The meter installation procedure for R-APDRP part B as per the technical committee decision is as under

- A minimum of 5.0 KVA per consumer or the present agreed load whichever is higher to be considered for designing loading profile of proposed HVDS transformers of various ratings.
- Proposed HVDS Transformers designed loading to be taken up 80 % of its rated capacity.
- It was also decided that the meters will be installed in steel boxes on HVDS Transformer Structures with capacity for meters equal to the number of consumers to be served from the HVDS transformers. Spare capacity @2 Meters/box or 20% spare capacity whichever is higher shall be provided for future expenditure. Common door with single locking facility shall be provided for all meters. The meter boxes will be installed under the HVDS Transformers with suitable G.I Clamping arrangements at appropriate height so that consumers can read their meters conveniently with the aid of a stool. For consumers fed through ABC Single Steel boxes will be provided on poles with appropriate capacity of meters as per requirement. Spare capacity as in case of HVDS shall be provided for future expansion.

TECHNICAL SPECIFICATION FOR CROSS-ARMS FOR 33 kV AND 11 kV OVERHEAD POWER LINES

1.0 'V' SHAPE M.S. CROSS ARM WITH CLAMPS

- 1.1 X-arms shall be made out of 100 x 50 x 6 mm and 75 x 40 x 6 mm M.S. Channel for 33KV and 75x40x6mm for 11KV
- 1.2 The cross arm shall be hot dipped galvanized generally conforming to IS – 2633/72.
- 1.3 The X-arm should not be welded/ jointed at any place except as specified.
- 1.4 The clamps for the X-arm shall be of G.I. & shall be hot dipped galvanized generally conforming to IS – 2633/72.
- 1.5 The clamps shall be designed to fit for the specified rail & PSC poles.

2.0 Shape & Size

- 2.1 The cross arms shall be of MS channel.
- 2.2 The cross arms shall have two holes of 22 mm dia (for 11kV line) and 26 mm dia (for 33kV line) for fixing of pin insulators. The center-to-centre distance between the holes shall be 1070 mm (for 11kV) and 1525 mm (for 33kV) and holes shall be in the middle of the top width of cross arm.
- 2.3 If required by the owner, holes of specified size and spacing shall also be provided for fixing of pole back clamp to suit the pole

3.0 Marking

The following information shall be marked on each cross arm:

- a) Manufacturer's name or trademark.
- b) Year of manufacture

8.11 - Sag

Electric Power transmission or distribution system can be done either by means of underground cables or by overhead lines. Since cable cost is comparatively high as such overhead lines with bare conductors are generally in use for both transmission and distribution systems, where air acts as insulation and insulation between the conductors is provided by adjusting spacing between them. The successful operation of the line depends to great extent upon the mechanical design of the line. While making mechanical design of any electric distribution lines, it is proper to adhere to the National Electric Safety Code which is the standard containing minimum safety requirements for distribution lines and poles. Loading criteria such as wind, ice loading factors etc, as per NES code, are required to be given full cognizance

The horizontal/transverse and vertical loading from various combinations of ice and wind on poles and wires as worst probable effect (captured by the rule in National Electricity safety code) is meant to be taken into consideration.

Main components of electrical lines are:

1. Conductors
2. Supporters (Poles)
3. Insulators etc.
4. Cross arms, etc

In an electrical distribution line three types of pole supports are generally used.

1. Tangent poles (max angle of 5 deg)
2. Guyed poles
3. Self supporting poles

1. Tangent Poles : Poles which are in straight line with other poles and may have a maximum angle of 5 deg. They typically resist only the forces due to wind, ice , gravity and the forces from unbalanced tension in the conductors. These poles do not typically require any special back filling material other than natural soil.

2. Guyed Poles: In addition to horizontal forces and their resulting moments caused by wind and vertical forces from dead load, guyed poles must resist loads in both horizontal and vertical directions due to guy wires. Guying forces are the biggest contributors to vertical forces in guyed poles. Like tangent poles, guyed poles do not make use of special backfill or concrete to transfer forces to the soil.

3. Self Supporting Poles: Self supporting poles, typically made of concrete or steel are used where tangent poles and guyed poles do not work. They may be located at corners of distribution lines where guyed poles/guy wires cannot be used (side walks prevent auning or property owners do not allow auning or other reasons prevent auning).

Pole depth as a thumb rule is one sixth of pole height

Besides above conductor sag and terrain is an important consideration in mechanical design of electric overhead lines. Conductor sag should be kept to the minimum in order to reduce the conductor material required and to avoid extra pole support height for sufficient clearance above ground level. At the same time, it is also desirable that tension in the conductor should be low to avoid mechanical failure of conductor and to permit the use of less strong poles. But low tension means high sag and low sag means high tension, so compromise between the two made while designing the lines.

Mathematically, $Sag S = \frac{Wl^2}{8T}$

W = (Resultant) weight per unit length of conductor

l = Length of conductor

T = Tension in the conductor

For standard practices conductor tension is less than 50% of its ultimate tensile strength.

Following are the calculations for evaluating various loads on the pole supports, which can give base for selecting conductor, span and pole supports. Since in our state, most of the pole supports used are self supporting, as such a recognized/expert designer is suggested to be employed for designing the lines.

SAG CALCULATION FOR WEASEL CONDUCTOR

DESIGN PARAMETERS :

- 1 Half span length(L) :
 $L = \text{As per actual}$ **30** m
- 2 Tensile strength (T_s) :
 $T_s = \text{Ref. IS : 398 - 1961}$ 1136 kg/m
- 3 Tension in cond.(T) :
 $T = 0.35 \times T_s$ 397.6 kg/m
- 4 Resultant load (W) :
 $W = \{(W_c + W_i)^2 + W_w^2\}$ 0.545835214 kg/m
- 5 Wind load (W_w) :
 $W_w = 0.667 \times D \times W_p$ 0.518259 kg/m
- 6 Ice Load (W_i) :
 $W_i = 0.0028(D + t) \times t$ 0 kg/m
- 7 Cond. weight (W_c) :
 $W_c = \text{Ref. IS : 398 - 1961}$ 0.1713 kg/m
- 8 Conductor dia(D) :
 $D = \text{Ref. IS : 398 - 1961}$ 7.77 mm
- 9 Ice thickness(t) :
 $t = \text{As per actual}$ **0** mm
- 10 Wind pressure(W_p) :
 $W_p = \text{Ref. IS :}$ **100** kg/m/S²

CALCULATION :

- 1 Sag calculation (d) :

$$d = WL^2 / 2T$$

$$\text{Vertical Sag} = d \cos [\tan^{-1} \{W_w / (W_c + W_i)\}]$$

$$\text{Horizontal Swing} = d \sin [\tan^{-1} \{W_w / (W_c + W_i)\}]$$

	<u>Meters</u>	<u>Feet</u>
	0.62	2.03
	0.19	0.64
	0.59	1.92

SAG CALCULATION FOR RABBIT CONDUCTOR

DESIGN PARAMETERS :

- 1 Half span length(L) :
L= As per actual 25 m
- 2 Tensile strenght (T_s) :
T_s= Ref. IS : 398 - 1961 1860 kg/m
- 3 Tension in cond.(T) :
T= 0.35 x T_s 651 kg/m
- 4 Resultant load (W) :
W = $\{(W_c + W_i)^2 + W_w^2\}$ 1.078791402 kg/m
- 5 Wind load (W_w) :
W_w = 0.667x D x Wp 0.50275125 kg/m
- 6 Ice Load (W_i) :
W_i= 0.0028(D + t) x t 0.74088 kg/m
- 7 Cond. weight (W_c) :
W_c= Ref. IS : 398 - 1961 0.2136 kg/m
- 8 Conductor dia(D) :
D= Ref. IS : 398 - 1961 10.05 mm
- 9 Ice thickness(t) :
t= As per actual 12 mm
- 10 Wind pressure(Wp) :
Wp= Ref. IS : 75 kg/m/S²

CALCULATION :

- 1 Sag calculation (d) :

	<u>Meters</u>	<u>Feet</u>
d = WL ² / 2T	0.52	1.70
Vertical Sag = d cos tan ⁻¹ {W _w / (W _c +W _i)}	0.46	1.50
Horizontal Swing = d sin tan ⁻¹ {W _w / (W _c +W _i)}	0.24	0.79

SAG CALCULATION FOR DOG CONDUCTOR

DESIGN PARAMETERS :

1 <u>Half span length(L) :</u>	L= As per actual	30 m
2 <u>Tensile strenght (T_s) :</u>	T _s = Ref. IS : 398 - 1961	3299 kg/m
4 <u>Resultant load (W) :</u>	$W = \{(W_c + W_i)^2 + W_w^2\}$	1.456251867 kg/m
5 <u>Wind load (W_w) :</u>	$W_w = 0.667 \times D \times W_p$	0.70785375 kg/m
6 <u>Ice Load (W_i) :</u>	$W_i = 0.0028(D + t) \times t$	0.87864 kg/m
7 <u>Cond. weight (W_c) :</u>	W _c = Ref. IS : 398 - 1961	0.394 kg/m
8 <u>Conductor dia(D) :</u>	D= Ref. IS : 398 - 1961	14.15 mm
9 <u>Ice thickness(t) :</u>	t= As per actual	12 mm
10 <u>Wind pressure(W_p) :</u>	W _p = Ref. IS :	75 kg/m/S ²

CALCULATION :

1 <u>Sag calculation (d) :</u>		<u>Meters</u>	<u>Feet</u>
	$d = WL^2 / 2T$	0.56754284	1.8619945
Vertical Sag =	$d \cos \tan^{-1} \{W_w / (W_c + W_i)\}$	0.495984064	1.6272245
Horizontal Swing =	$d \sin \tan^{-1} \{W_w / (W_c + W_i)\}$	0.275870773	0.9050768

SAG CALCULATION FOR PANTHER CONDUCTOR

DESIGN PARAMETERS :

1 Half span length(L) :

L= As per actual 100 m

2 Tensile strength (T_s) :

T_s= Ref. IS : 398 - 1961 9127 kg/m

3 Tension in cond.(T) :

T= 0.35 x T_s 3194.45 kg/m

4 Resultant load (W) :

W = $\{(W_c + W_i)^2 + W_w^2\}$ 2.334522181 kg/m

5 Wind load (W_w) :

W_w = 0.667x D x Wp 1.050525 kg/m

6 Ice Load (W_i) :

W_i = 0.0028(D + t) x t 1.1088 kg/m

7 Cond. weight (W_c) :

W_c= Ref. IS : 398 - 1961 0.976 kg/m

8 Conductor dia(D) :

D= Ref. IS : 398 - 1961 21 mm

9 Ice thickness(t) :

t= As per actual 12 mm

10 Wind pressure(Wp) :

Wp= Ref. IS : 75 Kg/m/S²

CALCULATION :

1 Sag calculation (d) :

$$d = WL^2 / 2T$$

	<u>Meters</u>	<u>Feet</u>
Vertical Sag = $d \cos \tan^{-1} \{W_w / (W_c + W_i)\}$	3.65	11.99
Horizontal Swing = $d \sin \tan^{-1} \{W_w / (W_c + W_i)\}$	1.64	5.39

SAG CALCULATION FOR DEER CONDUCTOR

DESIGN PARAMETERS :

- 1 Half span length(L) :
L= As per actual 100 m
- 2 Tensile strenght (T_s) :
T_s= Ref. IS : 398 - 1961 18230 kg/m
- 3 Tension in cond.(T) :
T= 0.35 x T_s 6380.5 kg/m
- 4 Resultant load (W) :
W = $\{(W_c + W_i)^2 + W_w^2\}$ 3.700268302 kg/m
- 5 Wind load (W_w) :
W_w = 0.667x D x Wp 1.49524725 kg/m
- 6 Ice Load (W_i) :
W_i= 0.0028(D + t) x t 1.407504 kg/m
- 7 Cond. weight (W_c) :
W_c= Ref. IS : 398 - 1961 1.9772 kg/m
- 8 Conductor dia(D) :
D= Ref. IS : 398 - 1961 29.89 mm
- 9 Ice thickness(t) :
t= As per actual 12 mm
Wp= Ref. IS : 75 Kg/m/S²

CALCULATION :

- 1 Sag calculation (d) :

	<u>Meters</u>	<u>Feet</u>
d = WL ² / 2T	2.90	9.51
Vertical Sag = d cos tan ⁻¹ {W _w / (W _c +W _i)}	2.65	8.70
Horizontal Swing = d sin tan ⁻¹ {W _w / (W _c +W _i)}	1.17	3.84

SAG CALCULATION FOR MOOSE CONDUCTOR

DESIGN PARAMETERS :

- 1 Half span length(L) :
 $L = \text{As per actual}$ 125 m
- 2 Tensile strength (T_s) :
 $T_s = \text{Ref. IS : 398 - 1961}$ 16250 kg/m
- 3 Tension in cond.(T) :
 $T = 0.35 \times T_s$ 5687.5 kg/m
- 4 Resultant load (W) :
 $W = \{(W_c + W_i)^2 + W_w^2\}$ 3.798089007 kg/m
- 5 Wind load (W_w) :
 $W_w = 0.667 \times D \times W_p$ 1.56928425 kg/m
- 6 Ice Load (W_i) :
 $W_i = 0.0028(D + t) \times t$ 1.457232 kg/m
- 7 Cond. weight (W_c) :
 $W_c = \text{Ref. IS : 398 - 1961}$ 2.0015 kg/m
- 8 Conductor dia(D) :
 $D = \text{Ref. IS : 398 - 1961}$ 31.37 mm
- 9 Ice thickness(t) :
 $t = \text{As per actual}$ 12 mm
- 10 Wind pressure(W_p) :
 $W_p = \text{Ref. IS :}$ 75 kg/m/S²

CALCULATION :

- 1 Sag calculation (d) :

	<u>Meters</u>	<u>Feet</u>
$d = WL^2 / 2T$	5.22	17.12
Vertical Sag = $d \cos \tan^{-1} \{W_w / (W_c + W_i)\}$	4.75	15.59
Horizontal Swing = $d \sin \tan^{-1} \{W_w / (W_c + W_i)\}$	2.16	7.07

PROPERTIES OF ACSR CONDUCTORS

S.No.	Conductor size (mm ²)	Commercial name	Dia. 'D' (mm)	Weight 'W'(kg)	Tensile Strength 'Ts' (kg/m)	Remarks
1	20 (6/1/2.59)	Weasel(0.03/30)	7.77	0.1277	1136	
2	30 (6/1/3.35)	Rabbit(0.05/50)	10.05	0.2136	1860	
3	65 (6/4.72/7/1.57)	Dog(0.1/100)	14.15	0.394	3299	
4	130 (30/7/3.0)	Panther(0.2/200)	21.00	0.976	9127	
5	260 (30/7/4.27)	Zebra(0.4/400)	29.89	1.9772	18230	
6	325(54/7/3.53)	Moose(0.5/500)	31.37	2.0015	16250	

CONDUCTOR SAG CALCULATION

S.No	Conductor size (mm ²) copper equivalent	Commercial name (in. ² /mm ²)	Span 2L (m)	Mult. Factor	Total Sag $d = WL^2/2T(m)$	Vertical sag $d \cos$ (m)	Sag +Ice-wind $d_i = WL^2/2T(ft.)$	Hor. swing** $d \sin$ (ft.)
1	20 (6/1/2.59)	Weasel(0.03/30)	40	0.0001716	0.27455	0.0862	1.453586	0.8552
2	30 (6/1/3.35)	Rabbit(0.05/50)	60	0.0001351	0.48629	0.1476	2.274411	1.5201
3	65 (6/4.72/7/1.57)	Dog(0.1/100)	130	0.0001107	1.87109	0.7208	7.964006	5.6649
4	130 (30/7/3.0)	Panther(0.2/200)	260	0.0000668	4.51538	2.5814	18.645573	12.1544
5	260 (30/7/4.27)	Zebra (0.4/400)	350	0.0000550	6.73841	4.7450	27.249604	15.6970
6	325(54/7/3.53)	Moose(0.5/500)	400	0.0000636	10.18198	7.0382	40.805941	24.1393

SAFE CLEARANCE

S.No	Voltage level (kV)	Horizontal (ft.)**	Vertical clearance (ft.)		
			Across street	Along street	Else where
1	Low & Medium	4	19	18	15
2	11	4	20	19	17
3	33	6	20	20	17
4	132	9	23	23	20
5	220	12	26	26	23
6	400	18	32	32	29

Note:

** Add horizontal swing to achieve safe clearance from any structure.

Add 3 feet for weather boarding

Total clearance between any proposed plinth and 132kV line with 0.2ACSR conductor at mid span will be

*(9+12.1544+3) = 24.1544 feet = **25 feet***

8.12- Working Load of PCC Poles

**Working Load on PCC Pole (Example of 8 Mtr/140 kg Pole) with dog conductor,
line span 50 mtr and wind zone-III of J&K (75kG/ sq.mtr.)**

	Cond	Wind	Dia	Span	Vert	PH	CH	Total
Bending Moment at Ground due to top Conductor	1	75	14.15	50	1	6.5	6.85	239.90 kgm
Bending Moment at Ground due to lower Conductors	2	75	14.15	50	1	6.5	5.5	385.23 kgm
Total Bending Moment at Ground Level								625.13 kgm
Equivalent Load at 0.6 Mtr								105.95 kg
	Pole	Wind	a	b	H			
Wind Load on Pole surface	1	75	275	105	6.5			92.63 kg
Bending Moment at Ground due to Pole surface	$W \times h/3 \times (a + 2b)/(a + b)$							256.14 kgm
Equivalent Load at 0.6 Mtr								43.41 kg
Total Transverse Load at 0.60 Mtr								149.37 kg
Ultimate Load with Load Factor of 2.5								373.42 kg

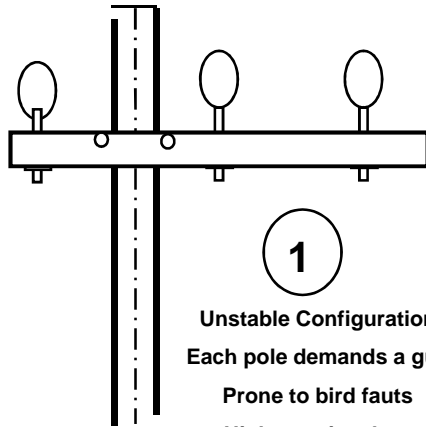
The nearest suitable pole of 8 mtr length is 200kG Working load.
The load of guard netting is over and above the load of 149.37 Kg.

Working Load on PCC Pole (Example of 9 Mtr/200 kg Pole) with dog conductor, line span 70 mtr and wind zone-III of J&K (75kG/ sq.mtr.)								
	Cond	Wind	Dia	Span	Vert	PH	CH	Total
Bending Moment at Ground due to top Conductor	1	75	14.15	70	1	7.5	7.85	384.88 kgm
Bending Moment at Ground due to lower Conductors	2	75	14.15	70	1	7.5	6.5	637.39 kgm
Total Bending Moment at Ground Level								1022.27 kgm
Equivalent Load at 0.6 Mtr								148.16 kg
	Pole	Wind	a	b	H			
Wind Load on Pole surface	1	75	315	115	7.5			120.94 kg
Bending Moment at Ground due to Pole surface	$W \times h/3 \times (a + 2b)/(a + b)$							383.20 kgm
Equivalent Load at 0.6 Mtr								55.54 kg
Total Transverse Load at 0.60 Mtr								203.69 kg
Ultimate Load with Load Factor of 2.5								509.23 kg

The nearest suitable pole of 9 mtr length is 300kG Working load.
The load of guard netting is over and above the load of 203.69 Kg.

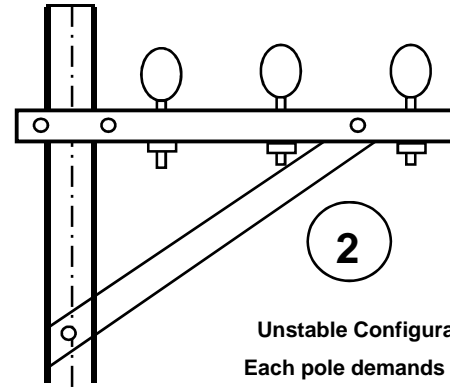
**8.13 CONSTRUCTION DRAWINGS
OF
CROSS ARMS, SUB STATION FRAME ETC**

SUB STANDARD CROSS ARMS AND CONDUCTOR CONFIGURATION(5 Cases)



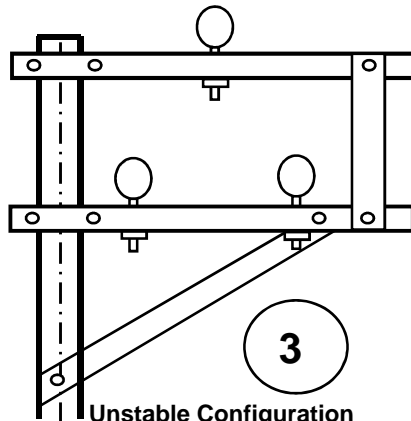
1

Unstable Configuration
 Each pole demands a guy
 Prone to bird faults
 High reactive drop
 Needs poles of high strength
 Not specified in standards
 Hence not recommended



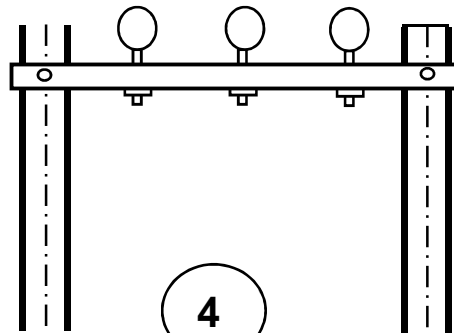
2

Unstable Configuration
 Each pole demands a guy
 Prone to bird faults
 High reactive drop
 Needs poles of high strength
 Very difficult to get phase clearance
 Not specified in standards
 Hence not recommended



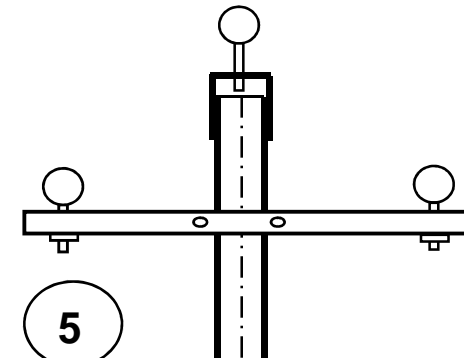
3

Unstable Configuration
 Each pole demands a guy
 Prone to bird faults
 Needs poles of high strength
 Not specified in standards
 Hence not recommended



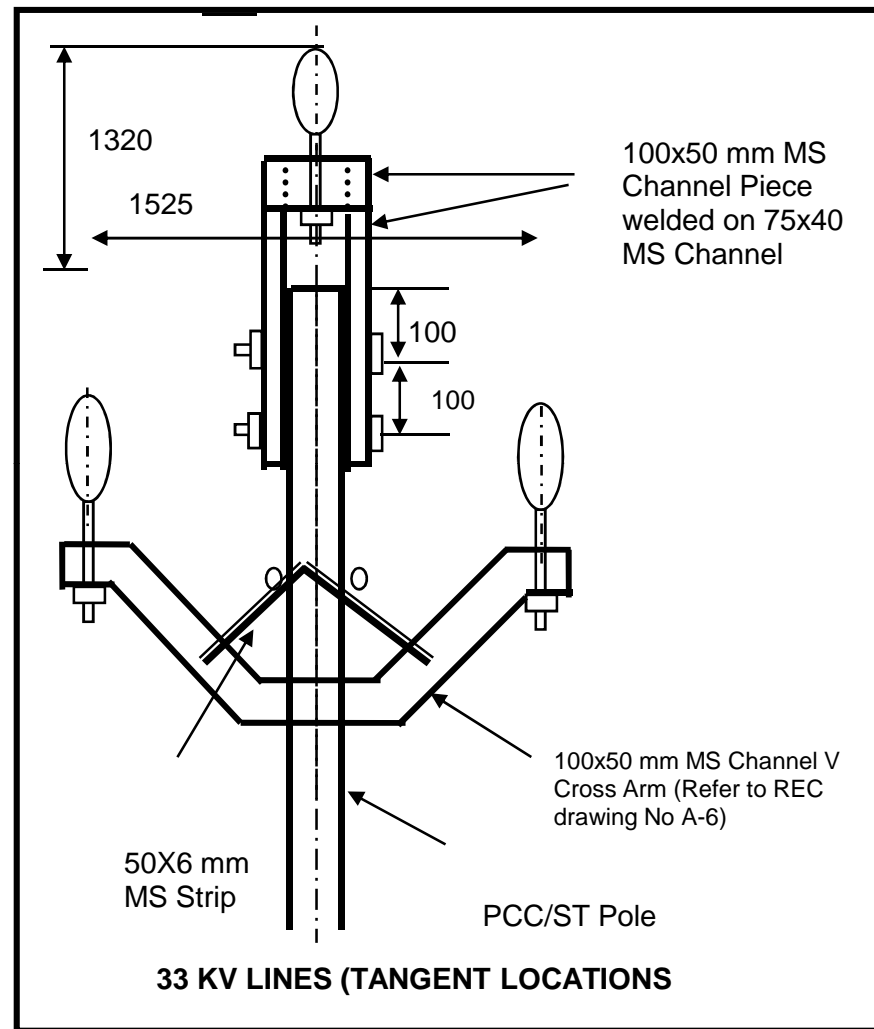
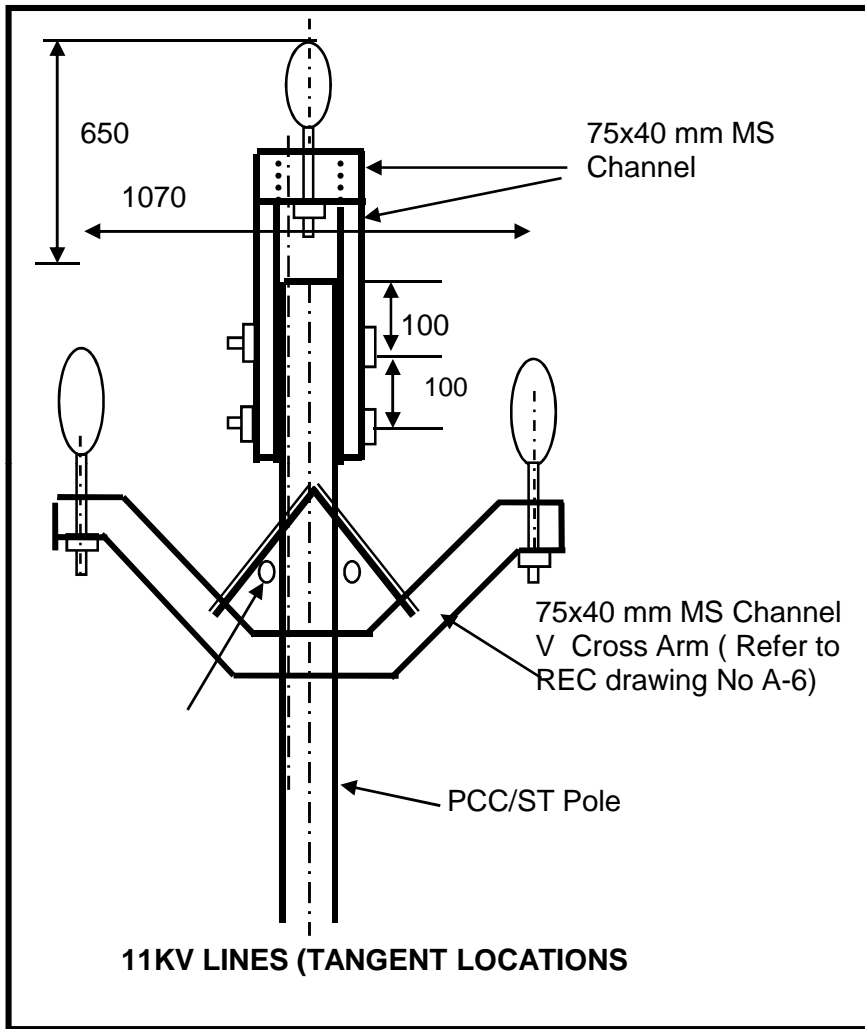
4

Very difficult to get phase clearance
 Prone to bird faults
 High reactive drop
 Not specified in standards
 Hence not recommended



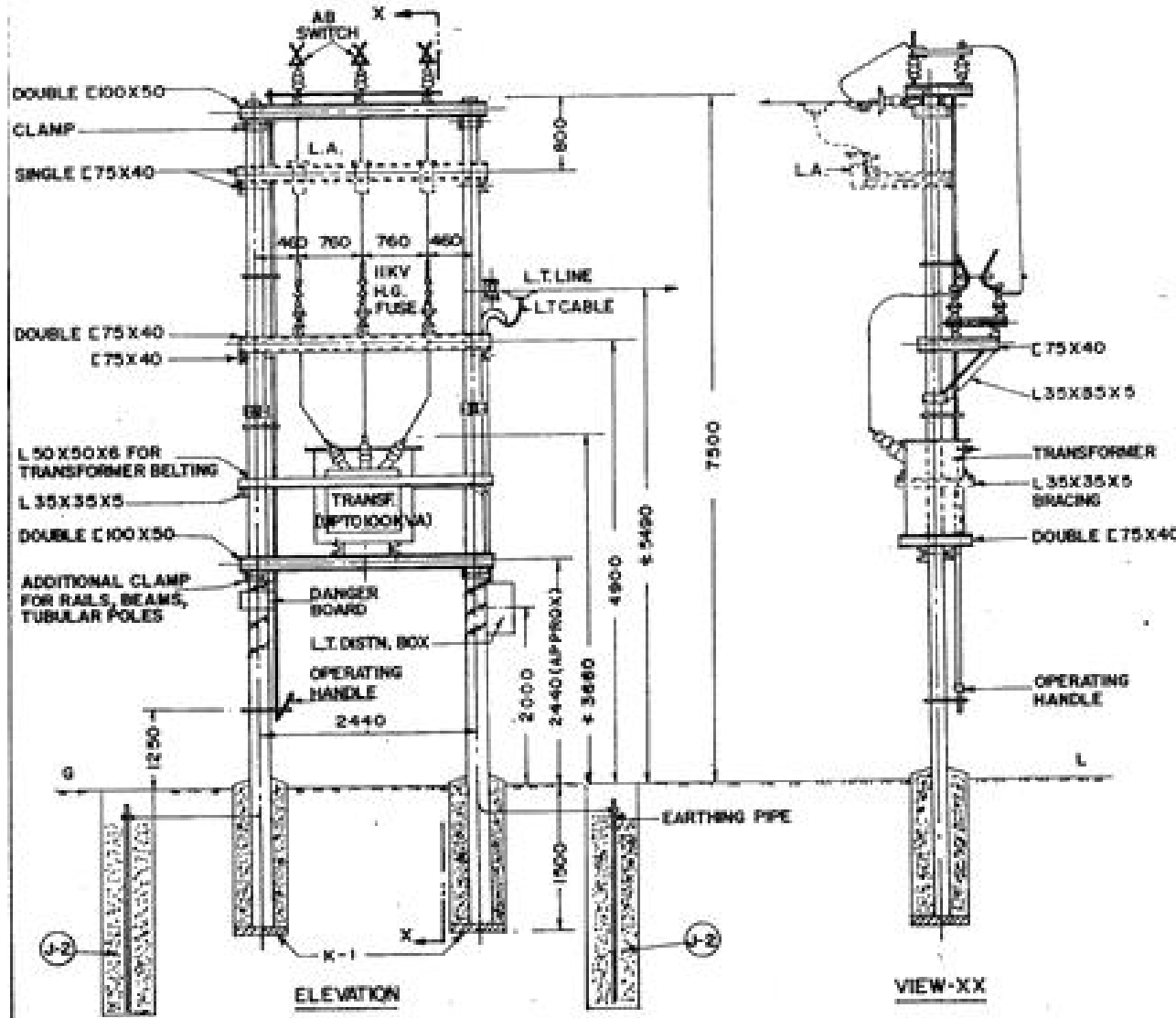
5

Prone to bird faults
 Not specified in standards
 Not recommended for straight runs



CONDUCTOR FORMATION AND CLEARENCE OF 11 KV AND 33 KV LINES

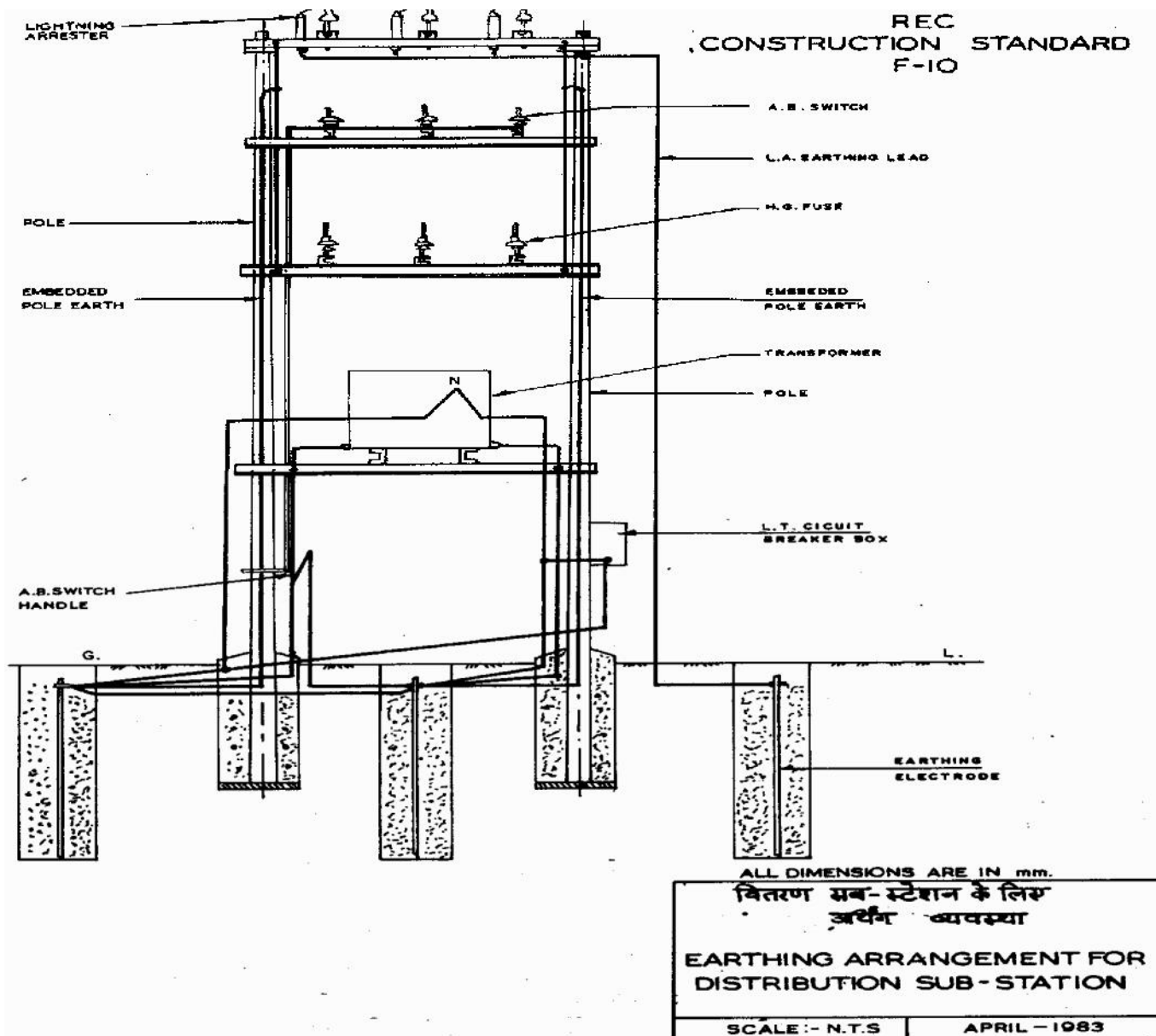
REC
CONSTRUCTION STANDARD
F-2



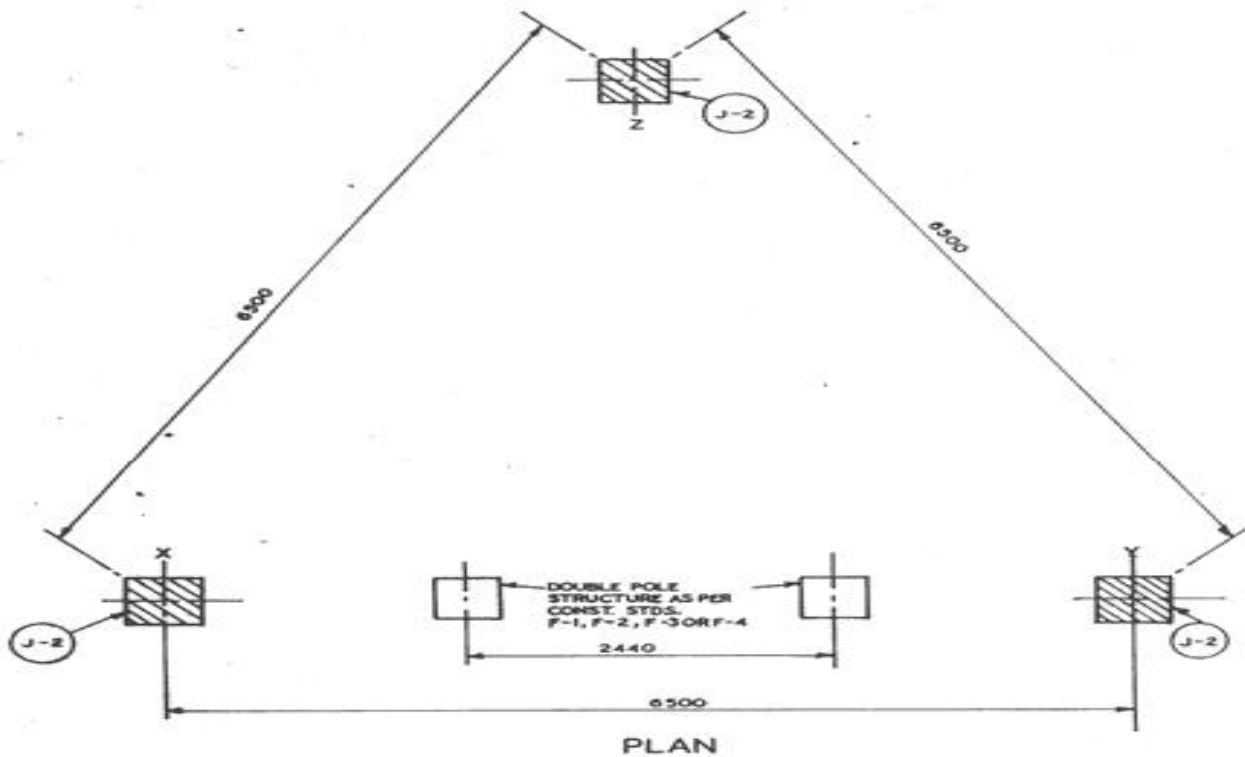
BILL OF MATERIAL

SUPPORTS	- 3 m.	2
CHANNELS	100x50 - 2800 (APPROX.)	4
CHANNELS	75 x 40 - 2800 (APPROX.)	2+1
CHANNELS	75x 40 - X-ARM FOR SUPPORTING H.G. FUSE & L.A.	2+2
ANGLES	50 x50x6 - 2800 (APPROX)	2
ANGLES	35x35x5 - 460 (APPROX)	2
ANGLES	35x35x5 - BRACING FOR SUPPORTING H.G. FUSE FOR SUPPORTING DISTRIBUTION BOX	2
DISTRIBUTION TRANSFORMER		1
AIR BREAK SWITCH (HORIZONTAL TYPE)		1
H.G. FUSE UNIT-3 PHASE		1 set
11 KV. LIGHTNING ARRESTERS		3
DISTRIBUTION BOX		1
EARTHING SET		AS REQD.
DANGER BOARD		1
CLAMPS, NUTS, BOLTS, BARBED WIRE ETC. AS REQD.		
L.T. CABLE		AS REQD.

11 के. वी. / 433-250 वोल्ट
3-फे. सिंगल और डबल गैप फ्यूज युक्त
विद्युत उप-स्टेशन
11KV/433-250 V
DISTRIBUTION SUB-STATION
WITH A.B. SWITCH &
HORN GAP FUSES
SCALE: N.T.S. 1972 / JAN. '88



REC
CONSTRUCTION STANDARD
F-5



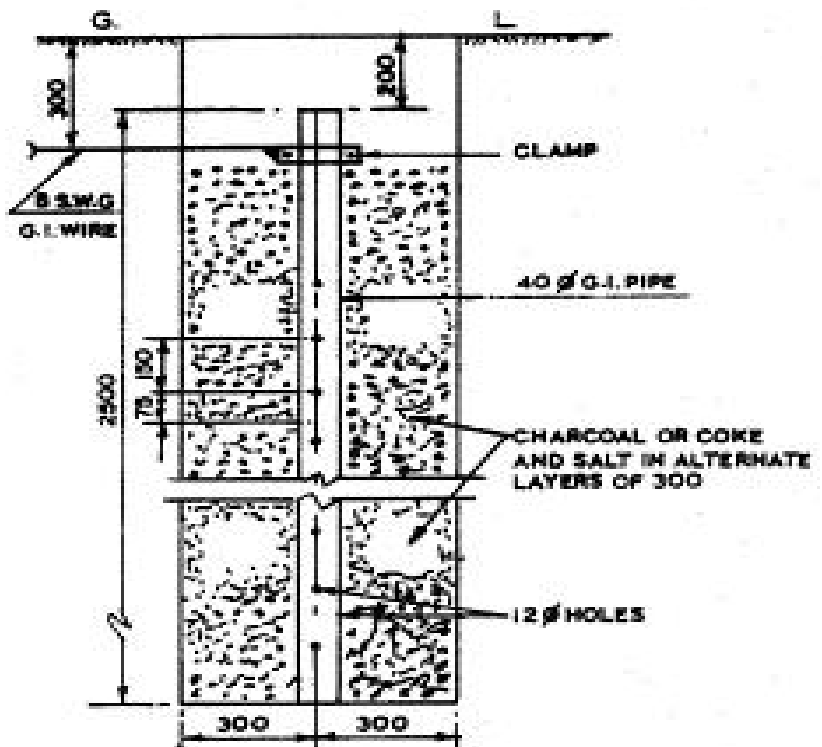
NOTES:-

1. THE CONNECTIONS TO THE THREE - EARTH ELECTRODES SHOULD BE AS FOLLOWS:-
 - (a) TO ONE OF THE EARTH ELECTRODES ON EITHER SIDE OF DOUBLE POLE STRUCTURE (X OR Y).
 - (i) ONE DIRECT CONNECTION FROM THREE 11KV LIGHTNING ARRESTERS.
 - (ii) ANOTHER DIRECT CONNECTION FROM THE L.T LIGHTNING ARRESTERS, IF PROVIDED.
 - (b) TO EACH OF THE REMAINING TWO EARTH - ELECTRODES.
 - (i) ONE SEPARATE CONNECTION FROM THE NEUTRAL (ON THE MEDIUM VOLTAGE SIDE) OF THE TRANSFORMER
 - (ii) ONE SEPARATE CONNECTION FROM THE TRANSFORMER BODY AND THE HANDLE OF THE 11 KV. A.B SWITCH.
 - (iii) ONE SEPARATE CONNECTION FROM THE EARTHING TERMINAL OF THE POLES
2. 4 mm (8 S.W.G) G.I.WIRE SHOULD BE USED FOR EARTH LEADS.

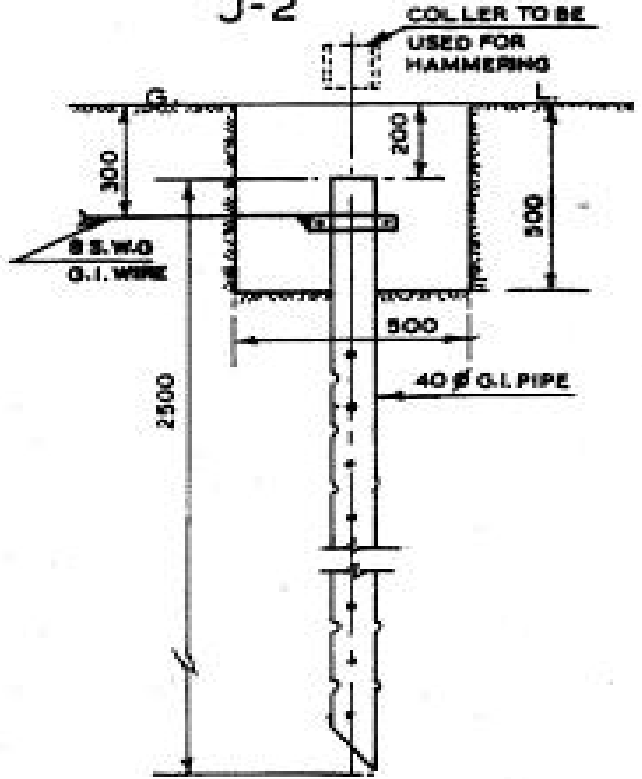
ALL DIMENSIONS ARE IN mm.

११ के. वी. / ४३३ - २५० वोल्ट वितरण सब-स्टेशन आर्थिंग के गड्ढे और कनेक्शन के स्थान 11 KV/433 - 250V DISTRIBUTION SUB - STATION LOCATION OF EARTH PITS AND CONNECTIONS
R-2 SCALE : N.T.S. 1993 / JAN. , - 1993

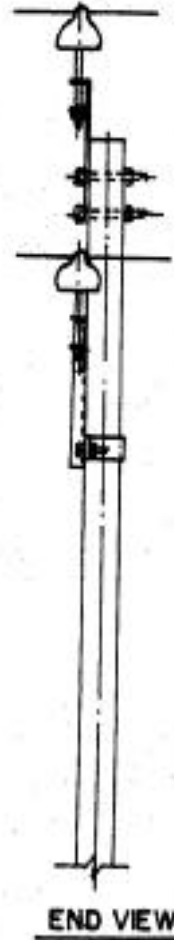
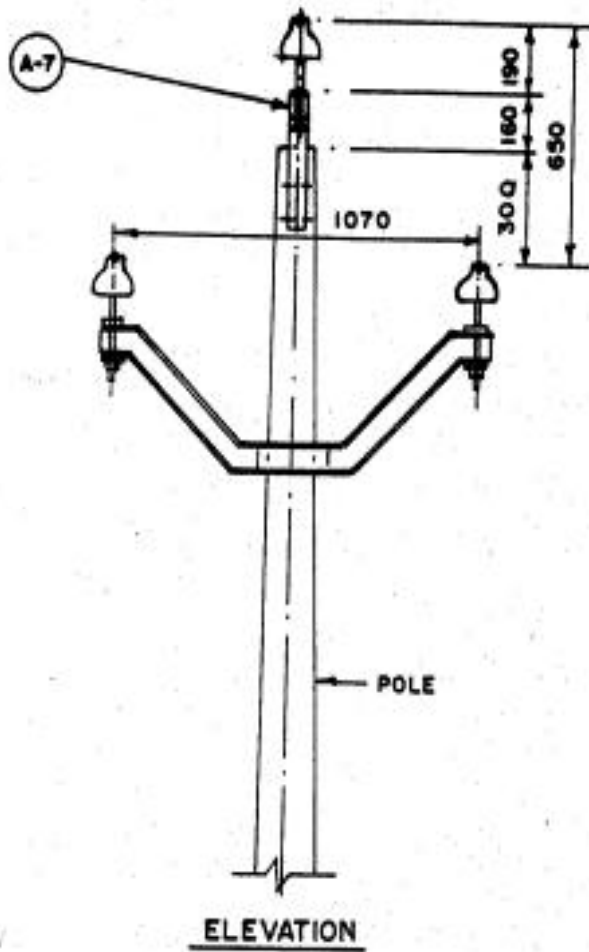
REC
CONSTRUCTION STANDARD
J-2



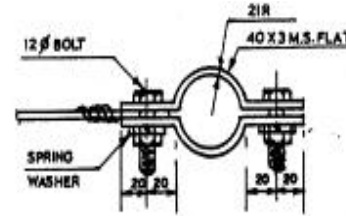
EARTHING FOR HARD, STIFF OR MEDIUM CLAY



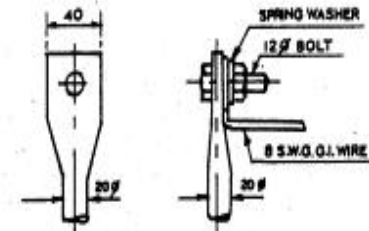
EARTHING FOR ORDINARY SOIL WHERE PIPE COULD BE HAMMERED IN



**REC
CONSTRUCTION STANDARDS
A-2**



**TYPICAL DETAIL OF CLAMP
FOR PIPE EARTH**



**TYPICAL DETAIL OF CONNECTION
FOR ROD EARTH**

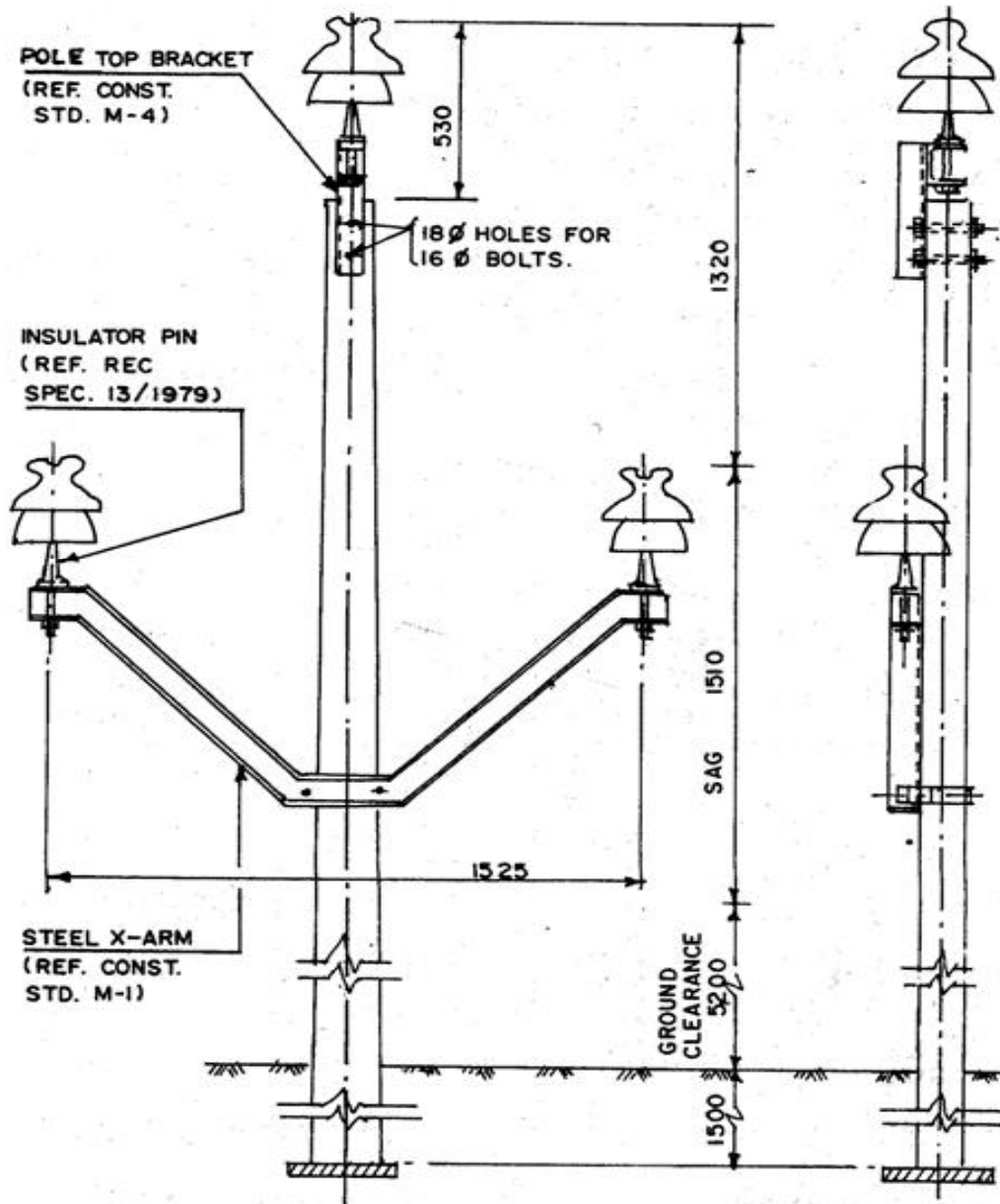
**TANGENT LOCATION
MAXIMUM SPAN-107 METRES**

ALL DIMENSIONS ARE IN mm

**११ के. वी. लाईनें
भूतार के बिना कन्डक्टर रचना व अन्तराल
11KV LINES
CONDUCTOR FORMATION AND
CLEARANCES
WITHOUT EARTH WIRE**

SCALE:- N.T.S

SEPT.-1972



R E C
CONSTRUCTION STANDARD
M - 3
BILL OF MATERIAL

9-OM SUPPORT	1
POLE TOP BRACKET	1
V- CROSS ARM (M.S. CHANNEL-100X50X6-4)	1
BACK CLAMP	1
BOLTS 16 ϕ	4
33 KV PIN INSULATOR	3
33 KV PINS	3
EARTHING COMPLETE	1

TANGENT LOCATION
MAX. SPAN 125 M
(CROSS COUNTRY)

ALL DIMENSIONS ARE IN mm.

३३ कि० वी० लाईन
कन्डक्टर रचना एवं अन्तराल
33KV LINE
CONDUCTOR FORMATION
AND CLEARANCES

SCALE: N.T.S | APRIL - 1981.

Suspension and Dead end clamps for Aerial Bunched Cable (ABC)

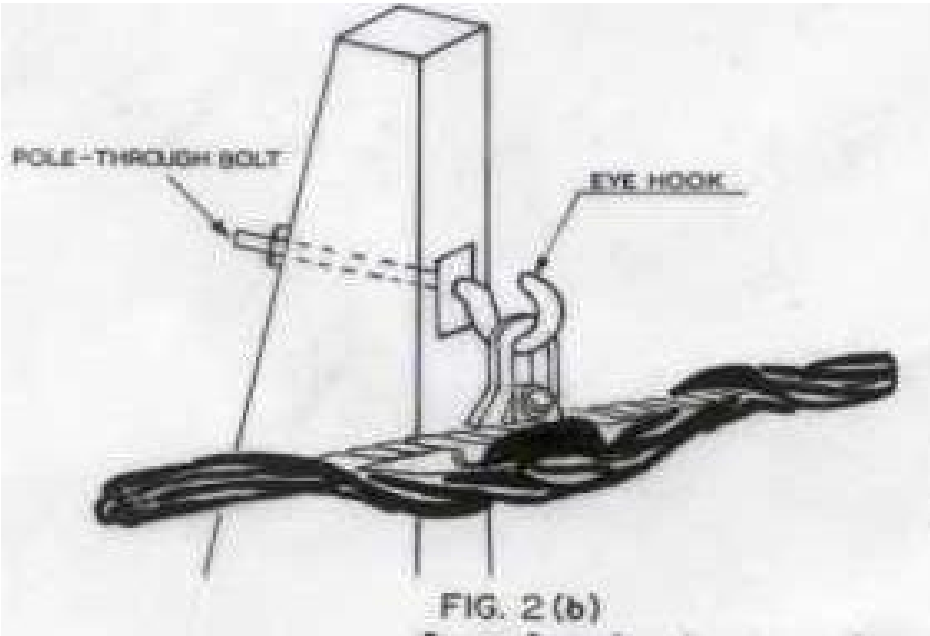
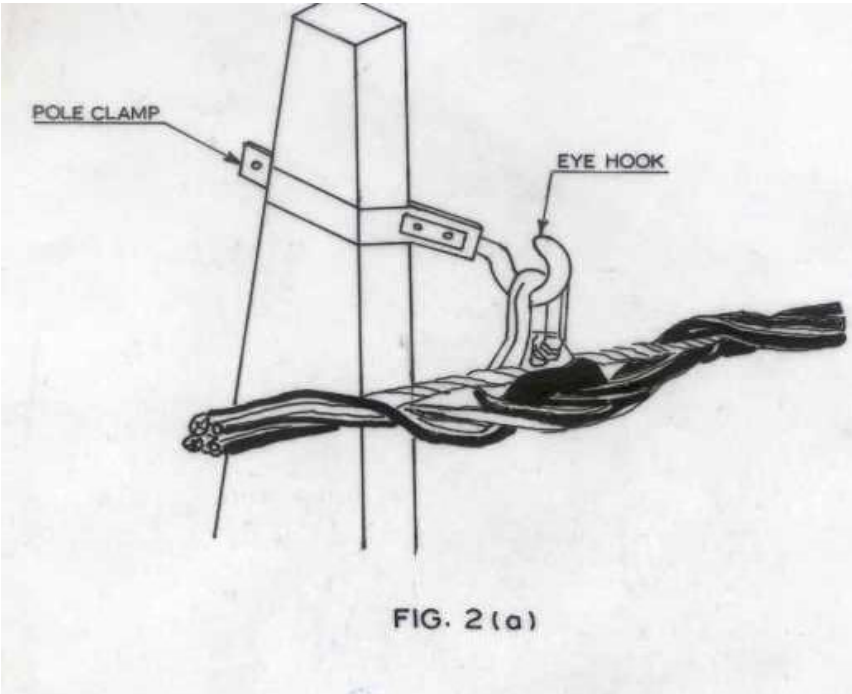


FIG. 2(a) AND 2(b) SHOWING THE SUSPENSION CLAMP IN POSITION WITH TWO TYPES OF EYE HOOKS .

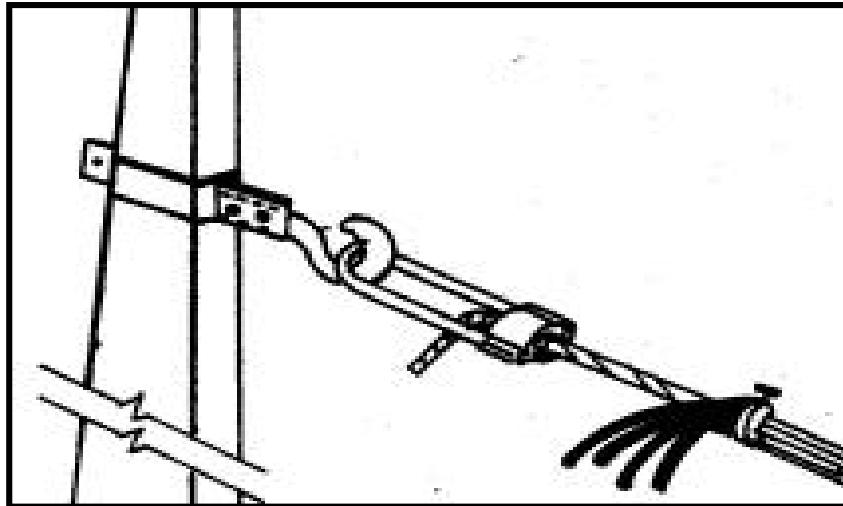
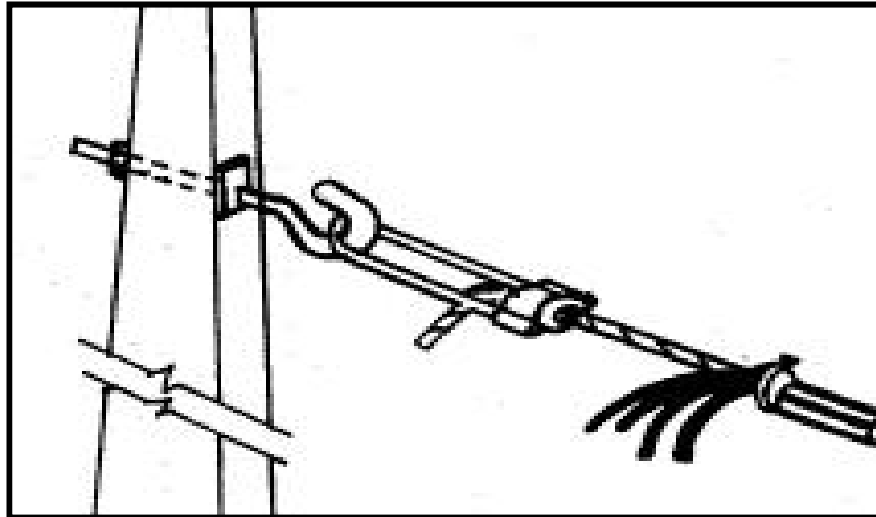
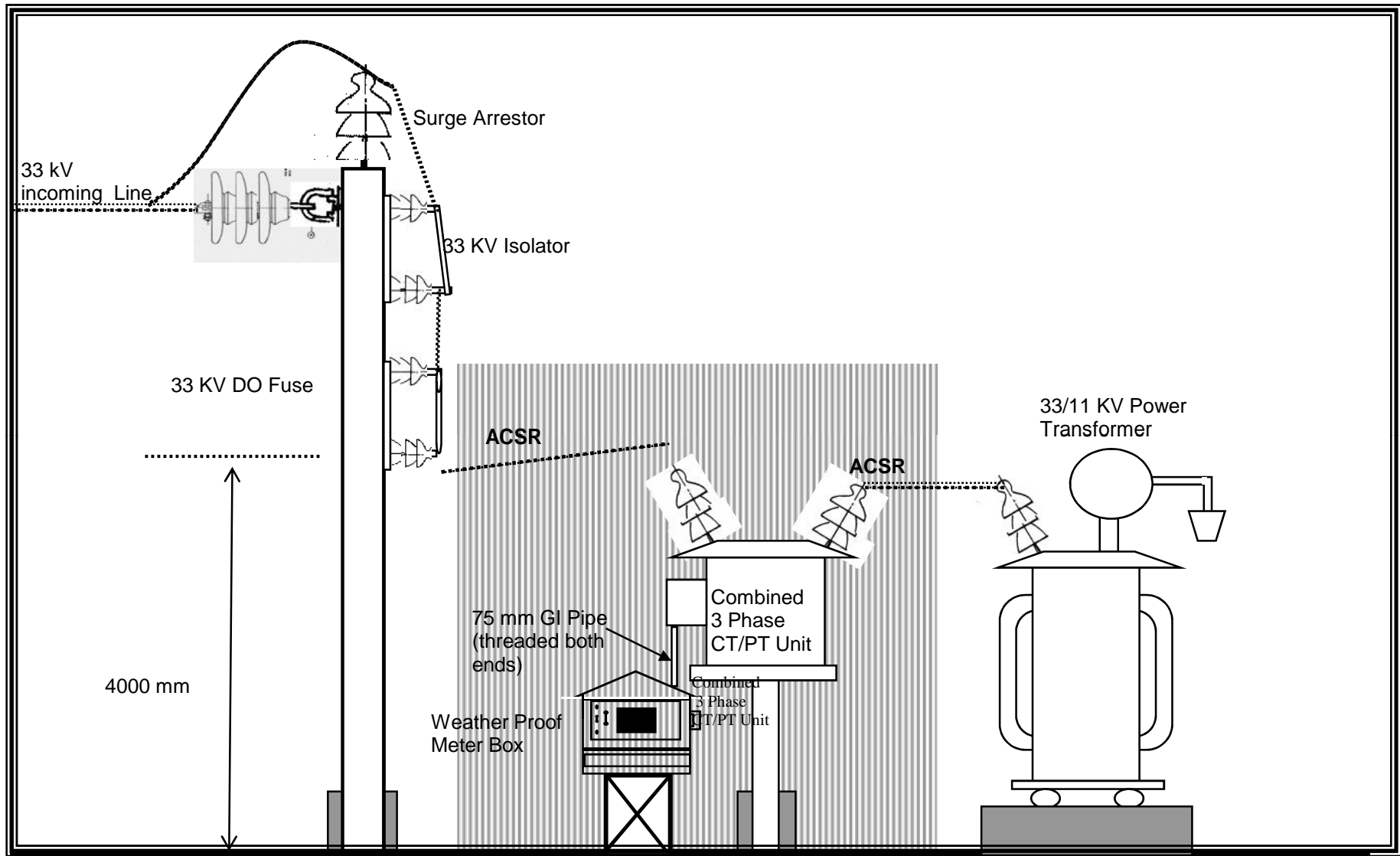


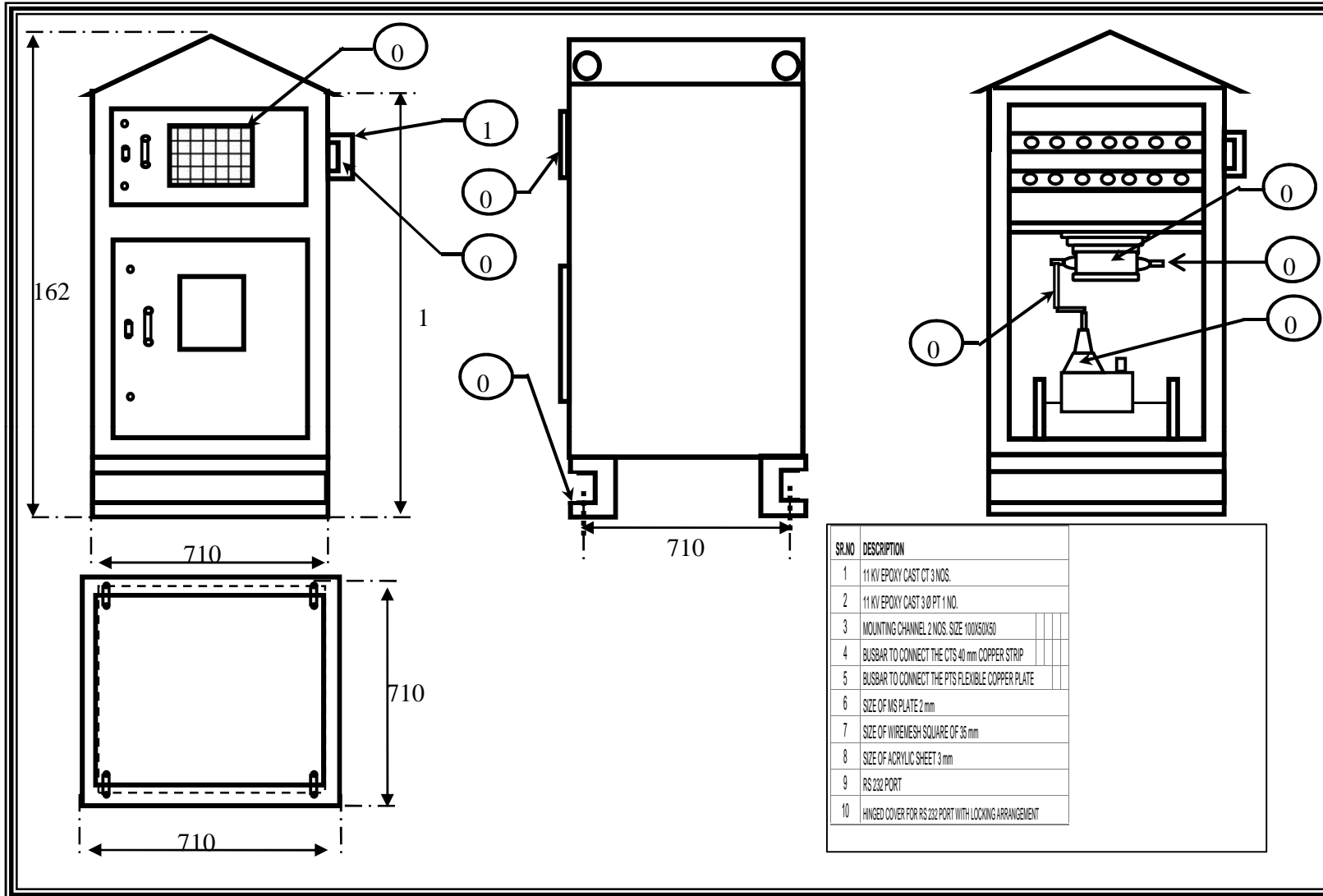
FIG.2(a) AND 2(b) SHOWING THE DEAD END CLAMP
IN POSITION WITH TWO TYPES OF EYE HOOKS

GENERAL REQUIREMENTS

1. The Dead End clamp shall be made of high strength Aluminium Alloy of designation 2280 (IS:617-1975) of tensile strength not less than 250 N/mm^2 (27 kgf/mm^2). The U-bar shall be made of hot dip galvanised steel. The eye-hooks shall be made of forged steel (IS:2004) or mild steel (IS:1570).
2. The clamp shall be suitable for holding both 25mm^2 and 35mm^2 messenger wire sizes of compacted diameters of 5.8mm and 6.8mm.
3. The clamp shall have a cone for holding the messenger wire and it shall automatically grip the messenger wire due to tension of the wire.
4. The clamp shall be free from all flaws, irregularities and sharp radii of curvature.
5. All ferrous fittings, eye hooks, bolts, nuts and washer shall be galvanised with Zinc conforming to grade Zn 98 of IS:209-1966. The spring washers and nuts etc. may be electro-galvanised. Nuts shall be made of material conforming to property Class 4.8 of IS:1367 for its mechanical properties.



Title :- 33 kV Consumer Metering Scheme
Drawing No. :- Drg-33 kVMTR-1



TITLE : 11 kV Consumer Metering Scheme