



## 24X7 POWER FOR ALL

### A JOINT INITIATIVE OF GOVERNMENT OF INDIA AND GOVERNMENT OF GUJARAT



FEBRUARY 2016



सत्यमेव जयते

Government of India



## Piyush Goyal

Minister of State (Independent Charge) for Power, Coal and New & Renewable Energy

### Foreword

Electricity consumption is one of the most important indicators and tool to achieve rapid economic growth and socio-economic development that decides the development level of a nation. The Government of India is committed to improve the quality of life of its citizens through higher electricity consumption. Our aim is to provide each household access to electricity, round the clock. The 'Power for All' programme is a major step in this direction. Gujarat is one of the high per capita electricity consumption states in the country and is also one of the states which has achieved 100% village electrification long time back.

Gujarat has been pioneer in implementing the electricity reforms and has achieved nil peaking shortage and even surplus in energy availability. Gujarat also holds the distinction of covering 100% rural areas under three phase supply system which ensures reliable and quality supply to rural hinterland. The state is expected to continue this initiative and complete the identified works in this report within stipulated time and cost.

This joint initiative of Government of India and Government of Gujarat aims to enhance the satisfaction levels of the consumers and improve the quality of life of people through 24x7 power supply at affordable cost. This would lead to rapid economic development of the state in primary, secondary & tertiary sectors resulting in inclusive development.

I compliment the Government of Gujarat and wish them all the best for implementation of this programme. The Government of India will complement the efforts of Government of Gujarat State in bringing uninterrupted quality power to all households, industries, commercial businesses, public needs & any other electricity consuming entities and adequate power to agriculture as per the state policy.



Government of Gujarat



## Smt. Anandiben Patel

### Chief Minister of Gujarat

#### Foreword

Power sector is a critical infrastructure element required for the smooth functioning of the economy. An efficient, resilient and financially sustainable power sector is essential to stimulate growth and prosperity in the state. The availability of reliable, quality and affordable power can ensure growth of all sectors of economy including agricultural, industrial and others.

Gujarat is a prosperous state with 100% electrification. However, there is need for strengthening the system and enhance the average hours of power supply to consumers coupled with the need to control the cost of power and keep the power companies also in pink of financial health. AT & C loss reduction and application of energy efficiency measures would go a long way in achieving these objectives.

It is at this juncture that “**24x7 Power for all**” programme play a pivotal role. Conceived with the objective of providing 24x7 quality, reliable and affordable power for all, this programme takes a holistic approach for addressing the concerns across the value chain in Power sector.

On behalf of Government of Gujarat, I would like to thank Government of India, Hon’ble Prime Minister and Hon’ble Minister of Power for implementation of this programme.



सत्यमेव जयते

Government of India



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ગુજરાત સરકાર

Government of Gujarat

## Joint Statement

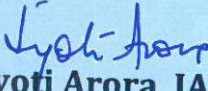
The State of Gujarat is committed to provide quality life to people of state. Electricity supply serves as an important means to achieve this. The programme of “24x7 power for all” is an important step in this direction and this programme will be implemented by Government of Gujarat (GoG) with the objective to connect the unconnected in phased manner by FY 2018-19 to ensure supply of quality, reliable and affordable power to all category of consumers on 24x7x365 basis.

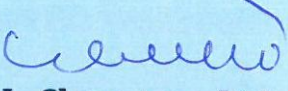
Government of Gujarat would ensure that all the necessary steps outlined in the PFA document are taken up in terms of capacity addition, power procurement, strengthening the required transmission and distribution network, encouraging renewable, demand side management & energy efficiency measures, undertaking customer centric initiatives, reduction of AT & C losses, bridging the gap between ACS & ARR, and following good governance practices in implementation of all central and state government schemes.

Government of India (GoI) would supplement the efforts of Government of Gujarat by fast tracking resolution of key issues pertaining to generation, expediting the additional interstate connectivity and ensuring optimum allocations in various distribution schemes, as per the provisions of applicable policies.

Government of Gujarat would endeavor to implement the programme within the targeted time frame of FY 2018-19 or even earlier than the targeted date.

The central and state governments would meet regularly to review the progress of the programme over the next four (4) years and would strive to achieve the objectives of the programme by taking the necessary steps as envisaged in the PFA document.

  
**Jyoti Arora, IAS**  
Joint Secretary  
Minister of Power (GoI)

  
**L. Chuaungo, IAS**  
Principal Secretary  
Energy & Petrochemicals Department  
Government of Gujarat (GoG)

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### **POWER MAP OF GUJARAT**



## EXECUTIVE SUMMARY

24x7 Power for All (24x7 PFA) is a Joint initiative of Government of India (GoI) and State Governments with the objective to ensure availability of 24x7 power supply to all households, industries, commercial businesses, public needs & any other electricity consuming entity and adequate power to agriculture consumers by FY 2018-19 as per the state policy.

This roadmap document aims to meet the above objectives for the state of Gujarat. Gujarat has already achieved 100% village electrification long time back and the per capita consumption of power in Gujarat was 1839 unit during FY 2014-15 which was much higher than the National average of 1010 units observed during FY 2014-15.

The power establishment of Gujarat after unbundling of erstwhile Gujarat Electricity Board is shared by four Government owned DISCOMS-UGVCL, DGVCL, MGVCL and PGVCL and Pvt. DISCOM like – Torrent Power Limited and MPSEZ. Additionally, there are bulk consumers like port trust etc.

### GROWTH IN DEMAND

As per power supply position in the state, Gujarat had peak power shortage up to FY 2011-12 which is nullified in the following years and since then there is no peaking shortage. On energy side, there is surplus to the tune of 25% in FY 2014-15 following the surplus trend in previous years also.

In order to achieve the objective of 24 x 7 power supply to All, the state would see an increase in peak demand from 14,005 MW at present (FY 2014-15) to 17,665 MW in FY 2018-19 with corresponding increase in energy requirement from 90998 MU in FY 2014-15 to 1,14,512 MU in FY 2018-19.

The future demand has been derived by estimating the urban and rural household consumption taking into account the growth in number of electrified households on the one hand and the growth in average consumption per household on the other. The combined growth rate based on five (5) years CAGR (from

FY 2010-11 to FY 2014-15) and in view of future growth potential of Industrial and Commercial activities, average CAGR of 7.0% p.a. has been adopted to project consumption of “other than domestic category” consumers.

### SUPPLY ADEQUACY

The available capacity (installed as well as allocated share) for the State as on 31<sup>st</sup> March 2015 was 24207.80 MW. In order to meet the estimated increased demand for providing 24x7 power supply in the state, the state has already planned additional capacity availability of 7,546 MW by FY 2018-19 through own generating stations, renewable energy sources, central generating stations and long term/medium term PPAs in a phased manner. Out of this, 3,610 MW shall be added through non-conventional energy sources and balance 3,936 MW through conventional sources.

The capacity utilisation of gas based power plants in Gujarat is poor due to inadequate availability of gas.

As such, for determining installed capacity (state share) of the State, the total installed capacity of gas based power stations has been considered. However, the Peak Demand and Energy Availability have been calculated considering the following two scenarios :

**Scenario-I** : Considering actual capacity utilisation of gas based plants based on present availability of gas.

**Scenario – II** : Considering full availability of gas and full capacity utilisation of gas based plants.

Gujarat State has informed that in case, domestic gas allocation is not available, the generation from gas based capacity i.e. 5650 MW (including 1648 MW of private licensee) can be availed on other SPOT RLNG based fuel to meet any intermittent demand / power deficit scenario.

In view of this, the entire gas based capacity, in line with Scenario – II, has been considered for working out energy and peaking availability. The surplus / deficit figures also have been arrived at considering Scenario-II.



In line with Scenario – II, it is to be noted that with the availability of additional capacity, the state will have surplus peaking availability in the range of 15.92% to 7.68% during FY 2015–16 to FY 2018-19. In terms of availability of energy, during the entire period of study i.e. from FY 2015 – 16 to FY 2018 – 19, the state will have availability of surplus energy ranging from 30.09% to 24.73%. It is to be noted that the GUVNL/ State Discoms have already made adequate power tie-up to meet the existing as well as upcoming power demand and there will not be any peaking deficit till FY 2018-19 considering the operational capacity and proposed capacity augmentation plan of state Discoms/ GUVNL.

Thus, the State of Gujarat emerges as a surplus state, both in terms of peak availability and energy availability, during the entire period of study i.e. from FY 2015 – 16 to FY 2018-19. The peak demand can be effectively reduced further through proper implementation of DSM & Energy efficiency measures in the state. While procuring power, the state is required to give more preference to Hydro Power in order to improve the hydro-thermal generation mix which is poor in the state. This will also help in balancing the energy supply & demand scenario.

In case of use of SPOT RLNG, expected to be costlier, the cost of energy is expected to be higher. The option of using SPOT RLNG, should therefore be exercised by the State only to meet any intermittent demand / power deficit scenario.

Further, the state is required to firm up plan for disposing surplus power on short terms/ medium term basis through bilateral arrangements and power exchange and earn revenue.

The state is executing 1 x 800 MW Wanakbori Extension Unit 8 which is likely to be commissioned during FY 2018–19. Timely execution of the project will help the state in meeting the power requirement of the state beyond FY 2018 – 19.

## ADEQUACY OF TRANSMISSION NETWORK

The state is well served by a network of Inter-state transmission lines at 765 kV, 400 kV & 220 kV levels. The existing ISTS transmission system capacity is adequate for meeting the present power requirement.

In ISTS system, Power Grid Corporation Limited (PGCIL) & Gujarat Energy Transmission Corporation Limited (GETCO) have already undertaken/planned a number of transmission works for further strengthening & augmenting the capacity and to ensure better connectivity of Gujarat State Grid with national Grid for meeting the projected power demand of Gujarat by FY 2018-19 for 24x7 PFA (Power for all) in the state.

The existing combined transformation capacity of PGCIL and GETCO system at 400/220 kV level is 15340 MVA and the same shall be increased to 31175 MVA by FY 2018-19 after implementation of ongoing & planned schemes, which shall be adequate to meet the projected peak demand of Gujarat of 17665 MW by FY 2018-19.

The existing Intra state transmission capacity at 220 kV level is 24740 MVA & at 132 kV level is 7145 MVA to cater to the Max Demand of 14005 MW of the state. The Intra state transmission capacity shall be increased to 39990 MVA at 220 kV level by FY 2018-19 which will be adequate to cater the projected Power demand of 17665MW of the state by FY 2018-19 to meet the 24 x7 requirements.

The capacity addition in Intra-state transmission system has been planned with an investment of 10302 Crores from FY 2015-16 to FY 2018-19 in the state to meet the requirement as envisaged for 24x7 PFA.

## ADEQUACY OF DISTRIBUTION NETWORK

Power distribution in the State is handled by eleven distribution licensees i.e. DGVCL, PGVCL, MGVL, UGVCL, Torrent Power (AEC), SEC Ltd., Kandla, Port Trust, Torrent Energy Ltd., Dahej, Synfra Ltd., Waghodia, Vadodara, Mundra Port





SEZ Ltd. (MPSEZ), Mundra, Kutch, Jubilant Ltd. and Vagra, Bharuch.

These companies are serving about 1,55,14,151 numbers (1,31,86,185 GUVNL + 2327966 Torrent Power) of electricity consumers including 1184799 numbers (11,84,303 GUVNL + 496 Torrent Power) under agriculture category during FY 2014-15. It has achieved 100% household electrification levels, Except Transformer metering & Agricultural consumer, 100% metering is done for all categories of consumers.

Gujarat Discoms have proposed several initiatives like IPDS, DDUGJY, NEF, State govt schemes etc. during FY 2015-16 to FY 2018-19 towards capacity addition in the state to meet the requirement as envisaged for 24x7 PFA.

The monitoring committee had sanctioned Rs 924.66 Crores for DDUGJY against the requirement of Rs. 2000 Crores. Similarly, the monitoring committee has sanctioned Rs. 1121.88 Crores for IPDS against the requirement of Rs. 1871 Crores. The works of feeder separation, establishment of New PSS, (Conventional & GIS), augmentation of existing PSS, new 66 & 11 kV lines, LT lines, capacitor bank, Sansadadarsh Gram Yojana & metering are proposed to be implemented in the state by FY 2018-19. Network up-gradation in rural & urban areas through a planned capacity addition of 11802 MVA at 220/11kV, 132/11 kV, 66/11kV & 33/11 kV PSS, 14448 MVA at DT level and creation of 11kV ABC & Bare conductor lines, U/G cables, LT lines, Electronic consumer meters, Capacitor bank etc.

The proposed distribution network with projected addition through GOI/State schemes (RAPDRP-B, DDUGJY, IPDS, RGGVY and State govt schemes) would be adequate under projected peak load addition.

The AT & C losses of the state are projected to be reduced from 14.50 % to 13.0% by FY 2018-19 as per state data.

## FINANCIAL VIABILITY

The erstwhile Gujarat Electricity Board (GEB) was reorganized effective from 1st April, 2005 in to Seven Companies with functional responsibilities of Trading, Generation, Transmission and Distribution. The loss of GEB up to 31.03.2005 apportioned was Rs 737.24 crore which was recorded as opening balance of Profit & Loss account as on 01.04.2005 in GUVNL.

The Gujarat Urja Vikas Nigam Limited was incorporated as a Govt. of Gujarat Company. Since 100% Shares in the other six companies are held by GUVNL w.e.f 1st April, 2005 they have become Subsidiary Companies of GUVNL as per the provisions of the Companies Act, 1956.

The financial position of the four distribution companies are as follows.

Accumulated profit for 2013-14 and 2014-15 are as follows:

(Rs. in Crore)		
Name of DISCOM	FY 2013-2014	FY 2014-2015
UGVCL	62.50	79.74
DGVCL	272.81	323.64
MGVCL	159.36	188.21
PGVCL	83.87	94.75

The present initiatives under 24x7 power for All involves new projects and schemes having financial outlays as explained in subsequent chapters. The viability of this project under prevailing tariff and power purchase regime and loss and demand growth projections as laid down under this roadmap have been examined and sensitivities of the same have also been worked out in order to assess the impact of change of Parameters like AT & C losses, Financing mix etc on the viability. It has been inferred that while meeting the objectives of Power For All-24x7 for the state of Gujarat, the state DISCOMs may have to go in for tariff hikes to the tune of 1% in FY 2016-17 in few scenarios to have financial viability by FY 2018-19.



## CHAPTER – 1: INTRODUCTION

Access to electricity on 24x7 basis for all its citizens means much more than merely an act of infrastructure development to any nation as this has direct co-relation with the socio economic profile of the community. Thus this issue has acquired significant dominance on the national as well as state agenda. Endeavour to perk-up the growth in electricity consumption to stand in pace with global benchmark therefore are to be taken up with top most priority. The state of Gujarat has attained full connectivity in past. Therefore, in the specific context of Gujarat, this initiative can be reinterpreted as targeting supply of quality power and make this more reliable and affordable.

Under the Indian Constitution, electricity is a concurrent subject and distribution of electricity falls under the purview of the respective State Government/State Power Utility. As per Electricity Act 2003, it is the duty of a distribution licensee to develop and maintain an efficient, co-ordinated and economical distribution system in his area of supply and to supply electricity in accordance with the provisions contained in the Act. The State Electricity Regulatory Commission (SERC) has to specify and enforce standards with respect to quality, continuity and reliability of service by licensees. Accordingly, State Electricity Regulatory Commissions (SERCs) have notified the Standards of Performance specifying maximum allowable time for restoration of supply due to forced breakdowns and Supply Code specifying the supply voltages & frequency etc, to be followed by Discoms. SERCs also monitor the performance of distribution companies on the basis of notified Performance of Standards.

### OBJECTIVES OF THE 24X7 POWER FOR ALL – JOINT INITIATIVE

To supplement the efforts of State Government, Government of India and Government of Gujarat have taken a joint initiative to provide 24 X 7 reliable power in the state to all consumers. The hours of adequate supply to agriculture consumers will be decided by the state Government. This initiative aims at ensuring

uninterrupted supply of quality power to existing consumers and providing access to electricity to all upcoming consumers by FY 2018-19.

The initiative of 24x7 Power supply to all encompasses mainly the following:

- i. To provide reliable & quality 24X7 power supply to the existing consumers in a phased manner within a period of three years from the date of commencement of the programme.
- ii. To ensure adequate capacity addition planning & tie ups for power from various sources at affordable price to meet the projected increase in power demand for future in a cost effective manner.
- iii. To strengthen the Transmission and Distribution network to cater to the expected growth in demand of existing as well as forthcoming consumers.
- iv. Monitoring the timely commissioning of various generating plants, transmission and distribution infrastructure to meet the expected growth in demand.
- v. To put in place a strategy to ensure reduction of AT&C losses as per or even better than the agreed loss reduction trajectory and methodology and steps required to be taken at every level of distribution.
- vi. Overall Power Supply Improvement – To be achieved by undertaking measures such as energy mix optimization, reduction in power operational inefficiency of state generation plant(s) and optimal fuel procurement policy.
- vii. To take financial measures including investment rollout plans and undertaking necessary balance sheet analysis to assess the financial strength/ weaknesses in the utility finances.
- viii. To introduce modern technologies to monitor reliable supply like sub-station



automation, providing adequate communication infrastructure, GIS, Reliability, Centralised Network Analysis and Planning tools, SAP driven ERP systems, DMS (Distribution Management Systems), OMS (Outage Management System), etc.

- ix. To take essential measures for meeting the performance standards as laid down by SERC.

An action plan would be drawn to achieve the above aims and objectives. The plan will be executed by the State Government with the support of Government of India, wherever necessary, as per their approved plans, schemes and policies. This joint initiative of Government of India and Government of Gujarat aims to enhance the satisfaction levels of consumers, improve the quality of life of people, and increase the economic activities resulting into inclusive development of the state.

#### **METHODOLOGY FOR PREPARATION OF THE ACTION PLAN FOR THE 24X7 POWER FOR ALL**

The plan aims at the following:

- Bridging the gap between the demand and supply for the already identified/registered consumers and other consuming entities, if any.
- If connectivity is already achieved, then ensuring quality, reliable and affordable power for all.

Accordingly the methodology adopted to prepare the 'Action Plan' for 24x7 PFA includes inter-alia:

- 1) Projection of average per day consumption of rural and urban households based on respective historical compounded annual growth rates (CAGR) during the past five years.
- 2) Projection of demand of consumers encompassing commercial, industrial, agricultural and remaining all have been considered under "others" category based on past data and historical CAGR thereof recorded for the state during the past years.
- 3) Project the annual energy requirement and maximum demand by aggregating the requirement of all consumer categories and applying an appropriate load factor.
- 4) Prepare a broad plan to meet/manage power demand in future through additional generation capacity/ export arrangements in case of surplus power, as the case may be.
- 5) Assess the financial implications on utilities for procuring additional energy to meet the energy requirement of all segments of consumers. Assess the adequacy of the network - both inter-state and intra-state transmission as well as distribution so as to meet the projected power requirement of all consumer categories of the state.
- 6) Conduct sensitivity analysis on various parameters namely tariff and AT&C loss reduction, etc. in order to assess the impact thereof on viability.
- 7) Set monitorable targets to achieve the goal of 24x7 Power for All in a cost effective manner to the consumers of the State.



## CHAPTER – 2: FACTS ABOUT GUJARAT

Gujarat, with a geographical spread of 196244 km<sup>2</sup> is the 6<sup>th</sup> largest state of Indian union in terms of area, and the 9<sup>th</sup> largest by population (as per census 2011) with total population of 6.04 Crores.

Gujarat is considered as one of the most prosperous and efficiently governed states in India. Forbes list of the world's fastest growing cities ranks Ahmadabad -the Gujarat capital- at number-3 after Chengdu and Chongqing of China. The state is bounded by Arabian sea to the west and south west and has Indian states of Rajasthan, Madhya Pradesh and Maharashtra as its neighbours.

Gujarat is considered to have the best infrastructure in India. This includes road, rail, air and seaport transport links along 1600 km long coastline that are well equipped and extensive throughout the region.

As a part of reform process, Government of Gujarat has unbundled the various functions of erstwhile Gujarat electricity Board (GEB). The various functions of board were entrusted to newly formed entities as follows:

1. GUVNL(Holding Company and single bulk buyer and supplier of power to DISCOMS)
2. GSECL(Generation Company)
3. GETCO(State Transmission utility)
4. PGVCL(DISCOS for western Gujarat)
5. UGVCL(DISCOS for Northern Gujarat)
6. MGVL(DISCOS for Central Gujarat)
7. DGVCL(DISCOS for southern Gujarat)

The power supply responsibility in the state is managed by the above listed GoG establishments alongwith private entities like Torrent Power Limited catering to the

consumers of Ahmadabad and Surat region. In addition, there are few other licensees/ bulk consumers like Kandla port trust, MPSEL and Torrent Energy Limited (Dahej SEZ). The complete list is shown in Chapter-7.

Over a period of time, Gujarat has successfully diversified its industrial base. At present, Gujarat has a production share of over 34% petroleum products and approx. 27% in chemical and pharma while it holds a share of approx. 10% in engineering industries. Gujarat also accounts for 80% of processed diamonds and 90% of diamond exports from India.

The brief profile of the state is as follows:

**Table-2.1**

### Brief Profile of Gujarat

Sl. No.	Description	
1	Area (Sq. Km.)	196244
2	Population (Persons as per 2011 census)	60439692
	- Rural	57.4%
	- Urban	42.6%
3	Per Capita income at current prices-FY 2013-14 (in Rs.)	106831
4	No. of Districts	33
5	State GDP growth rate (FY 2013-14)	15.5%
6	Total electrified household-FY 2014-15 as per state data(Rural)	6332012
7	Total electrified household-FY 2014-15 as per state data (Urban)	6725072

*GoG website and Statistics Times.com*



## CHAPTER – 3: CONSUMPTION PATTERN AND ELECTRIFICATION STATUS

As per Census 2011 data, there were about 121.8 Lakhs households in the State. The distribution thereof under urban and rural and

in terms of electrification status during that time frame was as follows:

**Table-3.1**

Description	Rural	Urban	Total
No. of Households in Gujarat	6765403 (55.5%)	5416315 (44.5%)	12181718
No. of Electrified Households	5749271 (52.2%)	5263943 (47.8%)	11013214
No. of Un-Electrified Households	1016132(87.0%)	152372(13.0%)	1168504

(Source: Census of India-2011)

The details of present day household status in the State of Gujarat based on Census figures and as per GoG data are as under:

**Table-3.2**

**No of Households in Gujarat (census 2011Projected to FY 2014-15, GoG owned Discoms & as per Torrent Power)**

Particulars	2001	2011	CAGR	As projected from Census figures	GoG owned Discoms (FY 2014-15)	As per Torrent Power (FY 2014-15)	Total for Gujarat State (FY 2014-15)
Total Households	9643989	12181718	2.36%	13057084	11134353	1922731	13057084
Rural Households	5885961	6765403	1.40%	6332012	6332012	0	6332012
Urban Households	3758028	5416315	3.72%	6725072	4802341	1922731	6725072
Total Electrified Households	7754307	11013214	3.57%	13057084	11134353	1922731	13057084
Rural Electrified H/H	4244758	5749271	3.08%	6332012	6332012	0	6332012
Urban Electrified H/H	3509549	5263943	4.14%	6725072	4802341	1922731	6725072
Total Un-electrified H/H	1889682	1168504	- 4.69%	0	0	0	0
Rural Un-electrified H/H	1641203	1016132	- 4.68%	0	0	0	0
Urban Un-electrified H/H	248479	152372	- 4.77%	0	0	0	0

Considering the expected rapid growth appetite of the state in the coming years, following assumptions for projection of demand under different categories have been considered:

- The number of electrified and un-electrified households in FY 2014-15 has been taken as

per Government of Gujarat data, but has been also compared with census data.

- Based on the urban & rural consumption data provided by GoG and Torrent Power Ltd., present per household consumption has been assessed as shown below :



Table-3.3

**ESTIMATION OF EXISTING PER HOUSEHOLD CONSUMPTION**

Sl. No.	Particulars/States → ↓	GoG owned Discoms (FY 2014-15)	As per Torrent Power (FY 2014-15)	Total data pertaining to Discoms
1	Total Households in State (nos.)	11134353	1922731	13057084
2	Total Urban Households (nos.)	4802341	1922731	6725072
3	Total Rural Households (nos.)	6332012	0	6332012
4	Total Electrified Households (nos.)	11134353	1922731	13057084
5	Total Electrified Households - Urban (nos.)	4802341	1922731	6725072
6	Total Electrified Households - Rural (nos.)	6332012	0	6332012
7	Balance Unelectrified Households (nos.)	0	0	0
8	Balance Unelectrified Households - Urban (nos.)	0	0	0
9	Balance Unelectrified Households - Rural (nos.)	0	0	0
10	Electrification of houses under 12th Plan RGGVY	0	0	0
11	Balance Unelectrified Households as per State Government (nos.)	0	0	0
12	Annual energy sold in the State during 2014-15 (MUs)	60237	9759	69996
13	Annual Domestic energy sold in the State during 2014-15 (MUs)	9529	3050	12580
14	Average Annual Energy Consumption per household during 2014-15 (kWh)	856	1586	963
15	Average Daily Energy Consumption per household during 2014-15 (kWh)	2.34	4.35	2.64
16	Annual Total Rural Consumption (MUs)	2896		2896
17	Annual per household rural consumption (kWh)	457		457
18	Annual Total Urban Consumption (MUs)	6633	3050	9683
19	Annual per Household Urban Consumption (kWh)	1381	1586	1440
20	Daily per household rural consumption (kWh)	1.25	0.00	1.25
21	Daily per household Urban consumption (kWh)	3.78	4.35	3.94

From the above table, the average daily per household Rural and Urban consumption works out to be 1.25 units/day and 3.94 units/day respectively. This has been considered in

projection of the Annual energy requirement for Electrified and Newly Constructed Households in the state from FY 2015-16 to FY 2018-19.

## CHAPTER – 4: DEMAND AND SUPPLY SCENARIO

For long, Gujarat has been taking initiatives in its power sector resulting into nil peaking shortage since FY 2012-13, while observing 25% surplus in energy in FY 2014-15.

The Power Supply Scenario in Gujarat (as per state data) from the FY 2008-09 to FY 2014-15 has been as under-

**Table-4.1**

**Power Supply Scenario**

Period/Items	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15
Peak Demand (MW)	12294	10848	11296	11401	12348	12577	14005
Peak Met (MW)	9437	9883	10461	11209	12348	12577	14005
Peak Deficit/Surplus (MW) (-/+)	-2857	-965	-835	-192	0	0	0
Peak Deficit/Surplus (%) (-/+)	-23%	-9%	-7%	-2%	0%	0%	0%
Energy Requirement (MU)	68188	68131	67065	72836	80575	79338	90998
Energy Availability (MU)	62214	75737	83974	96538	115233	116746	120543
Energy Deficit/Surplus (MU) (-/+)	-5974	7606	16909	23702	34658	37408	29545
Energy Deficit/Surplus (%) (-/+)	-10%	10%	20%	25%	30%	32%	25%

**Source : State Power Utilities.**

The above figures indicate that substantial steps were taken by the Government of Gujarat on power security front and thus a very robust and vibrant power sector is there today for Gujarat supporting its all round and rapid growth appetite.

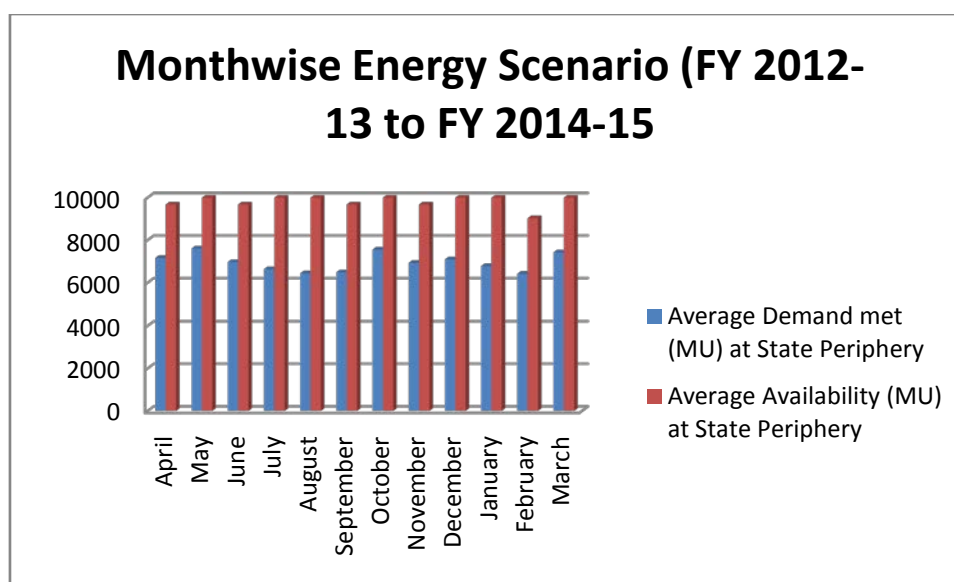
### Per Capita consumption (consumption of Units/ Year)

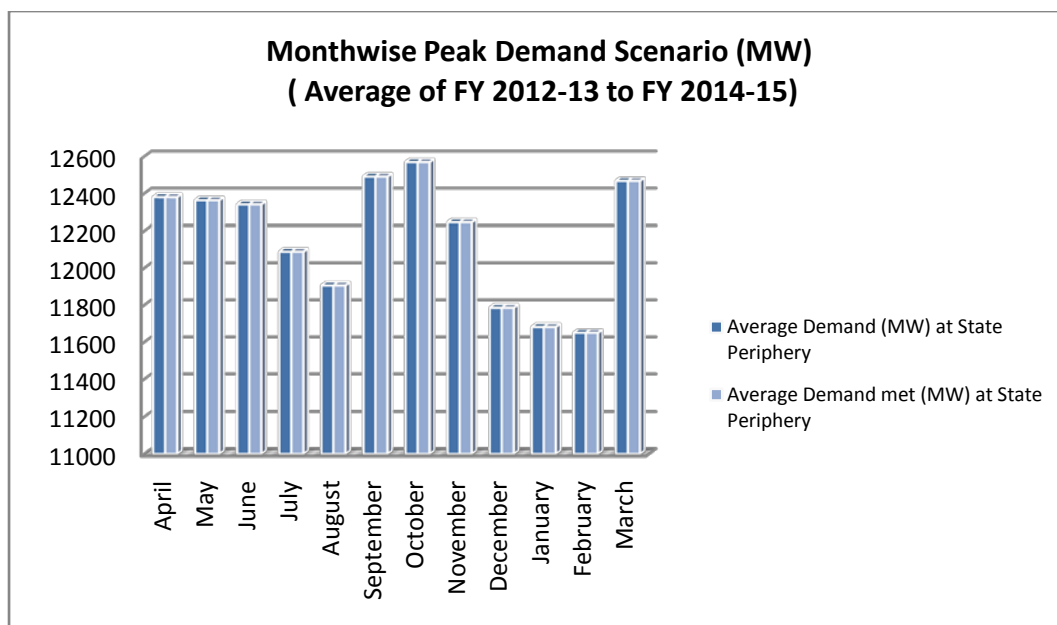
Based on the data available, the per capita consumption of 1839 units/ year during

FY 2014-15 in the state of Gujarat which is much higher than the National average of 1010 units/ year observed now. This higher per capita consumption is a testimony of the good quality of life in the state.

### Demand Variation

In order to have an insight of typical seasonal demand availability pattern of Gujarat, month wise demand availability scenario has also been analyzed. The season led demand variation based on average figures for FY 2012-13 to FY 2014-15 has been graphically represented as hereunder:





It can be visualized from the above that during months of December to February, the demand remains low while during rest of the year it remains in the band of 12000 MW to 12600 MW on an average.

### Demand Projections

The base year for the purpose of beginning the future assessment of demand has been considered as year FY 2014-15 which has an aggregated demand of 90.9 Billion Units (BU).

### Demand Estimation Methodology

The electricity distribution in Gujarat is taken care of by four numbers of Government owned DISCOMS- UGVCL, DGVCL, MGVCL, PGVCL and Private DISCOM – Torrent power limited supplying power to Ahmadabad and Surat regions. Additionally, there are other smaller Discoms/ bulk consumers like Kandla Port Trust and MPSEZ areas mainly catering to the port area consumption.

For the purpose of estimation, power consumers have been broadly classified into the domestic consumers and others (commercial, industrial, agriculture etc.). The demand projection has been done taking into account the demand for 24X7 power supply under following heads:

- Demand growth to a targeted value of already electrified households (both Urban and Rural).
- Demand from electrification of newly constructed Household (both Urban and Rural).
- Demand on account of users other than domestic consumers.
- Out of the total energy requirement of Gujarat during FY 2014-15 (90998 MU at state periphery), State owned DISCOMS account for 75162 MU (As per state data), 10637 MU is on account of Torrent Power Ltd. The balance is considered to be consumed by bulk consumers like port trust, special economic zone etc.

The assumptions for projection of demand under different categories are described below:

- The number of electrified and un-electrified households in FY2014-15 has been taken as per Government of Gujarat data and that of Torrent Power Ltd., though have been compared with census data.
- Based on the urban & rural consumption data provided by GoG and Pvt. DISCOMS, present per household consumption have been assessed as 1.25 unit/ day in rural area and 3.94 unit/day in urban area.

- Energy requirement for rural & urban households have been computed keeping in view the latent demand and considering a CAGR of **7.0%** on per household consumption for every consecutive year and thus increasing from the current levels of 1.25 units/day to **1.64** units/day by FY 2018-19 for rural households and per household from the current levels of 3.94 units/day to **5.17** units/day per urban household by FY 2018-19.
- Demand projections for consumers other than domestic have been done assuming 10% p.a. constant growth in energy requirement based on the CAGR calculated over past four years and discussion with state officials regarding future growth perspectives in these sectors. Also, as described previously, the bulk consumer demand has been considered under this category for projection purpose for the state.

#### PROJECTIONS OF ANNUAL ENERGY REQUIREMENT OF THE STATE

The annual energy requirement at consumer level for all types of consumers in the state works out to be around 75.68 BU in FY 2015-16 which is scaling up to around 94.40 BU in FY 2018-19 after considering the following :

#### a) Demand of already electrified households

The consumption level of present electrified households in the state is expected to grow due to ensured un-interrupted power supply. The annual energy requirement for existing households works out to be 16.49 BU in FY 2018-19.

#### b) Demand from electrification of newly constructed Household

To account for energy requirement of new houses which are likely to be constructed in coming years, projection have been done considering CAGR of 3.72% (census of 2001 & 2011) on number of urban households and CAGR of 1.40% in number of rural households based on census data.

#### c) Demand on account of users other than domestic consumer segment.

The annual energy requirement for consumers other than domestic has been calculated after discussion with State officials assuming that such segment of consumers are expected to grow at a constant CAGR of 7.0% p.a.

The summary of energy calculation at consumer level and requirement at State periphery is summarized in the table hereunder.

**Table-4.2**

Sl. No.	PARTICULARS→ ↓	YEARS			
		FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
A	<b>Total - Domestic (State Govt DISCOMs &amp; Pvt. DISCOM)</b>				
1	Total Annual Energy Requirement for existing electrified H/Hs incl. additional annual energy requirement	13460	14402	15410	16489
2	Annual Energy Requirement for Electrification of un-electrified Household	0	0	0	0
3	Cumulative Annual Energy Requirement for newly constructed Household	429	934	1526	2216
	<b>TOTAL DOMESTIC</b>	<b>13889</b>	<b>15336</b>	<b>16936</b>	<b>18705</b>
4	Total Annual Energy Requirement including additional energy requirement - Other than Domestic Consumers (with 7% growth P.A.)	61791	66116	70744	75696
	<b>GRAND TOTAL</b>	<b>75680</b>	<b>81452</b>	<b>87680</b>	<b>94402</b>
B	<b>Total - Domestic (State Govt DISCOMs)</b>				



Sl. No.	PARTICULARS→ ↓	YEARS			
		FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
1	Total Annual Energy Requirement for existing electrified H/Hs incl. additional annual energy requirement	10,196	10,910	11,674	12,491
2	Annual Energy Requirement for Electrification of un-electrified Household	-	-	-	-
3	Cumulative Annual Energy Requirement for newly constructed Household	308	670	1,093	1,586
	<b>TOTAL DOMESTIC</b>	<b>10,504</b>	<b>11,580</b>	<b>12,767</b>	<b>14,077</b>
4	Total Annual Energy Requirement including additional energy requirement - Other than Domestic Consumers (with 7% growth P.A.)	54,640	58,465	62,558	66,937
	<b>GRAND TOTAL</b>	<b>65,144</b>	<b>70,045</b>	<b>75,325</b>	<b>81,014</b>

### Annual energy requirement at state periphery

for the years FY 2015-16 to FY 2018-19 at the state periphery -

The table below shows projected energy requirement at the state periphery considering Distribution and intrastate transmission losses

**Table-4.3**

Sl. No.	Year	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
<b>A</b>	<b>Total (State Govt DISCOMs &amp; Pvt. DISCOM)</b>				
	Total Energy requirement for distribution (MU)				
	As per demand projections	75680	81452	87680	94402
	Distribution losses	14.50%	14.00%	13.50%	13.00%
	Intra state transmission losses	3.80%	3.80%	3.80%	3.80%
	Inter state transmission losses	1.50%	1.50%	1.50%	1.50%
	Energy requirement at state periphery	93412	99952	106973	114512
	Peak Demand (MW) at 74% Load Factor	14410	15419	16502	17665
<b>B</b>	<b>State Govt. DISCOMs</b>				
	Total Energy requirement for distribution (MU)	-	-	-	-
	As per demand projections	65,144	70,045	75,325	81,014
	Distribution losses	14.50%	14.00%	13.50%	13.00%
	Intra state transmission losses	3.80%	3.8%	3.8%	3.8%
	Inter state transmission losses	1.50%	1.50%	1.50%	1.50%
	Energy requirement at state periphery	80408	85955	91899	98272
	Peak Demand (MW) at 74% Load Factor	12404	13260	14177	15160
<b>C</b>	<b>Private DISCOM (A-B)</b>				
	Energy requirement	13004	13998	15074	16240
	Peak Demand (MW) at 74% Load Factor	2006	2159	2325	2505



The load factor of 74% has been considered based on the average of actual data furnished by state for past years.

The detailed calculation of energy demand under different categories is given at annexure-I.

Consequent upon projecting the unrestricted demand up to the terminal year of FY 2018-19, the energy requirement at consumers end is estimated as 94.40 BU which corresponds to 114.51 BU at State periphery for all categories of consumers after accounting for losses. The consequent maximum demand requirement of the state is projected to increase to 17665 MW by FY 2018-19.

As per projections made in 18th EPS of CEA, the projected energy demand and peak load for the state of Gujarat would be 125 BU and 21942 MW in FY 2018-19 as against the now calculated energy demand of 114.51 BUs and peak load of 17665 MW in FY 2018- 19.

As against energy demand of 114.51 BU in FY 2018-19, the energy availability projections from all possible sources as per State Generation Plan by FY 2018-19 works out to 152.0 BU (shown in next chapter) and thus, there is a surplus scenario as per projections for FY 2018-19.

The adoption of various energy efficiency measures like energy efficient irrigation pump-sets, energy efficient lighting (use of LEDs), adopting demand side management initiatives like introduction of Time of Day (TOD) tariff etc., or by adopting accelerated AT & C loss reduction targets would also help in reducing the peak demand.

However, an assessment of the adequacy of Generation, Transmission and Distribution infrastructure has been made in the subsequent chapters to meet the projected demand of 17665 MW of the state and the same are covered in the subsequent chapters.

## CHAPTER – 5: GENERATION PLAN

### GENERATION PLAN

Study of generation plan will ensure adequate capacity addition planning & tie ups for power from various sources at affordable price to meet the projected increase in power demand for future. Areas of studies are:

- a. Existing Generation
- b. Future Generation Plans (Projects under construction and future projects)
- c. Generation capacity required to meet Peak Demand
- d. Power procurement costs
- e. Fuel Requirement
  - Coal requirement based on linkage with CIL
  - Coal Imports to meet shortfall of Coal

- Short availability of gas
  - Issues regarding coal procurement plan
  - Allocation of coal linkage/coal blocks for future power projects
  - Hydro Power issues
- f. Year-wise capacity addition plan from renewable source (separately for Solar, Wind, Biomass etc.)
  - g. Action plan of the state
  - h. Fund Requirements
  - i. GoI/ State Government Interventions

### Existing Generation Capacity / Availability of Power (As on 31.03.2015)

The details of existing generating capacity available as on 31.03.2015 for the state of Gujarat are shown in table-5.1 below :

**Table- 5.1**

**Existing Generation Capacity/ Availability of Power (As on 31.03.2015)**

Ownership / Sector	MODE WISE BREAK UP							Grand Total (MW)
	Thermal				Nuclear	Hydel	Renewables (Wind. Solar. Biomass, Small Hydro)	
	Coal/ lignite	Gas	Oil	Total				
STATE	4220	728	-	4948	-	540*	21	5509.00
IPPs / JV (STATE)	750	1519	-	2269.00	-	-	302.80	2571.80
IPPs (PRIVATE)	5405	2603**	-	8008.00	-	-	4269.00	12277.00
CENTRAL	2625	424	-	3049.00	559.00	232.00	10.00	3850.00
TOTAL	13000	5274	0	18274	559.00	772.00	4602.80	24207.80

Source: State Power Utilities

\* 7 MW State's small hydro is included under renewable.

\*\* includes 1648 MW of Private licensee Torrent share (861MW SUGEN, 287MW Uno SUGEN, 100MW VATVA & 400MW DGEN)

As shown in Table-5.1 above, the total generation capacity / availability of power as on 31.03.2015 for the state of Gujarat is 24207.80 MW. Out of which 53.7% is from Coal / lignite based Thermal, 21.79% is from Gas based Thermal, 2.31% is from Nuclear, 3.19% is from Hydro and balance 19.01% is from Renewable Energy Sources.

In terms of ownership, Private IPPs/ UMPP/ Purchase has the largest share of 50.71%, followed by State Sector Projects which is about

22.76%. The share of Central Sector Allocation is about 15.90% and State Sector IPPs contribute about 10.62%.

### Future plan for augmentation of generation capacity / availability of power

As per generation Plan of State of Gujarat, capacity of around 7546 MW is expected to be added by FY 2018-19 (from new projects, from enhanced allocation from central sector and IPP project). Out of this, about 3610 MW shall be added through non-conventional energy sources



and balance 3936 MW through conventional sources. As such the total available capacity by FY 2018 – 19 is expected to be 31753.8 MW (23548 MW – conventional and around 8205.80 MW – Renewable).

Year wise Summary of Generation Capacity / Availability of Power (State Share) up to year 2018-19 are indicated in Table 5.2 below:

**Table 5.2**

Particulars	Year wise existing & likely Capacity to be added (MW) – Cumulative				
	As on March 2015	As Planned			
		FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
STATE SECTOR					
State Sector Thermal (Coal / Lignite)	4220.00	4720.00	4720.00	4720.00	5520.00
State Sector Thermal (Gas)	728	1104	1104	1104	1104
State Hydro	540.00	540.00	540.00	540.00	540.00
State small Hydro (RES)	7.00	7.00	7.00	7.00	7.00
CENTRAL GENERATING STATION SHARE					
CGS Thermal (Coal)	2625.00	2838	3238	3458	3909
CGS Thermal(Gas)	424.00	424.00	424.00	424.00	424.00
CGS Hydro	232.00	232.00	232.00	232.00	232.00
CGS Nuclear	559.00	559.00	1035.00	1035.00	1035.00
PRIVATE IPP PROJECTS					
Private IPP Thermal (Coal/Lignite)	5405.00	5405.00	5405.00	5405.00	5405.00
Private IPP Thermal (Gas)*	2603.00	2603.00	2603.00	2603.00	2603.00
STATE IPP PROJECTS					
State IPP Thermal (Coal / Lignite)	750.00	1250.00	1250.00	1250.00	1250.00
State IPP Thermal (Gas)	1519.00	1519.00	1519.00	1519.00	1519.00
RES (IPP + State)					
Biomass	41.20	41.20	41.20	41.20	41.20
Small Hydro	9.60	25.60	28.60	42.60	57.60
Solar	1003.00	1097.00	1142.00	1803.00	2489.00
Wind	3542.00	4147.00	4814.00	5204.00	5618.00
TOTAL	24207.80	26511.80	28102.80	29387.80	31753.80

Source: State Power Utilities

\*includes 1648 MW of Private licensee Torrent share (861MW SUGEN, 287MW Uno SUGEN, 100MW VATVA & 400MW DGEN)

Break up and details of capacities likely to be added year wise is indicated in Annexure-II.

**Capacity Under / Planned for Renovation & Modernisation (R&M) in Gujarat and their status:**

Some of the plants / units of the state utility (GSECL) are under Renovation & Modernisation (R&M) plan. Details and status of the same are as furnished in Table 5.3 below:



**Table- 5.3**

Sl. No.	Name of the Plant / Unit	Status
1	Retrofitting of LMZ turbines of 210 MW of Wanakbori TPS Unit No. 3 and 200 MW Ukai TPS Unit No.4(Phase – I)	(a) LOA placed on M/s NASL on 29.04.15 (b) Zero Date: 10.03.2015 (c) Contract signed on 25.05.2015 (d) Detail Engg. Work started (e) Project cost is Rs. 206.75 Crores (f) Estimated time for completion of work is about 22 months up to commissioning.
2	Retrofitting of ESP – Ukai Unit No. 3 & 4 (Phase – I)	(a) LOA placed on M/s NASL on 28.07.2014 (b) Detail engineering and approval of drawings and supply for Ukai – 3 & 4 under progress. (c) Project cost is Rs. 46.75 Crores (d) Time limit for completion of work is 16 months
3	Retrofitting of ESP – Wanakbori Unit no. 1, 2, 3 & Ukai Unit No. 5 (Phase – II)	(a) Price bids opened on 05.05.2015. However, tender has been scrapped and revised bids have been invited. (b) Estimated project cost is Rs. 110 Crores.
4.	Up gradation of C&I System Ukai TPS No. 3 & 4	(a) LOA placed on M/s BHEL on 18.06.2015 (b) Estimated project cost is Rs. 20 Crores (c) The work of unit -3 shall be carried out during shutdown ESP retrofitting work from 15.12.2015. The work for unit-4 shall be carried with turbine retrofitting work.
5.	Availability & Efficiency improvement through modification in boiler back pass and air preheater –Ukai Unit No. 4	(a) LOI placed on M/s BHEL. (b) Project Cost is Rs. 54.10 (c) Zero date is 17.08.2015. (d) Time schedule is 12 months. (e) Work shall be carried out with turbine retrofitting work.

Source: GSECL

### Peaking & Energy Availability to Meet Peak & Energy Demand

Year wise peaking availability has been worked out based on the peaking availability & auxiliary power consumption norms of each plant as per National Electricity Plan (Vol-I) for 12<sup>th</sup> five year Plan. 8% contribution from solar and wind installed capacity has been considered for estimation of Peak demand. Similarly the energy availability in each year has also been worked out based on the PLF & auxiliary power consumption norms of each plant as per National Electricity Plan (Vol-I) for 12<sup>th</sup> five year Plan and as per the information made available by the State.

Though Gujarat State has a considerable Gas Based Generation Capacity, the capacity utilisation of these plants is poor due to inadequate availability of gas. As such, for determining the installed capacity (state share) of the State, the total installed capacity (state

share) of the gas based power stations have been considered. However, the Peak Demand and Energy Availability have been calculated considering the following two scenarios :

**Scenario –I :** Considering actual capacity utilisation of gas based plants based on present availability of gas. Under this scenario, out of 5650 MW gas based capacity, only 2207 MW has been considered for working out Peak Demand and Energy Availability during the period FY 2015 – 16 to FY 2018 -19 considering that similar situation with regard to gas availability shall prevail till FY 2018 – 19.

**Scenario – II:** Considering full availability of gas and full capacity utilisation of gas based plants. Under this scenario total 5650 MW gas based capacity has been considered for working out Peak Demand and Energy Availability during the period FY 2015 – 16 to FY 2018 -19 considering

that adequate quantity of gas shall be available during the period of study i.e from FY 2015 – 16 to FY 2018-19.

have been worked out upto FY 2018-19 for both the scenarios and are shown in Table 5.4a and Table 5.4b below:

The availability of peaking capacity and energy availability projection from all possible sources

**Table-5.4a**

**Scenario – I**

Financial Year	Total Capacity (MW)	Estimated Peak Availability at State Periphery (MW)	Estimated Energy availability at State Periphery	
			Energy from all sources (MU)	Energy from renewable energy sources (MU)
FY 2015-16	26511.80	14198.17	108159.35	9389.58
FY 2016-17	28102.80	14850.92	114999.56	10643.60
FY 2017-18	29387.80	15119.35	121318.89	12480.03
FY 2018-19	31753.80	16195.66	126685.30	14403.98

**Table-5.4b**

**Scenario – II**

Financial Year	Total Capacity (MW)	Estimated Peak Availability at State Periphery (MW)	Estimated Energy availability at State Periphery	
			Energy from all sources (MU)	Energy from renewable energy sources (MU)
FY 2015-16	26511.80	17137.85	133624.77	9389.58
FY 2016-17	28102.80	17790.60	140449.55	10643.60
FY 2017-18	29387.80	18059.04	146768.88	12480.03
FY 2018-19	31753.80	19135.35	152135.29	14403.98

Gujarat State has informed that in case, domestic gas allocation is not available, the generation from gas based capacity i.e. 5650 MW (including 1648 MW of private licensee) can be availed on other SPOT RLNG based fuel to meet any intermittent demand / power deficit scenario. As such the entire gas based capacity, in line with Scenario - II has been considered for further working.

Based on the deliberations in the previous text, the scenario in the state emerges as shown in the Table-5.5a below. It could be seen from Table 5.5a that the peak demand of Gujarat would be about 17665 MW by FY 2018-19 considering the additional power requirement for providing 24x7 power supply to all in the state. The expected energy requirement at state periphery for FY 2015-16 is about 93412 MU which is likely to increase to 114512 MU by FY 2018-19.

It is also observed from Table 5.5a that in terms of peaking availability, Gujarat state will have surplus availability in FY 2015 – 16 (15.92%), FY 2016 – 17 (13.33%), FY 2017 – 18 (8.62%) and FY 2018 – 19 (7.68%).

In FY 2018-19, out of total demand of 17665 MW, the demand of State Discoms is 15160 MW and the balance 2505 MW is demand of the Private Discoms/ Licenses. Similarly, the out of total peak availability of 19135 MW (FY 2018-19), 17324 MW is available for State Discoms and balance 1811 MW is available for Private Discoms/ Licenses.

It is to be noted that the GUVNL/ State Discoms have already made adequate power tie-up to meet the existing as well as upcoming power demand and there will not be any peaking deficit till 2018-19 considering the operational capacity and proposed capacity augmentation plan of State Discoms/ GUVNL.

In terms of availability of energy, during the entire period of study i.e. from FY 2015 – 16 to FY 2018 – 19, the state will have availability of surplus energy ranging from 30.09% to 24.73%.

Thus, the State of Gujarat emerges as a surplus state, both in terms of peak availability and energy availability, during the entire period of study i.e from FY 2015 – 16 to FY 2018-19. The peak demand can be effectively reduced further





through proper implementation of DSM & Energy efficiency measures in the state. While procuring power, the state is required to give more preference to Hydro Power in order to improve the hydro-thermal generation mix which is poor in the state. This will also help in balancing the energy supply & demand scenario.

Regarding energy projections, it is to be noted that the figures have been arrived at considering Scenario – II i.e. full utilization of Gas based generation capacity. In case of use of SPOT

RLNG, expected to be costlier, the cost of energy generated also is expected to be higher. The option of using SPOT RLNG, should be exercised by the State only to meet any intermittent demand / power deficit scenario.

Further, the state is required to firm up plan for disposing surplus power on short term/ medium term basis through bilateral arrangements and Power exchange and earn revenue.

**Table -5.5a**

Sl. No.	Power Supply Position	Unit	Year wise Figures			
			FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
1	Peak Requirement (L.F. = 0.74)	MW	14410	15419	16502	17665
2	Estimated Peak Availability	MW	17138	17791	18059	19135
3	Surplus(+) / Deficit(-)	MW	2728	2372	1557	1470
4	Surplus (+) / Deficit(-)	%	15.92	13.33	8.62	7.68
5	Energy Requirement at State Periphery	MU	93412	99952	106973	114512
6	Estimated Energy Availability at State Periphery	MU	133625	140450	146769	152135
7	Surplus(+) / Deficit(-)	MU	40213	40498	39796	37623
8	Surplus(+) / Deficit(-)	%	30.09	28.83	27.11	24.73

The generation mix as per the proposed generation plan (refer Table-5.2 above) of the state is shown in Table-5.5b.

**Table -5.5b**

GENERATION MIX					
Financial Year	Thermal (Coal / lignite), (%)	Thermal (Gas) (%)	Hydro (%)	Nuclear (%)	RES (%)
FY 2014-15	53.70	21.79	3.19	2.31	19.01
FY 2015-16	53.61	21.31	2.91	2.11	20.06
FY 2016-17	52.00	20.10	2.75	3.68	21.47
FY 2017-18	50.47	19.23	2.63	3.52	24.15
FY 2018-19	50.65	17.79	2.43	3.26	25.86

Generation mix for the state of Gujarat is skewed. Hydro power contributes only about 2-3%. Tying up power supply from Hydel power stations will improve the energy mix.

#### Fuel Scenario & Issues:

Generating Stations in Gujarat are required to perform at higher PLF enabling state of Gujarat to achieve “24 x 7 power for all” for which there should not be any constraint of coal / lignite and

gas supply. Adequate and consistent availability of fuels will also ensure that no capacity in Gujarat remains unutilized for the want of fuel.

#### Fuel (Coal and Gas) Requirement:

The current coal and gas scenario and the projections for next 5 years have been presented below in Table-5.6a and Table-5.6b.

**A) Coal Requirement / Availability:**

**Table- 5.6a**

TYPE	Year wise Coal Requirement (Million Tonnes) – GSECL Plants			
	FY 15-16	FY 16-17	FY 17-18	FY 18-19
Coal Requirement	20.51	21.73	21.73	23.50
Fuel Availability / Linkage	18.67	18.67	18.67	18.67
Shortfall in Coal	1.84	3.06	3.06	4.83
Additional Coal requirement	1.84	3.06	3.06	4.83
Coal import planned	1.00	2.50	2.50	2.50
Shortfall in Coal even after import	0.84	0.56	0.56	2.33

*In addition to the above, for Kutch Lignite Thermal Power Station (KLTPS), a pit head lignite based power plant, the total requirement of lignite for generation at normative availability (@80%) is around 24.50 lakh tones per annum basis.*

The shortfall in coal needs to be met through additional coal linkage from GoI on time to time basis or by purchasing from the market through

e-auction. Alternatively, the issue of shortfall can also be addressed by planning enhanced imports of coal.

**B) Gas Requirement / Availability for GSECL gas based plants:**

**Table- 5.6b**

TYPE	Gas requirement (MMSCMD) – GSECL Plants				
	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19
Gas Requirement	4.65	4.80	4.80	4.80	4.80
Gas allocation	0.20	0.25	0.25	0.25	0.25
Shortfall in Gas	4.45	4.55	4.55	4.55	4.55

*Note: Gas requirement and availability for plants of Torrent Power / Torrent Energy is not included in the above table as the data is yet to be made available by Torrent Power.*

**Issue related to Fuel Requirement and availability:**

- (i) As informed by Gujarat State, in case domestic gas allocation is not available, the generation from gas based capacity can be availed on other SPOT RLNG based fuel to meet any intermittent demand / power deficit scenario.

However, the SPOT RLNG based generation is expected to be costlier.

- (ii) The present shortfall of gas is adversely affecting PLF of gas based stations in the state which is low. In view of this, cost of generation of Gas based Generating Stations becomes higher on account of less utilization of plant. For GUVNL / State Discoms ( except Torrent Power), against the gas requirement of 19.76 MCMD, gas available is 2.64 MCMD only.

- (iii) New gas based capacity of 1078 MW (376 MW Dhuvaran expansion of GSECL and 702 MW Pipavav of GPPC) is ready for operation. Gas supply for these power stations is yet to be tied up. As such, no gas is available & hence these plants are lying idle. As per the information provided by the State 3.52 MCMD gas for GPPC, Pipavav and 1.65 MCMD gas for Dhuvaran Expansion are required for maximum generation from these two plants.

- (iv) GUVNL has tied up 1010 MW with KSK (Mahanadi) Ltd. through competitive bidding ( Case – 1) wherein source of fuel is coal from Morga mines, Chattisgarh allocated to M/s GMDC. However, KSK is not supplying power to GUVNL citing non-availability of coal from GMDC. Presently,



the petition for adjudication of dispute is pending before GERC.

- (v) GUVN has also tied up 1600 MW ( 800 MW with Shapoorji Pallonji Energy Gujarat Ltd. and 800 MW with Essar Power Gujarat Limited) power through

competitive bidding (Case – 1). However, both these projects are inordinately delayed as the respective Project Developers are seeking increase in tariff citing promulgation of Indonesian regulation.

## ACTION PLAN – STATE

To complete the generating capacities of State and to monitor the Central Sector & IPP Projects as per following Roll out Plan:

**Table- 5.7**

Power for All – Roll Out Plan	FY 2015-16 (MW)	FY 2016-17 (MW)	FY 2017-18 (MW)	FY 2018-19 (MW)	Total (MW)
Generation (State Sector )	876	-	-	800	1676
NCE / RNES including state RES (solar PV)	715	715	1065	1115	3610
IPP (State)	500	-	-	-	500
Central Sector	213	876	220	451	1760
IPP (Private) Projects / Purchase	-	-	-	-	-
<b>TOTAL</b>	<b>2304</b>	<b>1591</b>	<b>1285</b>	<b>2366</b>	<b>7546</b>

- To firm up plan to address fuel (coal / gas) procurement and availability issues (as discussed above) so that no capacity within Gujarat state remains unutilized.
- To improve the generation mix (Thermal: Hydro ratio) through more tie up from hydro power plants in order to balance the energy supply & demand scenario. Matter to be taken up by State with MoP, GoI for more allocation from Central Sector Hydro Projects to Gujarat..
- To firm up plan and implement DSM and energy efficiency measures to reduce the peak demand.
- To firm up plan for disposing surplus power on short terms/ medium term basis through bilateral arrangements and power exchange and earn revenue.
- To expedite timely execution and commissioning of 800MW Capacity of Wanakbori TPP Extension Unit 8.
- To execute R & M projects as per schedule so that renovated and refurbished unit are back in generation as planned.
- GoG through GERC is requested to help resolve the dispute between KSK (Mahanadi) and GUVNL at the earliest so that 1010 MW power is available to the state.

## POWER PURCHASE PLANNING

The state will work towards institutionalizing and strengthening the Power Purchase Planning and Procurement Cell, which will dedicatedly work on the short / medium / long term power purchase planning and work on the procurement of power on cost effective basis.

This cell will also work on the monthly power availability from already tied up sources ( on the basis of annual schedules provided by these sources) and accordingly work out the requirement for tying up power through competitive bidding route keeping into consideration the huge seasonal variation in

availability of energy from various sources across the year.

### Best Practices Adopted by Gujarat State for reduction in costly power purchase:

GUVNL has tied up 7615 MW Capacity through competitive bidding ( 5810 MW thru' Case 1 & 1805 MW thru' Case – 2) out of which State Utilities are already receiving 5005 MW power at competitive rates. The break up of 5005 MW power being received by the State is as follows:

- Mundra Power Project of Adani ( Case -1) – 2000 MW.
- ACB India Limited (Case – 1) – 200 MW
- Essar Power Gujarat Ltd. (Case – 1) – 1000 MW
- Mundra UPMM – Coastal Gujarat (Case – 2) – 1805 MW

Moreover, power is purchased in real time basis by State Load Despatch Centre / Distribution Companies based upon the prevailing power demand observing the Merit order protocol i.e

cheaper to costlier generation in order to optimize the power purchase cost. Further, GUVNL on behalf of its Distribution Companies is disposing off the surplus power in short term market through bilateral arrangement & Power exchanges for optimum utilization of the available generation capacity.

### Government of India (GOI) Intervention Required:

- GoI's intervention is required to facilitate availability of cheaper gas in adequate quantity for the gas based plants (either lying idle or running at low PLF).
- GoI's intervention is also required to facilitate enhanced linkage for coal to meet the shortfall.

### Fund Requirement:

The detail of estimated fund requirement of the State Sector Projects is given in table 5.8 below:

**Table- 5.8**

#### For State Sector Projects

Sl. No.	Type	Total Cost of Project (Rs. Crores)	Expenditure up to March 2015 (Rs. Crores)	Year wise Fund Requirement (Rupees in crores)				Tie Ups for Fund
				FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	
A.	Projects under Expansion							80% debt (through bank loans), 20% Equity
a.	Sikka thermal	3180	3046	134	--	--	--	
b.	Wankbori Thermal	4465	-	719.40	1194.80	1281.70	1269.10	
	Total for Expansion Projects	7645	3046	853.40	1194.80	1281.70	1269.10	
B.	Projects Under Renovation & Modernisation (R&M)							To be given by GoG as grant.
a.	Wanakbori Unit 1-6	554.80	-	60.25	89.88	143.99	260.68	
b.	Ukai Unit 3-5	504.96	-	115.24	117.57	52.90	219.25	
c.	Gandhinagar	8.25	-	1.00	7.25	0.00	0.00	
	Total for R&M Projects	1068.01	-	176.49	214.70	196.89	479.93	
	Grand total			1029.89	1409.50	1478.59	1749.03	

## CHAPTER - 6 : TRANSMISSION PLAN

The present peak power demand and energy requirement of Gujarat at state periphery during FY 2014-15 is 14005 MW and 90998MU respectively. The above requirement in the coming years is expected to increase significantly due to various factors such as increase in agriculture consumption, increased uses of various appliances in domestic sector, increase in commercial activities & industrialization in the state. Taking into account all the above with an objective to provide 24x7 power supply to all, the expected power demand of Gujarat by FY 2018-19 would be of the order of 17665 MW with annual energy requirement of 114512 MU. To meet this growing demand, a robust & reliable Inter-state & Intra-state transmission network is required. In view of this, existing transmission system would be strengthened both at Inter-state level as well as Intra-state level with proper planning to cater the demand in a reliable manner. In order to improve reliability in transmission system, 400 kV ring main system has been

developed in the state having connectivity with central grid. For details refer power Transmission map of Gujarat 132 kV and above as on 31.01.2015 (attached in the report after Annexure).

### Existing Inter State Transmission System (ISTS)

Presently about 6158 ckt km EHV transmission line comprising of 765 kV (418 ckt km) 400 kV (4740 ckt km), 220 kV (1000 ckt km) and 6 nos. of Grid sub-stations with 1no. 765/400 kV & 5 nos. 400/220 kV with total transformation capacity of 6965 MVA are existing in Gujarat under Inter-state Transmission system of PGCIL.

The existing Inter-state transformation capacity at 400 kV level is 3965 MVA having 5 nos. of Grid substations.

The details of existing ISTS Grid sub-stations are as mentioned below :

**Table-6.1**

**Details of existing Grid sub-station (ISTS)**

Sl. No.	Name of GSS	Voltage Ratio	No. of Transformers	MVA capacity	Total Transformer capacity(MVA)
<b>765 kV GRID SUBSTATION (PGCIL)</b>					
1	Vadodara (GIS)	765/400	2	1500	3000
<b>Total :</b>					<b>3000</b>
<b>400 kV GRID SUBSTATION (PGCIL)</b>					
1	Bachau	400/220 kV	2	315	630
2	Dehgam	400/220 kV	2	315	630
3	Pirana	400/220 kV	2	315	630
4	Vapi	400/220 kV	3	315	945
5	Navsari	400/220 kV			1130
<b>Total :</b>					<b>3965</b>
<b>400 kV GRID SUBSTATION (GETCO)</b>					
1	Asoj	400/220 kV	3	2x500+1x315	1315
2	Kosamba	400/220 kV	3	315	945
3	Soja	400/220 kV	2	500	1000
4	Kasor	400/220 kV	2	315	630
5	Chorania	400/220 kV	2	500	1000
6	Amreli	400/220 kV	3	315	945
7	Vadavi	400/220 kV	3	315	945
8	Varsana	400/220 kV	2	315	630
9	Zerda	400/220 kV	3	315	945
10	Halvad	400/220 kV	2	315	630
11	Jetpur	400/220 kV	4	1x500+3x315	1445
12	Hadala	400/220 kV	3	315	945
<b>Total :</b>					<b>11375</b>
<b>Total (PGCIL+ GETCO)</b>					<b>15340</b>



In order to facilitate the drawl of power by Gujarat and to meet the projected peak load of 19779MW by FY 2018-19, a robust inter-state transmission system (ISTS) would be required. The present ISTS system capacity of PGCIL at 400/220 kV level is 3965 MVA and it would be increased to 6965 MVA by FY 2018-19 after implementation of ongoing schemes. In addition to this, the existing transformation capacity at 400/220 kV level of GETCO system is 11375 MVA and it would be increased to 24210MVA by FY 2018-19 after new addition & augmentation of substations. (For GETCO details refer Intra state transmission system indicated in subsequent para of this chapter). The combined Transformation capacity of PGCIL & GETCO system at 400/220 kV level would be 31175MVA by FY 2018-19 after implementation of ongoing and proposed schemes, which shall take care the increased power demand of Gujarat up to FY 2018-19.

The various ongoing/ planned ISTS projects are outlined below. :

#### On-Going ISTS Projects

##### New GSS & Transmission lines

- **New GSS** :1000 MVA

Sl. No.	Sub-Station	765/400kV	400/220kV
1	Vadodara (GIS)	-	1,000
	<b>Sub-total :</b>	-	<b>1,000</b>

- **400 kV transmission lines –**  
**Total approx. : 1820 ckt km.**
- **Total Cost -Approx. Rs. 5250 Cr.**

##### Scheme Details:

#### i) Western Region System Strengthening –V (Part System) (~725 Cr.)

- 400 kV Vapi- Kudus (MSETCL) D/c-120 km (Completion schedule : June' 2016)

#### ii) Tr. System of Mundra Ultra Mega Power Project (Part-B) (Part System) (~2000 Cr.)

- Navsari-Boisar 400 kV D/c : 204 km (Completion schedule : March' 2016)

#### iii) Transmission system for evacuation of Kakrapar Atomic Power Project unit 3 & 4 (2X700 MW) (~380 Cr.)

- Kakrapar NPP- Navsari 400kV D/c – 65 km
- Kakrapar NPP- Vapi 400kV D/c - 120 km (Completion schedule : Oct' 2016)

#### vi) Transmission system for strengthening for IPPs in Chhattisgarh & MP (~1600 Cr.)

- Extention at 400/220 kV Vadodara GIS ICT (2x500 MVA) (Completion schedule: July' 2016)

#### v) Transmission System Associated with Essar Power Gujarat Ltd. (~550 Cr.)

- EPGL TPS - Bachau 400kV D/c (Triple) line (Completion schedule : Dec., 2015)

**Note:** The following inter-regional transmission system under implementation by POWERGRID shall also facilitate transfer of power from Gujarat to other regions.

##### West – South

- a) Kolhapur – Narendra 765kV D/c (initially charged at 400kV)( Completion schedule : Oct, 2015)

##### West – North

- a) Gwalior– Jaipur 765kV 2X S/c (Commissioned)

#### Planned ISTS Projects

##### • Planned GSS Transformation Capacity

<b>Total capacity</b>	: 9,000 MVA
<b>765kV</b>	: 6,000 MVA
<b>400kV</b>	: 3,000 MVA

Sl. No.	Sub-Station	765/400kV	400/220kV
1	Bhuj Pool	3,000	1,000
2	Banaskantha	3,000	1,000
3	Vataman	-	1,000
	<b>Sub-total</b>	<b>6,000</b>	<b>3,000</b>

- **765 kV and 400 kV transmission lines –**  
**Total approx. : 1700 ckt km.**  
**765kV : 1500 ckt km**  
**400kV : 200 ckt km**



- **Total Cost - Approx. Rs. 8000 Cr.**

#### **Scheme Details :**

#### **i) Evacuation of Renewable Energy generations located in WR and NR to Northern Region states.**

**Green Energy Corridor :Part C (2250 Cr.) & Green Energy Corridor : Part B (3750 Cr.)**

- Bhuj Pool-Banaskantha 765 kV D/c (July' 2018)
- Banaskantha -Chittorgarh 765 kV D/c (July' 2018)
- Banaskantha-Sankhari 400 kV D/c (July' 2018)
- Establishment 765/400/220kV (765/400 kV-2x1500 MVA & 400/220kV-2x500MVA)sub-station each at Bhuj Pool and Banaskantha. (July' 2018)
- Associated reactive compensation (Bus reactors & line reactors) (July' 2018)

#### **ii) Transmission system associated with Chhattisgarh UMPP (5x800 MW) (Part System) (~2000 Cr.)**

(System currently on hold : Shall be taken up depending on progress of Chhattisgarh UMPP)

- Indore- Vadodra 765kV 2nd S/c- 300 km
- Vadodra- Vataman 400kV D/c (Quad)

- Establishment of 2x500 MVA, 400/220kV substation at Vataman
- Augmentation of transformation capacity at 765/400kV Vadodra Substation by 1x1500 MVA

**Note: 1. other schemes being implemented by POWERGRID in Western Region shall indirectly benefit Gujarat.**

**2. The following inter-regional transmission system under implementation by POWERGRID shall also facilitate transfer of power from Gujarat to other regions.**

#### **West – South**

- Wardha- Nizamabad- Hyderabad 765kV D/c (May' 2018)
- $\pm 600$ kV, 4000MW HVDC Bipole from Raigarh (Kotra) in Western Region to Pugulur in Southern Region (2018-19/2019-20)

#### **West – North**

- Jabalpur- Orai 765kV D/c (April' 2018)

The details of year wise ongoing New/ augmentation on existing sub-stations are as follows :

**Table-6.2**

Project	Voltage Level	Unit	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
Inter-State Transmission Network	765/400 kV	No./MVA		-		2/6000
	400 /220 kV	No./MVA		1/1000		2/2000

#### **On-going Tariff Based Competitive Bidding (TBCB) Scheme:**

- **Presently no scheme is under implementation under this head.**

**Inter and Intra state Transmission plan for evacuation of power from existing and upcoming Renewable Energy sources. Balancing Infrastructure envisaged for integration of large scale renewable.**

The existing renewable energy generation of Gujarat is of the order of 4596 MW which shall increase up to 8206MW by FY 2018-19. The

existing renewable bulk size wind farm generations are being evacuated through 132kV & 220 kV network. The power evacuation from proposed bulk renewable generation is being planned to be evacuated by green energy corridor project.



### Renewable Energy Management centers proposed for Real time monitoring of Generation from RE sources:

Presently Renewable Energy Management center is not there but CTU will implement this under green energy corridor project.

### Adequacy to meet Power Transfer requirement of the state till 2019

The present ISTS system transformation capacity at 400/220 kV CTU level is 3965 MVA and after augmentation it shall be increased to 6965 MVA. At GETCO system existing capacity at 400/220 kV level is 11375 and it would be increased to 24210 MVA by FY 2018-19 after new addition & augmentation. Hence the combined transformation capacity at 400/220 kV level would be 31175 MVA by FY 2018-19.

In addition to above, the state's ISTS network is evacuating power at 220 kV and below level from state generating units. From state generating units approximately 6729 MW power was being evacuated in FY2014-15 and it is expected that approximately 6799 MW in FY 2015-16, 6859 MW in FY2016-17, 6956 MW in FY2017-18, 7057 MW in FY2018-19 would be

evacuated at 220 kV and below level by GETCO network.

The projected power demand of Gujarat by FY2018-19 would be 17665 MW (19628 MVA). Considering drawal of power from state generating units at 220 kV level and below, the balance power drawal at 400 kV level would be 7611MW (8457MVA) by FY 2015-16, 8560MW (9511MVA) by FY 2016-17, 9546MW (10607MVA) by FY 2017-18, 10608MW (11786MVA) by FY 2018-19. Considering 80% loading on transformers and overall diversity factor of 1.2, minimum transformation capacity required at 400 kV level would be 1.5 times the projected peak demand i.e. 12685 MVA (8457 x 1.5) by FY 2015-16, 14267 MVA (9511 x 1.5) by FY 2016-17, 15910 MVA (10607 x 1.5) by FY 2017-18, 17680 MVA (11786x 1.5) by FY 2018-19.

The year wise generation addition, total available capacity vis-a-vis transmission system available at 400 kV level for Gujarat is tabulated as under:

**Table-6.3**

Financial Year	Generation Within Gujarat (MW)		Inter state (ISGS) – Generation outside Gujarat (MW)		Total Peak Availability (in MW)	Peak Power Demand of Gujarat at 400 kV level (Peak power demand- power evacuated at 220 kV level & below) MW	Minimum Transformation capacity required at 400 kV level (MVA)*	Available Transformation System capacity existing/Planned at 400 kV level including PGCIL & GETCO(Inter & Intra state) 400/220 kV GSS MVA
	Addi- tion	Total	Addi- tion	Total				
FY 2015-16	2091	23039.8	213	3472	17148.39	14410-6799 =7611	12685	19415
FY 2016-17	1191	24230.8	400	3872	17800.66	15419-6859 =8560	14266.67	23360
FY 2017-18	1065	25295.8	220	4092	18068.82	16502-6956= 9546	15910	26175
FY 2018-19	1915	27210.8	451	4543	19144.58	17665-7057= 10608	17680	31175

\* Minimum transmission capacity at 400 kV level = Peak power demand at 400 kV level (in MW /0.9) x 1.5.

As such, the existing and planned ISTS System would be adequate to meet the projected peak demand of Gujarat of 17665 MW by FY 2018-19.

#### **Action Plan – CTU**

- Ongoing schemes (New Sub-stations & Transmission lines) shall be implemented as per schedule by PGCIL for ensuring robust and reliable transmission system.

#### **Intra state Transmission System:**

The existing Intra state transmission capacity at 400kV GSS level (400/220 kV) is 11375 MVA, at 220 kV GSS level (220/132 kV, 220/66 kV, 220/33 kV & 220/11 kV) is 24740 MVA, and at 132 kV GSS level (132/66 kV, 132/33 kV, 132/11 kV) is 7145 MVA.

The ongoing strengthening program of Intra-state transmission system is under implementation. After implementation of this plan the existing transformation capacity shall increase to 24210 MVA at 400 kV and 39990 MVA at 220 kV by FY2018-19 after new addition & augmentation.

#### **Intra State Transmission System (Existing):**

The transmission network as on March' 2015 that presently caters to the load demand across the State is as follows:

- 12 Nos. of 400 kV grid sub-stations with 11375 MVA transformation capacity along with 4052 ckt km of associated Transmission lines.
- 94 Nos. of 220 kV grid substations with 24740 MVA transformation capacity (220/132 kV - 5300 MVA, 220/66 kV 19020 MVA, 220/33 - 20 MVA, 220/11 kV – 400 MVA) along with 16987 ckt km associated 220 KV line.

- 54 Nos. of 132 kV grid substations with 7145 MVA transformation capacity (132/66 kV - 6230 MVA, 132/33 kV - 290 MVA, 132/11 – 625 MVA) along with 5073 ckt km associated 132 kV line.

***Note: List of existing 400kV, 220 kV & 132 kV Substations and transmission lines is enclosed as Annexure-III.***

#### **Details of ongoing / Planned Inter State Transmission system**

##### **New Sub-stations, Augmentation/ Transmission lines**

- 8 nos. 400/220 kV grid sub-stations at Charanka (630 MVA), Chharodi (1500 MVA), Sankhari (630 MVA), Kalavad (1000 MVA), Vav (1500 MVA), Shapar (1000 MVA), Fedra (1000 MVA), Bhachunda (1000 MVA).
- 18 No. of 220/66 kV grid sub-stations with 320 MVA transformation capacity and 2 No. of 220/66 kV grid sub-stations with 480 MVA transformation capacity.
- 5 No. of 220/132 kV grid sub-stations with 300 MVA transformation capacity at Wankaner, Sankhari, Gotri, Babara & Zaiod.
- Augmentation of existing 7 nos. of 400/220 KV grid sub-stations with total 4575 MVA transformation capacity addition.
- Augmentation of existing 45 nos. of 220/66 KV grid sub-stations with total 6080 MVA transformation capacity addition.
- Augmentation of existing 7 nos. of 220/132 KV grid sub-stations with total 950 MVA transformation capacity addition.

The year wise proposed physical plan of new sub-station/augmentation & Transmission lines are as follows:

**Table-6.4**

Project	Voltage Level	Unit	Existing as on March'15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
Intra-State Transmission Network	400/220kV	No./MVA	12/11375	4075	2945	2815	3000
	400KV	ckt. km.	4052	-	-	70	120
	220/132kV	No./MVA	11/5300	250	900	900	400
	220KV	ckt. km.	16987	-	120	80	325
	220/66kV	No./MVA	13/19020	3180	3260	3260	3100
	132/66kV	No./MVA	/6230	500	450	200	200
	132/11kV	No./MVA	/625	50	-	-	-

The details of ongoing/ planned Intra-state transmission system are enclosed as Annexure-IV.

The year wise peak power demand of state, vis-a-vis transmission system available at 220 kV level for Gujarat is tabulated as under:

**Adequacy to meet Power Transfer requirement of the state till 2019**

**Table- 6.5**

Financial Year	Peak power demand (MW)		Minimum Transformation capacity required at GSS (MVA)*	Transmission System existing/Planned at 220kV level (220/66kV & 220/132 kV ) (MVA)	
	Addition	Total		Addition	Total
FY 2014-15		14005	23342		24740
FY 2015-16	405	14410	24017	3430	28170
FY 2016-17	1009	15419	25698	4160	32330
FY 2017-18	1083	16502	27503	4160	36490
FY 2018-19	1163	17665	29442	3500	39990

**\* Minimum transformation capacity in MVA = Peak power demand at distribution level (in MW /0.9) x 1.5.**

As such, the existing and planned Intra-state transmission system would be adequate to meet the projected peak demand of Gujarat of 17665MW by FY 2018-19 at 220 kV level as well down below level.

**Year wise fund requirement for development of Planned Transmission system:**

Total estimated investment of about Rs. 10302 Crores from FY 2015-16 to FY 2018-19 has been

envisaged for intra state system. Details of year wise investment plan for transmission infrastructure for FY 2015-16 to FY 2018-19 are indicated in Table- 6.6 below.

**Year wise details of Physical targets and proposed investments are detailed in Annexure-V.**

**Table-6.6****Intra State Transmission system investment**

Sl. No.	Financial Year	Investment Rs (Crores)
1	FY 2015-16	2385
2	FY 2016-17	2532
3	FY 2017-18	2712
4	FY 2018-19	2674
	<b>Total Investment in Intra state</b>	<b>10302</b>

**Action Plan – GETCO (STU)**

- The ongoing scheme needs to be implemented as per schedule for ensuring 24x7 power supply to all in the State.
- Financial tie up for approved infrastructure shall be timely arranged/tied up with funding agencies and State Govt. shall be requested to provide equity support, if required.

**State Government intervention**

- The state government shall provide all necessary help to STU for installation of new GSS with associated transmission line with respect to land acquisition & Right of way constraints in the state.

**Government of India intervention**

- **Mitigation of Right of way constraints and availability of land:** GOI, MoP has issued guidelines on 15.10.2015 for providing compensation for acquiring ROW clearance for transmission lines which shall be considered for the same.

**Best practices adopted/ other initiatives taken by Power Transmission Company (GETCO)**

- ➔ *Integration of upcoming generation capacity within State to ensure timely evacuation*
- ➔ *Planning of sub-transmission network for upcoming Central Power through ISTS*
- ➔ *Technical requirements:*

- ❑ *Reactive Power Management – Reduce Transmission Losses and quality power supply.*

- ❑ *Optimization of distribution feeder length and fix substation location to overcome load diversity -Agriculture and urban area for proper load distribution.*

- ❑ *Reliability – Ring Main System to curb radial feeders*

- ❑ *n-1 criteria for transformer for system reliability.*

- ➔ *Identify upcoming load potential pockets- DMIC, DFCC, GIDC, Ports, Railways & Metro Projects, Automobile Hub, etc.*

- ➔ *Replacement of aged, chemically & pollution affected, obsolete technology and unsafe equipments with latest state of art technological equipments.*

- ➔ *Integration of Renewable energy at remote locations- Peak & Off Peak*

- ➔ *Close coordination with DISCOMs for their requirement*

- ➔ *Failure investigation team formed for root cause analysis and Corrective & Preventive action*

- ➔ *Web based Transmission Asset Management System (TAMS) for monitoring of entire life cycle of equipment and R&M planning*

- ➔ *Third party diagnostic monitoring of 66 kV class transformer and CTs to curb failure of CTs - replacement of ITC make CTs of batch 1992 – 96.*

- ➔ *Addition in Equipment Specification*

- ➔ *Online Diagnostic like DGA Equipment and Tan delta measurement of bushing*

- ➔ *Maintenance free condition control breather provided*

- ➔ *Lightning impulse and temperature rise test as special test on 1 out of lot for major EHV equipments.*

- ➔ *600 multiple chopped lightning impulse withstand test - As a type test*

- ➔ *Manufacturing stage wise inspection and proto inspection incorporated*





→ Tan delta is limited to 0.3% in Current Transformer

→ Leakage current is limited to 0.5 mA – Acceptance test

→ Moisture content is limited to 0.5% of total mass of insulating oil.

#### Other initiatives undertaken:

**Table-6.6**

Technologies adopted	Purpose
Substation Automation System	Human interface at limited points - Manpower optimization
Optical CT and merging units	A step towards Digital Substation for better reliability and availability
OPGW – Replacement of Conventional PLCC to FOTE	To away with obsolete technology Bigger band width for data transmission
GIS and Hybrid switchgear	Maintenance free and economical on life cycle cost basis
Geographical Information System (GIS)	Asset mapping for network planning
Reactive power compensation - 4903 MVAR installed	Quality power supply
PMU and WAMS – Sponsored R&D project with IIT, Mumbai	Pre-warning analytics , Oscillation mode identification , Hybrid State Estimator, Dynamic Security Assessment
New Energy Accounting Software for Deviation Settlement Mechanism (DSM)	Automated Energy Accounting at SLDC
High performance conductor in place of traditional ACSR conductor	50% more capacity with lesser transmission loss

Gujarat is the most modern state in the western region of India known locally as Jewel of the Western Part. The power demand of the state is expected to increase from 14005 MW in FY 2014-15 to 17665 MW by FY 2018-19 due to natural increase in demand from the present consumer base, addition of new households, rapid growth in industry & more commercial activities in and around the urban areas. The objectives of this Roadmap for supplying 24X7 Power For All (PFA) to all the consumers can be achieved through capacity augmentations, building redundancies in the upstream networks, adopting appropriate technologies and efficient systems for a reliable and quality power for the end consumers. The state has achieved 100% electrification level in household sector.

Power distribution in the State of Gujarat is served by following eleven distribution licensees:

- **DGVCL:** DAKSHIN GUJARAT VIJ COMPANY LIMITED which distributes electricity in seven districts of south Gujarat.
- **MGVCL:** MADHYA GUJARAT VIJ COMPANY LIMITED which distributes electricity in the central areas of Gujarat.
- **PGVCL:** PASCHIM GUJARAT VIJ COMPANY LIMITED which is the electricity distributor in Western region of Gujarat. PGVCL is the largest amongst all the four State run distribution companies. The area of operation of PGVCL includes Saurashtra and Kachchh regions.
- **UGVCL:** UTTAR GUJARAT VIJ COMPANY LIMITED which operates through the network spread over 50000 Sq. Kms covering six full districts in northern region of Gujarat and three part districts in western and central areas.
- **Torrent Power (AEC) Limited:** It is the electricity distributor in the city of Ahmadabad in Gujarat.
- **Torrent Power (SEC) Limited:** It is the electricity distributor in the city of Surat in Gujarat.

- Kandla Port Trust
- Torrent Energy Ltd., Dahej
- Synfra Ltd., Waghodia, Vadodara
- Mundra Port SEZ Ltd. (MPSEZ), Mundra, Kutch
- Jubilant Ltd., Vagra, Bharuch

These companies are serving about 1,55,14,151 numbers (1,31,86,185 GUVNL + 2327966 Torrent Power) of electricity consumers including 1184799 numbers (11,84,303 GUVNL + 496 Torrent Power) under agriculture category during FY 2014-15.

All categories of consumers, except agriculture consumers, in the state are being given supply with 24 hrs electricity. The agriculture consumers are getting 8 hours of three phase electricity, whereas, for rest of the hrs, they are getting single phase power. There is no planning for further increase in number of hours of providing electricity to agriculture consumers in the state.

The DISCOM wise **Reliability index parameter** for the state of Gujarat for last 3 years is furnished below in the Table- 7.1 :

**Table- 7.1**

<b>2014-15</b>			
<b>DISCOM</b>	<b>SAIFI (No)</b>	<b>SAIDI (minutes)</b>	<b>% DT failure rate</b>
DGVCL	8.35	0.45	4.46
MGVCL	4.75	0.20	4.06
PGVCL	8.26	0.94	13.15
UGVCL	2.75	0.17	5.6
Torrent Power	Not available		0.89

<b>2013-14</b>			
<b>DISCOM</b>	<b>SAIFI (No)</b>	<b>SAIDI (minutes)</b>	<b>% DT failure rate</b>
DGVCL	10.10	0.57	7.9
MGVCL	5.18	0.23	4.51
PGVCL	8.14	0.43	13.97
UGVCL	2.97	0.19	6.76
Torrent Power	Not available		

**2012-13**

DISCOM	SAIFI (No)	SAIDI (minutes)	% DT failure rate
DGVCL	8.99	0.51	9.38
MGVCL	5.56	0.30	4.7
PGVCL	2.34	0.25	11.49
UGVCL	2.88	0.16	6.85
Torrent Power	Not available		

**Metering status:** The Discom wise status of Metering efficiency for last 3 years is shown in table 7.2 and the planning for completion of distribution transformer metering is shown in **Annexure-VI**.

**Table 7.2****2014-15**

DISCOM	Consumer Metering (%)	Feeder Metering (%)	Transformer Metering (%)
DGVCL	98.31	100	68
MGVCL	99.09	100	98
PGVCL	94.31	100	69
UGVCL	94.95	100	74

**2013-14**

DISCOM	Consumer Metering (%)	Feeder Metering (%)	Transformer Metering (%)
DGVCL	98.24	100	61.37
MGVCL	99.06	100	88.64
PGVCL	94.10	100	28.02
UGVCL	94.77	100	74.81

**2012-13**

DISCOM	Consumer Metering (%)	Feeder Metering (%)	Transformer Metering (%)
DGVCL	98.16	100	43.40
MGVCL	99.04	100	50.11
PGVCL	93.65	100	25.29
UGVCL	94.53	100	78.74

**HT: LT Ratio**

Various initiatives by distribution companies like HVDS, Bifurcation of 11 kV feeders etc have been taken to increase the **HT to LT** ratio. The Table-7.3 furnished below reflects the outcomes of these measures.

**Table- 7.3**

Description	FY 2005-06	FY 2006-07	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15
HT Lines (22/11kV (CKM)	196451	202071	213441	223702	220885	244513	258954	284911	308749	326083
LT Lines (CKM)	228737	239357	252764	264343	278562	286191	292354	297099	302442	307717
Ratio of HT/LT	0.86	0.84	0.84	0.85	0.79	0.85	0.89	0.96	1.02	1.06

## EXISTING DISTRIBUTION SYSTEM

The distribution network comprises of 220/11kV, 132/11kV, 66/11kV & 33/11kV PSS, 66 kV & 33 kV Sub transmission lines, 11 kV lines and LT distribution systems which deliver electricity to the majority of the end consumers. An abstract of the distributed network of all distribution licensees in the state in terms of

installed transformation capacity and line lengths of feeders at sub-transmission and distribution voltage levels is provided below in Table No-7.4. This shows operational statistics cum overall view of the strength of Electrical distribution network under four numbers of discoms in the state of Gujarat as on 31st March 2015.

**Table-7.4**

Sl. No.	Particulars	Unit	Status of FY 2014-15
1	Total number of 66KV & 33kV Lines/feeders	No.	2237
2	Total length of 66KV & 33kV lines	Ckt km	26361
3	Total number of 220/11kV, 132/11kV, 66/11kV, 33/11kV PSS	No.	1409
5	Total capacity of 220/11kV, 132/11kV, 66/11kV, 33/11kV PSS	MVA	45405
6	Total number of 11 KV & 22KV Lines	No.	12108
7	Total length of 11KV & 22 KV lines	Ckt km	326083
5	Total Number of Distribution transformers	No.	881376
8	Total capacity of Distribution transformers	MVA	36512
9	Total length of LT Lines	Ckt km	307717

*Source: State Power Utilities*

The operational statistics cum overall view of the strength of Torrent power Electrical distribution network is given in Table No- 7.5 as on 31st March 2015.

**Table-7.5**

Sl. No.	PARTICULARS	UNIT	STATUS OF FY 2014-15
1	220 kV lines	Ckt km	129.13 (D/C)
2	132 kV lines	Ckt km	(155.84(O/H)+23.43(U/G))D/C
3	66 kV lines	Ckt km	(89.34(O/H)+57.26(U/G))D/C
4	33 kV lines	Ckt km	(298.41 U/G)D/C
5	11 kV lines	Ckt km.	(354.64 O/H+5627.52U/G)S/C
6	Total Number of Power transformers	No.	214
7	Total capacity of Power transformers	MVA	7907.5
8	Total Number of Distribution transformers (11/0.415) kV	No.	9399
9	Total capacity of Distribution transformers	MVA	2621.64
10	Total length of LT Lines	Ckt km	28424.35

*Source: Torrent Power*

## Category Wise Consumers

The number of consumers (category wise) as on 31.03.2015 for Gujarat state discoms (4 nos.) is shown below in Table- 7.6 :

**Table- 7.6**

Sl. No.	Category-Wise Consumers	Numbers	Consumption (MU)	% of Consumption
1	Domestic	10267164	9529	16 %
2	Commercial	127991	221	3 %
3	Industrial(LT)	1497713	31413	50%
4	Industrial(HT)	12032		
5	Public Lighting	30388	247	0%
6	Railways	13	742	1%
7	Agriculture	1184303	16443	27%
8	Public Water Works & Sewage Pumping	66581	1526	3%
9	Others			
	<b>Total</b>	<b>13186185</b>	<b>60236</b>	<b>100%</b>

Source: State Power Utilities

The number of consumers (category wise) for Torrent power as on 31.03.2015 is shown below in Table- 7.7

**Table-7.7**

Sl. No.	Category-Wise Consumers	Numbers in FY 2014-15
1	Domestic (RGP)	1,754,239
2	Commercial (Non RGP)	521,672
3	Industrial (LTP/LTMD)	43,525
4	Industrial (HT)	1,388
5	Temporary	30
6	Agriculture	496
7	General	6616
	<b>Total</b>	<b>2,327,966</b>

Source: Torrent Power

## DISTRIBUTION SCHEMES UNDER IMPLEMENTATION

### RAPDRP

Restructured Accelerated Power Development and Reforms Program (R-APDRP) was launched by Ministry of Power, Govt. of India in the XI<sup>th</sup> Five year Plan as a Central Sector Scheme to cover urban areas - towns and cities with population of more than 30,000 as per Census of 2001. Power Finance Corporation Limited (PFC) has been designated as the Nodal Agency for this program. . The continuation of RAPDRP for 12th & 13th plan has been subsumed in the newly launched IPDS scheme in Dec 2014. The focus of R-APDRP Programme was on Actual Demonstrable Performance in terms of

sustained loss reduction in distribution network. Establishment of reliable and automated systems for sustained collection of accurate base line data, and adoption of Information Technology in the areas of energy accounting will be before taking up the regular distribution strengthening projects.

The program was divided into two (2) parts, Part-A and Part-B. Part-A includes projects for establishment of baseline data and IT applications like Meter Data Acquisition, Meter Reading, Billing, Collections, GIS, MIS, Energy Audit, New Connection, Disconnection, Customer Care Services, Web self-service, etc. and verification of baseline AT&C losses as well as implementation of SCADA/DMS

(Supervisory Control And Data Acquisition/ Distribution Management System).

Part-B of RAPDRP includes regular distribution strengthening projects i.e. renovation, modernization and strengthening of 11 kV lines and Substations, Re-conductoring of lines at 11kV level and below, Load Bifurcation, Feeder Separation, Load Balancing, HVDS (11kV), Aerial Bunched Conductor in dense areas, replacement of electromagnetic energy meters with tamper proof electronic meters, installation of capacitor banks and mobile service Centre, etc.

100% grant is provided under R-APDRP Part-A projects while a maximum of 50% grant is being provided for Part B projects after fulfilling certain conditions.

#### **Status of R-APDRP**

Accordingly under this scheme, 84 towns having population of more than 30,000 have been covered. In all the towns, major activities like GIS consumer survey, GIS asset mapping, meter & modem installation have been completed 100%. All the 84 towns have been declared "Go-Live". 75 % data availability in MDAS has also been achieved. Moreover, 6 towns (Surat, Bhavnagar, Jamnagar, Rajkot, Ahmadabad, Vadodara) population of more than 4 Lakh and energy input of more than 350 MUs per Year have been identified for installation of SCADA/DMS system.

The circle wise details of works completed and associated amounts in each discoms for the complete R-APDRP scheme is furnished in Annexure-VII & VIIA.

#### **RGGVY**

Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) was launched by Government of India during 10<sup>th</sup> plan period in 2005 for providing access to electricity for all rural households in the country. The scheme has been subsumed in newly launched Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) in Dec 2014.

Under this scheme, 90% grant was provided for electrification of un-electrified Households, intensification of partially electrified households

and free electricity connections to BPL households in the country.

#### **STATUS OF RGGVY**

Government of India launched RGGVY scheme during 10<sup>th</sup> plan period for providing access to electricity to all rural households in the country. The scheme was continued during 11<sup>th</sup> Plan and the continuation of 12<sup>th</sup> & 13<sup>th</sup> plan RGGVY has been subsumed in the newly launched DDUGJY scheme of GOI in Dec 2014.

Gujarat Govt. has submitted Detail Project Reports of all the 25 nos. of Districts in 2005. In all 25 projects, Work has been completed & closure proposals have already been submitted to REC.

District wise progress of RGGVY is furnished in **Annexure-IX** & financial status of closure of RGGVY Projects is given in **Annexure-VIII**.

#### **ADDITIONAL MEASURES**

In addition to R-APDRP and RGGVY schemes, some additional measures as enlisted below have also been taken by GoG & central Government.

#### **National Electricity Fund (NEF):**

Central government has launched a NEF scheme for improving the distribution infrastructure of MGCL discom fed area and sanctioned an amount of Rs. 100 crores for the same.

**Kutirjyoti-** In this scheme, Electrification of Households of Scheduled Tribe Beneficiaries in Tribal Area is done.

#### **State Government schemes:**

Government of Gujarat has launched several schemes such-

**TASP Wells & Petapara-** The scheme covers Agriculture wells and **Petapara Electrification** in Tribal Areas. Under this scheme total investment planned is around Rs 1482.60 crores for 4 years from FY 2015-16 to FY 2018-19.

**SCSP for House Holds Connections-** The scheme covers electrification of households of scheduled caste beneficiaries. Under this scheme GOG planned to invest Rs. 20 crores.





**Zupadpatti** - The scheme covers electrification of house holds of poor families. Under this scheme GOG planned to invest Rs 80 crores.

**Sagarkhedu Sarvangivikas Yojana (Grant)** - The scheme covers strengthening of distribution line & transmission line and the scheme had been merged with erstwhile RGGVY which has now also subsumed into DDUGJY.

**Sagarkhedu Sarvangivikas Yojana (Share Capital)** - The scheme covers construction of new 66/11 kV sub station and electrification of AG wells in area of PGVCL.

**Energy Conservation**- The scheme covers installation of small capacity transformers and activities related to energy conservation.

**Kisan Hit Urja Shakti Yojana (KHUSHY)**- The scheme covers installation of small capacity transformers in the area of PGVCL. Under this scheme total investment planned is around Rs 600 crores for 4 years from FY 2015-16 to FY 2018-19.

**Agriculture Wells (Non Tribal Areas)**-The scheme covers electrification of agriculture wells .

**TASP Transmission Line &Sub Station** – The scheme covers installation of new sub stations and lines in tribal area. Under this scheme GOG planned to invest Rs 640 crores.

#### **Smart Village Distributed Renewable Energy Generation with Smart Grid Concept Scheme-**

The scheme covers smart village distributed renewable energy generation with smart grid concept scheme in PGVCL area.

**Solar Ag Pump Set (Achievement Up to July-2015)**– The scheme covers installing solar pump sets. Under this scheme GOG planned to invest Rs 240 crores.

**Share Capital Contribution to GUVNL for Shifting /replacement of poles and Distribution lines in the area of Municipal Corporations and Nagarpalikas.** - The scheme covers shifting /replacement of poles and distribution lines in the area of municipal corporations and Nagarpalikas. Under this scheme GOG planned to invest Rs 400 crores. Scheme wise fund requirement from FY 2015-16 to FY 2018-19 for the above GOG projects has been given in **Annexure –X**.

#### **System strengthening work by Discoms:**

This segment is not included in State / Central Govt. Schemes. It is funded from DISCOM's own fund. This segment should be covered as fund requirement under PFA. The Discom wise fund requirement for system strengthening work is given in Table-7.8. The detailed requirement is given in Annexure-XIA.

**Table-7.8**

(Rs. in Cr.)

DISCOMS	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	Total
DGVCL	58.70	53.50	60.45	83.00	255.64
MGVCL	29.79	22.97	32.18	57.00	141.95
PGVCL	597.87	246.74	277.19	388.00	1509.80
UGVCL	137.28	128.48	132.98	119.00	517.74
GUVNL (TOTAL)	823.65	451.76	502.80	647.00	2425.21

## IT INITIATIVE TAKEN BY STATE OF GUJARAT

The IT initiative taken by each discom is furnished below :

- DGVCL**
- Started GPRS based LT Billing
  - Android based mobile application and bill payment
  - Web based Urja Suraksha Setu for consumer and employee awareness for Electrical Safety.
- MGVCL**
- Implemented RAPDRP IT applications & ERP system
  - Latest technology adopted in Distribution network
- PGVCL**
- PGVCL has started online application process for recruitment.
  - SMS to consumers for planned shutdown, bill detail, payment made, log/closure of complaints etc.
- Consumer Portal to facilitate consumers for online payment, view/download bills/payments , apply for new connection/shifting/load change, Complaint registration etc.
- Payment facility through ECS, consumer portal, ATP, ATM, e-Gram Centralized Customer Care center with toll free no. to facilitate consumers for log their complaints, check the status of complaint, last bill/payment details etc.
- UGVCL**
- Online job application portal
  - Mobile/photo billing
  - Web based AT & C loss monitoring system
  - Consumer Monitoring System

## PLAN FOR PROVIDING AGRICULTURE CONNECTIONS

Registration for new and providing agriculture connections is a continuous process. To clear the backlog, every year maximum agriculture wells are being electrified, but flow of applications for new connections also increased considerably. Moreover, ban imposed on providing AG

Connection in Dark Zone areas was lifted from March-2012. Hence, huge Ag applications were registered under Dark zone areas in the FY 2012-13.

Details of Applications received and Agriculture connections released from FY 2010-11 to FY 2015-16 (up to July-15) are as under.

**Table-7.9**

Financial Year	Applications for New Agriculture connection received	Nos. of Agricultural Wells electrified
FY 2010-11	85769	36652
FY 2011-12	58110	68941
FY 2012-13	209196	97459
FY 2013-14	74804	95312
FY 2014-15	84938	100250
FY 2015-16 (Up to July-15)	26941	38742
<b>Total</b>	<b>539758</b>	<b>437356</b>

Providing of Agriculture connections is being planned considering the various parameters viz. Generation, Basic Infrastructure, Transmission Sub-Stations, Transmission Network, Distribution System and Finance. Financial criteria plays a vital role to provide Agriculture connections, because to provide an Agriculture connection to the Agriculture applicant under Normal Scheme, an average expenditure of Rs. 1.7 lakhs is incurred, while from the applicant, only nominal fixed charge is recovered.

Moreover, Tariff for AG Consumer is also subsidized. So, burden of Subsidy Amount is also born by GoG.

With the financial support i.e. scheme-wise fund availability from the state Govt. during FY 2015-16, it is planned to electrify 101000 Agriculture wells. In the same line of FY 2015-16, it is planned to electrify about 100000 Agriculture wells in each year.

### AT&C LOSSES IN NEXT 5 YEARS (INCLUDING AG SECTOR)

Projected Trajectory for reduction of AT&C losses is given below in table 7.10 :

**Table-7.10**

DISCOM	FY 2014-15		Year wise projection				
	Projection	Achievement	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20
DGVCL	10.83	9.33	10.83	10.83	10.83	10.83	10.83
MGVCL	16.4	11.8	16	15.5	15	14.5	14
PGVCL	23.12	22.77	21.07	19.48	18.31	17.2	16.26
UGVCL	9.1	9.87	9.1	9.1	9.1	9.1	9.1
Gujarat	15	14.64	14.5	14	13.5	13	12.5

### MEASURES PROPOSED BY GOG FOR REDUCTION IN AT&C LOSSES

The objective of reducing Aggregate Technical and Commercial (AT&C) losses in the project areas can be achieved by implementing following methodologies;

- Plugging pilferage point
- Supply of quality power
- Faster identification of faults & early restoration of power
- Proper metering
- Strategic placement of capacitor banks & switch.
- Proper planning & designing of distribution networks.
- The real time monitoring & control of the distribution system through state-of-the art SCADA/DMS system .

- Up gradation of distribution S/S & 11kV network to meet the SCADA/DMS requirements.
- Implementation of SCADA through SCADA Implementation Agency (SIA).

Apart from above, each discom plans to implement some additional measures to restrict AT&C losses;

- Erection of new substations
- New 11kv line for feeder bifurcation
- Conductor augmentation
- Laying of HT& LT Aerial Bunch Cable
- New transformers for improvement in voltage
- Replacement of EM meters to static

### Measures already been adopted by GoG to reduce AT&C losses

The Distribution loss which is a combination of Technical and Commercial losses has been brought down to the present levels through a number of rectification activities as enumerated below.

#### Reduction of Technical losses:-

- Bifurcation of lengthy/overloaded feeders either from the Existing S/S or by erecting new feeders from the newly commissioned S/S in co-ordination with the State Transmission Utility (GETCO).
- Replacement of Conventional CRGO transformers by Amorphous Core transformers to achieve a reduction in the Core losses by 40 to 45 %. (No load losses of transformer). In fact, in the last three financial years a total of 18221 nos. either new Amorphous transformer provided or CRGO transformers were replaced by Amorphous Core transformers.
- Adoption of HVDS system to minimize the LT line losses, if not to eliminate which not only improves the HT/LT ratio in addition to curbing the power theft through hooking by unscrupulous consumers. Total 1157 nos. of new small capacity transformers were installed to promote HVDS system.
- Action taken for knowing correct Distribution loss
  - Consumers are correctly feeder coded.
  - All the consumers of one feeder brought in one billing cycle.
  - Feeder wise billing started.
- Line Capacitors:  
At present it is decided to carry out the work of providing Line capacitors to improve power factor.
- Underground Cable:  
Since underground cable network has discrete advantages of reduced interruptions, increased system reliability, reduction in accidents, increased customer satisfaction and reduction in technical loss.

#### Reduction of Commercial losses:-

- Replacement of old/sluggish meters by new quality/static meters along with providing New Metal Meter Boxes (MMB), and sealing of the installations to make them foolproof.
- Replacement of Bare LT conductors with LT Aerial Bunched Cables (ABC) in addition to the practice of erecting LT lines in theft prone areas by using A B Cables only.
- Vigorous installation checking programs conducted by the Vigilance wing of the company as well as by the (O&M) squads.
- Adoption of the facility of Automatic Meter Reading in case of HT/EHT consumers to avoid the manual intervention in addition to cross verification of the meter readings taken by meter readers in case of LT consumers, analysis of consumption category wise, verification of the zero/Low consumption cases as well as the Non billing cases.
- RAPDRP scheme covering part A and Part B was introduced to bring down the losses Increase in Collection Efficiency.

As a part of increasing the consumer's satisfaction in addition to the increased collection efficiency, DGVCL has taken a number of steps to facilitate the consumers in payment of their energy bills.

- Full day collection centers in all Sub Divisions through e-Gram and post offices at the remote and scattered areas.
- DGVCL has installed 42 nos. of ATP (All Time Payment) machines for any time payment of energy bills. DGVCL has planned of 25 nos. of additional ATP machines for better service.
- Payment of energy bills are accepted at 67 locations by cooperative societies, and cooperative banks. Also at post offices and at Gram Panchayat offices payment is accepted.
- Facility of e-Payment is available 24 x 7 from June-2012 onwards.



## IMPROVING CONSUMER CONVENIENCE & REVAMPING MAINTENANCE PHILOSOPHY

Detail measures for improving Consumer Convenience & Revamping Maintenance Philosophy adopted by the various discom wise given below :

<b>DGVCL</b>	<ul style="list-style-type: none"> <li>• 24X7 Customer Care Centre</li> <li>• Providing ATP machine for cash collection</li> <li>• SMS facility to Customer</li> </ul>
<b>MGVCL</b>	<ul style="list-style-type: none"> <li>• Centralized customer care centre with Outage Management system developed for improvement of reliability</li> <li>• Online bill payment, new connection etc facility</li> <li>• SMS facility</li> </ul>
<b>PGVCL</b>	<ul style="list-style-type: none"> <li>• Centralized customer care centre with Outage Management system developed for improvement of reliability</li> <li>• Online bill payment</li> <li>• SMS facility</li> <li>• ATP machine for cash collection</li> </ul>
<b>UGVCL</b>	<ul style="list-style-type: none"> <li>• Customer Care Centre</li> <li>• U/G of Bol GIDC</li> <li>• U/G of Heritage Area</li> <li>• U/G of Japanese Industrial Area</li> <li>• Ahmadabad periphery area SCADA</li> <li>• U/G of Pramukh Feeder and Kudasan Area</li> <li>• Online bill payment</li> <li>• SMS to R-APDRP/Non-RAPDRP consumers for billing, payment and planned shut down</li> <li>• E-Gram bill collection system</li> </ul>

### Best Practices in Distribution Companies

- **Jyoti Gram Yojana** :-- 24X7 continuous quality power supply.
- **Increased Metering and billed energy**:-- No unmetered connection and innovative methods for billing & bill collection.
- **Curbing power theft**:-- Strict penalty, vigorous checking drives.
- **System renovation & Infrastructure development**:-- HVDS, feeder bifurcation, Loss reduction activities.
- **Use of Information Technology (ERP)**:-- Better accounting for utilities & speedy services & satisfaction to the consumers.
- DIG (S) & CVO is the head of Vigilance & Security and Enforcement in GUVNL.
- DISCOM wise Police Stations in all the Four DISCOMs of Gujarat State with One more

additional Police Station in Paschim Gujarat Vig Co. Ltd. as it has bigger area. i.e. Five Police Stations. There are total 73 Checking squads in all DISCOMs of Gujarat. Team leader of each checking is Junior Engineer or Deputy Engineer with necessary meter testing staff & vehicle. All 73 Checking Squads are under DIG(S) & CVO, Vigilance Department, GUVNL. A mass checking drive is being arranged in every DISCOM with the help of all 73 checking squads & DISCOMs checking teams during every week for 4-5 days throughout the year under the direct supervision of DIG(S) & CVO & Addl. Chief Engineer, Vigilance.

### **PERFORMANCE MONITORING MECHANISM:**

The following performance monitoring mechanism (as given in table 7.11) is under implementation in the state of Gujarat.



## A. Various Meetings proposed at different level

**Table-7.11**

Sl. No.	Name of Meetings	Participants	Place	Frequency
1	HOD meeting	Officers of the level of EE and above all departments and selected DEs	Corporate office	Fortnightly
2	SE's conference	SE-Circle + 11 EEs +22 DE (in rotation/ specific related to poor performance)	Corporate Office	Every month
3	DE(Tech)s meeting	All Circles' and Zones DE	Corporate office	Every month
4	DE(RE)'s meeting	All Circles' and Zones DE	Corporate office	Every month
5	EEs + SDO meeting	all EEs of Divisions and all SDOs of sub-division by SE in presence of Concerned monitoring officers(CE/ACE)	At Circle level	Every month
6	AO(IA&I)	All AO (IA&I)	Corporate	Every month
7	AO meeting	All Circle	Corporate	Quarterly
8	AS meeting	All circle	Corporate	Quarterly
9	Line staff meeting	All line staff including village EA	Sub division	Every month
10	Meter Reader's meeting	All line staff including village EA	Sub division	Every month

## B. Field visits & Inspections

- All SDOs, EEs, SEs, are taking field visits regularly in every week.
- All ACEs, CEs are taking field visits regularly in every month.
- All AO(Rev) &SA(Rev) are taking visit of 4 sub-divisions per month
- INSPECTION:- All Sub Divisions, Divisions are being inspected at regular interval as per annual schedule by EEs & SEs

Follow-up of field visits taken by DE&EE is done by the SE and Filed visit of SE by the Corporate for the observation points

## FUND REQUIREMENT

Fund requirement for govt. schemes (approved & un-approved) is given below in Table- 7.12, 7.13 & 7.14.

**Table-7.12**

(In Rs Crores)

Schemes	Fund Sanctioned	Fund released Up to 31 <sup>st</sup> March 2014-15	Fund Utilised Up to 31 <sup>st</sup> March 2014-15	Requirement (Crores)					Remarks
				FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	Total	
RAPDRP- Part- A (For towns with population more than 30,000)	230.72	154.52	149.53	76.20	0	0	0	76.20	0
RAPDRP Part A – SCADA projects	138.51	42.52	9.32	38.39	57.59	0	0	95.99	0
RAPDRP- Part-B	1123.90	546.82	649.26	230.83	346.25	0	0	577.08	0
<b>Total sanctioned GOI schemes</b>	<b>1493.13</b>	<b>743.86</b>	<b>808.11</b>	<b>345.43</b>	<b>403.84</b>	<b>0.00</b>	<b>0</b>	<b>749.27</b>	<b>0</b>



**Table-7.13****Fund Requirement (approved) for ongoing & proposed schemes****(In Rs. Crores)**

	<b>FY 2015-16</b>	<b>FY 2016-17</b>	<b>FY 2017-18</b>	<b>FY 2018-19</b>	<b>Total</b>
<b>DGVCL</b>					
DDUGJY	18.60	93.02	74.42	0.00	186.047
IPDS	18.70	93.52	74.82	0.00	187.04
R-APDRP	38.26	44.73	0.00	0.00	82.99
System Strengthening activities of the distribution network	58.70	53.50	60.45	83.00	255.64
Normal Development and System improvement work	307.84	307.84	307.84	307.84	1231.36
<b>Total</b>	<b>442.11</b>	<b>592.61</b>	<b>517.52</b>	<b>390.84</b>	<b>1943.08</b>
<b>MGVCL</b>					
DDUGJY	25.96	129.81	103.84	0.00	259.61
IPDS	37.29	186.46	149.17	0.00	372.92
R-APDRP	69.73	81.53	0.00	0.00	151.26
System Strengthening activities of the distribution network	29.79	22.97	32.18	57.00	141.95
Normal Development and System improvement work	343.90	343.90	343.90	343.90	1375.60
<b>Total</b>	<b>506.68</b>	<b>764.67</b>	<b>629.09</b>	<b>400.90</b>	<b>2301.34</b>
<b>PGVCL</b>					
DDUGJY	35.68	178.42	142.74	0.00	356.84
IPDS	45.97	229.85	183.88	0.00	459.70
R-APDRP	180.72	211.30	0.00	0.00	392.02
System Strengthening activities of the distribution network	597.87	246.74	277.19	388.00	1509.80
Normal Development and System improvement work	1319.55	1319.55	1319.55	1319.55	5278.20
<b>Total</b>	<b>2179.80</b>	<b>2185.86</b>	<b>1923.36</b>	<b>1707.55</b>	<b>7996.56</b>
<b>UGVCL</b>					
DDUGJY	12.22	61.08	48.86	0.00	122.16
IPDS	10.22	51.11	40.89	0.00	102.22
R-APDRP	56.70	66.30	0.00	0.00	123.00
System Strengthening activities of the distribution network	137.28	128.48	132.98	119.00	517.74
Normal Development and System improvement work	606.25	606.25	606.25	606.25	2425.00
<b>Total</b>	<b>822.67</b>	<b>913.21</b>	<b>828.98</b>	<b>725.25</b>	<b>3290.12</b>
<b>GUVNL</b>					
DDUGJY	92.47	462.33	369.86	0.00	924.66
IPDS	112.19	560.94	448.75	0.00	1121.88
R-APDRP	345.41	403.86	0.00	0.00	749.27
System Strengthening activities of the distribution network	823.65	451.69	502.80	647.00	2425.14
Normal Development and System improvement work	2577.54	2577.54	2577.54	2577.54	10310.16
<b>Total</b>	<b>3951.26</b>	<b>4456.35</b>	<b>3898.95</b>	<b>3224.54</b>	<b>15531.10</b>

**Table-7.14(a)**

**Fund Requirement for system strengthening & Approved work of proposed GOI schemes  
(DDUGJY & IPDS)**

**(In Rs. Crores)**

	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	Total
DDUGJY	92.46	462.33	369.86	0.00	924.66
IPDS	112.18	560.94	448.76	0.00	1121.88
R-APDRP	749.27	0.00	0.00	0.00	749.27
<b>Total</b>	<b>953.91</b>	<b>1023.27</b>	<b>818.62</b>	<b>0.00</b>	<b>2795.81</b>

**Table-7.14(b)**

**Fund Requirement for system strengthening & approved work of proposed  
GoG schemes**

	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	Total
Government of Gujarat Schemes.	2577.54	2577.54	2577.54	2577.54	10310.16

**Table-7.14(c)**

**Balance Fund Requirement for system strengthening & unapproved work of proposed  
GOI/ GoG schemes**

**(In Rs. Crores)**

	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	Total
System Strengthening activities of the distribution network	823.65	451.69	502.80	647.00	2425.14

**Table-7.14(d)**

**Total Fund Requirement for the above (Table 7.14(a+b+c))**

**(In Rs. Crores)**

	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	Total
<b>Total</b>	<b>3951.26</b>	<b>4456.35</b>	<b>3898.95</b>	<b>3224.54</b>	<b>15531.10</b>

## PROPOSED SCHEMES FOR RURAL & URBAN AREAS

To provide 24x7 quality & reliable power to the consumers in the state, Discoms have formulated a plan for augmentation of distribution system in rural areas and urban areas. The monitoring committee had sanctioned Rs. 924.66 Crores for DDUGJY against the requirement of Rs. 2000 Crores. Similarly, the monitoring committee has sanctioned Rs. 1121.88 Crores for IPDS against the requirement of Rs. 1871 Crores. The works of feeder separation, establishment of New PSS, (Conventional & GIS), augmentation of existing PSS, new 66 & 11 kV lines, LT lines, capacitor bank, Sansadadarsh Gram Yojana & metering are proposed to be implemented in the state by FY 2018-19.

## THE FUND REQUIREMENT FOR THE URBAN & RURAL AREAS

**Table-7.15**

(In Rs. Cr)		
Sl. No.	Name of Scheme/Project Requirement	Fund Requirement
1	Urban areas	1871
2	Rural areas	2000

## DEEN DAYAL UPADHYAYA GRAM JYOTI YOJANA (DDUGJY)

Government of India launched Deen Dayal Upadhyay Gram Jyoti Yojana (DDUGJY) on 3<sup>rd</sup> December, 2014 for;

- Separation of agriculture and non-agriculture feeders facilitating judicious re-storing of supply to agricultural & non-agriculture consumers in the rural areas.
- Strengthening and augmentation of sub-transmission & distribution infrastructure in rural areas, including metering of distribution transformers/ feeders/ consumers.

- Rural electrification for completion of the targets laid down under RGGVY for 12<sup>th</sup> and 13<sup>th</sup> Plans by carrying forward the approved outlay for RGGVY to DDUGJY.

The components at (i) and (ii) of the above schemes will have an estimated outlay of Rs. 43033 Crores including a budgetary support of Rs. 33453 Crores from Government of India during the entire implementation period.

The scheme of RGGVY as approved by CCEA for continuation in 12<sup>th</sup> and 13<sup>th</sup> Plans has been subsumed in this scheme as a separate rural electrification component for which CCEA has already approved the scheme cost of Rs. 39275 Crores including a budgetary support of Rs. 35447 Crores. This outlay will be carried forward to the new scheme of DDUGJY in addition to the outlay of Rs.43033 Crores. REC is the nodal agency for the operationalization of DDUGJY in the Country.

Gujarat discoms has the total requirement covering all Distribution Zones including system strengthening, metering, feeder segregation & Sansadadarsh Gram Yojna at Estimated cost of Rs 2000 Crores for getting funding under DDUGJY.

Monitoring Committee headed by Secretary (Power) approved the DDUGJY projects on 06.08.2015 for Rs. 924.7 Crores for Gujarat which include projects worth

- Rs. 527.86 Crores for electrification of rural households as well as for system improvement,
- Rs. 193.31 Crores for Distribution transformer & consumer metering.
- Rs. 196.96 Crores for segregation and augmentation of 11kV feeders.
- Rs. 2.04 Crores for SAGY (Sansad Adarsh Gram Yojna) scheme.

The approved cost also includes Rs. 4.58 crores as PMA charges. The remaining fund as

per the requirement would have to be arranged by the State. The detailed requirement (approved) is given in Annexure-XA.

### **INTEGRATED POWER DEVELOPMENT SCHEME (IPDS)**

The Central Government has sanctioned "Integrated Power Development Scheme" (IPDS) on 3<sup>rd</sup> December, 2014 for urban area for :

- (i) Strengthening of sub-transmission and distribution networks in the urban areas.
- (ii) Metering of distribution transformer/ feeders/ consumers in the urban areas.
- (iii) IT enablement of distribution sector and strengthening of distribution network for completion of the targets laid down under R-APDRP for 12<sup>th</sup> and 13<sup>th</sup> Plans by carrying forward the approved outlay for R-APDRP to IPDS.

The components at (i) and (ii) above will have an estimated outlay of Rs. 32,612 Crores including a budgetary support of Rs. 25,354 Crores from Government of India during the entire implementation period.

The scheme of R-APDRP as approved by CCEA for continuation in 12<sup>th</sup> and 13<sup>th</sup> Plans has been subsumed in this scheme as a separate component relating to IT enablement of distribution sector and strengthening of distribution network [component (iii) above] for which CCEA has already approved the scheme cost of Rs. 44,011 Crores including a budgetary support of Rs. 22,727 Crores. This outlay will be carried forward to the new scheme of IPDS in addition to the outlay indicated above. PFC is the nodal agency for the operationalization of IPDS in the country.

It is related to the work of renovation & up gradation of transmission & distribution infrastructure of urban area in Gujarat. Under IPDS, Government of Gujarat has the total requirement with an estimated cost of Rs. 1871 Crores for augmentation of distribution system in 38 towns in the state. Monitoring Committee headed by Secretary (Power) approved the IPDS projects of 38 towns at an estimated cost of Rs. 1121.88 Crores. The detailed requirement (approved) is given in Annexure-XI.

### **ASSESSMENT OF ADEQUACY OF DISTRIBUTION SYSTEM**

The network growth as planned by various State run distribution companies (4 No) is as follows in Table-7.16:

**Table-7.16**

Sl. No.	Particulars	Unit	Status of FY 2014-15	During FY 2015-16	During FY 2016-17	During FY 2017-18	During FY 2018-19	Cumulative up to FY 2018-19
1	No. of 66KV & 33kV Lines/feeders	No.	2237	94	98	96	98	2622
2	Total length of 66KV & 33 kV lines in	ckt. Km.	26361	1484	1568	1656	1749	32817
3	Total No. of 220/11 kV, 132/11kV, 66/11, & 33/11kV PSS	No.	1409	90	96	102	108	1805
4	Total capacity of 220/11 kV, 132/11kV, 66/11 & 33/11kV PSS in MVA	MVA.	45405	2700	2861	3031	3211	57207
5	Total No. of Distribution transformers	No.	881376	104938	124336	140010	157660	1408321
6	Total capacity of Distribution transformers in MVA	MVA.	36512	3119	3465	3768	4097	50960
7	No of 11 KV+22KV Lines	No	12108	620	652	685	720	14785
8	Total length of 11KV+22 KV lines in ckt. Km	ckt. Km	326083	24520	26363	28346	30477	435790

Sl. No.	Particulars	Unit	Status of FY 2014-15	During FY 2015-16	During FY 2016-17	During FY 2017-18	During FY 2018-19	Cumulative up to FY 2018-19
9	Total length of LT Lines in ckt. Km	ckt. Km	307717	4700	4772	4845	4919	326952

From the above table it is evident that the transformation capacity at PSS is projected to grow from 45405 MVA in FY 2014-15 to 57207MVA in FY 2018-19. The transformation capacity at 11/0.415kV level is projected to grow from 36512 MVA in FY2014-15 to 50960 MVA in FY 2018-19.

The Projected peak demand of the state, including demand of large industrial consumers has been Projected at 17665 MW in FY 2018-19. Correspondingly the peak demand at 11 kV would be 19628 MVA considering a power factor of 0.9. Against this peak requirement, the installed capacity 220/11kV,132/11kV,66/11kV & 33/11kV level in FY 2018-19 is projected at 57207 MVA. This shows that the sub transmission system would be adequate for meeting the projected load. Average loading of the system would be around 34% on 132/11kV, 66/11kV and 33/11 kV transformers under peak demand conditions.

Considering the load of HT consumers in FY 2018-19 is about 2000 MW derived from the data of HT CONSUMER billed in FY 2014-15. Correspondingly the demand met at 415 V would be 15,665 MW (17665 MW-2000 MW) which corresponds to 17,405 MVA considering a power factor of 0.9. Against this peak requirement, the installed capacity 11/0.415kV level is in FY 2018-19 is projected at 50960 MVA which shows that the Distribution transformation capacity planned at DT level for FY 2018-19 would be adequate for meeting the projected demand by FY 2018-19 and Average loading of DTs would be around 34 %.

From the aforesaid it can be concluded that Distribution transformation capacity planned at DT level for FY 2018-19 would be adequate for meeting the projected demand.

#### ACTION POINT-FOR STATE GOVERNMENT

1. To complete all the distribution works necessary for providing 24x7 quality supply to all the connected consumers.
2. To meet the agreed trajectory for reduction of AT&C losses through initiatives as described earlier under sub heading "Reduction in AT&C losses"
3. To introduce modern technologies to monitor reliable supply like sub-station automation, providing adequate communication infrastructure, GIS, Reliability, Centralized Network Analysis and Planning tools, SAP driven ERP systems, DMS (Distribution Management Systems), OMS (Outage Management System), etc.
4. State would take necessary steps to meet the Performance Standards specified by PERC. Proper mechanism of monitoring Key performance Index (KPI) as described under sub heading "Performance Monitoring Mechanism"
5. To make arrangement of balance funds of schemes of GOI like DDUGJY and IPDS including amount required for System Strengthening.

#### GOI INTERVENTION

To approve the net fund requirement i.e. unapproved portion of **DDUGJY** and **IPDS** including amount required for **System Strengthening** to fulfill the requirement as envisaged under 24x7 PFA scheme.

## CHAPTER – 8 : RENEWABLE ENERGY STATUS AND PLAN

Renewable energy is increasingly becoming an important source of the energy mix –meeting the twin objectives of energy security and clean energy considerations. Gujarat has good potential for promotion and development of renewable and non conventional energy projects, particularly Wind, Solar, Biomass and Small / Mini Hydel Projects. Good explorable options and potential exists for power generation from irrigation canal drops, solar including solar PV on canal top, wind, biomass generation etc. State has already issued liberal policies for promotion of renewable energy generation.

Government of Gujarat (GoG) is keen to tap renewable power potential of the state to meet the growing demand of power in an environmental friendly and sustainable manner. In this direction GoG has taken a number of initiatives. Three cities viz. Gandhinagar, Surat and Rajkot of Gujarat have been declared to be developed as Solar Cities. GoG has developed a solar park near Charanka Village in Patan District which is the world's first multi developer, multi facility, multi technology and multi beneficiary park. The Charanka Solar Park, when fully built, is planned to host 500 MW of solar power using state-of-the-art thin film and crystalline technology. The present installed capacity of the Charanka Solar Park as on September 2015 is 345 MW.

State of Gujarat is also pioneer in developing Canal Top Solar PV Projects. 1 MW canal top Solar PV project has been developed by GSECL on the Narmada Branch Canal near Chandrasan Village in Kadi Taluka. Sardar Sarovar Narmada Nigam Limited (SSNNL) has also commissioned 10 MW Canal Top Solar PV project on the Narmada Canal in Vadodara for their captive use. In Wind Power Generation, State of Gujarat holds the second position in the country, the first being Tamilnadu. The installed wind power capacity in Gujarat upto July 2015 is 3752 MW vis-à-vis all India capacity of 23865 MW.

The areas of present study are:

- Renewable energy plan especially for Wind, Solar and Biomass based power projects
- Grid connected and off grid Roof Top Solar scheme
- Solar water pumping scheme particularly for agricultural consumers
- Action plan of the state
- Fund Requirements
- GoI/ State Govt Interventions

### Grid Connected Renewable Energy:

The total grid connected Renewable Energy (RE) installed capacity (consisting of Wind, Solar, biomass, Small hydel etc.) as on 31.03.15 and potential of Gujarat State (as per MNRE) are given in Table- 8.1 below:

**Table -8.1**

Source	Present Installed Capacity (MW) already Commissioned (as on 31.03.15)	Under Execution (MW)	Potential (MW) (As per MNRE)
Solar Power	1003	25	35770
Wind Power	3542	200	35071
Biomass Power	41.2	--	1221
Bagasse Cogeneration	--	--	350
Small Hydro Power including 7 MW state small hydro	16.6	--	202
Waste to Energy	--	--	112
Total	4602.8	225	72726

**Note:** In Renewable Energy Sector, 200 MW of Wind Capacity tied up by the state is likely to get commissioned by March 2016. Moreover, 25 MW solar thermal project for which long term PPA has been signed by the State Utilities is likely to be commissioned by June - 2017.



### Policy and notifications in place

Various 'New and Renewable Energy Policies' are already in place in Gujarat. The policies notified by GoG and GERC are as described below:

- a) "Solar Power policy 2009".
- b) "Gujarat Solar Power Policy 2015"- (Notification dated 13.08.2015) for augmenting solar capacity in the state.
- c) "GERC order no. 3 of 2015 - determination of tariff for Solar Energy Projects.
- d) "GERC order for determination of tariff for biomass based power generation"
- e) " GERC Order – Determination of tariff for Bagasse based cogeneration power plant"
- f) "Wind Power Policy 2007"
- g) GERC regulation on wind power dated 11.08.2006"
- h) Wind Power Policy 2009 – GEDA"
- i) "Wind Power Policy Extension dated 19.03.2013"
- j) "Wind Power Policy 2013" – (Notification dated 25.07.2013) for augmenting Wind capacity in the state.

For further promoting generation through NRSE, GoG has also come out with many notifications with respect to exemptions of taxes & duties, with respect to land use, etc.

### Government of Gujarat Initiatives and Plan

Gujarat Energy Development Agency (GEDA) is the State Nodal Agency for promotion and development of Renewable Energy projects and the State Designated Agency (SDA) for the implementation of Energy Conservation Act, 2001. GEDA is also the State agency for Renewable Energy Certificates (REC) accreditation under the notification by GERC in accordance with the REC Regulation of CERC.

Following strategic initiatives have been taken:

- a) To create conducive conditions for attracting private sector investment in NRSE projects along with broader participation by public community / civil society.
- b) To provide decentralized renewable energy for agriculture, industry, commercial and household sectors particularly in rural areas thereby improving the quality of power and reducing transmission and distribution losses.
- c) To give support to specific NRSE projects and schemes for generating energy and conserving energy through energy efficiency.
- d) To support research, development, and commercialization of new and emerging technologies in RE sector such as fuel cell, hydrogen and chemical energy, alternative fuels for transportation use, etc.
- e) To use agricultural waste and cattle dung for the production of bio fuel.
- f) To create awareness through work shop / seminars, energy audits and demo projects in order to promote energy efficiency in different sectors of the economy in the state.

### RENEWABLE PURCHASE OBLIGATION (RPO):

Every obligated entity (distribution licensee(s), captive users, open access customers etc.) shall purchase electricity from RE sources including solar, not less than a percentage specified by GERC from time to time. As per regulation 2010 with amendments for procurement of energy from Renewable Sources ( Notification no. 3 of 2010, CORAM Order on RPO dated 17.04.2010, Notification No. 4 of 2010 dated 16.07.2010 and First Amendment Regulations 2014 vide Notification No. 2 of 2014).



**Table -8.2**

Year	FY2015 -16	FY2016 -17	FY2017 - 18	FY2018 - 19
Non Solar RPO (%)	7.00	7.75	8.50	9.25
Solar RPO (%)	1.50	1.75	2.00	2.25
Others (%)	0.50	0.50	0.50	0.50
<b>Total RPO (%)</b>	<b>9.00</b>	<b>10.00</b>	<b>11.00</b>	<b>12.00</b>

Year Wise Availability (Cumulative) through proposed capacity addition plan - through renewable (grid interactive) is as follows:

**Table-8.3**

Sl. No.	NRSE Projects	Year wise Availability (Cumulative) – In MW				
		Installed Capacity as on March 31, 2015	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
1	Solar Power	1003	1097	1142	1803	2489
2	Wind Power	3542	4147	4814	5204	5618
3	Others:					
	- Biomass Power	41.2	41.2	41.2	41.2	41.2
	- Bagasse Cogeneration	-	-	-	-	-
	- Small Hydro Power	16.60	32.60	35.60	49.60	64.60
	- Waste to Energy	-	-	-	-	-
<b>Total Expected MWs</b>		<b>4602.8</b>	<b>5318</b>	<b>6033</b>	<b>7098</b>	<b>8213</b>

#### Action Plan of the State for Grid Interactive NCE/RNES Plants

The state has to ensure completion and addition of renewable generating capacities in the State of Gujarat as per the following roll out plan:

**Table -8.4**

Sl. No.	NRSE Projects	Year wise Addition of Capacity (MW)				Total (MW)
		FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	
1	Solar Power *	94	45	661	686	1486
2	Wind Power	605	667	390	414	2076
3	Others:					
	- Biomass Power	-	-	-	-	-
	- Bagasse Cogeneration	-	-	-	-	-
	- Small Hydro Power	16.0	3.0	14.0	15.0	48.0
	- Waste to Energy	-	-	-	-	-
<b>Total</b>		<b>715</b>	<b>715</b>	<b>1065</b>	<b>1115</b>	<b>3610</b>

\* Excluding Rooftop Solar

## Fund Requirement

Total fund required for RE projects for capacity addition is estimated and the same is shown in Table below:

**Table-8.5**

### Fund Requirement

Sl. No.	NRSE Projects	Year wise Fund Requirement ( Rs. in Crores)				Total (Rs in Cr.)
		FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	
1	Solar Power	658	315	4627	4802	10402
2	Wind Power	4068	4092	4500	4944	17604
3	Others: - Biomass Power - Bagasse Cogeneration - Small Hydro Power - Waste to Energy	96	18	84	90	288
	<b>Total</b>	<b>4822</b>	<b>4425</b>	<b>9211</b>	<b>9836</b>	<b>28294</b>

### Funding of proposed investment

Total proposed investment of Rs. 28294 Crores for installation of additional 3610 MW capacity of Renewable Energy Projects will be met mostly through funding of Private developers / IPPs. However, assistance/grant as available from Central/State Govt. source as indicated below may also be sought to meet the total requirement of fund.

- Central Financial Assistance provided by MNRE, GoI under its various schemes.
- Central Financial Assistance provided by MoP, GoI as applicable.
- Grant provided by State Government (GoG).
- State Green Energy Cess Fund as applicable.

### Intervention by Govt. of Gujarat:

- GoG may submit their proposal to MNRE for VGF funding as per norms of the scheme.
- Set up single window clearances mechanism to expedite clearances of NCE / RNES projects.
- To provide solar energy generation based rebate in electricity bills for motivating consumers to install solar power plants.
- Grid connected solar PV plant on Canal Top may be taken up aggressively by GEDA for implementation in the state.

### Intervention by GOI :

- Viability Gap Funding (VGF) as applicable for various solar Projects in the State.
- Subsidy for development of Green energy Corridor from NCEF.

### Renewable Energy Initiatives of Govt. of Gujarat at Consumer Level:

#### Grid connected and Off Grid Roof Top Solar Scheme:

#### GEDA- INITIATIVES REQUIRED TO BE TAKEN:

- Off grid Rooftop Solar Power Plant at Govt. buildings may be implemented in the State by Renewable Energy Department / GEDA. Solar rooftop power plant of suitable capacity (say 1 kWp range) at various residences and commercial buildings may be implemented by FY 2018 -19.
- Rooftop SPV power programme may be implemented by FY 2018 -19. At present, 5 MW and 4 MW capacity rooftop SPV power plants are installed in Gandhinagar and Vadodara respectively. However, solar rooftop policy yet to be finalised by the Government of Gujarat. Finalisation of the same is to be expedited.

- Installation of Solar Power plant at District Collectorate, Hospital & Circuit Houses of each districts of Gujarat may be completed by FY 2018 -19.

### **Solar water Pumping Scheme**

In the State of Gujarat there are various pockets where the ground water level is less than 100 feet i.e. river catchment area, Canals etc. Further there is substantial scope of Solar Water Pumping System in the Poly Houses and green houses. So there shall be promotion of solar water pumping system in these areas.

During FY 2014-15 MNRE has allocated target of 1500 solar water pumps under Central Finance Assistance (CFA) to Gujarat. However, as per the internal planning of GoG, 1594 nos. of solar water pumps ( 104 nos. of 3HP and balance 1490 pumps of 5 HP) were planned to be installed in FY 2014 – 15. In FY 2014 – 15, only 955 pumps are commissioned and the balance pumps are being installed and commissioned in FY 2015 – 16. GoG has provided a grant of Rs. 50 Crores with matching grant from MNRE ( MNRE Grant – Rs. 32400/HP).

For FY 2015–16, GoG has planned installation of 2300 nos ( 300 nos. 3 HP and 2000 nos. 5HP) solar water pumps for which orders have already been placed. GoG has granted Rs. 60 Crores for the project. However, MNRE approval of CFA is yet to be received.

The contribution of beneficiaries of various categories is as follows:

- General Category – Rs. 5000/HP
- SC, ST Category – Rs. 1000/HP

### **Solar Off-Grid Systems**

It is an ongoing scheme of MNRE in which domestic lighting system (DLS) / home lighting

system (HLS- Model-II) are being provided to the beneficiaries in rural and urban areas having one solar module of 24 W, 2 LEDs each of 9 W and one battery of 12V, 12Ah capacity. This scheme is having a provision of 30% subsidy from MNRE, 60% from GOG and balance 10% to be borne by the beneficiary.

GoG has planned installation of 11000 nos. solar home lighting system in FY 2015–16 for remote and forest areas ( Gir forest region) of Gujarat. GoG has granted Rs. 50 Crores for the scheme. Under the scheme one solar module of 400 W with battery back-up each consisting of 1 no. 5 W LED, 2 nos. 8 W LEDs, 1 nos. fan of 24 W, 1 no. connection for TV and 1 nos. connection for mobile charger shall be given to each household covered under the scheme. GUVNL has sent a proposal through GEDA for obtaining CFA assistance from MNRE. The contribution of beneficiaries of various categories under solar lighting scheme is as follows:

- General Category – 10% cost of the system
- SC, ST, BPL Category – Free of cost

The Government buildings, hospitals, Public Health Centres (PHCs), Block offices in rural and semi-urban areas may also be proposed to be provided with Solar Off-Grid Systems with battery support.

Proposal for above schemes would be prepared on annual basis and submitted to MNRE for approval. The projected figures of above scheme are mentioned in Table given below:

Table-8.6

**Details of Renewable Energy Initiatives ( Physical & Investment)**

Sl. No.	Particulars	Unit	FY 15-16	FY 16-17	FY 17-18	FY 18-19	Total
<b>A</b>	<b>Grid connected Solar Rooftops (as per MNRE plan)</b>		15 MW	385MW	400 MW	480MW	1280MW
	Investment required	Rs. Cr.	120	3080	3200	3840	10240
	Subsidy from MNRE	%	As applicable				
<b>B</b>	<b>Solar off-grid systems</b>						
<b>i)</b>	<b>Solar power Plant</b>						
	Investment required	Rs. Cr.					
	Assistance from MNRE	%					
	Assistance from GoG	%					
<b>ii)</b>	<b>Solar pump systems</b>	No.	2939				
	Investment required	Rs. Cr.	99.55				
	Assistance from MNRE	%	As applicable				
	Assistance from GoG	%	As applicable				
	Beneficiary	%	Balance Fund				
<b>iii.</b>	<b>Solar Power Pack (400 W each) with Battery back up</b>	No.	11100				
	Investment required	Rs. Cr.	45.51				
	Assistance from MNRE	%	As applicable				
	Assistance from GOP	%	As applicable				
	Beneficiary	%	Balance Fund				
<b>iv.</b>	<b>Solar Street Lighting</b>	Nos					
	Investment required	Rs. Cr.					
	Assistance from MNRE	%					
	Assistance from GoG	%					
	Beneficiary	%	Balance Fund				
<b>v.</b>	<b>Solar Lantern for BPL and SC &amp; ST</b>	Nos.					
	Investment required	Rs. Cr.					
	Assistance from MNRE	%					
	Assistance from GoG	%					

**Funding for implementation of above scheme will be met from:**

- Central Financial Assistance (CFA) provided from Ministry of New and Renewable Energy, GoI under its various scheme.
- Central Financial Assistance from Ministry of Power, GoI under DDG scheme.
- Grant provided from State Government.
- State Green Energy Fund, if any.
- Various private developers.

**Action PLAN - state -renewable energy**

DPRs for above schemes would be prepared and submitted to MNRE for approval on yearly basis

**GOI INTERVENTION**

- To facilitate earlier approval of DPRs for the above scheme.
- Capital subsidy under Rashtriya Krishi Vikash Yojana for solar Pump system.
- The target shall be given on programme mode instead of project mode.
- Central Financial Assistance shall be provided in the beginning of financial year.

With increasing importance being given to low carbon growth these days, the cheapest and more affordable option to overcome the energy deficit is Demand Side Management (DSM) and implementation of energy efficiency measures in various sectors such as agriculture, municipalities, buildings, domestic, industries etc. The DSM has been traditionally seen as a means of reducing peak electricity demand. In fact, by reducing the overall load on an electricity network, DSM has various beneficial effects, including mitigating electrical system emergencies, reducing the number of blackouts and increasing system reliability. Possible benefits can also include reducing dependency on expensive imports of fuel, reducing energy cost, and reducing harmful emissions to the environment.

Finally, DSM has a major role to play in deferring high investments in generation, transmission and distribution networks. Thus DSM applied to electricity systems provides significant economic, reliability and environmental benefits. Opportunities for reducing energy demand are numerous in all sectors and many are low-cost, or even no cost, items that most enterprises or individuals could adopt in the short term, if good energy management is practiced.

In view of absence of any data, an exercise has been undertaken using data from other states such as Rajasthan and Andhra Pradesh. Going by the experience of these states, one finds the most common measures of DSM and the average normative approximate savings for each measure are as furnished below:

**Table-9.1**

Sector	DSM Technique	Energy saving Potential as % of total consumption	Investment/MU of savings (INR Crores)
Agriculture	Replacement with Energy efficient pump Sets	27%	1.5
Domestic	Replacement of ICLs with LED bulbs	23%	0.8
Commercial building	Retrofitting of Energy efficient equipments	15%	1.5
Public water Works (PWW)	Replacement with energy efficient Pumps	26%	0.6
Municipal Street lighting(MSL)	Replacement of existing street light with LEDs	51%	2.0

Application of the above provides substantial energy savings per year. In Street lighting, the saving potential is maximum, because in this sector DSM can be planned and implemented by municipal authority. Public water works is a government organization and hence penetration rate is quite high. In other sectors, serious awareness campaign through stakeholders' consultation is required to achieve and enhances the desired energy savings.

Enlisted below are some of the DSM measures and energy efficiency initiatives to be taken up in the state of Gujarat.

- Mandatory use of LED / CFL in Govt. buildings / Govt. aided institutions / Boards / Corporations.

- Promotion of Solar water heating system in domestic sector
- Solar Water Heating System to be made mandatory in industries where hot water is required for processing, hospitals and nursing homes, Govt. hospitals, hotels, motels and banquet halls, jail barracks, canteens, housing complexes set up by Group Housing Societies/Housing Boards, Residential buildings built on a plot of size 500 sq.yds. and above falling within the limits of Municipal Committees/Corporations and all Govt. buildings, Residential Schools, Educational Colleges, Hostels, Technical/Educational Institutes, District Institute of Education and



Training, Tourism Complexes and Universities etc.

- Use of star rated pumps to be mandated for agriculture sector.

### **Government of Gujarat (GoG) Initiatives**

To encourage Energy Efficiency (EE) and DSM, GoG has taken up many initiatives as given below:

- Mandatory energy audit for H.T. consumers.
- Walk through Energy Audit for L.T. consumers.
- Micro irrigation scheme linked with new Agricultural Connection.
- Use of solar technology- Facilitation for installation of solar water heating for domestic consumers.
- Energy Conservation Building Code (ECBC) mandatory for consumers having load more than 500KW.
- Municipal energy efficiency programme through Gujarat Urban Development Corporation (GUDC).
- Agricultural Feeder bifurcation from Rural Feeder and 8 hr. power supply arrangement for Agricultural Load in order to flatten load curve of DISCOM/State.
- Replacement of inefficient Agriculture pump sets with high efficiency star rated pumps. Promoting use of solar water pump sets for agriculture purpose at various locations of DISCOMs.
- Replacement of incandescent bulbs with LED.
- Installation of Automatic Power Factor Controller (APFC) panel for Industrial/urban and Agriculture Feeders.
- Time of Day (TOD) Tariff & Power factor penalty/incentives for HT Industrial Consumers.
- Exclusive night hour tariff for HT & LT consumers.
- Campaign for increasing awareness in consumers to provide energy Efficiency & Energy Conservation.

### **Policy and notification in Place**

Gujarat Electricity Regulatory Commissions (GERC) has notified Demand Side Management (DSM) Regulation, 2012 vide notification no. 1 of 2012 dated 08.05.12. The regulation requires the DISCOMs under Gujarat Urja Vikas Nigam Limited (GUVNL) as well as Torrent Power Limited (TPL) to formulate DSM Action Plan and programs to be implemented in their respective licensed area.

Energy Conservation Building Code (ECBC) has been launched by Bureau of Energy Efficiency, MOP, GOI on 27th May, 2007 to be implemented on voluntary basis. The code is applicable to buildings/ building complexes that have a connected load/ contract demand of 100 kW/ 120 KVA or more. However, in Gujarat the ECBC is mandatory for consumers having load more than 500 kW.

### **Agency responsible for DSM:**

Energy Conservation Measures shall be implemented and enforced in the state by GEDA (the State Designated Agency for Energy Conservation) in accordance with the provisions contained in the Energy Conservation Act-2001 of GoI and amendment thereon as the Energy Conservation (Amendment) Act 2010, in consultation with Bureau of Energy Efficiency, Ministry of Power and Government of India.

### **Objectives and suggested Interventions**

The objectives of DSM action plan have been identified as

- Supplementing national level efforts for implementation of various DSM schemes set out by the Bureau of Energy Efficiency,
- Encouraging consumers to amend their electricity consumption pattern both with respect to timing and level of electricity demand for efficient use of energy,
- Reducing the environmental damage by reducing the emission of greenhouse gases,
- Promoting strategic efforts to induce lasting structural or behavioral changes in the market that result in increased adoption of energy-efficient technologies, services, and practices.

Keeping this in view, GUVNL entrusted TERI (The Energy and Resources Institute) with the task of preparation of “Demand Side Management Plan for the four distribution companies”.

As required in the Regulations, a detailed load research study was carried out in order to analyse the load patterns of different consumer categories; namely Agricultural, Domestic (Rural & Urban), and Industry (LTMD & HT) by studying the load data at the feeder level in licensed areas of DGVCL, MGVL, PGVCL and UGVCL. Detailed interactions with different stakeholders, such as Utilities, GERC, industry sub-sectors and other consumer/industry associations, were also conducted to understand current initiatives undertaken in implementing energy efficiency measures in different categories, barriers/challenges faced and possible steps required in overcoming these challenges.

Based on the above, DSM interventions are identified for different consumer categories and prioritized for each target consumer category based on ease of implementing the measures.

Suggested interventions included:

- a) Promoting facilitation support to industries for implementing energy auditing measures,
- b) Promoting energy efficient appliances,
- c) Promoting mandatory purchase of energy efficient pumps for new agricultural connections,
- d) Promoting solar pumps,
- e) Introducing demand response on a pilot basis in industries and large commercial buildings, and establishing Centers of Excellence, conducting capacity building workshops and forming energy club/associations for educating children and youth. Introduction of electric vehicles and inter-state trading are recommended as strategic load growth options.

## Funding Models – Options

Different funding model options for funding DSM programmes to be explored which may include State Energy Conservation Fund, part funding through Energy Service Companies (ESCO), ARR, Energy Efficiency Services Limited (EESL), International Funding Agencies, such as, GEF, World Bank, ADB etc. ESCO model is recommended as the most suitable strategy for implementation of some of the proposed DSM interventions. The need for pro-active involvement and participation of the utilities, GoG, GEDA, financial institutions is also highlighted.

## DSM activities to be taken up by various DISCOMs:

In the meeting held on 3<sup>rd</sup> June, 2014 at Gandhinagar for the proposed DSM Plan of the State owned DISCOMs and TPL as per GERC (DSM) Regulations, 2012, it was decided that the following DSM activities should be undertaken by various DISCOMs

- Solar Pumps Installation and Awareness:  
**By all DISCOMs**
- Industrial Energy Audit:
  - DGVCL (Ankleshwar & Sachin area)
  - MGVL ( V.V.Nagar )
- Promotion of Energy Efficient Appliances:  
**By all DISCOMs**
- Demand Response: UGVCL

## Saving Potential through DSM

There is a substantial potential of saving of energy up to 20-30% in different sectors of the economy in the state.

The agricultural sector accounted for about 24.56% of the state's energy consumption during FY 2012-13. Substantial saving potential (up to 27% i.e. about 4038 MUs) exists in this sector through replacement programmes of existing pumps by energy efficient pumps. However, actual potential of savings in the state on account of DSM can be ascertained only after completion of DSM plan for state.

Domestic sector accounted for about 14.20 % of the state's energy consumption during 2012-13. In order to stimulate investments in energy efficient lighting projects, high quality LED lamps are proposed to be given to households at the cost of incandescent lamps (ICLs) to encourage them to invest in energy efficiency under the Domestic Efficient Lighting Program (DELP).

The Domestic Efficient Lighting Programme (DELP) seeks to promote high quality LED lighting in the domestic sector by overcoming the high first cost barrier. DELP will enable sale of LED bulbs from designated places at a cost that is much less than the market price of Rs. 350-450 as replacements of Incandescent Lamps (ICLs). The programme will reduce installed load approximately by 1048 MW as shown in Table-9.2 and will lead to approximate annual energy consumption reduction of the

#### DELP KEY FEATURES

- LED at cost of Rs. 95-105 as against a market price of Rs 350-450
- Consumer take LED bulb at Rs. 10/-, Balance paid by DISCOM from energy savings or by consumer in 8-12 months installment.
- 3 years free replacement warrantee
- No impact on tariff
- Total upfront investments by EESL

state by more than 1119 million KWh. The saved energy can be sold to better paying consumers like Industry and Commercial, which will provide additional revenue stream to the state utility.

ICLs are extremely energy inefficient form of lighting. In contrast, LEDs consume a fraction of energy used by ICLs to provide better light output. A single LED outlasts about 30 ICLs, and hence on life cycle cost effectiveness it fares better than ICL and CFL. However, the penetration of LEDs is very low because of their high first cost. To overcome this barrier, Energy Efficiency Services Limited (EESL), has been implementing programmes in several states to provide high quality LEDs as replacements to ICLs and CFLs at a cost of Rs. 95-105 each to residential consumers.

EESL, procures the LEDs bulbs and provides to consumers at an initial rate of Rs. 10 each (balance by DISCOM from energy savings or by consumer in installment) as against their market price of Rs. 350-450.

**Table-9.2**

	RURAL	URBAN	TOTAL	REMARKS
No. of House Hold Consumers targeted, (Lakhs)	61.75	65.54	127.29	Total electrified H/Hs including 17 lakhs H/Hs electrified by Torrent Power at Surat & Ahmedabad
No. of inefficient ICLs & CFLs to be replaced, (Lakhs)	123.50	131.08	254.58	<b>RURAL</b> – 2 nos. ICLs ( 60 W each) to be replaced with LEDs ( 7 W each) <b>URBAN</b> – 1 no. ICL (60 W each) and 1 no. CFL (14 W each) to be replaced with LEDs (7 W each)
Total reduction of connected load in the state, (MW)	655	393	1048	
Total energy consumption reduction in the state, (MUs)	699	420	1119	
Energy bill reduction for households per annum (Rs.)	280 to 370	160 to 210	---	Average domestic tariff considered Rs. 2.5 to Rs.3.25 per kWh
Cost reduction for DISCOMS per annum of peak power (Rs. Crores)	838	503	1341	Cost of peak power considered Rs. 1.28 Crores / MW / Annum
Upfront investment by State/ DISCOM	Nil	Nil	Nil	
Total Program Investment by EESL/ Lighting companies* (Rs. Crores)	135	143	278	Cost of LED bulb considered as Rs. 109 per bulb inclusive of transportation and bulb distribution charges.
Recovery of cost	1. DISCOM Repayment 2. Consumer Repayment			

Note: \* Taxes such as service tax, sales tax, or any other taxes as applicable will be charged on actual basis which is not included in these amounts.

EESL will make / arrange the upfront investment estimated at Rs. 278 Crores for procurement, transportation, distribution of 254.58 Lakhs LEDs to domestic households in the state.

**Initiatives / Measures already taken by state and indicative savings is as given in Table- 9.3 below:**

**Table- 9.3**

**Initiative of Different Discoms During FY 2014- 15 and FY 2015- 16**

Particulars	Quantity	Energy Savings per Annum (MU)	Demand Savings (MW)	Total Cost in Rs. Crores
<b>DAKSHIN GUJARAT VIJ COMPANY LIMITED (DGVCL)</b>				
Replacement of fans				
-5 Star rated Energy Efficient	86100	2.91	3.64	17.22
-Super Energy Efficient	2501			0.65
Replacement of Tube Light	17918	0.63	0.6	1.07
Installation of Agricultural Solar Water Pumps (5 HP)	300	2.53	1.44	21
Energy Audit	---	---	---	0.12
Awareness Programme	---	---	---	0.28
Administrative Cost	---	---	---	4.03
<b>Sub Total for DGVCL</b>		<b>6.07</b>	<b>5.68</b>	<b>44.37</b>
<b>PASCHIM GUJARAT VIJ COMPANY LIMITED (PGVCL)</b>				
Upfront support of differential cost on 5 star rated Agriculture pump under new connection	25000	37.66	21.50	23.87
Replacement of Fans	75030	2.464	3.08	14.02
<b>Sub Total for PGVCL</b>		<b>40.124</b>	<b>24.58</b>	<b>37.89</b>
<b>UTTAR GUJARAT VIJ COMPANY LIMITED (UGVCL)</b>				
Replacement of ICls by LED lamps	279822	15.57	14.57	9.89
Energy efficient pumps for Agriculture	1000	2.52	1.44	4.98
Efficient ceiling fan for household	139911	11.33	14.17	28.98
Energy efficient fans for Govt. School	1000	0.39	0.49	1.65
<b>Sub Total for UGVCL</b>		<b>29.81</b>	<b>30.67</b>	<b>45.49</b>
<b>MADHYA GUJARAT VIJ COMPANY LIMITED (MGVCL)</b>				
No. of LEDs to be installed	68011	34.15	31.96	2.4
No. of star rated fans to be installed	67754	2.224	2.78	12.83
No. of solar pumps to be installed	59	0.498	0.28	3.07
<b>Sub Total for MGVCL</b>		<b>36.872</b>	<b>35.02</b>	<b>18.30</b>

**Approach / Strategy**

All the above interventions involve replacement of inefficient equipment / appliances with energy efficient ones for the agriculture, domestic, commercial buildings and municipalities. **These can be undertaken by the State Government at no upfront cost by using the Energy Service Company (ESCO) model.** The model is based on the concept of promoting Performance Contract mode where

the company invests in any project by entering into a contract agreement with the facility owner which is recovered through the savings accrued due to reduced electricity bills.

**Actions Points**

The sector-wise Central Government and State Government actions envisaged to facilitate implementation of energy efficiency measures as mentioned above are detailed below:



### Central Government

- BEE may consider formulation of specification for LED bulbs and introducing star label scheme for LED bulbs.
- Energy Efficiency Services Limited (EESL) to take up project design and project development.

### State Government

- Distribution Companies / Utilities may file DSM petition with Gujarat Electricity Regulatory Commission (GERC) for getting sanction of the proposed DSM plan.
- Ensure formulation of a detailed time line in consultation with concerned departments like Distribution Companies for implementation of energy efficiency measures in municipalities.
- Ensure establishment of a payment security mechanism so that the company making investments under the ESCO mode recovers the same through the savings accrued due to reduced electricity bills.

### Central Government

- BEE may provide technical support for effective enforcement of ECBC and promotion of ESCO based retrofitting works in Government buildings. BEE can provide support for capacity building of state department through establishment of ECBC cells for compliance of ECBC and retrofitting in Government buildings.
- Energy Efficiency Services Limited (EESL) to take up project design and project development for retrofitting in commercial buildings.

### State Government

- Government of Gujarat has to adopt ECBC Directives for new commercial building design and mandated energy audit of existing commercial building once in a three-year period. Effective enforcement of ECBC compliance and mandating retrofitting in energy-audited buildings may result in reduction of electrical consumption from commercial sector. Government of Gujarat may consider mandatory retrofitting in Government buildings with an objective of reduction of electricity bills, which state government is paying against electricity bill of these buildings. This would also demonstrate impact of ESCO based retrofitting projects to private building owners to adopt the same.
- As per the Planning Commission's projection; residential building are becoming one of the larger consumers of electricity in the country by 2030. BEE is introducing design guidelines for energy efficient multi storey residential apartments including in the composite and hot & dry climatic zone. State Government may mandate compliance of these guidelines through institutional framework in the state.
- For residential buildings, the state could adopt the star labeling scheme for multi-storey residential apartment buildings, being prepared by BEE.

In addition to the above, Gujarat Electricity Regulatory Commission (RERC) may be requested to issue directives for creation of DSM funds by DISCOMs / Utilities of the State so that DSM activities can get extra emphasis. Such funds can be utilized for meeting incremental cost of efficiency improvement.



## CHAPTER – 10: FINANCIAL VIABILITY OF DISTRIBUTION COMPANIES

### Gujarat Financial Position

As a part of Power Reform Process, the Electricity Act, 2003, was passed by the Central Government and Gujarat Electricity Industry (Re-organization & Regulation) Act, 2003, was passed by the Government of Gujarat to restructure the Electricity Industry with an aim to improve efficiency in management and delivery of services to consumers.

Under the provisions of the said Acts Govt. of Gujarat framed the Gujarat Electricity Industry Re-organization & Comprehensive Transfer Scheme, 2003, (the Transfer Scheme) vide

Government Notification dated 24-10-2003 for transfer of assets/liabilities etc. of erstwhile GEB to the successor entities.

Accordingly erstwhile Gujarat Electricity Board (GEB) was reorganized effective from 1st April, 2005 into Seven Companies with functional responsibilities of Trading, Generation, Transmission and Distribution. The loss of GEB up to 31.03.2005 apportioned was Rs 737.24 crore which was recorded as opening balance of Profit & Loss account as on 01.04.2005 in GUVNL.

### The Companies incorporated are as under:

1. Gujarat Urja Vikas Nigam Ltd. (GUVNL)	- Holding Company
2. Gujarat State Electricity Corp. Ltd.(GSECL)	- Generation
3. Gujarat Energy Transmission Corp. Ltd.(GETCO)	- Transmission
4. Uttar Gujarat Vij Company Ltd. (UGVCL)	- Distribution
5. Dakshin Gujarat Vij Company Ltd. (DGVCL)	- Distribution
6. Madhya Gujarat Vij Company Ltd. (MGVCL)	- Distribution
7. Paschim Gujarat Vij Company Ltd. (PGVCL)	- Distribution

The Gujarat UrjaVikas Nigam Limited was incorporated as a Govt. of Gujarat Company. Since 100% Shares in the other six companies are held by GUVNL w.e.f 1st April, 2005 they have become Subsidiary Companies of GUVNL as per the provisions of the Companies Act, 1956.

The financial position of the four distribution companies are as follows.

Accumulated profit for 2013-14 and 2014-15 are as follows:

(Rs. in Crore)		
Name of DISCOM	FY 2013-2014	FY 2014-2015
UGVCL	62.50	79.74
DGVCL	272.81	323.64
MGVCL	159.36	188.21
PGVCL	83.87	94.75

### Financial Viability

Based on the road map discussed in the previous chapters, various scenarios have been prepared to visualize the profitability from operating the business as per the roadmap laid down and sensitivity thereof with changes in important input parameters like tariff and AT&C losses.

However, the analysis has been restricted up to FY 2018-19 being the analysis framework for 24x7 PFA initiatives.

The following scenarios have been detailed in subsequent sections:

- At targeted growth rate as per “24x7 Power for All” Road Map (Base case) for State DISCOMs and Private DISCOM.
- Same as (a) and tariff hikes for viability, if required
- Non-Adherence to AT & C Loss Reduction Trajectory and subsequent dependence on higher tariff hike for viability.
- At targeted growth and loss reductions as per roadmap and all fundings including those under GOI schemes as per Debt equity ratio of 70:30.
- UDAY Scheme - State to take over 75.0% of DISCOMs debt as on 30 sept’ 2015 over two years -50.0% in FY 2015-16 and 25.0% in FY 2016-17 and Interest rate on balance 25.0% to be charged at 9.0%





## Common Assumptions

1. Average cost of power purchase considered as Rs. 3.95 per unit including intrastate transmission charges for all the State Government DISCOMs as provided by the GoG and Rs 5.29 per unit including intra state transmission charges for private DISCOMs/Bulk consumers respectively. The details are given as hereunder:

**Table-10.1**

Sl. No	Description	State Govt. DISCOMs (FY 2014-15)	Private DISCOMs (FY 2015-16)
1.	Energy purchased (MU)	75162	10,102.27
2.	Purchase cost (Cr. Rs.) incl. PGCIL Charges	29672	5,344.44
3	Per Unit purchase Cost incl. intra state transmission charges (Rs/kWh)	3.95	5.29

Source: GoG data and Annual report/ Tariff order of Pvt DISCOM-FY2015-16

2. Escalation towards O&M cost (excl employees cost) and administrative and General expenses has been considered @ 6% p.a. in line with average changes in WPI;

**Table-10.2**

Month/ Year	WPI Indices	CPI Indices
Average FY 2012-13	168	215
Average FY 2013-14	178	236
Increase	5.95%	9.8%
Say	6.0%	10%

Source: eaindustry.gov.in

3. Escalation towards Employee Cost considered @ 10% p.a. based on CPI Indices.
4. Purchase Demand considered as forecasted in previous chapters
5. Grant, Loan and Equity on Govt. sponsored scheme are calculated as per guidelines/policy of respective scheme

6. Interest computation has been done as per the existing loan profiles of all DISCOMs of the State. Interest on future long term loan has been calculated @ 12% p.a.
7. The existing average billing rate was Rs 5.13/kWh in FY 2015-16 based on the actual sales provided by the GoG for FY 2014-15. From FY 2016-17 to FY 2018-19, the average billing rate has been derived from the projected annual energy requirement at consumer end figures. The weighted average ABR is shown hereunder:

**Table-10.3**

Year	State Gov DISCOMs (Rs./kWh)	Private DISCOMs (Rs./kWh)
FY 2015-16	5.13	6.22
FY 2016-17	5.13	6.18
FY 2017-18	5.13	6.17
FY 2018-19	5.13	6.16

Source: GoG & Pvt DISCOMs- FY 2015-16

The details of wt. average billing rate is given in Annexure-XII.

8. Depreciation has been computed @ average 3.76% for existing assets and 5.28% for new incoming assets.
9. Escalation towards Meter Rent & Other Receipts has been considered@ 3.57% p.a. as per CAGR of no. of electrified households and other income considered growing @ 2.0% p.a.
10. Receivable against supply of power has been projected @ 2 months level.
11. Liabilities for purchase of power has been considered as 2 month of power purchase.
12. Collection efficiency has been assumed as 100%.
13. The income tax has been computed @34.61%.



**Scenario-A: At targeted growth rates as per the 24x7 Road Map (Base case)**

**Assumptions**

- ✓ No tariff hike and change in power purchase cost
- ✓ T&D losses, AT&C losses and Collection Efficiency as per targeted trajectory.

**Financial Position of the State Gov DISCOMs (Scenario A)**

**Table-10.4A**

**(In Rs. Crores)**

Assumptions		SCN-A				
Sl.no	Description	Units	2015-16	2016-17	2017-18	2018-19
1	Total unrestricted annual energy requirement (Consumer end)	MU	65,144	70,045	75,325	81,014
2	Requirement at state periphery (Grossed up)	MU	80,408	84,665	90,521	96,798
3	AT & C Losses(As per agreed trajectory)	%	14.50%	14.00%	13.50%	13.00%
4	Collection efficiency	%	100.0%	100.0%	100.0%	100.0%
5	T&D Losses excl inter state transmission losses	%	17.75%	17.27%	16.79%	16.31%
6	Inter state transmission losses	%	1.50%	1.50%	1.50%	1.50%
7	Energy availability at state periphery(MU)		79,202	84,665	90,521	96,798
8	Power purchase cost incl intra state transmission charges	Rs/Unit	3.95	3.95	3.95	3.95
9	Purchased power	MU	80,408	84,665	90,521	96,798
10	Average billing rate	Rs/Unit	5.13	5.13	5.13	5.13
11	Tariff increase	%	0.0%	0.0%	0.0%	0.0%
12	Effective Average billing rate	Rs/Unit	5.13	5.13	5.13	5.13
13	Surplus energy available	MU	42361	43723	44187	43275
14	Backdown energy	MU	42361	43723	44187	43275
15	Surplus energy sold to other states	MU	-	-	-	-
<b>Expense</b>						
1	Employ cost escalation	%	10%	10%	10%	10%
2	Repair & Maintenance escalation	%	6%	6%	6%	6%
3	Administrative & General escalation	%	6%	6%	6%	6%
<b>Financial position of Utility -</b>		<b>SCN-A</b>				
Sl.no	Description	Units	2015-16	2016-17	2017-18	2018-19
1	Net sales-Power	Rs Cr	33,419	35,946	38,649	41,560
2	Meter rent,theft recov etc	Rs Cr	906	939	972	1,007
3	Revenue Subsidies	Rs Cr	1,100	1,100	1,100	1,100
4	Other Income (Intt., DPS & Grant etc.)	Rs Cr	740	754	769	785
<b>Total Income</b>			<b>36,165</b>	<b>38,739</b>	<b>41,491</b>	<b>44,452</b>
<b>Expenditure</b>						
4	Power Purchase	Rs Cr	31,761	33,443	35,756	38,235
5	Fixed cost payable against backdown capacity	Rs Cr	-	-	-	-
6	Employee cost	Rs Cr	1,684	1,853	2,038	2,242
7	R & M Cost	Rs Cr	128	136	144	153
8	Admn. & General expenses	Rs Cr	137	145	154	163
9	Others	Rs Cr	170	170	170	170
<b>Total Expenses</b>			<b>33,881</b>	<b>35,747</b>	<b>38,262</b>	<b>40,963</b>
10	Gross Profit	Rs Cr	2,284	2,992	3,229	3,489
11	Interest	Rs Cr	777	1,114	1,400	1,571
12	Depreciation	Rs Cr	1,211	1,418	1,610	1,768
13	Profit before tax	Rs Cr	296	460	219	150
14	Tax	Rs Cr	103	159	76	52
<b>Net Profit after taxes</b>			<b>194</b>	<b>301</b>	<b>143</b>	<b>98</b>

**Table-10.4B**

<b>Cash-flow statement</b>				
				(Rs.in Cr.)
Description	2015-16	2016-17	2017-18	2018-19
<b>Cash inflow</b>				
-Grants	123	613	638	499
-Equity	1,041	1,012	1,005	967
-Long term loans-Govt.	2,615	3,005	2,255	1,758
-Profit before Tax	296	460	219	150
-Depreciation	1,211	1,418	1,610	1,768
-Interest	777	1,114	1,400	1,571
-Bank borrowings for working capital	1	2	2	2
-Security deposit from consumers	396	436	479	527
Deposit for Electrification, Service Connection etc.	48	53	58	64
Short term borrowings	-	-	-	-
<b>Total Cash inflow</b>	<b>6,508</b>	<b>8,111</b>	<b>7,667</b>	<b>7,306</b>
<b>Cash outflow</b>				
-capital expenditure	3,779	4,629	3,899	3,225
-Loan repayments	312	312	874	1,044
-Repayment of short term borrowings	-	-	-	-
-Interest payouts	777	1,114	1,400	1,571
-Increase in working capital	91	111	81	95
-Interest on short term borrowings	-	-	-	-
-Tax	103	159	76	52
<b>Total cash outflow</b>	<b>5,061</b>	<b>6,325</b>	<b>6,330</b>	<b>5,987</b>
Net cash inflow	1,447	1,786	1,337	1,320
Opening cash & bank balance from previous year	492	1,939	3,725	5,062
<b>Closing cash balance</b>	<b>1,939</b>	<b>3,725</b>	<b>5,062</b>	<b>6,382</b>

Based on the above figures, it is evident that if Govt. DISCOMS in the state adhere to the target electrification and reduction of T&D losses as per agreed trajectory, financial losses would not be there.

Table-10.4C

## Financial Position of the Private DISCOM

(In Rs. Crore)

Assumptions		SCN-A				
Sl.no	Description	Units	2015-16	2016-17	2017-18	2018-19
1	Total unrestricted annual energy requirement (Consumer end)	MU	10,535	11,407	12,356	13,388
2	Requirement at state periphery (Grossed up)*	MU	13,004	13,998	15,074	16,240
3	Energy availability (MU)		12,062	12,062	12,062	12,062
4	Power purchase cost incl intra state transmission charges	Rs/Unit	5.29	5.29	5.29	5.29
5	Purchased power	MU	13,004	13,998	15,074	16,240
6	Average billing rate	Rs/Unit	6.22	6.17	6.16	6.15
7	Tariff increase	%	0.0%	0.0%	0.0%	0.0%
8	Effective Average billing rate	Rs/Unit	6.22	6.17	6.16	6.15
9	Surplus energy sold to other states	MU	-	-	-	-
<b>Expense</b>						
1	Employ cost escalation	%	10%	10%	10%	10%
2	Repair & Maintenance escalation	%	6%	6%	6%	6%
3	Administrative & General escalation	%	6%	6%	6%	6%
<b>Financial position of Utility -</b>		<b>SCN-A</b>				
Sl.no	Description	Units	2015-16	2016-17	2017-18	2018-19
1	Net sales-Power	Rs Cr	6,553	7,038	7,611	8,233
2	Meter rent,theft recov etc	Rs Cr	89	92	95	99
3	Revenue Subsidies & Grants	Rs Cr	-	-	-	-
4	Other Income (Intt., DPS etc.)	Rs Cr	56	59	62	65
<b>Total Income</b>			<b>6,698</b>	<b>7,189</b>	<b>7,768</b>	<b>8,397</b>
<b>Expenditure</b>						
5	Power Purchase	Rs Cr	6,879	7,405	7,974	8,591
6	Employee cost	Rs Cr	160	176	194	213
7	R & M Cost	Rs Cr	117	124	131	139
8	Admn. & General expenses	Rs Cr	144	153	162	171
9	Others	Rs Cr	-	-	-	-
<b>Total Expenses</b>			<b>7,300</b>	<b>7,857</b>	<b>8,461</b>	<b>9,114</b>
10	Gross Profit	Rs Cr	(602)	(669)	(693)	(718)
11	Interest	Rs Cr	141	217	321	463
12	Depreciation	Rs Cr	158	158	158	158
13	Profit before tax	Rs Cr	(901)	(1,044)	(1,173)	(1,339)
14	Tax	Rs Cr	-	-	-	-
<b>Net Profit after taxes</b>			<b>(901)</b>	<b>(1,044)</b>	<b>(1,173)</b>	<b>(1,339)</b>

\* The Requirement at state periphery has been arrived at by the difference of total annual energy requirement of the State and the same for only the state DISCOMs (Refer Table No. 4.3 in Chapter-4)

Table-10.4D

**Cash-Flow Statement for Private DISCOM (Scenario A)**

(In Rs. Crore)

<b>Cash-flow statement</b>				
				(Rs.in Cr.)
Description	2015-16	2016-17	2017-18	2018-19
<b>Cash inflow</b>				
-Grants	-	-	-	-
-Equity	-	-	-	-
-Long term loans-Govt.	-	-	-	-
-Profit before Tax	(901)	(1,044)	(1,173)	(1,339)
-Depreciation	158	158	158	158
-Interest	141	217	321	463
-Bank borrowings for working capital	-	-	-	-
-Security deposit from consumers	66	73	80	88
Deposit for Electrification, Service Connection etc.	4	5	5	6
Short term borrowings	1,507	2,651	3,941	5,425
<b>Total Cash inflow</b>	<b>975</b>	<b>2,059</b>	<b>3,333</b>	<b>4,801</b>
<b>Cash outflow</b>				
-capital expenditure	-	-	-	-
-Loan repayments	119	119	119	119
-Repayment of short term borrowings	648	1,507	2,651	3,941
-Interest payouts	141	133	125	119
-Increase in working capital	46	104	93	110
-Interest on short term borrowings	84	196	345	512
-Tax	-	-	-	-
<b>Total cash outflow</b>	<b>1,039</b>	<b>2,059</b>	<b>3,333</b>	<b>4,801</b>
Net cash inflow	(64)	-	0	(0)
Opening cash balance from previous year	64	(0)	0	(0)
<b>Closing cash balance</b>	<b>0</b>	<b>(0)</b>	<b>0</b>	<b>(0)</b>

**Scenario B: Non-Adherence to Performance Parameters (Loss Reduction Trajectory) and subsequent dependence on Higher Tariff Hike for viability.**

**ASSUMPTIONS**

- AT&C losses higher by 1% than the targeted trajectory.
- All other assumptions same as in Base case



Table-10.5A

## Financial Position of the State Gov DISCOMs (Scenario B)

(In Rs. Crores)

Assumptions		SCN-B				
Sl.no	Description	Units	2015-16	2016-17	2017-18	2018-19
1	Total unrestricted annual energy requirement (Consumer end)	MU	65,144	70,045	75,325	81,014
2	Requirement at state periphery (Grossed up)	MU	81,360	85,661	91,579	97,923
3	AT & C Losses(As per agreed trajectory)	%	15.50%	15.00%	14.50%	14.00%
4	Collection efficiency	%	100.0%	100.0%	100.0%	100.0%
5	T&D Losses excl inter state transmission losses	%	18.71%	18.23%	17.75%	17.27%
6	Inter state transmission losses	%	1.50%	1.50%	1.50%	1.50%
7	Energy availability at state periphery(MU)		79,202	84,665	90,521	96,798
8	Power purchase cost incl intra state transmission charges	Rs/Unit	3.95	3.95	3.95	3.95
9	Purchased power	MU	81,360	85,661	91,579	97,923
10	Average billing rate	Rs/Unit	5.13	5.13	5.13	5.13
11	Tariff increase	%	0.0%	0.0%	0.0%	0.0%
12	Effective Average billing rate	Rs/Unit	5.13	5.13	5.13	5.13
13	Surplus energy available	MU	42361	43723	44187	43275
14	Backdown energy	MU	42361	43723	44187	43275
15	Surplus energy sold to other states	MU	-	-	-	-
<b>Expense</b>						
1	Employ cost escalation	%	10%	10%	10%	10%
2	Repair & Maintenance escalation	%	6%	6%	6%	6%
3	Administrative & General escalation	%	6%	6%	6%	6%
<b>Financial position of Utility -</b>		<b>SCN-B</b>				
Sl.no	Description	Units	2015-16	2016-17	2017-18	2018-19
1	Net sales-Power	Rs Cr	33,419	35,946	38,649	41,560
2	Meter rent,theft recov etc	Rs Cr	906	939	972	1,007
3	Revenue Subsidies	Rs Cr	1,100	1,100	1,100	1,100
4	Other Income (Intt., DPS & Grant etc.)	Rs Cr	740	754	769	785
<b>Total Income</b>			<b>36,165</b>	<b>38,739</b>	<b>41,491</b>	<b>44,452</b>
<b>Expenditure</b>						
4	Power Purchase	Rs Cr	32,137	33,836	36,174	38,680
5	Fixed cost payable against backdown capacity	Rs Cr	-	-	-	-
6	Employee cost	Rs Cr	1,684	1,853	2,038	2,242
7	R & M Cost	Rs Cr	128	136	144	153
8	Admn. & General expenses	Rs Cr	137	145	154	163
9	Others	Rs Cr	170	170	170	170
<b>Total Expenses</b>			<b>34,257</b>	<b>36,140</b>	<b>38,680</b>	<b>41,408</b>
10	Gross Profit	Rs Cr	1,908	2,598	2,811	3,044
11	Interest	Rs Cr	777	1,114	1,400	1,571
12	Depreciation	Rs Cr	1,211	1,418	1,610	1,768
13	Profit before tax	Rs Cr	(79)	67	(199)	(295)
14	Tax	Rs Cr	-	23	-	-
<b>Net Profit after taxes</b>			<b>(79)</b>	<b>44</b>	<b>(199)</b>	<b>(295)</b>



Table-10.5B

<b>Cash-flow statement</b>				
				(Rs.in Cr.)
Description	2015-16	2016-17	2017-18	2018-19
<b>Cash inflow</b>				
-Grants	123	613	638	499
-Equity	1,041	1,012	1,005	967
-Long term loans-Govt.	2,615	3,005	2,255	1,758
-Profit before Tax	(79)	67	(199)	(295)
-Depreciation	1,211	1,418	1,610	1,768
-Interest	777	1,114	1,400	1,571
-Bank borrowings for working capital	1	2	2	2
-Security deposit from consumers	396	436	479	527
Deposit for Electrification, Service Connection etc.	48	53	58	64
Short term borrowings	-	-	-	-
<b>Total Cash inflow</b>	<b>6,132</b>	<b>7,718</b>	<b>7,249</b>	<b>6,862</b>
<b>Cash outflow</b>				
-capital expenditure	3,779	4,629	3,899	3,225
-Loan repayments	312	312	874	1,044
-Repayment of short term borrowings	-	-	-	-
-Interest payouts	777	1,114	1,400	1,571
-Increase in working capital	59	109	79	93
-Interest on short term borrowings	-	-	-	-
-Tax	-	23	-	-
<b>Total cash outflow</b>	<b>4,927</b>	<b>6,188</b>	<b>6,252</b>	<b>5,933</b>
Net cash inflow	1,205	1,530	997	929
Opening cash & bank balance from previous year	492	1,697	3,227	4,224
<b>Closing cash balance</b>	<b>1,697</b>	<b>3,227</b>	<b>4,224</b>	<b>5,153</b>

The scenario exhibits that if state DISCOMs do not adhere to the committed AT&C loss reduction trajectory by even 1%, financial losses would be there.

Tariff Hike to the tune of 1.0% in FY 2016-17 on average Billing rate of Rs. 5.13 per unit in FY 2016-17 would be required for financial sustainability.

**Scenario C: All the funding including those by GOI as per Debt : Equity ratio of 70:30**

#### ASSUMPTIONS

- All schemes finance as per D:E Ratio of 70:30.
- All other assumptions same as in Base case
- Grant considered as zero in all future years.



Table-10.6A

## Financial Position of the State Gov DISCOMs (Scenario C)

(In Rs. Crores)

Assumptions		SCN-C				
Sl.no	Description	Units	2015-16	2016-17	2017-18	2018-19
1	Total unrestricted annual energy requirement (Consumer end)	MU	65,144	70,045	75,325	81,014
2	Requirement at state periphery (Grossed up)	MU	80,408	84,665	90,521	96,798
3	AT & C Losses(As per agreed trajectory)	%	14.50%	14.00%	13.50%	13.00%
4	Collection efficiency	%	100.0%	100.0%	100.0%	100.0%
5	T&D Losses excl inter state transmission losses	%	17.75%	17.27%	16.79%	16.31%
6	Inter state transmission losses	%	1.50%	1.50%	1.50%	1.50%
7	Energy availability at state periphery(MU)		79,202	84,665	90,521	96,798
8	Power purchase cost incl intra state transmission charges	Rs/Unit	3.95	3.95	3.95	3.95
9	Purchased power	MU	80,408	84,665	90,521	96,798
10	Average billing rate	Rs/Unit	5.13	5.13	5.13	5.13
11	Tariff increase	%	0.0%	0.0%	0.0%	0.0%
12	Effective Average billing rate	Rs/Unit	5.13	5.13	5.13	5.13
13	Surplus energy available	MU	42361	43723	44187	43275
14	Backdown energy	MU	42361	43723	44187	43275
15	Surplus energy sold to other states	MU	-	-	-	-
<b>Expense</b>						
1	Employ cost escalation	%	10%	10%	10%	10%
2	Repair & Maintenance escalation	%	6%	6%	6%	6%
3	Administrative & General escalation	%	6%	6%	6%	6%
<b>Financial position of Utility -</b>		<b>SCN-C</b>				
<b>Sl.no</b>	<b>Description</b>	<b>Units</b>	<b>2015-16</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>
1	Net sales-Power	Rs Cr	33,419	35,946	38,649	41,560
2	Meter rent,theft recov etc	Rs Cr	906	939	972	1,007
3	Revenue Subsidies	Rs Cr	1,100	1,100	1,100	1,100
4	Other Income (Intt., DPS & Grant etc.)	Rs Cr	740	754	769	785
<b>Total Income</b>			<b>36,165</b>	<b>38,739</b>	<b>41,491</b>	<b>44,452</b>
<b>Expenditure</b>						
4	Power Purchase	Rs Cr	31,761	33,443	35,756	38,235
5	Fixed cost payable against backdown capacity	Rs Cr	-	-	-	-
6	Employee cost	Rs Cr	1,684	1,853	2,038	2,242
7	R & M Cost	Rs Cr	128	136	144	153
8	Admn. & General expenses	Rs Cr	137	145	154	163
9	Others	Rs Cr	170	170	170	170
<b>Total Expenses</b>			<b>33,881</b>	<b>35,747</b>	<b>38,262</b>	<b>40,963</b>
10	Gross Profit	Rs Cr	2,284	2,992	3,229	3,489
11	Interest	Rs Cr	782	1,148	1,476	1,659
12	Depreciation	Rs Cr	1,214	1,440	1,661	1,832
13	Profit before tax	Rs Cr	288	403	92	(3)
14	Tax	Rs Cr	100	140	32	-
<b>Net Profit after taxes</b>			<b>189</b>	<b>264</b>	<b>60</b>	<b>(3)</b>

**Table-10.6B**

<b>Cash-flow statement</b>				
				(Rs.in Cr.)
<b>Description</b>	<b>2015-16</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>
<b>Cash inflow</b>				
-Grants	-	-	-	-
-Equity	1,082	1,216	1,170	967
-Long term loans-Govt.	2,697	3,413	2,584	1,758
-Profit before Tax	288	403	92	(3)
-Depreciation	1,214	1,440	1,661	1,832
-Interest	782	1,148	1,476	1,659
-Bank borrowings for working capital	1	2	2	2
-Security deposit from consumers	396	436	479	527
Deposit for Electrification, Service Connection etc.	48	53	58	64
Short term borrowings	-	-	-	-
<b>Total Cash inflow</b>	<b>6,508</b>	<b>8,111</b>	<b>7,521</b>	<b>6,808</b>
<b>Cash outflow</b>				
-capital expenditure	3,779	4,629	3,899	3,225
-Loan repayments	312	312	923	1,121
-Repayment of short term borrowings	-	-	-	-
-Interest payouts	782	1,148	1,476	1,659
-Increase in working capital	91	111	81	95
-Interest on short term borrowings	-	-	-	-
-Tax	100	140	32	-
<b>Total cash outflow</b>	<b>5,063</b>	<b>6,340</b>	<b>6,411</b>	<b>6,099</b>
Net cash inflow	1,445	1,771	1,111	708
Opening cash & bank balance from previous year	492	1,937	3,708	4,819
<b>Closing cash balance</b>	<b>1,937</b>	<b>3,708</b>	<b>4,819</b>	<b>5,527</b>

Tariff Hike to the tune of 1.0% in FY 2016-17 on average Billing rate of Rs. 5.13 per unit in FY

2016-17 would be required for financial sustainability.



## Scenario D: As per UDAY Scheme

### ASSUMPTIONS

- State to take over 75.0% of DISCOMs debt as on 30 sept' 2015 over two years -50.0% in FY 2015-16 and 25.0% in FY 2016-17.
- Interest rate on balance 25.0% to be charged at 9.0%

**Table-10.7A**

### **Financial Position of the State Gov DISCOMs (Scenario D)**

(In Rs. Crores)

Assumptions		SCN-D				
Sl.no	Description	Units	2015-16	2016-17	2017-18	2018-19
1	Total unrestricted annual energy requirement (Consumer end)	MU	65,144	70,045	75,325	81,014
2	Requirement at state periphery (Grossed up)	MU	80,408	84,665	90,521	96,798
3	AT & C Losses(As per agreed trajectory)	%	14.50%	14.00%	13.50%	13.00%
4	Collection efficiency	%	100.0%	100.0%	100.0%	100.0%
5	T&D Losses excl inter state transmission losses	%	17.75%	17.27%	16.79%	16.31%
6	Inter state transmission losses	%	1.50%	1.50%	1.50%	1.50%
7	Energy availability at state periphery(MU)		79,202	84,665	90,521	96,798
8	Power purchase cost incl intra state transmission charges	Rs/Unit	3.95	3.95	3.95	3.95
9	Purchased power	MU	80,408	84,665	90,521	96,798
10	Average billing rate	Rs/Unit	5.13	5.13	5.13	5.13
11	Tariff increase	%	0.0%	0.0%	0.0%	0.0%
12	Effective Average billing rate	Rs/Unit	5.13	5.13	5.13	5.13
13	Surplus energy available	MU	42361	43723	44187	43275
14	Backdown energy	MU	42361	43723	44187	43275
15	Surplus energy sold to other states	MU	-	-	-	-
<b>Expense</b>						
1	Employ cost escalation	%	10%	10%	10%	10%
2	Repair & Maintenance escalation	%	6%	6%	6%	6%
3	Administrative & General escalation	%	6%	6%	6%	6%
<b>Financial position of Utility -</b>		<b>SCN-D</b>				
Sl.no	Description	Units	2015-16	2016-17	2017-18	2018-19
1	Net sales-Power	Rs Cr	33,419	35,946	38,649	41,560
2	Meter rent,theft recov etc	Rs Cr	906	939	972	1,007
3	Revenue Subsidies	Rs Cr	1,100	1,100	1,100	1,100
4	Other Income (Intt., DPS & Grant etc.)	Rs Cr	740	754	769	785
<b>Total Income</b>			<b>36,165</b>	<b>38,739</b>	<b>41,491</b>	<b>44,452</b>
<b>Expenditure</b>						
4	Power Purchase	Rs Cr	31,761	33,443	35,756	38,235
5	Fixed cost payable against backdown capacity	Rs Cr	-	-	-	-
6	Employee cost	Rs Cr	1,684	1,853	2,038	2,242
7	R & M Cost	Rs Cr	128	136	144	153
8	Admn. & General expenses	Rs Cr	137	145	154	163
9	Others	Rs Cr	170	170	170	170
<b>Total Expenses</b>			<b>33,881</b>	<b>35,747</b>	<b>38,262</b>	<b>40,963</b>
10	Gross Profit	Rs Cr	2,284	2,992	3,229	3,489
11	Interest	Rs Cr	765	996	1,290	1,499
12	Depreciation	Rs Cr	1,211	1,418	1,610	1,768
13	Profit before tax	Rs Cr	308	578	329	222
14	Tax	Rs Cr	107	200	114	77
<b>Net Profit after taxes</b>			<b>202</b>	<b>378</b>	<b>215</b>	<b>145</b>

Table-10.7B

<b>Cash-flow statement</b>				
				(Rs.in Cr.)
Description	2015-16	2016-17	2017-18	2018-19
<b>Cash inflow</b>				
-Grants	123	613	638	499
-Equity	1,041	1,012	1,005	967
-Long term loans-Govt.	2,615	3,005	2,255	1,758
-Profit before Tax	308	578	329	222
-Depreciation	1,211	1,418	1,610	1,768
-Interest	765	996	1,290	1,499
-Bank borrowings for working capital	1	2	2	2
-Security deposit from consumers	396	436	479	527
Deposit for Electrification, Service Connection etc.	48	53	58	64
Short term borrowings	-	-	-	-
<b>Total Cash inflow</b>	<b>6,508</b>	<b>8,111</b>	<b>7,667</b>	<b>7,306</b>
<b>Cash outflow</b>				
-capital expenditure	3,779	4,629	3,899	3,225
-Loan repayments	-	-	562	731
-Repayment of short term borrowings	-	-	-	-
-Interest payouts	765	996	1,290	1,499
-Increase in working capital	91	111	81	95
-Interest on short term borrowings	-	-	-	-
-Tax	107	200	114	77
<b>Total cash outflow</b>	<b>4,741</b>	<b>5,936</b>	<b>5,946</b>	<b>5,627</b>
Net cash inflow	1,767	2,175	1,721	1,680
Opening cash & bank balance from previous year	492	2,259	4,435	6,156
<b>Closing cash balance</b>	<b>2,259</b>	<b>4,435</b>	<b>6,156</b>	<b>7,836</b>

Tariff Hike would not be required as profitability is there.

## CHAPTER – 11 : OTHER INITIATIVES

### Communication

Successful implementation of 24X7 Power Supply Scheme requires clear communication among all the stakeholders across the value chain, including the consumers. In order to avoid potential roadblocks in implementation due to poor communication and flow of information, the following table lists the primary responsibility of each stakeholder and the corresponding method in which it will be carried out.

A centralized corporate communication team can be formed at headquarters of the DISCOM for

looking at activities of overall communication strategy.

The financial situation in Gujarat makes it imperative to raise tariffs while other initiatives including 24X7 supply are implemented. Such tariff increases would inevitably impact consumers and meet with resistance. To address this, the utilities would clearly communicate their plans on implementing the reliable 24X7 supply scheme along with the other reliability and efficiency improvement measures that they are implementing. A high level of involvement of the Government of Gujarat will also be required.

**Table-11.1**

**Proposed communication responsibilities**

Communication Objective	Responsibility	Frequency
“ Power for all” - Roll Out Plan	ACS, Power	Quarterly
Power Supply Position	MD Transco	Daily
Energy Savings & Conservation	MD, Discoms	Monthly
Planned Outages & Disruption	MD, Discoms	Daily
Real time feeder-wise Information	MD, Discoms	Daily
Status update on Deliverables	ACS, Power	Quarterly
Renewable Power	Director, State Renewable Energy Deptt	Quarterly
Generation- Projects, PLF & Fuel	MD, State Genco	Monthly
Transmission Projects – Physical Progress and Achievements	MD, Transco	Monthly
Distribution – Progress ,Achievements, Losses, Consumer Initiatives etc.	MD, Discoms	Monthly

### Information Technology Initiatives

The need to adopt IT in every sphere of utility operation is pervasive. Power is a complex product that must be consumed on a real time basis. The overall value involved in the process is very high. Even more importantly it touches all citizens. Yet, the information systems that drive the operations of the sector are generally very basic and information transparency and consistency is poor. While sporadic efforts have been made in the past to improve this, quantum changes are required to increase IT adoption in all spheres of power sector operation.

In Gujarat, IT adoption on a massive scale will required to be pursued in the following areas:

- At the corporate level, the operations need to be integrated through implementation of Enterprise Resource Planning Systems (ERP). This would cover critical aspects like Finance and Accounts, Asset Management, Inventory Management, Human Resource Management, Project Management, Personal information System (PIS). ERP will help in timely capitalization of asset, deriving better business value of investment etc.
- At the commercial operations level there is a need to comprehensively implement Customer Management Systems (CMS) for undertaking customer related processes including billing and collections, customer





complaint management, new connection provision etc.

- Centralized Information & Monitoring System for operational, enforcement & litigation, vigilance activities and analysis.
- Power management would require the institution of technically capable controlling facilities equipped with tools like SCADA and Distribution Management Systems (DMS) that allow for adequate visualization of the networks and response capabilities. Technologies for sub-station automation, GIS, SCADA, DMS, OMS, etc., shall be adopted. For the urban areas SCADA is quite useful for improving reliability and reduction of network downtime.
- Regional Distribution Control Centres (RDCC) within the State are proposed to be established. These will initially cater to the principal load centres, but would thereafter be expanded to all load centres of the state. This will be a key initiative, not only for effectively managing 24X7 supply, but also thereafter for other functions like forecasting.
- Renewable Energy Management centres shall be established and equipped with adequate capabilities through financing availed from KfW and ADB.
- Power procurement optimization tools will be implemented to reduce the power procurement costs and improve supply reliability. This shall be achieved through the institution of technically robust forecasting, scheduling and dispatch (Unit Commitment) and settlement tools. The tools shall be used to ensure that the control room operators have the ability to take real time decisions to ensure cost reduction.
- Project monitoring tools shall be incorporated in the PMU to ensure that progress on the investments in the state are

monitored rigorously and bottlenecks identified.

- Standards of service specified under Section 57 of the EA 2003 shall be monitored. The utilities shall use IT tools to gather the information with regards to service standards with minimal manual intervention to ensure transparency and credibility.

The above need to be implemented urgently, and also need to be integrated with each other to ensure that the systems are inter-operable (i.e., they can talk to each other). For this the utilities shall evolve a detailed IT plan to implement the above in a well-coordinated manner.

### Institutional Arrangement

A strong monitoring framework is essential to ensure the success of the “Power for all” scheme. The following structure is being proposed to undertake regular monitoring of the progress of all initiatives being under-taken in this scheme.

- **Government of India (GOI) Level Committee:** It is proposed that this committee will review the overall progress of the scheme on a quarterly basis and provide necessary support to ensure a coordinated response from the Central Govt. - where necessary. The committee may be constituted with the following members – PFC, REC, CEA, SECI, EESL, Ministry of Power, Ministry of Coal, and MNRE.
- **State Government Level Committee:** It is proposed that a State level committee headed by the Chief Secretary will be formed to review the progress of the scheme on a quarterly basis. This committee will monitor the progress of the works undertaken as part of the scheme and issue directions to enable faster execution. This committee will be constituted with the following Principal Secretaries/ Secretaries of the Power, Finance, Urban Development, Agriculture and other relevant departments along with the CMD/Chairman/MD of state utilities.



- **Department Level Committee:** It is proposed that the Department level committee headed by the ACS power/Secretary Power will be formed and shall undertake steps required to ensure the projects are progressing as per the action plan. This committee will undertake progress reviews on a monthly basis. The committee will be constituted with the following members –ACS Power /Secretary Power and MDs of state power utilities.
- **District Level Committee** – It is proposed to constitute a district level committee headed by the Deputy Commissioner to take action that is necessary to ensure the projects are completed in a timely manner and address any issues pertaining to land or other relevant approvals. The committee will be constituted with the following members – Deputy Commissioner and Superintendent Engineer of state utilities.
- **Project Monitoring Unit (PMU)** – A project monitoring unit shall be set up for monitoring the progress of the works being undertaken under this scheme. The PMU will operate under the Secretary, Energy and shall be operated by an external independent agency. The PMU shall be responsible for undertaking coordination, preparing the action plans and monitoring progress of all works under the “Power for all” scheme. The PMU would also help facilitate in tracking the action steps and providing feedback to the

various committee that are proposed to be set up under the scheme. Government of India shall provide grants for the PMU operations.

The committees that are being proposed above are required to be set up at the earliest to kick start the whole scheme. It is important that the committees keep meeting on a regular basis as per the frequency/ timelines mentioned above – to ensure that the objectives set out under the “Power for all” scheme are achieved.

### Capacity Building

With the increase of IT in the Generation, Transmission & Distribution system and to meet the expectations of 24 X 7 power supply for the consumers in the state, it is important to focus on capacity building of the employees for enhancement of technical know-how for latest technological developments and to increase the consumer satisfaction. The capacity building may also include consumer grievance system, awareness regarding importance of working with safety, outage management system, demand side management etc. It is also imperative to state that for serving the consumers in a different way change of mindset of the employees would be required. It is critical that Change Management initiatives are rolled out and institutionalized throughout the DISCOM for achieving better results. The details of the present employee in the Gujarat Discoms is as under:

**Table-11.2**

#### Employee Base

Sl. No.	Name of Co.	Class	Tech	Non-Tech	Sanctioned Post
1	PGVCL	I	548	51	599
2		II	773	133	906
3		III	1793	4594	6387
4		IV	4614	755	5369
	<b>TOTAL</b>		<b>7728</b>	<b>5533</b>	<b>13261</b>
1	DGVCL	I	271	29	300
2		II	409	53	462
3		III	778	2060	2838
4		IV	2309	274	2583
	<b>TOTAL</b>		<b>3767</b>	<b>2416</b>	<b>6183</b>
1	MGVCL	I	248	37	285
2		II	318	93	411



Sl. No.	Name of Co.	Class	Tech	Non-Tech	Sanctioned Post
3		III	904	2228	3132
4		IV	2443	436	2879
	<b>TOTAL</b>		<b>3913</b>	<b>2794</b>	<b>6707</b>
1	<b>UGVCL</b>	I	284	23	307
2		II	398	73	471
3		III	888	2580	3468
4		IV	2862	392	3254
	<b>TOTAL</b>		<b>4432</b>	<b>3068</b>	<b>7500</b>
1	<b>GSECL</b>	I	1053	96	1149
2		II	900	92	992
3		III	3441	798	4239
4		IV	2120	555	2675
	<b>TOTAL</b>		<b>7514</b>	<b>1541</b>	<b>9055</b>
1	<b>GETCO</b>	I	701	45	746
2		II	792	92	884
3		III	4915	1091	6006
4		IV	4556	419	4975
	<b>TOTAL</b>		<b>10964</b>	<b>1647</b>	<b>12611</b>
1	<b>GUVNL</b>	I	64	36	100
2		II	27	25	52
3		III	13	99	112
4		IV	7	81	88
	<b>TOTAL</b>		<b>111</b>	<b>241</b>	<b>352</b>
1	<b>All</b>	I	3169	317	3486
2		II	3617	561	4178
3		III	12732	13450	26182
4		IV	18911	2912	21823
	<b>TOTAL</b>		<b>38429</b>	<b>17240</b>	<b>55669</b>

In view of the importance of the training on new technologies, there is a requirement for development and implementation of Human Resource training program so as to realize the dream of 24 X 7 power supply system in the state in its true sense .

Gujarat Energy Training and Research Institute (GETRI) is an autonomous institute promoted by Gujarat Urja Vikas Nigan Limited and its group companies and registered under Bombay Public

Trust Act. This institute has been established with a view to provide a platform for continuous development of employees by imparting various training, supported by research and documentation of best practices needed in the modern era.

Various internal & external training programmes conducted by Power companies for their Technical & Non technical Employees is shown in **Annexure-XIII**



## CHAPTER – 12 : YEAR WISE ROLL OUT PLAN

DELIVERABLES						
Power for All – Roll Out Plan	Units	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	Total
GENERATION						
Generation (State Sector )	MW	876	-	-	800	1676
NCE / RNES including state RES (solar PV)	MW	788	730	1425	1525	4468
IPP (State)	MW	500	-	-	-	500
Central Sector	MW	240	876	220	220	1556
IPP (Private) Projects / Purchase	MW	-	-	-	-	-
<b>TOTAL</b>	<b>MW</b>	<b>2404</b>	<b>1606</b>	<b>1645</b>	<b>2545</b>	<b>8200</b>
TRANSMISSION						
<b>Inter State</b>						
Grid Substation (New/ Augmentation)						
765/400 KV	Nos/MVA				2/6000	2/6000
400/220 KV	Nos/MVA		1/1000		2/2000	3/3000
<b>Lines</b>						
765 KV	ckt km					
400 KV	ckt km	408	610			1018
<b>Intra State</b>						
Grid Substation (New/ Augmentation)						
400/220 KV	Nos/MVA	4075	2945	2815	3000	12835
220/132 KV	Nos/MVA	250	900	900	400	2450
220/66 KV	Nos/MVA	3180	3260	3260	3100	12800
132/66 KV	Nos/MVA	500	450	200	200	1350
132/11 KV	Nos/MVA	50	-	-	-	50
<b>Lines</b>						
400 KV	ckt km	510	595	550	600	2255



DELIVERABLES						
Power for All – Roll Out Plan	Units	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	Total
220 KV	ckt km	1140	1126	950	950	4166
DISTRIBUTION						
No. of 66KV & 33kV Lines/feeders	No.	94	98	96	98	386
Total length of 66KV & 33 kV lines in	ckt. Km.	1484	1568	1656	1749	6456
Total No. of 220/11 kV,132/11kV, 66/11, & 33/11kV PSS	No.	90	96	102	108	396
Total capacity of 220/11 kV,132/11kV, 66/11 & 33/11kV PSS in MVA	MVA.	2700	2861	3031	3211	11802
<b>Total No. of Distribution transformers</b>	No.	<b>104938</b>	<b>124336</b>	<b>140010</b>	<b>157660</b>	<b>526945</b>
Total capacity of Distribution transformers in MVA	MVA.	3119	3465	3768	4097	14448
No of 11 KV+22KV Lines	No	620	652	685	720	2677
<b>Total length of 11KV+22 KV lines in ckt. Km</b>	ckt. Km	<b>24520</b>	<b>26363</b>	<b>28346</b>	<b>30477</b>	<b>109706</b>
<b>Total length of LT Lines in ckt. Km</b>	ckt. Km	<b>4700</b>	<b>4772</b>	<b>4845</b>	<b>4919</b>	<b>19235</b>
<b>AT&amp;C losses</b>	%	<b>14.50</b>	<b>14.00</b>	<b>13.50</b>	<b>13.00</b>	
RENEWABLE ENERGY						
Solar Power *	MW	94	45	661	686	1486
Wind Power	MW	678	682	750	824	2934
Others: - Biomass Power - Bagasse Cogeneration - Small Hydro Power - Waste to Energy	MW	16	3	14	15	48
<b>Total Renewable Energy :</b>	<b>MW</b>	<b>788</b>	<b>730</b>	<b>1425</b>	<b>1525</b>	<b>4468</b>



## CHAPTER – 13 : SECTOR WISE INVESTMENT PLAN & FUND REQUIREMENT

(in Rs. Crore)

		Sector	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	Total	Remarks
<b>Generation</b>	Projects under Expansion	Sikka Extension-3 & 4	134.00	0.00	0.00	0.00	134.00	
		Wankbori thermal	719.40	1194.80	1281.70	1269.10	4465.00	
	R & M Works (Special Projects)	Wanakbori Unit 1-6	60.25	89.88	143.99	260.68	554.80	
		Ukai Unit 3-5	115.24	117.57	52.90	219.25	504.96	
		Gandhinagar	1.00	7.25	0.00	0.00	8.25	
	<b>Total Investment</b>		<b>1029.89</b>	<b>1409.50</b>	<b>1478.59</b>	<b>1749.03</b>	<b>5667.01</b>	
	<b>Total Fund Requirement till FY 2018-19</b>		<b>1029.89</b>	<b>1409.50</b>	<b>1478.59</b>	<b>1749.03</b>	<b>5667.01</b>	
	<b>Grant from GoG for R &amp; M (Special Projects)</b>		<b>176.49</b>	<b>214.70</b>	<b>196.89</b>	<b>479.93</b>	<b>1068.01</b>	
	<b>Equity Contribution to be approved by GoG</b>		<b>177.38</b>	<b>238.96</b>	<b>256.34</b>	<b>253.82</b>	<b>926.50</b>	
	Loan from Commercial Banks/Fund requirement under PFA		676.02	955.84	1025.36	1015.28	3672.50	
<b>Transmission</b>	<b>Intra State</b>							
	400 KV Sub Station		328	146	237	180	891	
	400 KV Lines		688	594	641	451	2375	
	220 KV Sub Station		247	188	318	280	1033	
	220 KV Lines		285	218	251	276	1030	
	132 KV Sub Station		33	22	28	11	94	
	132 KV Lines		15	15	15	12	57	
	66 KV Sub Station		254	428	341	407	1429	
	66 KV Lines		197	338	283	325	1144	
	Bus Reactor		0	15	15	15	45	
	Capacitor Bank		0	32	32	32	96	
	SVC		0	2	2	2	6	
	<b>Total</b>		<b>2047</b>	<b>1998</b>	<b>2163</b>	<b>1992</b>	<b>8200</b>	
	R&M						0	
	Renovation and Modernization		174	100	150	150	574	
	Augmentation of Sub-station/ Lines		136	419	377	500	1432	
	<b>Total</b>		<b>309</b>	<b>519</b>	<b>527</b>	<b>650</b>	<b>2005</b>	
	OPGW		29	15	22	32	97	





		Sector	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	Total	Remarks
	<b>Grand Total</b>		<b>2385</b>	<b>2532</b>	<b>2712</b>	<b>2674</b>	<b>10302</b>	
	<b>Total Fund Requirement till FY 2018-19</b>		<b>2385</b>	<b>2532</b>	<b>2712</b>	<b>2674</b>	<b>10302</b>	
	Fund raise from Green Energy Corridor Project (Rs. 1962.12 Crore upto 2020)		0	392	589	589	<b>1570</b>	
	NCEF Grant (40%)		0	157	177	235	<b>569</b>	
	Loan from KfW (40%)		0	157	235	235	<b>628</b>	
	Equity (20%)		0	78	118	118	<b>314</b>	
	Fund requirement Excluding GEC		2385	2139	2123	2085	<b>8732</b>	
	Debt: 80% of the total Fund Requirement from Nationalized bank & ADB / <b>Fund requirement under PFA</b>		1908	1711	1699	1668	<b>6986</b>	
	<b>GoG Grant /Equity : 20% of total Fund Requirement (Including TASP &amp; Sagarkhedu share equity)</b>		<b>477</b>	<b>428</b>	<b>425</b>	<b>417</b>	<b>1746</b>	
<b>Total Transmission</b>			<b>2385</b>	<b>2532</b>	<b>2712</b>	<b>2674</b>	<b>10302</b>	
<b>Distribution</b>	RAPDRP Part-A		76.20	0.00			<b>76.20</b>	
	RAPDRP Part-A (SCADA)		38.39	57.59			<b>95.99</b>	
	RAPDRP Part-B		230.83	346.25			<b>577.08</b>	
	DDUGJY		92.01	460.06	372.63		<b>924.70</b>	
	IPDS		112.19	560.94	448.75		<b>1121.88</b>	
	System Strengthening activities of the distribution network		823.65	451.69	502.80	647.00	<b>2425.14</b>	
	TASP for sub stations / lines		160.00	160.00	160.00	160.00	<b>640.00</b>	
	Electrification of Hutments		20.00	20.00	20.00	20.00	<b>80.00</b>	
	Kutir Jyoti Scheme		3.75	3.75	3.75	3.75	<b>15.00</b>	
	TASP for Rural Electrification wells & petaparas		370.65	370.65	370.65	370.65	<b>1482.60</b>	
	Scheduled Caste Sub Plan		5.00	5.00	5.00	5.00	<b>20.00</b>	
	Energy Conservation		40.00	40.00	40.00	40.00	<b>160.00</b>	
	Sagar Khedu Sarvangi Vikas Yojana		425.00	425.00	425.00	425.00	<b>1700.00</b>	
	KHUSHY for PGVCL – Equity		150.00	150.00	150.00	150.00	<b>600.00</b>	
	Share capital for Agri. Connection		1158.14	1158.14	1158.14	1158.14	<b>4632.56</b>	
	Solar Pump Sets (AG)		60.00	60.00	60.00	60.00	<b>240.00</b>	



		Sector	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	Total	Remarks
	Scheduled Caste Sub Plan AG Connection (Capital)		35.00	35.00	35.00	35.00	140.00	
	Share Capital Contribution to GUVNL for shifting/replacement of Poles and Distribution Lines in the area of Municipal Corporations and Nagarpalikas		100.00	100.00	100.00	100.00	400.00	
	Assistance to State PSEs for providing solar based Decentralized Electrification in non-electrified areas (New item)		50.00	50.00	50.00	50.00	200.00	
	<b>Grand Total Distribution</b>		<b>3950.82</b>	<b>4454.07</b>	<b>3901.72</b>	<b>3224.54</b>	<b>15531.14</b>	
	Total Fund Requirement till FY 2018-19		3951	4454	3902	3225	15531	
	Fund from GoG Grant		2577.540	2577.540	2577.540	2577.540	10310	
	Fund from GoI Grant		550	1425	821	0	2796	
	Net fund requirement (Loan from Bank )/ <b>Fund requirement under PFA</b>		824	452	503	647	2425	
<b>Renewable Energy</b>	Solar Power		658.00	315.00	4627.00	4802.00	10402.00	* Gujarat has tie up the renewable capacity with ipps by PPA hence, this fund will not need to be arrange by GUVNL.
	Wind Power		4068.00	4092.00	4500.00	4944.00	17604.00	
	Others:		96.00	18.00	84.00	90.00	288.00	
	- Biomass Power							
	- Bagasse Cogeneration							
	- Small Hydro Power							
	- Waste to Energy							
<b>Total Renewable Energy</b>			<b>4822.00</b>	<b>4425.00</b>	<b>9211.00</b>	<b>9836.00</b>	<b>28294.00</b>	
<b>Grand Total</b>			<b>12187.44</b>	<b>12820.16</b>	<b>17303.14</b>	<b>17483.58</b>	<b>59794.32</b>	

**ANNEXURE – I**

**DETAILED CALCULATION OF ENERGY DEMAND UNDER DIFFERENT CATEGORIES**

Sl. No.	Particulars→ ↓	Calculation steps		Years			
				2015-16	2016-17	2017-18	2018-19
A	DEMAND PROJECTIONS FOR ELECTRIFIED HOUSEHOLDS						
1	Consumption of Rural Electrified Households						
2	Consumption (units per day per household)		Units	1.34	1.43	1.54	1.64
3	Annual Energy Requirement for existing electrified Rural Household	6332012	MUs	3,099	3,316	3,548	3,797
4	Consumption of Urban Electrified Households						
5	Consumption (units per day per household)		Units	4.22	4.52	4.83	5.17
6	Annual Energy Requirement for existing urban electrified Household	6725072	MUs	10,361	11,086	11,862	12,693
7	Consumption of Domestic consumers with Torrent power	0	MUs	-	-	-	-
7	Total Annual Energy Requirement for existing electrified households	(3+6+7)	MUs	13,460	14,402	15,410	16,489
B	ADDITIONAL ENERGY REQUIREMENTS FOR ELECTRIFIED DOMESTIC CONSUMERS						
1	Additional Energy Required for Electrified Households (Annual projection (-) current Energy available MUs)	(A7-E3)	MUs	880	1,822	2,830	3,909
C	ELECTRIFICATION OF UNELECTRIFIED HOUSEHOLDS ( per year)						
	URBAN						
1	Unelectrified Household as on 31.03.2014		Nos.				



Sl. No.	Particulars→ ↓	Calculation steps		Years			
				2015-16	2016-17	2017-18	2018-19
2	Electrification of unelectrified Household	-	Nos.	-	-	-	-
3	Cumulative Annual Energy Requirement for Electrification of unelectrified Household	$(A5 \times C2 \times 365) / 10^6$	MUs	-	-	-	-
	<b><u>RURAL</u></b>						
4	Unelectrified Households as on 31.03.2014	0	Nos.				
5	Targeted Electrification of unelectrified		%				
6	Electrification of unelectrified Household	$C4 \times C5$	Nos.	-	-	-	-
7	Cumulative Annual Energy Requirement for Electrification of unelectrified Household	$(A2 \times C6 \times 365) / 10^6$	MUs	-	-	-	-
8	Total households electrified out of unelectrified (Rural + Urban)	$(C2 + C6)$	Nos.	-	-	-	-
9	Annual Energy Requirement for Electrification of unelectrified Household	$(C3 + C7)$	MUs	-	-	-	-
<b>D</b>	<b>ELECTRIFICATION OF NEWLY CONSTRUCTED HOUSEHOLDS ( per year)</b>						
	<b><u>URBAN</u></b>						
1	Total Household - Urban (nos.) 2014	6725072					
	Yearly Increase in Urban H/H	3.72%	Nos	2,50,364	2,59,684	2,69,352	2,79,379
2	Yearly cumulative Increase in Urban H/H as per GoG		Nos.	2,50,364	5,10,048	7,79,399	10,58,779
3	Cumulative Annual Energy Requirement (MUs) for newly constructed Household - Urban	$(A5 \times D2 \times 365) / 10^6$	MUs	386	841	1,375	1,998
	<b><u>RURAL</u></b>						
4	Total Household Rural 2014	6332012					
	Yearly Increase in Rural H/H as per GOG	1.40%	Nos.	88,791	90,036	91,299	92,579

Sl. No.	Particulars→ ↓	Calculation steps		Years			
				2015-16	2016-17	2017-18	2018-19
5	Yearly cummulative Increase in Rural H/H as per GOR			88,791	1,78,827	2,70,126	3,62,705
6	Annual Energy Requirement for newly constructed Household	$(D5 \times A2 \times 365) / 10^6$	MUs	43	94	151	217
7	Total newly constructed households	(D2+D5)	Nos.	3,39,155	6,88,875	10,49,526	14,21,484
8	Cumulative Annual Energy Requirement for newly constructed Household	(D3+D6)	MUs	429	934	1,526	2,216
<b>E</b>	<b>ANNUAL ENERGY REQUIREMENTS</b>						
1	Total Additional Annual Energy Requirement - Domestic Consumer	(B1+C9+D8)	MUs	1,309	2,756	4,356	6,125
2	Current Energy Available - Total	70328	MUs	70,328	70,328	70,328	70,328
3	Current Energy Available - Domestic	12580	MUs	12,580	12,580	12,580	12,580
5	Total Domestic Annual Energy Requirement (Current + Projection)	(E1+E3)	MUs	13,889	15,336	16,936	18,705
6	Current Energy Available - Other than Domestic	57,748	MUs	57,748	57,748	57,748	57,748
7	Total Annual Energy Requirement - Other than Domestic Consumers (with 7% growth P.A.)		MUs	61,791	66,116	70,744	75,696
8	Additional Energy Required for other than domestic Categories of Consumers (yearwise)		MUs	4,042	4,325	4,628	4,952
7	Additional Energy Required for other than domestic (Cumulative)			4,042	8,368	12,996	17,948
9	Total Energy Requirements (all)	(E1+E2+E7)	MUs	75,680	81,452	87,680	94,401

**ANNEXURE – II**

**BREAK UP & DETAILS OF CAPACITIES EXISTING AND LIKELY TO BE ADDED YEAR WISE**

Sl. No.	Power Sources / Generating Stations	Type (Thermal / Hydro / NRSE etc.)	Location of the Plant	As on March 2015 (MW)	Capacity Available As Planned				REMARKS
					FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	
					(MW)	(MW)	(MW)	(MW)	
A	STATE SECTOR (OWN) GENERATING STATIONS								
A1	THERMAL								
A1.1	Ukai Thermal Power Station, Ukai ( 2 x 120 MW + 2 x 200 MW + 1 x 210 MW + 1 x 500 MW)= 1350 MW	Thermal (coal)	Gujarat	1350	1350	1350	1350	1350	
A1.2	Gandhinagar Thermal Power Station, Gandhinagar (2 x 120 MW + 3 x 210 MW) = 870 MW	Thermal (coal)	Gujarat	870	870	870	870	870	
A1.3	Wanakbori Thermal Power Station (7 X 210 MW) = 1470 MW + 800 MW = 2270	Thermal (coal)	Gujarat	1470	1470	1470	1470	2270	800 MW Unit will be added in FY 2018 – 19 from extension U-8 (800 MW)
A1.4	Sikka Thermal Power Station ( 2 x 120 MW) = 240 MW + 500 MW = 740 MW	Thermal (coal)	Gujarat	240	740	740	740	740	500 MW Unit will be added in FY 2015 – 16 from U-3&4 (2x250 MW)
A1.5	Kutch Lignite Thermal Power Station (2 x 70 MW + 2 x 75 MW) = 290 MW	Thermal (Lignite)	Gujarat	290	290	290	290	290	
A1.6	Dhuvaran Thermal Power Station ( 4 x 63.5 + 2 x 140 MW) = 534 MW	Thermal (Gas)	Gujarat	0	0	0	0	0	All units have been retired. Last one in December 2010.
A1.7	Dhuvaran CCPP – I (1 x 67.85 MW GTG + 38.767 MW STG)	Thermal (Gas)	Gujarat	106	106	106	106	106	
A1.8	Dhuvaran CCPP – II (1 x 72.51 MW GTG + 1 x 39.94 MW STG)	Thermal (Gas)	Gujarat	112	112	112	112	112	
A1.9	Dhuvaran CCCP - III	Thermal	Gujarat	0	376	376	376	376	





Sl. No.	Power Sources / Generating Stations	Type (Thermal / Hydro / NRSE etc.)	Location of the Plant	As on March 2015 (MW)	Capacity Available As Planned				REMARKS
					FY 2015-16 (MW)	FY 2016-17 (MW)	FY 2017-18 (MW)	FY 2018-19 (MW)	
	(376 MW)	(Gas)							
A1.10	Utran Gas Based Power Station (CCPP - 1 & CCPP - 2), 510 MW	Thermal (Gas)	Gujarat	510	510	510	510	510	
A1.11	<b>SUBTOTAL STATE THERMAL</b>			<b>4948</b>	<b>5824</b>	<b>5824</b>	<b>5824</b>	<b>6624</b>	
<b>A2</b>	<b>HYDEL POWER GENERATING STATIONS (INCLUDING MICRO HYDRO PROJECTS)</b>								
A2.1	Ukai Hydro Power Station, Ukai ( 4 x 75 MW ) = 300 MW	Hydel	Gujarat	300	300	300	300	300	
A2.2	Ukai Left Bank Canal Hydro Power Station ( 2 x 2.5 MW ) = 5 MW	Hydel (Small Hydro - RES)	Gujarat	5	5	5	5	5	
A2.3	Kadana Hydro Power Station ( 4 x 60 MW ) = 240 MW	Hydel	Gujarat	240	240	240	240	240	
A2.4	Panam Canal Mini Hydro Power Station (2 x 1 MW) = 2 MW	Hydel (Small Hydro - RES)	Gujarat	2	2	2	2	2	
A2.5	<b>SUBTOTAL STATE HYDEL</b>			<b>547</b>	<b>547</b>	<b>547</b>	<b>547</b>	<b>547</b>	
<b>A3</b>	<b>TOTAL STATE SECTOR (Thermal &amp; Hydel) (A1.11+A2.5)</b>			<b>5495</b>	<b>6371</b>	<b>6371</b>	<b>6371</b>	<b>7171</b>	
<b>B</b>	<b>CENTRAL SECTOR POWER GENERATING STATIONS (CGS)</b>								
<b>B1</b>	<b>CGS THERMAL</b>								
<b>B1a</b>	<b>NTPC THERMAL PLANTS</b>								
B1a.1	NTPC - Kawas , 656 MW - CCPP	Thermal (Gas)	Gujarat	187	187	187	187	187	
B1a.2	NTPC - Jhanor Gandhar , 657 MW - CCPP	Thermal (Gas)	Gujarat	237	237	237	237	237	
B1a.3	NTPC - Korba - ( 3 x 200 + 3 x 500 + 1 x 500 MW ) = 2600 MW	Thermal (Coal)	Chhattisgarh	456	456	456	456	456	
B1a.4	NTPC - Vindhyachal Stage 1, 2, 3 & 4 - ( 6 x 210 + 6 x 500 MW ) = 4260	Thermal (Coal)	M.P.	975	1068	1068	1068	1068	93 MW will be additionally available in

Sl. No.	Power Sources / Generating Stations	Type (Thermal / Hydro / NRSE etc.)	Location of the Plant	As on March 2015 (MW)	Capacity Available As Planned				REMARKS
					FY 2015-16 (MW)	FY 2016-17 (MW)	FY 2017-18 (MW)	FY 2018-19 (MW)	
	MW								FY 2015 – 16 From U-5
B1a.5	NTPC, Mouda Stage - I - 2 x 500 MW = 1000 MW	Thermal (Coal)	Maharashtra	240	360	480	480	480	120 MW will be additionally available in FY 2015 - 16, from Stage II U-1, Another 120 MW will be additionally available from 16 – 17, from Stage II, U-2.
B1a.6	NTPC - Sipat ( 3 x 660 + 2 x 500 ) = 2980 MW	Thermal (Coal)	Chhattisgarh	813	813	813	813	813	
B1a.7	NTPC - Kahalgaon II (3 x 500 MW) = 1500 MW	Thermal (Coal)	Bihar	141	141	141	141	141	
B1a.8	NTPC - Lara ( 2 x 800MW)	Thermal (Coal)	Chhattisgarh	0	0	280	280	280	280 MW will be available in FY 2016 - 17
B1a.9	NTPC - Gadarwara ( 1 x 800)	Thermal (Coal)	M.P.	0	0	0	220	220	220 MW will be available in FY 2017 - 18
B1a.10	NTPC - Khargone (1 x 660 MW)	Thermal (Coal)	M.P.	0	0	0	0	220	220 MW will be available in FY 2018 - 19
B1a.11	NTPC- North Karanpura (3X660MW)	Thermal (Coal)	Jharkhand	0	0	0	0	231	231 MW will be available in FY 2018 - 19
<b>B1a.12</b>	<b>SUB TOTAL - CGS NTPC THERMAL</b>			<b>3049</b>	<b>3262</b>	<b>3662</b>	<b>3882</b>	<b>4333</b>	
<b>B2</b>	<b>CGS NUCLEAR</b>								
<b>B2a</b>	<b>NPCIL NUCLEAR PLANT</b>								
B2a.1	Kakrapar Atomic Power Station (2 X 220MW) = 440 MW + 2 x 700 MW = 1840 MW	Nuclear	Gujarat	125	125	601	601	601	476 MW will be available in FY 2016 – 17 From Kakrapar Extension
B2a.2	Tarapur Atomic Power Station (1 & 2) ( 320 MW)	Nuclear	Maharashtra	160	160	160	160	160	
B2a.3	Tarapur Atomic Power Station (3 & 4) ( 1080 MW)	Nuclear	Maharashtra	274	274	274	274	274	

Sl. No.	Power Sources / Generating Stations	Type (Thermal / Hydro / NRSE etc.)	Location of the Plant	As on March 2015 (MW)	Capacity Available As Planned				REMARKS
					FY 2015-16 (MW)	FY 2016-17 (MW)	FY 2017-18 (MW)	FY 2018-19 (MW)	
B2a.4	<b>SUB TOTAL - CGS NUCLEAR</b>			<b>559</b>	<b>559</b>	<b>1035</b>	<b>1035</b>	<b>1035</b>	
<b>B3</b>	<b>CGS Hydel - (SARDAR SAROVAR NIGAM LTD.) - SSNL</b>								
B3.1	Share of Gujarat from SSP (RBPH) - River Bed Power House - (6 x 200 MW)	Hydel	Gujarat	192	192	192	192	192	
B3.2	Share of Gujarat from SSP (CHPH) - Canal Head Power House - (5 x 50 MW)	Hydel	Gujarat	40	40	40	40	40	
B3.3	<b>SUB TOTAL - CGS SSNL Hydel</b>			<b>232</b>	<b>232</b>	<b>232</b>	<b>232</b>	<b>232</b>	
<b>B4</b>	<b>TOTAL CGS SHARE (B1a.8 + B2a.4 + B3.3)</b>			<b>3840</b>	<b>4053</b>	<b>4929</b>	<b>5149</b>	<b>5600</b>	
<b>C</b>	<b>IPP (PRIVATE SECTOR) PROJECTS</b>								
C1	Torrent Power - Sabarmati (1 x 60MW + 1 x 120MW + 1 x 110MW + 1 x 121 MW)	Thermal (Coal)	Gujarat	400	400	400	400	400	
C2	Torrent Power - Vatva (2 x 32.5 MW - GT + 1 x 35 MW STG)	Thermal (Gas)	Gujarat	100	100	100	100	100	
C3	Torrent Power - SUGEN: (1148 MW)Uno SUGEN (383 MW)DGEN (1200 MW)CCPPs	Thermal (Gas)	Gujarat	<b>1548.00</b>	<b>1548.00</b>	<b>1548.00</b>	<b>1548.00</b>	<b>1548.00</b>	Shares of: SUGEN- 861MW UNOSUGEN-287 MW DGEN-400MW
C4	ESSAR Power Gujarat Ltd. (EPGL) - Salaya-I (2 x 600 MW)	Thermal (Coal)	Gujarat	1000	1000	1000	1000	1000	Competitive Bidding (Case - 1)
C5	ESSAR Power Generation Ltd. (EPGL) - HAzira (515 MW)	Thermal (Gas)	Gujarat	300	300	300	300	300	
C6	China Light Power India - CLPI (Gujarat Paguthan Energy Corprn. Ltd. - GPEC)(3 x 138 MW GTG + 1 x	Thermal (Gas)	Gujarat	655	655	655	655	655	

Sl. No.	Power Sources / Generating Stations	Type (Thermal / Hydro / NRSE etc.)	Location of the Plant	As on March 2015 (MW)	Capacity Available As Planned				REMARKS
					FY 2015-16 (MW)	FY 2016-17 (MW)	FY 2017-18 (MW)	FY 2018-19 (MW)	
	241 MW STG)								
C7	Adani Power – Mundra (5 x 660 MW + 4 x 330 MW) = 4620MW	Thermal (Coal)	Gujarat	2000	2000	2000	2000	2000	Competitive Bidding (Case – 1)
C8	Tata Power - Mundra - UMPP - CGPL ( Coastal Gujarat Power Ltd.)- (5 x 800 MW)	Thermal (Coal)	Gujarat	1805	1805	1805	1805	1805	Competitive Bidding (Case – 2)
C9	ACB (India Limited), Chattisgarh	Thermal (Coal)	Chattisgarh	200	200	200	200	200	Competitive Bidding (Case – 1)
C10	<b>TOTAL IPP (PRIVATE SECTOR) PROJECTS (SUM : C1 to C9)</b>			<b>8008</b>	<b>8008</b>	<b>8008</b>	<b>8008</b>	<b>8008</b>	
<b>D</b>	<b>IPP (STATE SECTOR) PROJECTS</b>								
D1	Gujarat Industries Power Co. Ltd. (GIPCL) - Vadodara - I, 165 MW Stage -II 145 MW	Thermal (Gas)	Gujarat	<b>310</b>	<b>310</b>	<b>310</b>	<b>310</b>	<b>310</b>	
D2	Gujarat Industries Power Co. Ltd. (GIPCL) - SLPP - I & II - Lignite Based (2 x 125 MW + 2 x 125 MW) = 500 MW	Thermal (Lignite)	Gujarat	<b>500</b>	<b>500</b>	<b>500</b>	<b>500</b>	<b>500</b>	
D3	Gujarat State Energy Generation Ltd. (GSEG) - Hazira Surat ( 156 MW CCPP)	Thermal (Gas)	Gujarat	<b>156</b>	<b>156</b>	<b>156</b>	<b>156</b>	<b>156</b>	
D4	Gujarat State Energy Generation Ltd. (GSEG) - Hazira - CCPP - II (351 MW CCPP)	Thermal (Gas)	Gujarat	<b>351</b>	<b>351</b>	<b>351</b>	<b>351</b>	<b>351</b>	
D5	Gujarat Mineral Development Corporation - GMDC - Akrimota ( 2 x 125 MW)	Thermal (Lignite)	Gujarat	<b>250</b>	<b>250</b>	<b>250</b>	<b>250</b>	<b>250</b>	
D6	Gujarat Pipavav Power Company	Thermal	Gujarat	<b>702</b>	<b>702</b>	<b>702</b>	<b>702</b>	<b>702</b>	



Sl. No.	Power Sources / Generating Stations	Type (Thermal / Hydro / NRSE etc.)	Location of the Plant	As on March 2015 (MW)	Capacity Available As Planned				REMARKS
					FY 2015-16 (MW)	FY 2016-17 (MW)	FY 2017-18 (MW)	FY 2018-19 (MW)	
	Ltd. (GPPC)(702 MW CCPP)	(Gas)							
D7	Bhavnagar Energy Co. Ltd. (BECL) - Unit 1 & 2 ( 2 x 250 MW = 500 MW)	Thermal (Lignite)	Gujarat	0	500	500	500	500	500 MW will be available in FY 2015 - 16
D8	<b>TOTAL IPP (STATE SECTOR) PROJECTS (SUM : D1 to D7)</b>			<b>2269</b>	<b>2769</b>	<b>2769</b>	<b>2769</b>	<b>2769</b>	
<b>E</b>	<b>GUJARAT ENERGY DEVELOPMENT AUTHORITY (GEDA) AND NEW &amp; RENEWABLE SOURCES OF ENERGY (State &amp; Private)</b>								
E1	Biomass IPP	NRSE	Gujarat	41.2	41.2	41.2	41.2	41.2	
E2	Mini / small Hydel	NRSE	Gujarat	9.6	25.6	28.6	42.6	57.6	
E3	Solar	NRSE	Gujarat	1003	1097	1142	1803	2489	
E4	Wind	NRSE	Gujarat	3542	4147	4814	5204	5618	
E5	<b>SUBTOTAL GEDA &amp; NRSE (State &amp; Private)</b>			<b>4596</b>	<b>5311</b>	<b>6026</b>	<b>7091</b>	<b>8206</b>	
	<b>GRAND TOTAL( A3+ B4+ C10+D7+E5)</b>			<b>24207.8</b>	<b>26511.8</b>	<b>28102.8</b>	<b>29387.8</b>	<b>31753.8</b>	

**DETAILS OF EXISTING INTRA-STATE GRID SUB-STATIONS**

Sl. No.	Name of Sub Station	TR. Circle	District	Taluka	Dt. of T.C / Commi.	Financial Year	Calendar Year	Voltage Class
1	220KV Mogar	Nadiad	Anand	Anand	28-01-1972 31-03-2015	71-72 14-15	1972 2015	220 KV
2	132KV Atul	Navsari	Valsad	Valsad	3/20/1973	72-73	1973	132 KV
3	132KV Bhesan	Navsari	Surat	Choryasi	1/3/1966	65-66	1966	132 KV
4	132KV Valia	Bharuch	Bharuch	Valiya	5/22/1972	72-73	1972	132 KV
5	132KV Bharuch	Bharuch	Bharuch	Bharuch	5/19/1973	73-74	1973	132 KV
6	132KV Ankleshwar	Bharuch	Bharuch	Ankleshwar	10/12/1976	76-77	1976	132 KV
7	132KV Tilakwada	Jambuva	Narmada	Tilakwada	9/4/1973	73-74	1973	132 KV
8	132KV Vasedi (Chhota' pur)	Jambuva	Chhotaudepur	Chhotaudepur	3/27/1998	97-98	1998	132 KV
9	132KV Manjusar	Jambuva	Vadodara	Savli	3/31/1996	95-96	1996	132 KV
10	132KV Fertilizernagar	Jambuva	Vadodara	Vadodara	12/10/1968	68-69	1968	132 KV
11	132KV Jawaharnagar	Jambuva	Vadodara	Vadodara	1/23/1973	72-73	1973	132 KV
12	132KV Nandesari (Dhanora)	Jambuva	Vadodara	Vadodara	7/27/1982	82-83	1982	132 KV
13	132KV Karjan (Miyagam)	Jambuva	Vadodara	Karjan	6/15/1989	89-90	1989	132 KV
14	132KV Gotri	Jambuva	Vadodara	Vadodara City	6/19/1964	64-65	1964	132 KV
15	132KV Dahod	Jambuva	Dahod	Dahod	12/17/1983	83-84	1983	132 KV
16	132KV Ode	Nadiad	Anand	Anand	2/10/1984	83-84	1984	132 KV
17	132KV Undel	Nadiad	Anand	Cambay	3/29/1995	94-95	1995	132 KV
18	132KV Mehmedabad	Nadiad	Kheda	Mehmedabad	6/6/1969	69-70	1969	132 KV
19	132KV Nadiad	Nadiad	Kheda	Nadiad	10/2/1974	74-75	1974	132 KV
20	132KV Vatva (Narol)	Nadiad	Ahmedabad	Ahmedabad	1/16/1964	63-64	1964	132 KV
21	132KV Sabarmati	Nadiad	Ahmedabad	City	12/29/1969	69-70	1969	132 KV
22	132KV Chiloda	Nadiad	Gandhinagar	Gandhinagar	1/2/1989	88-89	1989	132 KV



**DETAILS OF EXISTING INTRA-STATE GRID SUB-STATIONS**

Sl. No.	Name of Sub Station	TR. Circle	District	Taluka	Dt. of T.C / Commi.	Financial Year	Calendar Year	Voltage Class
23	132KV Talod	Himatnagar	Sabarkantha	Talod	1/3/1974	73-74	1974	132 KV
24	132KV Dhandhuka	S'nagar	Ahmedabad	Dhandhuka	2/16/1972	71-72	1972	132 KV
25	132KV Sitagadh	S'nagar	Surendranagar	Sayla	10/30/1992	92-93	1992	132 KV
26	132KV Visnagar	Himatnagar	Mehsana	Visnagar	3/5/1992	91-92	1992	132 KV
27	132KV Idar	Himatnagar	Sabarkantha	Idar	1/25/1978	77-78	1978	132 KV
28	132KV Sidhpur	Mehsana	Patan	Sidhpur	1/18/1970	69-70	1970	132 KV
29	132KV Patan	Mehsana	Patan	Patan	8/11/1985	85-86	1985	132 KV
30	132KV Deesa	Palanpur	Banaskantha	Deesa	9/1/1980	80-81	1980	132 KV
31	132KV Wankaner	Gondal	Morbi	Wankaner	2/1/1965	64-65	1965	132 KV
32	132KV Lalpur	Gondal	Morbi	Wankaner	3/18/1995	94-95	1995	132 KV
33	132KV Vikram (Rajkot-C)	Gondal	Rajkot	Rajkot	6/14/1988	88-89	1988	132 KV
34	132KV Vajadi	Gondal	Rajkot	Rajkot	8/28/1999	99-00	1999	132 KV
35	132KV Jasdan	Gondal	Rajkot	Jasdan	3/10/1999	98-99	1999	132 KV
36	132KV Naghedi (Jamnagar)	Jamnagar	Jamnagar	Jamnagar	3/31/1972	1972	1972	132 KV
37	132KV Dhrol	Gondal	Jamnagar	Dhrol	3/31/2002	01-02	2002	132 KV
38	132KV Bhatia	Jamnagar	Devbhumi Dwarka	Kalyanpur	3/29/1995	94-95	1995	132 KV
39	132KV Jam Khambhalia	Jamnagar	Devbhumi Dwarka	Jam-Khambhaliya	3/11/1992	91-92	1992	132 KV
40	132KV Dhoraji	Junagadh	Rajkot	Dhoraji	1/4/1971	70-71	1971	132 KV
41	132KV Bhayavadar	Junagadh	Rajkot	Upleta	3/6/1997	96-97	1997	132 KV
42	132KV Junagadh	Junagadh	Junagadh	Junagadh City	10/17/1987	87-88	1987	132 KV
43	132KV Bhuj	Anjar	Kutch	Bhuj	6/5/1971	71-72	1971	132 KV
44	132KV Samkhiyali	Anjar	Kutch	Bhachau	1/30/1995	94-95	1995	132 KV
45	132KV Talala	Junagadh	Gir Somnath	Talala	3/16/1970	69-70	1970	132 KV



**DETAILS OF EXISTING INTRA-STATE GRID SUB-STATIONS**

Sl. No.	Name of Sub Station	TR. Circle	District	Taluka	Dt. of T.C / Commi.	Financial Year	Calendar Year	Voltage Class
46	132KV Haripur	Junagadh	Gir Somnath	Talala	3/26/2003	02-03	2003	132 KV
47	132KV Paliyad	Amreli	Botad	Botad	12/31/1988	88-89	1988	132 KV
48	132KV Barwala	Amreli	Botad	Barwala	12/31/1988	88-89	1988	132 KV
49	132KV Vallabhipur	Amreli	Bhavnagar	Vallabhipur	2/1/1994	93-94	1994	132 KV
50	132KV Bhomiyavadar	Jamnagar	Porbandar	Porbandar	2/28/2012	11-12	2012	132 KV
51	132KV Limkheda	Jambuva	Dahod	Limkheda	3/29/2013	12-13	2013	132 KV
52	220KV Vapi	Navsari	Valsad	Vapi	4/29/1980	80-81	1980	220 KV
53	220KV Bhilad	Navsari	Valsad	Umargam	2/14/1994	93-94	1994	220 KV
54	220KV Navsari	Navsari	Navsari	Navsari	4/4/1967	67-68	1967	220 KV
55	220KV Chikhali (Ambheta)	Navsari	Navsari	Chikhli	3/27/1999	98-99	1999	220 KV
56	220KV Vav (Valthan)	Navsari	Surat	Kamrej	1/15/1980	79-80	1980	220 KV
57	220KV Ichha'pore	Navsari	Surat	Choryasi	3/23/1992	91-92	1992	220 KV
58	220KV Sachin (Talangpur)	Navsari	Surat	Choryasi	1/22/2000	99-00	2000	220 KV
59	220KV Bardoli (Mota)	Navsari	Surat	Bardoli	5/30/2001	01-02	2001	220 KV
60	220KV Kim	Bharuch	Surat	Mangrol	8/19/1993	93-94	1993	220 KV
61	220KV Achhalia	Bharuch	Bharuch	Zagadiya	3/17/1979	78-79	1979	220 KV
62	220KV Haldarva	Bharuch	Bharuch	Bharuch	3/30/1992	91-92	1992	220 KV
63	220KV Zagadia	Bharuch	Bharuch	Zagadiya	6/6/1995	95-96	1995	220 KV
64	220KV Dahej	Bharuch	Bharuch	Wagra	23/03/1998 21-03-08	97-98 07-08	1998	220 KV
65	220KV Wagra	Bharuch	Bharuch	Wagra	12/2/2008	08-09	2008	220 KV
66	220KV Jambuva	Jambuva	Vadodara	Vadodara	2/10/1972	71-72	1972	220 KV
67	220KV Mobha (Gavasad)	Jambuva	Vadodara	Padra	3/9/2000	99-00	2000	220 KV
68	220KV Wadhodia	Jambuva	Vadodara	Waghodiya	7/24/1993	93-94	1993	220 KV
69	220KV Chandrapura	Jambuva	Panchmahal	Halol	1/26/1989	88-89	1989	220 KV

**DETAILS OF EXISTING INTRA-STATE GRID SUB-STATIONS**

Sl. No.	Name of Sub Station	TR. Circle	District	Taluka	Dt. of T.C / Commi.	Financial Year	Calendar Year	Voltage Class
70	220KV Godhara	Jambuva	Panchmahal	Godhra	1/15/1999	98-99	1999	220 KV
71	220KV Karamsad	Nadiad	Anand	Anand	7/30/1970	70-71	1970	220 KV
72	220KV Kapadvanj	Nadiad	Kheda	Kapadvanj	3/20/1993	92-93	1993	220 KV
73	220KV Salejada (Dholka)	Nadiad	Ahmedabad	Dholka	3/16/1998	97-98	1998	220 KV
74	220KV Ranasan	Nadiad	Gandhinagar	Gandhinagar	10/30/1969	69-70	1969	220 KV
75	220KV Khanpur (Dehgam)	Nadiad	Gandhinagar	Dehgam	11/19/1994	94-95	1994	220 KV
76	220KV Dhansura	Himatnagar	Arvalli	Dhansura	4/24/1984	83-84	1984	220 KV
77	220KV Viramgam	S'nagar	Ahmedabad	Viramgam	1/1/1976	75-76	1976	220 KV
78	220KV Limbdi	S'nagar	Surendranagar	Limbdi	10/27/1970	71-72	1970	220 KV
79	220KV Dhrangadhra	S'nagar	Surendranagar	Dhrangadhra	2/26/1991	90-91	1991	220 KV
80	220KV Halvad	S'nagar	Morbi	Halvad	1/23/2004	03-04	2004	220 KV
81	220KV Dhanki (Deposit)	S'nagar	Surendranagar	Lakhatar	1/17/2005	04-05	2005	220 KV
82	220KV Adalsar (SSNNL - Deposit)	S'nagar	Surendranagar	Lakhatar	9/30/2006	06-07	2006	220 KV
83	220KV Rajpur (SSNNL - Deposit)	S'nagar	Surendranagar	Wadhwan	3/31/2008	07-08	2008	220 KV
84	220KV Bala (SSNNL - Deposit)	S'nagar	Surendranagar	Wadhwan	1/20/2009	08-09	2009	220 KV
85	220KV Dudhrej (SSNNL - Deposit)	S'nagar	Surendranagar	Wadhwan	1/22/2009	08-09	2009	220 KV
86	220KV Chhatral	Mehsana	Gandhinagar	Kalol	5/23/1977	77-78	1977	220 KV
87	220KV Jamla	Himatnagar	Gandhinagar	Kalol	6/24/1995	95-96	1995	220 KV
88	220KV Mehsana	Mehsana	Mehsana	Mehsana	11/28/1975	75-76	1975	220 KV
89	220KV Vijapur	Himatnagar	Mehsana	Vijapur	3/26/1987	86-87	1987	220 KV
90	220KV Mitha	Mehsana	Mehsana	Mehsana	6/4/2001	01-02	2001	220 KV
91	220KV Agiyol (H'nagar)	Himatnagar	Sabarkantha	Himatnagar	11/26/1990	90-91	1990	220 KV



**DETAILS OF EXISTING INTRA-STATE GRID SUB-STATIONS**

Sl. No.	Name of Sub Station	TR. Circle	District	Taluka	Dt. of T.C / Commi.	Financial Year	Calendar Year	Voltage Class
92	220KV Mathasur (Bhutia)	Sabarkantha	Sabarkantha	Idar	1/28/2006	05-06	2006	220 KV
93	220KV Kheralu	Palanpur	Mehsana	Kheralu	3/24/1996	95-96	1996	220 KV
94	220KV Sankhari	Mehsana	Patan	Patan	8/14/1995	95-96	1995	220 KV
95	220KV Jangral	Palanpur	Patan	Saraswati	11/2/2003	03-04	2003	220 KV
96	220KV Radhanpur	Palanpur	Patan	Radhanpur	12/31/2004	04-05	2004	220 KV
97	220KV Palanpur	Palanpur	Banaskantha	Palanpur	12/26/1988	88-89	1988	220 KV
98	220KV Deodar (Vakha)	Palanpur	Banaskantha	Deodar	1/31/1989	88-89	1989	220 KV
99	220KV Tharad	Palanpur	Banaskantha	Tharad	9/2/1998	98-99	1998	220 KV
100	220KV Thavar (Dhanera)	Palanpur	Banaskantha	Dhanera	11/16/2006	06-07	2006	220 KV
101	220KV Agathala	Palanpur	Banaskantha	Lakhni	3/28/2010	09-10	2010	220 KV
102	220KV Gondal	Gondal	Rajkot	Gondal	4/15/1965	65-66	1965	220 KV
103	220KV Nyara (Rajkot)	Gondal	Rajkot	Rajkot	3/29/1996	95-96	1996	220 KV
104	220KV Morbi (Pipli)	Gondal	Morbi	Morbi	3/27/1997	96-97	1997	220 KV
105	220KV Jamnagar	Jamnagar	Jamnagar	Jamnagar	3/29/1995	94-95	1995	220 KV
106	220KV Moti Paneli	Junagadh	Rajkot	Upleta	1/23/1998	97-98	1998	220 KV
107	220KV Keshod	Junagadh	Junagadh	Keshod	12/27/1988	88-89	1988	220 KV
108	220KV Visavadar	Junagadh	Junagadh	Visavadar	3/31/1995	94-95	1995	220 KV
109	220KV Sardargadh	Junagadh	Junagadh	Manavadar	11/20/1997	97-98	1997	220 KV
110	220KV Ranavav	Jamnagar	Porbandar	Ranavav	6/5/1980	80-81	1980	220 KV
111	220KV Anjar	Anjar	Kutch	Anjar	7/15/1988	88-89	1988	220 KV
112	220KV Nakhatrana	Anjar	Kutch	Nakhatrana	9/25/1995	95-96	1995	220 KV
113	220KV Nanikhakhar	Anjar	Kutch	Mandvi	12/31/1997	97-98	1997	220 KV
114	220KV Chitrod (Shivlakha)	Anjar	Kutch	Rapar	5/8/2004	04-05	2004	220 KV
115	220KV Varsana	Anjar	Kutch	Anjar	1/30/2008	07-08	2008	220 KV
116	220KV Kukma	Anjar	Kutch	Bhuj	6/30/2008	08-09	2008	220 KV



**DETAILS OF EXISTING INTRA-STATE GRID SUB-STATIONS**

Sl. No.	Name of Sub Station	TR. Circle	District	Taluka	Dt. of T.C / Commi.	Financial Year	Calendar Year	Voltage Class
117	220KV Vartej	Amreli	Bhavnagar	Bhavnagar	2/2/1966	65-66	1966	220 KV
118	220KV Dhasa	Amreli	Botad	Gadhda	1/29/1999	98-99	1999	220 KV
119	220KV Palitana (Sagapara)	Amreli	Bhavnagar	Palitana	6/8/1999	99-00	1999	220 KV
120	220KV Mahuva (Otha)	Amreli	Bhavnagar	Mahuva	3/31/2000	99-00	2000	220 KV
121	220KV Savarkundla	Amreli	Amreli	Savarkundla	3/31/1966	1966	1966	220 KV
122	220KV Timbdi (Kodinar)	Junagadh	Gir Somnath	Sutrapada	12/31/1989	89-90	1989	220 KV
123	220KV Dhokadva (Kansari)	Junagadh	Gir Somnath	Girgadhada	3/31/1996	96-97	1996	220 KV
124	220KV Botad	Amreli	Botad	Botad	3/31/2010	09-10	2010	220 KV
125	220KV Bhat (Bavla)	Nadiad	Ahmedabad	Dascroi	6/3/2010	10-11	2010	220 KV
126	220KV Shapar	Junagadh	Junagadh	Vanthali	3/29/2012	11-12	2012	220 KV
127	220KV Lalpar	Gondal	Morbi	Morbi	1/11/2012	11-12	2012	220 KV
128	220KV Kangsiyali	Gondal	Rajkot	Lodhika	6/27/2011	11-12	2011	220 KV
129	220KV Charanka	Palanpur	Patan	Santalpur	12/31/2011	11-12	2011	220 KV
130	220KV Lunawada	Jambuva	Mahisagar	Lunawada	3/31/2012	11-12	2012	220 KV
131	220KV Sarla (Chotila)	S'nagar	Surendranagar	Sayla	3/15/2013	12-13	2013	220 KV
132	220KV Vadala (Mokha)	Anjar	Kutch	Mundra	3/23/2013	12-13	2013	220 KV
133	220KV Vondh (Bhachau)	Anjar	Kutch	Bhachau	3/24/2013	12-13	2013	220 KV
134	220KV Bhatiya	Jamnagar	Devbhumi Dwarka	Kalyanpur	3/30/2013	12-13	2013	220 KV
135	400KV Asoj	Jambuva	Vadodara	Vadodara	8/15/1986	86-87	1986	400 KV
136	400KV Kasor	Nadiad	Anand	Sojitra	1/31/1996	95-96	1996	400 KV
137	400KV Soja	Himatnagar	Gandhinagar	Kalol	1/16/1987	86-87	1987	400 KV
138	400KV Vadavi (Ranchodpur)	Mehsana	Mehsana	Kadi	1/28/2006	05-06	2006	400 KV
139	400KV Kansari (Zerda)	Palanpur	Banaskantha	Deesa	3/5/1999	98-99	1999	400 KV
140	400KV Jetpur	Gondal	Rajkot	Jetpur	3/12/1987	86-87	1987	400 KV



**DETAILS OF EXISTING INTRA-STATE GRID SUB-STATIONS**

Sl. No.	Name of Sub Station	TR. Circle	District	Taluka	Dt. of T.C / Commi.	Financial Year	Calendar Year	Voltage Class
141	400KV Hadala	Gondal	Morbi	Tankara	5/26/2007	06-07	2007	400 KV
142	400KV Choraniya	S'nagar	Surendranagar	Limbdi	10/18/1994	94-95	1994	400 KV
143	400KV Amreli	Amreli	Amreli	Amreli	3/31/1999	98-99	1999	400 KV
144	400KV Dinod (Kosamba)	Bharuch	Surat	Mangrol	3/31/2011	10-11	2011	400 KV
145	400KV Tappar	Anjar	Kutch	Anjar	1/13/2011	10-11	2011	400 KV
146	220KV Bhachau (PS-3)	Anjar	Kutch	Bhachau	3/31/2014	13-14	2014	220 KV
147	220KV Sartanpar (Tankara)	Gondal	Morbi	Wankaner	3/31/2014	13-14	2014	220 KV
148	220KV Karjan (132KV upgradation)	Jambuva	Vadodara	Karjan	3/27/2014	13-14	2014	220 KV
149	220KV Vyankatpura (Jarod)	Jambuva	Vadodara	Waghodiya	3/31/2014	13-14	2014	220 KV
150	132KV Chandkheda (Zundal/Khorj)	Nadiad	Ahmedabad	Dascroi	03-03-2014 31/03/2015	13-14 14-15	2014 2015	132 KV
151	220 KV Popada (Bhestan)	Navsari	Surat	Choryasi	3/29/2014	13-14	2014	220 KV
152	132KV Vakhatpar (Doliya)	S'nagar	Surendranagar	Sayla	3/31/2014	13-14	2014	132 KV
153	220KV Vallabhipur	Amreli	Bhavnagar	Vallabhipur	2/28/2015	14-15	2015	220 KV
154	220KV Nani Hamipur (PS-2)	Anjar	Kutch	Rapar	3/31/2015	14-15	2015	220 KV
155	220KV Suva (Near Dahej)	Bharuch	Bharuch	Wagra	3/31/2015	14-15	2015	220 KV
156	220KV Faredi (Modasa)	Himatnagar	Arvalli	Modasa	3/30/2015	14-15	2015	220 KV
157	132KV Zoz	Jambuva	Chhotaudepur	Chhotaudepur	3/31/2015	14-15	2015	132 KV
158	132KV Bhavnath (HYB)	Junagadh	Junagadh	Junagadh city	3/29/2015	14-15	2015	132 KV
159	400KV Halvad (Mansar)	S'nagar	Morbi	Halvad	1/23/2015	14-15	2015	400 KV
160	220KV Dhanki-2	S'nagar	Surendranagar	Lakhatar	3/27/2015	14-15	2015	220 KV



**DETAILS OF EXISTING INTRA STATE TRANSMISSION LINES - 400 kV**

Sl. No.	Name of Circle	Name of Line.	S/C D/C	Length in Kms.
1	Bharuch	400 KV Kosamba-Asoj	S/C	122.35
2	Bharuch	400 KV Kosamba - Ukai 1	D/C	68.10
3	Bharuch	400 KV Kosamba - Ukai 2	D/C	68.10
4	Bharuch	401 KV Kosamba - Ukai 3	S/C	91
5	Jambuva	400 KV Asoj-Wanakbori	S/C	76.00
6	Jambuva	400 KV Asoj-Chorania-1	S/C	166.00
7	Jambuva	400 KV Asoj-Chorania-2	S/C	177.00
8	Jambuva	400 KV Asoj-SSP	S/C	83.00
9	Nadiad	400 KV Kasor-SSP	S/C	146.00
10	Nadiad	400 KV Kasor-GPEC	S/C	98.00
11	Nadiad	400 KV Kasor-Chorania	S/C	103
12	Mehsana	400 KV Vadavi-Dehgam(PGCL)-1	D/C	62.3
13	Mehsana	400 KV Vadavi-Dehgam(PGCL)-2	D/C	62.3
14	Palanpur	400 KV Soja-Kansari	D/C	135
15	H'nagar	400 KV Soja- Wanakbori	S/C	95.1
16	H'nagar	400 KV Soja- PGCIL (Dehgam)	S/C & D/C	40
17	H'nagar	400 KV PGCIL- Wanakbori	S/C & D/C	67
18	Amreli	400 KV Amreli-Jetpur 1	S/C	96
19	Amreli	400KV Amreli-Jetpur-2		115
20	Amreli	400KV Amreli-Hadala		164
21	Gondal	400 KV Hadala-Jetpur	S/C	115
22	Gondal	400 KV Mundra - Hadala	S/C	238
23	Gondal	400KV Vadinar - Hadala -1	D/C	112.88
24	Gondal	400KV Vadinar - Hadala -2	D/C	112.88
25	Anjar	400 KV Varsana - Hadala	S/C	154
26	Anjar	400 KV Mundra (Adani) - Varsana 1	S/C	86.05
27	Anjar	400 kv Varsana - Adani line-2	D/C	80.042
28	Anjar	400 kv Varsana - Adani line-3	D/C	80.042
29	Chorania	400 KV Chorania-Hadala	S/C	166.4
30	Chorania	400 KV Chorania- Amreli	S/C	164
31	Chorania	400 KV Kosamba Chorania 1	D/C	228.5
32	Chorania	400 KV Kosamba Chorania 2	D/C	228.5

**DETAILS OF EXISTING INTRA STATE TRANSMISSION LINES - 220 kV**

Sl. No.	Name of Circle	Name of Line.	S/C D/C	Length in Kms.
1	Navsari	Ambheta-Vapi	S/C	46.95
2	Navsari	Bhilad-TAPS.	S/C	62.37
3	Navsari	Ichhapore-Essar-1.	D/C	16.00
4	Navsari	Ichhapore-Essar-2.	D/C	16.00
5	Navsari	Ichhapore-Kawas No. 1	S/C	6.00
6	Navsari	Ichhapore-RIL-1.	D/C	9.00
7	Navsari	Ichhapore-RIL-2.	D/C	9.00
8	Navsari	Navsari-Ambheta.	S/C	21.64
9	Navsari	Navsari-Bhilad.	S/C	88.70
10	Navsari	Navsari-Talangpur	S/C	30.54
11	Navsari	Navsari-Nasik-1.	D/C	70.00
12	Navsari	Navsari-Nasik-2.	D/C	70.00
13	Navsari	Navsari - Popda	S/C	22.55
14	Navsari	Vav - Popda	S/C	28.45
15	Navsari	Talangpur-Essar-1.	D/C	30.60
16	Navsari	Talangpur-Essar-2.	D/C	30.60
17	Navsari	Ukai(Th.)-Ukai(Hy.)-1.	D/C	2.50
18	Navsari	Ukai(Th.)-Ukai(Hy.)-2.	D/C	2.50
19	Navsari	Ukai-Mota(Bardoli) - 2	S/C	52.80
20	Navsari	Vapi-Bhilad-2.	D/C	22.81
21	Navsari	Vapi-Tarapur-2.	S/C	80.64
22	Navsari	Ichh -Kawas -2		6.00
23	Navsari	Vav-Mota(Bardoli) -2	S/C	13.50
24	Navsari	Vav-Talangpur-1.	D/C	38.54
25	Navsari	Vav-Mota-1.	S/C	13.50
26	Navsari	Mota-Ukai(Th.)-KAPP-1.	S/C	52.80
27	Navsari	Vapi-Ambheti-1	D/C	14.18
28	Navsari	Bhilad-Ambheti-1	D/C	20.77
29	Navsari	Bhilad-Ambheti-2	D/C	21.74
30	Navsari	Bhilad-Ambheti-3	D/C	21.74
31	Navsari	Mota-Ambheta Line No-1	D/C	47.11
32	Navsari	Mota-Ambheta Line No-2	D/C	47.11
33	Navsari	Vav-Utran-2	S/C	24.65
34	Navsari	Mora(L&T)-GSEG	S/C	2.91
35	Navsari	Mora(L&T)-L&T 1	D/C	0.75
36	Navsari	Mora(L&T)-L&T 2	D/C	0.75
37	Bharuch	Haladarwa-GPEC-1	D/C	10.29
38	Bharuch	Haladarwa-GPEC-2	D/C	10.29
39	Bharuch	Haladarwa-Jambuva	S/C	61.5
40	Bharuch	Haladarwa- Zagadia	S/C	55
41	Bharuch	Haladarwa-Dahej	D.C	62
42	Bharuch	Haladarwa-Wagra	S/C	29

**DETAILS OF EXISTING INTRA STATE TRANSMISSION LINES - 220 kV**

Sl. No.	Name of Circle	Name of Line.	S/C D/C	Length in Kms.
43	Bharuch	Haldarwa-IPCL-1	D/C	59.2
44	Bharuch	Haldarwa-IPCL-2	D/C	59.2
45	Bharuch	Wagra-Railway-1	D/C	9.26
46	Bharuch	Wagra-Railway-2	D/C	9.26
47	Bharuch	Achhalia - Ukai (Th) 1	D/C	84
48	Bharuch	Achhalia - Ukai (Th) 2	D/C	84
49	Bharuch	Achhalia - Ukai (Th) 3	S/C	84
50	Bharuch	Achhalia - Ukai (Hy) 1	D/C	83
51	Bharuch	Achhalia - Ukai (Hy) 2	D/C	83
52	Bharuch	Achhalia- Jambuva-1	D/C	47
53	Bharuch	Achhalia- Jambuva-2	D/C	47
54	Bharuch	Achhalia- Jambuva-3	D/C	50
55	Bharuch	Achhalia- Jambuva-4	D/C	50
56	Bharuch	Zagadia-Mangrol-1	D/C	35
57	Bharuch	Zagadia-Mangrol-2	D/C	35
58	Bharuch	Zagadia-Jambuva	D/C	61.5
59	Bharuch	Zagadia- Kim	D/C	40.82
60	Bharuch	Zagadia- Kosamba-3	D/C	25.26
61	Bharuch	Zagadia- RMGL	D/C	0.3
62	Bharuch	Zagadia- Kosamba-1	D/C	24.2
63	Bharuch	Zagadia- Kosamba-2	D/C	24.2
64	Bharuch	Dahej-Wagra	D.C	36.65
65	Bharuch	Dahej-GACL-1	D.C	1.5
66	Bharuch	Dahej-GACL-2	D.C	1.5
67	Bharuch	Dahej - Indogulf -1	D.C	5.5
68	Bharuch	Dahej - Indogulf -2	D.C	5.5
69	Bharuch	Dahej-ONGC - LNG - 1	D.C	6.63
70	Bharuch	Dahej - LNG - 2	D.C	5.9
71	Bharuch	Kosamba Suva	D.C	128.04
72	Bharuch	Suva Mobha	D.C	77.192
73	Bharuch	Suva Kosamba	D.C	128.04
74	Bharuch	Kim - Utran -1	D/C	22.2
75	Bharuch	Kim - Utran - 2	D/C	22.2
76	Bharuch	Kim - GSEG	D/C	48.25
77	Bharuch	Kim - Mora	D/C	49.15
78	Bharuch	Kim - TPGL 1	D/C	4.06
79	Bharuch	Kim - TPGL 2	D/C	4.06
80	Bharuch	Kim - Vav 1	D/C	21
81	Bharuch	Kim-Kosamba 1	D/C	24.6
82	Bharuch	Kim-Kosamba 2	D/C	24.6
83	Bharuch	Kosamba-Utran 1	D/C	42.58
84	Bharuch	Kosamba-Vav(Old Kosmba-Utran-2)	D/C	35.3

**DETAILS OF EXISTING INTRA STATE TRANSMISSION LINES - 220 kV**

Sl. No.	Name of Circle	Name of Line.	S/C D/C	Length in Kms.
85	Bharuch	Kosamba - GSEG 1	D/C	62.37
86	Bharuch	Kosamba - GSEG 2	D/C	62.37
87	Bharuch	Kosamba-Mobha-1	D/C	88.4
88	Jambuva	Jambuva-Karamsad-1	D/C	48.42
89	Jambuva	Jambuva-Karamsad-2	D/C	48.42
90	Jambuva	Jambuva-Waghodia	S/C	26.32
91	Jambuva	Jambuva-Asoj	S/C	24.50
92	Jambuva	Waghodia-Asoj	S/C	32.00
93	Jambuva	Gavasad-Kasor-1	D/C	52.67
94	Jambuva	Gavasad-Kasor-2	D/C	52.67
95	Jambuva	Gavasad-SLPP-1	D/C	107.20
96	Jambuva	Gavasad-SLPP-2	D/C	107.20
97	Jambuva	Gavasad-Karjan	S/C	43.33
98	Jambuva	SLPP-Karjan	S/C	89.69
99	Jambuva	Gavasad-SLPP-4	D/C	110.70
	Jambuva	Gavasad-Suva	S/C	77.00
100	Jambuva	Gavasad-Kosamba-1	D/C	89.00
101	Jambuva	Gavasad-Kosamba-2	D/C	89.00
102	Jambuva	Godhra-Chandrapura-1	D/C	35.00
103	Jambuva	Godhra-Chandrapura-2	D/C	35.00
104	Jambuva	Godhra-Kadana	D/C	80.00
105	Jambuva	Godhra-Savdasna Muvada	D/C	56.00
106	Jambuva	Godhra-Wanakbori	S/C	35.00
107	Jambuva	Savdasna Muvada-Kadana	S/C	24.00
108	Jambuva	Chandrapura-PMSteel	S/C	10.00
109	Jambuva	Asoj-Chandrapura-1	D/C	35.00
110	Jambuva	Asoj-Chandrapura-2	D/C	35.00
111	Jambuva	Asoj Karamsad 1	D/C	44.00
112	Jambuva	Asoj Karamsad 2	D/C	44.00
113	Jambuva	Asoj -Vyankatpura	D/C	21.00
114	Jambuva	Vyankatpura- wanakbori	D/C	75.00
115	Jambuva	Asoj- Wanakbori 2	D/C	63.00
116	Nadiad	Kapadwanj-Ranasan-1	D/C	63.36
117	Nadiad	Kapadwanj-Ranasan-2	D/C	63.36
118	Nadiad	Wanakbori-Kapadwanj-1	D/C	35.76
119	Nadiad	Wanakbori-Kapadwanj-2	D/C	35.76
120	Nadiad	Khanpur-AECo.-1	D/C	29
121	Nadiad	Khanpur-AECo.-2	D/C	29
122	Nadiad	Khanpur-Kapadwanj-1	D/C	40
123	Nadiad	Khanpur-Kapadwanj-2	D/C	40
124	Nadiad	Khanpur-PGCL-1	D/C	11.77
125	Nadiad	Khanpur-PGCL-2	D/C	11.77

**DETAILS OF EXISTING INTRA STATE TRANSMISSION LINES - 220 kV**

Sl. No.	Name of Circle	Name of Line.	S/C D/C	Length in Kms.
126	Nadiad	Ranasan-Gandhinagar-1	D/C	19.83
127	Nadiad	Ranasan-Gandhinagar-2	D/C	19.83
128	Nadiad	Ranasan-PGCL-1	D/C	19.83
129	Nadiad	Ranasan-PGCL-2	D/C	19.83
130	Nadiad	Salejada-Bhat-1	D/C	26.296
131	Nadiad	Salejada-Bhat-2	D/C	26.296
132	Nadiad	Bhat-Pirana-1	D/C	14.632
133	Nadiad	Bhat-Pirana-2	D/C	14.632
134	Nadiad	Salejada-Chorania	S/C	76.3
135	Nadiad	Karamsad-Ranasan-1	D/C	71.44
136	Nadiad	Karamsad-Ranasan-2	D/C	71.44
137	Nadiad	Karamsad-Salejada	S/C	76.8
138	Nadiad	Karamsad-GEPC-1	D/C	94.5
139	Nadiad	Karamsad-GEPC-2	D/C	94.5
140	Nadiad	Karamsad-Kasor-1	D/C	12
141	Nadiad	Karamsad-Kasor-2	D/C	12
142	Nadiad	Kasor-Dhuwaran	S/C+D/C	52.7
143	Nadiad	Kasor-Botad	D/C	144.6
144	Mehsana	G'nagar-Mehsana-1	D/C	52.00
145	Mehsana	G'nagar-Mehsana-2	D/C	52.00
146	Mehsana	Mehsana-Radhanpur	S/C	95.00
147	Mehsana	Mehsana-Sankhari	S/C	48.20
148	Mehsana	Mitha-Sankhari - 1	D/C	33.06
149	Mehsana	Mitha-Sankhari - 2	D/C	33.06
150	Mehsana	Mitha-Santhal	D/C	9.00
151	Mehsana	G'nagar-Chhatral-1	S/C	27.30
152	Mehsana	Gandhinagar-Chhatral-2	S/C	27.30
153	Mehsana	220KV Sankhari-Shivlakha	S/C	185.00
154	Mehsana	220kv Sankhari-Jangral-1	D/C	32.29
155	Mehsana	220kv Sankhari-Jangral-2	D/C	32.29
156	Mehsana	Kheralu-Palanpur-1	D/C	51.00
157	Mehsana	Kheralu-Palanpur-2	D/C	51.00
158	Mehsana	Kheralu - Bhutiya CKT - 1	D/C	49.00
159	Mehsana	Kheralu - Bhutiya CKT - 2	D/C	49.00
160	Mehsana	Chhatral-Vadavi	S/C & D/C	12.60
161	Mehsana	Vadavi-Viramgam	S/C	42.70
162	Mehsana	Vadavi-Mitha-1	D/C	44.14
163	Mehsana	Vadavi-Mitha-2	D/C	44.14
164	Palanpur	220KV DEODAR-CHARNKA	S/C	88.00
165	Palanpur	220KV CHARNKA - SHIVLAKHA	S/C	122.00
166	Palanpur	220KV THARAD-DEODAR -1	D/C	38
167	Palanpur	220KV THARAD-DEODAR -2	D/C	38

**DETAILS OF EXISTING INTRA STATE TRANSMISSION LINES - 220 kV**

Sl. No.	Name of Circle	Name of Line.	S/C D/C	Length in Kms.
168	Palanpur	220KV KANSARI-DEODAR-1	D/C	52.00
169	Palanpur	220KV KANSARI-DEODAR-2	D/C	52.00
170	Palanpur	220KV KANSARI-AGTHALA	D/C	28.00
171	Palanpur	220KV AGATHALA-THARAD	D/C	28.00
172	Palanpur	220KV KANSARI-THARAD-2	D/C	56.00
173	Palanpur	220KV THARAD - THAVAR - 1	D/C	49.00
174	Palanpur	220KV THARAD - THAVAR - 2	D/C	49.00
175	Palanpur	220KV THARAD - AMARAPUR - 1	D/C	86.59
176	Palanpur	220KV THARAD - AMARAPUR - 2	D/C	86.59
177	Palanpur	220KV PALANPUR-KANSARI-1	D/C	40.00
178	Palanpur	220KV PALANPUR-KANSARI-2	D/C	40.00
179	Palanpur	220KV KANSARI -JANGRAL-I	D/C	37.00
180	Palanpur	220KV KANSARI -JANGRAL-II	D/C	37.00
181	Palanpur	220KV RADHANPUR-DEODAR	D/C	35.00
182	Palanpur	220KV KANSARI-THAVAR-1	D/C	28.00
183	Palanpur	220KV KANSARI-THAVAR-2	D/C	28.00
184	Palanpur	220KV CHARANKA-NaniHamirpar PS2	D/C	116.00
185	Himatnagar	220KV Agiyol-Vijapur	S/C	35.2
186	Himatnagar	220KV Agiyol-Bhutiya-1	D/C	35.6
187	Himatnagar	220KV Agiyol-Bhutiya-2	D/C	35.6
188	Himatnagar	220KV W'bori-Dhansura-1	D/C	75.6
189	Himatnagar	220KV W'bori-Dhansura-2	D/C	75.6
190	Himatnagar	220KV Kadana-Dhansura-1	D/C	58.9
191	Himatnagar	220KV Kadana-Dhansura-2	D/C	58.9
192	Himatnagar	220KV Dhansura-Agiyol-1	D/C	33.41
193	Himatnagar	220KV Dhansura-Agiyol-2	D/C	35.2
194	Himatnagar	220KV G'nagar-Jamla 1 Line	D/C	22
195	Himatnagar	220KV G'nagar-Jamla 2 Line	D/C	22
196	Himatnagar	220KV Jamla-Kheralu 1 line	D/C	62
197	Himatnagar	220KV Jamla-Kheralu 2 line	D/C	62
198	Himatnagar	220KV Soja-Mehsana-1	S/C	34
199	Himatnagar	220KV Soja-Mehsana-2	S/C	36
200	Himatnagar	220KV Soja-Mitha	D/C	45.8
201	Himatnagar	220KV Soja-Jamla-1	D/C	3.5
202	Himatnagar	220KV Soja-Jamla-2	D/C	3.5
203	Himatnagar	220KV G'nagar-Soja-1	S/C & D/C	16
204	Himatnagar	220KV G'nagar-Soja-2	S/C & D/C	16
205	Himatnagar	220KV Soja-Santhal	D/C	37
206	Himatnagar	220KV Soja-Vijapur-1	D/C	27.5
207	Himatnagar	220KV Soja-Vijapur-2	D/C	27.5
208	Surendranagar	Dhrangadhra-Halvad-1	S/C	27.11



**DETAILS OF EXISTING INTRA STATE TRANSMISSION LINES - 220 kV**

Sl. No.	Name of Circle	Name of Line.	S/C D/C	Length in Kms.
209	Surendranagar	Dhrangadhra-Halwad -2	S/C	27.11
210	Surendranagar	220KV Mansar Bhimsar 1	D/C	142.00
211	Surendranagar	220KV Mansar Bhimsar 2	D/C	142.00
212	Surendranagar	220KV Halvad Mansar line 1	D/C	12.00
213	Surendranagar	220KV Halvad Mansar line 2	D/C	12.00
214	Surendranagar	220KV Halvad-Sartanpar 1	D/C	95.19
215	Surendranagar	220KV Halvad-Sartanpar 2	D/C	95.19
216	Surendranagar	220 KV Rajpar-Dudhrej	D/C	10.00
217	Surendranagar	220 KV Bala - Dudhrej	D/C	14.71
218	Surendranagar	220 KV Bala - Rajpar	D/C	5.35
219	Surendranagar	220 KV Sadla-Gondal	S/C	115.10
220	Surendranagar	220 KV Dhanki-Bala	D/C	20.10
221	Surendranagar	220 KV Adalsar-Bala	D/C	10.85
222	Surendranagar	220 KV Viramgam Neno line no-1	D/C	26.50
223	Surendranagar	220 KV Viramgam-Neno line no- 2	D/C	26.50
224	Surendranagar	220 KV Viramgam Bhat line no-1	D/C	35.20
225	Surendranagar	220 KV Viramgam Bhat line no-2	D/C	35.20
226	Surendranagar	220 KV Viramgam-Dhanki No.1	D/C	30.49
227	Surendranagar	220 KV Viramgam-Dhanki No.2	D/C	30.49
228	Surendranagar	220 KV Dhanki-Adalsar	D/C	9.19
229	Amreli	220K Botad Vartej	S/C	71.00
	Amreli	220KV Botad-Valbhipur Line	S/C	43.4
230	Amreli	220KV Amreli-Dhasa 1	D/C	38.00
231	Amreli	220KV Amreli-Dhasa 2	D/C	38.00
232	Amreli	220 kv SKD-Visavadar	S/C	94.60
233	Amreli	220Kv SKD-Dhokdwa	S/C	65.00
234	Amreli	220Kv SKD-Amreli 1	D/C	45.00
235	Amreli	220Kv SKD-Amreli 2	D/C	45.00
236	Amreli	22KV S'KUNDLA-220KV GPPC 1	D/C	80.2
237	Amreli	22KV S'KUNDLA-220KV GPPC 2	S/C	80.20
238	Amreli	220Kv GPPC-Otha No. 01	D/C	69.2
239	Amreli	220KV GPPC-OTHA-2 LINE	S/C	69.20
240	Amreli	220 kv Otha Sagapara No 1	D/C	47.787
241	Amreli	220 kv Otha Sagapara No 2	D/C	47.787
242	Amreli	220Kv SKD-GPPL	S/C	54.60
243	Amreli	220Kv GPPL-Kovaya	S/C	7.50
244	Amreli	220Kv SKD-Kovaya No 02	S/C	51.10
245	Amreli	220Kv SKD-BECL-Vartej	S/C	150.60
246	Amreli	220Kv Vartej - Sagapara	S/C	38.60
247	Amreli	220Kv SKD-Sagapara	S/C	78.00
248	Amreli	220 KV Sagapara - BECL-1	D/C	41.90
249	Amreli	220 KV Sagapara - BECL-2	D/C	41.90



**DETAILS OF EXISTING INTRA STATE TRANSMISSION LINES - 220 kV**

Sl. No.	Name of Circle	Name of Line.	S/C D/C	Length in Kms.
250	Gondal	220KV Gondal-Kangasiyali	S/C	45.40
251	Gondal	220KV Nyara - Kangasiyali	S/C	33.50
252	Gondal	220KV Nyara - Tebhada line -1	D/C	93.00
253	Gondal	220KV Nyara - Tebhada line -2	D/C	93.00
254	Gondal	220KV Jetpur-Gondal	S/C	26.00
255	Gondal	220KV Jetpur-Rajkot	D/C	72.00
256	Gondal	220KV Jetpur-Visavadar	S/C	54.50
257	Gondal	220kV Jetpur Shapur	S/C	46.50
258	Gondal	220KV Jetpur-Sardargadh	S/C	65.00
259	Gondal	220KV Jetpur-Ranavav	S/C	104.00
260	Gondal	220KV Jetpur-Motipaneli	S/C	74.00
261	Gondal	220KV Jetpur-Jamnagar-I	D/C	92.00
262	Gondal	220KV Jetpur-Jamnagar-II	D/C	92.00
263	Gondal	220 KV Hadala-Morbi	D/C	59.46
264	Gondal	220KV Hadala-Nyara-1	D/C	12.11
265	Gondal	220KV Hadala-Nyara-2	D/C	12.11
266	Gondal	220KV Hadala Sartanpar Line no. 1	D/C	63.83
267	Gondal	220KV Hadala Sartanpar Line no. 2	D/C	63.83
268	Gondal	220KV Morbi - Lalpar	S/C	7.24
269	Gondal	220 kV Morbi - Bhimasar	S/C	113.00
270	Gondal	220KV Sartanpar Bhimasar	S/C	125.61
271	Gondal	220KV Lalpar Sartanpar	S/C	8.81
272	Junagadh	220KV Motipaneli-Ranavav	S/C	64.00
273	Junagadh	220KV Sardargadh-Keshod	S/C	69.00
274	Junagadh	220KV Keshod Timbadi	S/C	66.00
275	Junagadh	220KV Motipaneli-sadodar-1	D/C	26.82
276	Junagadh	220KV Motipaneli-sadodar-2	D/C	26.82
277	Junagadh	220KV Motipaneli-Sardargadh-1	D/C	35.52
278	Junagadh	220KV Motipaneli-Sardargadh-2	D/C	35.52
279	Junagadh	220KV Dhokadva-Timbdi	S/C	63.00
280	Junagadh	220kV Shapur-Keshod	S/C	29.50
281	Jamnagar	220KV Jamnagar-Essar-I	D/C	47.50
282	Jamnagar	220KV Jamnagar-Essar-II	D/C	47.50
283	Jamnagar	220 KV Jam-RPL	D/C+ S/C	37
284	Anjar	220KV Nakhatrana - Akrimota No.1	D/C	99
285	Anjar	220KV Jamanvada - Akrimota No.2	D/C	136.27
286	Anjar	220kV Nakhatrana-Jamanvada Line	D/C	69.99
287	Anjar	220KV Pandhro - Nakhatrana No. 1	D/C	75
288	Anjar	220KV Pandhro - Nakhatrana No. 2	D/C	75
289	Anjar	220 KV Suthari-Sindhodi line	S/C	13.837
290	Anjar	220 KV Akri-Panadhro line No.1	S/C	27.5

**DETAILS OF EXISTING INTRA STATE TRANSMISSION LINES - 220 kV**

Sl. No.	Name of Circle	Name of Line.	S/C D/C	Length in Kms.
291	Anjar	220 KV kukma- Panadhro No.1	D/C	124.5
292	Anjar	220 KV kukma- Panadhro No.2	D/C	124.5
293	Anjar	220kv Nakhatrana- Varsana- no.1	D/C	107
294	Anjar	220kv Nakhatrana- Varsana- no.2	D/C	107
295	Anjar	220KV Nakhatrana - Nanikhakhar-1	D/C	59
296	Anjar	220KV Nakhatrana - Nanikhakhar-2	D/C	59
297	Anjar	220 KV Adani- Nani khakhar-1	D/C	16.25
298	Anjar	220 KV Adani- Nani khakhar-2	D/C	16.25
299	Anjar	220 KV Suthari-Nani-Khakhar line No.1	D/C	78.612
300	Anjar	220 KV Suthari-Nani-Khakhar line No.2	D/C	78.612
301	Anjar	220 kv Sindhodi - Nani Khakhar No.1	D/C	82.49
302	Anjar	220 kv Sindhodi - Nani Khakhar No.2	D/C	82.49
303	Anjar	220 kv CGPL - Nani Khakhar	D/C	15.467
304	Anjar	220KV Nanikhakhar -Mokha	D/C	47.598
305	Anjar	220KV Tappar -Mokha	D/C	57.598
306	Anjar	220 KV Tappar-Khakhar	D/C	83.7
307	Anjar	220KV Welspun -Anjar	D/C	15.81
308	Anjar	220KV Shivilakha-welspun	D/C	73.238
309	Anjar	220kv Shivilakha Anjar line	D/C	75
310	Anjar	220 KV Tappar-APL No.1	D/C	82.16
311	Anjar	220 KV Tappar-APL No.2	D/C	82.16
312	Anjar	220KV Tapper-Vondh line	D/C	30.7
313	Anjar	220KV Tapper-Hadala line	D/C	165.39
314	Anjar	220KV Anjar - Kukma -1	D/C	27.9
315	Anjar	220KV Anjar - Kukma-2	D/C	27.9
316	Anjar	220KV Tappar - Varsana line no:3	D/C	3.876
317	Anjar	220KV Tappar - Varsana line no:4	D/C	3.876
318	Anjar	220KV Mokha - OPG line	S/C	13.987
319	Anjar	220 KV Shivilakha-Tappar No.1	D/C	55
320	Anjar	220 KV Shivilakha-Tappar No.2	D/C	55
321	Anjar	220 KV Shivilakha-Morbi No.1	D/C	73
322	Anjar	220 KV Shivilakha-Morbi No.2	D/C	73
323	Anjar	220kv Shivilakha Vestas line no.1	D/C	21.665
324	Anjar	220kv Shivilakha Vestas line no.2	D/C	21.665
325	Anjar	220KV Vondh-Morbi	D/C	78.8
326	Anjar	220KV Shivilakha - PS-2 (Nani Hamirpar)	D/C	63
327	Anjar	220KV PS-2 (Nani Hamirpar)- PS1 (Manjuvas)-1	D/C	11

**DETAILS OF EXISTING INTRA STATE TRANSMISSION LINES - 220 kV**

Sl. No.	Name of Circle	Name of Line.	S/C D/C	Length in Kms.
328	Anjar	220KV PS-2 (Nani Hamirpar)- PS1 (Manjuvas)-2	D/C	11
329	Chorania	220KV Chorania- Sadla	S/C	43
330	Chorania	220KV Chorania- Limbadi -1	D/C	3.00
331	Chorania	220KV Chorania- Limbadi -2	D/C	3.00
332	Chorania	220KV Chorania - Viramgam	S/C	71.00
333	Chorania	220KV Chorania -Dhrangdhra -1	D/C	72.00
334	Chorania	220KV Chorania -Dhrangdhra -2	D/C	72.00
335	Chorania	220KV Chorania - Bala Line - 1	D/C	29.50
336	Chorania	220KV Chorania - Bala Line - 2	D/C	29.50

**DETAILS OF TRANSMISSION LINES - 132 kV**

Sl. No.	Name of Circle	Name of Line.	S/C D/C	Length in Kms.
1	Navsari	132kv Navsari - Popda No. 1.	S/C	17
2	Navsari	132kv Popda - Bhestan No. 1.	S/C	11.68
3	Navsari	132kv Navsari-Bhestan-2.	D/C	27
4	Navsari	132kv Navsari-Atul.	S/C	48.12
5	Navsari	132kv Atul-Railway-1.	D/C	4.4
6	Navsari	132kv Atul-Railway-2.	D/C	4.4
7	Navsari	132kv Bhestan-Railway-1.	D/C	2.4
8	Navsari	132kv Bhestan-Railway-2.	D/C	2.4
9	Bharuch	Haldarwa-Karjan	S/C	35.36
10	Bharuch	Achhalia-Ankleshwar -1	D/C	35
11	Bharuch	Achhalia-Ankleshwar -2	D/C	35
12	Bharuch	Achhalia-GNFC-1	D/C	36
13	Bharuch	Achhalia-GNFC-2	D/C	36
14	Bharuch	Achhalia-Valia -1	D/C	26
15	Bharuch	Achhalia-Valia -2	D/C	26
16	Bharuch	Achhalia-RPL 1	D/C	7.2
17	Bharuch	Achhalia-RPL 2	D/C	7.2
18	Bharuch	Valia-Guj. Gardian -1	D/C	10
19	Bharuch	Valia-Guj. Gardian -2	D/C	10
20	Bharuch	Haldarwa- Bharuch	S/C	6.94
21	Bharuch	Bharuch- Railway - 1	D/C	1.51
22	Bharuch	Bharuch- Railway - 2	D/C	1.51
23	Bharuch	Ankleshwar - Bharuch -1	D/C	8.94
24	Bharuch	Ankleshwar - Bharuch -2	D/C	8.94
25	Jambuva	Jambuva-Gotri-1	S/C	12.86
26	Jambuva	Jambuva-Gotri-2	S/C	12.86



### DETAILS OF TRANSMISSION LINES - 132 kV

Sl. No.	Name of Circle	Name of Line.	S/C D/C	Length in Kms.
27	Jambuva	Jambuva-Karjan	S/C	20.76
28	Jambuva	Jambuva-Tilakwada	S/C	52.50
29	Jambuva	Jambuva-Railway-1	D/C	2.20
30	Jambuva	Jambuva-Railway-2	D/C	2.20
31	Jambuva	Jambuva-ModernPetro-1	D/C	12.50
32	Jambuva	Jambuva-ModernPetro-2	D/C	12.50
33	Jambuva	Gotri-Fertilizernagar-1	D/C	10.23
34	Jambuva	Gotri-Fertilizernagar-2	D/C	10.23
35	Jambuva	Gotri-Dhuvaran-1	D/C	47.50
36	Jambuva	Gotri-Dhuvaran-2	D/C	47.50
37	Jambuva	Karjan-Inox	D/C	0.50
38	Jambuva	Karjan-JCT	S/C	6.50
39	Jambuva	Karjan-Haldarwa	S/C	22.20
40	Jambuva	Godhra-W.Railway-1	D/C	7.00
41	Jambuva	Godhra-W.Railway-2	D/C	7.00
42	Jambuva	Dahod-W.Railway-1	D/C	2.85
43	Jambuva	Dahod-W.Railway-2	D/C	2.85
44	Jambuva	Godhra-C'Udepur(Vasedi)	S/C	76.60
45	Jambuva	Godhra-Dahod	S/C	65.43
46	Jambuva	Godhra-Limkheda	S/C	48.00
47	Jambuva	Limkheda-Dahod	S/C	37.00
48	Jambuva	Manjusar-Nirma-1	D/C	5.47
49	Jambuva	Manjusar-Nirma-2	D/C	5.47
50	Jambuva	F'nagar-J'nagar-1	S/C	7.10
51	Jambuva	F'nagar-J'nagar-2	S/C	7.10
52	Jambuva	Nandesari-GIPCL-1	S/C	2.14
53	Jambuva	Nandesari-GIPCL-2	S/C	2.14
54	Jambuva	Jawaharnagar-GIPCL-3	S/C	9.23
55	Jambuva	Jawaharnagar-GIPCL-4	S/C	9.23
56	Jambuva	Jawaharnagar-Jambuva-1	S/C	37.00
57	Jambuva	Jawaharnagar-Jambuva-2	S/C	37.00
58	Jambuva	Fertilizer-GSFC-1	D/C	0.01
59	Jambuva	Fertilizer-GSFC-2	D/C	0.01
60	Jambuva	Manjusar-ERDA	S/C	1.63
61	Jambuva	Asoj-Nandesari-1	D/C	19.76
62	Jambuva	Asoj-Nandesari-2	D/C	19.76
63	Jambuva	Asoj-Fertiliser 1	D/C	12.00
64	Jambuva	Asoj-Fertiliser 2	D/C	12.00
65	Jambuva	Asoj Manjusar 1	D/C	10.00
66	Jambuva	Asoj Manjusar 2	D/C	10.00
67	Jambuva	Asoj Railway 1	D/C	14.00
68	Jambuva	Asoj Railway 2	D/C	14.00

**DETAILS OF TRANSMISSION LINES - 132 kV**

Sl. No.	Name of Circle	Name of Line.	S/C D/C	Length in Kms.
69	Nadiad	Chiloda-G'nagar-1	D/C	9.43
70	Nadiad	Chiloda-G'nagar-2	D/C	9.43
71	Nadiad	Chiloda-Talod	S/C	26.92
72	Nadiad	Ranasan-Chiloda	S/C	15.33
73	Nadiad	Ranasan-PRL	S/C	5.8
74	Nadiad	Ranasan-S'mati-1	D/C	13.12
75	Nadiad	Ranasan-S'mati-2	D/C	13.12
76	Nadiad	Ranasan-Talod	S/C	37.56
77	Nadiad	Ranasan-Vatva-1	D/C	26.56
78	Nadiad	Ranasan-Vatva-2	D/C	26.56
79	Nadiad	Ranasan-Vijapur	S/C	93.86
80	Nadiad	Sabarmati-AECo.1	D/C	0.2
81	Nadiad	Sabarmati-AECo.2	D/C	0.2
82	Nadiad	Dhuvaran-Undel	D/C	14.5
83	Nadiad	Undel-Vatva-1	D/C	95.5
84	Nadiad	Dhuvaran-Vatva-2	D/C	81.95
85	Nadiad	Vatva-Mehmedabad	S/C	23.56
86	Nadiad	Mehmedabad W Rly. I	D/C	2.14
87	Nadiad	Mehmedabad W Rly.-II	D/C	2.14
88	Nadiad	Nadiad-Mehmedabad	S/C	11.5
89	Nadiad	Karamsad-Nadiad	S/C	27.15
90	Nadiad	Karamsad-Ode	S/C	36.00
91	Nadiad	Karamsad-Dhuvaran-1[Gotri line-2]	S/C	41.20
92	Nadiad	Karamsad-Dhuvaran-2[Gotri line-1]	S/C	41.2
93	Nadiad	Ode-W'Rly-1	D/C	17.3
94	Nadiad	Ode-W'Rly-2	D/C	17.3
95	Mehsana	Mehsana-Sidhpur-1	D/C	48.00
96	Mehsana	Mehsana-Sidhpur-2	D/C	35.00
97	Mehsana	Mehsana-Patan-1	D/C	35.00
98	Mehsana	Mehsana-Patan-2	D/C	35.00
99	Mehsana	Mehsana-Visnagar	S/C	20.50
100	Mehsana	Sidhpur-Deesa	S/C	42.00
101	Himatnagar	132KV Agiyol-Idar	S/C & D/C	32.00
102	Himatnagar	132KV Agiyol-Talod	S/C & D/C	32.00
103	Himatnagar	132KV Idar-Vijapur	S/C	45.00
104	Himatnagar	132KV Visnagar-Vijapur	S/C	28.00
105	Surendranagar	Dhuvaran (CCPP)-Limbdi-1	D/C	138.00
106	Surendranagar	Dhuvaran (CCPP)-Limbdi--2	D/C	138.00
107	Surendranagar	Limbdi-Wankaner	D/C	106.00
108	Surendranagar	Sitagadh-Wankaner	S/C	42.00
109	Surendranagar	CCPP-Dhandhuka-1	D/C	95.60
110	Surendranagar	CCPP-Dhandhuka-2	D/C	95.60



### DETAILS OF TRANSMISSION LINES - 132 kV

Sl. No.	Name of Circle	Name of Line.	S/C D/C	Length in Kms.
111	Surendranagar	Dhandhuka-Paliyad	S/C	86.00
112	Surendranagar	Dhandhuka-Vikram	S/C	161.00
113	Surendranagar	Dhandhuka-Barwala	S/C	78.00
114	Surendranagar	Dhandhuka-Botad	S/C	86.00
115	Surendranagar	Vakhatpar - Sitagadh	S/C	15.94
116	Surendranagar	Limbdi-Vakhatpar	S/C	50.1
117	Amreli	Paliyad-Jasdan	S/C	55.80
118	Amreli	Paliyad-Vikram	S/C	132.80
119	Amreli	132KV Barwala-Vallabhipur	S/C	38.50
120	Amreli	132 KV Botad-Paliyad Line	S/C	25.00
121	Gondal	132KV Gondal-Jasdan	S/C	50
122	Gondal	132KV Gondal-Vikram	S/C	39
123	Gondal	132KV Gondal-Bhayavadar	S/C	84
124	Gondal	132KV Gondal-Haripur	S/C	100
125	Gondal	132KV Gondal-Dhoraji	S/C	58
126	Gondal	132kV Jasdan - Theoliya Line-01	D/C	7.24
127	Gondal	132kV Jasdan - Theoliya Line-02	D/C	7.24
128	Gondal	132KV Vikram-Nyara	S/C	33
129	Gondal	132KV Vikram-Vajdi	S/C	18
130	Gondal	132KV Nyara-Vajdi	S/C	15
131	Gondal	132KV Wankaner - Dhrol	S/C	68
132	Gondal	132KV Wankaner - Varshamedi - 1	D/C	65
133	Gondal	132KV Wankaner - Varshamedi - 2	D/C	65
134	Gondal	132kv Sikka - Dhrol line	D/C	71
135	Gondal	132kv Dhrol Sartanpar line	D/C	98.74
136	Gondal	132kv Sartanpar-Lalpar	S/C	10.542
137	Gondal	132kv Wankaner-Sartanpar line	S/C	23.272
138	Junagadh	Bhayavadar-Ranavav	S/C	90.00
139	Junagadh	Haripur-Talala	S/C	11.00
140	Junagadh	Talala - Junagadh	S/C	52.24
141	Junagadh	Timbdi-Talala No.1	D/C	22.00
142	Junagadh	Timbdi-Talala No.2	D/C	22.00
143	Junagadh	Timbdi-Ambuja No.1	D/C	12.00
144	Junagadh	Timbdi-Ambuja No.2	D/C	12.00
145	Junagadh	Timbdi-CCGL	S/C	10.00
146	Junagadh	Shapur - Dhoraji	S/C	31.8
147	Junagadh	Shapur - Junagadh	S/C	35.5
148	Jamnagar	132KV Jamnagar-Wankaner	S/C	97
149	Jamnagar	132KV Jamnagar-Naghedi-I	D/C	12
150	Jamnagar	132KV Jamnagar-Naghedi-II	D/C	12
151	Jamnagar	132KV Sikka-Jamnagar	D/C	27
152	Jamnagar	132KV RPL-Sikka	D/C+ S/C	21

**DETAILS OF TRANSMISSION LINES - 132 kV**

Sl. No.	Name of Circle	Name of Line.	S/C D/C	Length in Kms.
153	Jamnagar	132KV Jam-Khambhalia	S/C	64
154	Jamnagar	132KV Sikka-Naghedi	S/C	30
155	Jamnagar	132KV Sikka-Bhatia	S/C	78.6
156	Jamnagar	132KV Khambhalia-Bhatia-1	S/C	46.34
157	Jamnagar	132KV Bhatia-Enercon-1	S/C	8.12
158	Jamnagar	132KV Khambhalia-Bhatia-2	S/C	46.34
159	Jamnagar	132KV Bhatia-Enercon-2	D/C	8.12
160	Jamnagar	132KV Bhatia-Bhatia-1	D/C	1.16
161	Jamnagar	132KV Bhatia-Bhatia-2	D/C	1.16
162	Jamnagar	132KV SC & CI - I	D/C	1.00
163	Jamnagar	132KV SC & CI - II	D/C	1.00
164	Jamnagar	132KV Ranavav-Bhomiyavadar	S/C	35.40
165	Jamnagar	132KV Bhomiyavadar-Sikka	S/C	76.54
166	Jamnagar	132KV Gunda(suzlon)-Bhomiyavadar line-1	D/C	11.67
167	Jamnagar	132KV Gunda(suzlon)-Bhomiyavadar line-2	D/C	11.67
168	Anjar	132 Kv Samkhiyali - Shikarpur line-1	D/C	22.00
169	Anjar	132 Kv Samkhiyali - Shikarpur line-2	D/C	22.00



**ONGOING/ PLANNED INTRA STATE TRNSMISSION SYSTEM**

<b>A. 400/220 KV GSS NEW &amp; UNDER AUGMENTATION (Transformation Capacity in MVA )</b>							
<b>i) Capacity addition (MVA) due to augmentation of existing substations</b>							
<b>400/220 KV</b>	<b>Existing Capacity</b>	<b>Augmantation of existing Substations</b>					<b>Total</b>
		<b>FY 2015-16</b>	<b>FY 2016-17</b>	<b>FY 2017-18</b>	<b>FY 2018-19</b>	<b>13th FYP</b>	
Asoj	1315	500					1815
Kosamba	945	315					1260
Soja	1000	500		500			2000
Kasor	630	315				500	1445
Chorania	1000		500		500		2000
Amreli	945		315				1260
Vadavi	945			315			1260
Varsana	630	315				500	1445
Zerda	945					500	1445
Halvad	630					1000	1630
Jetpur	1445						1445
Hadala	945				500		1445
<b>Total :</b>	<b>11375</b>	<b>1945</b>	<b>815</b>	<b>815</b>	<b>1000</b>	<b>2500</b>	<b>18450</b>
<b>ii) Capacity addition (MVA) due to creation of new substations</b>							
<b>400/220 KV</b>		<b>FY 2015-16</b>	<b>FY 2016-17</b>	<b>FY 2017-18</b>	<b>FY 2018-19</b>	<b>13th FYP</b>	<b>Total</b>
Charanka		630					630
Chharodi		1500					1500
Sankhari			630				630
Kalavad				1000			1000
Vav			1500				1500
Shapar					1000		1000
Fedra				1000			1000
Bhogat						1000	1000
Achhalia						1000	1000
Bhachunda					1000		1000
Keshod						1000	1000
Pipavav						1000	1000
Chhara						1000	1000
Prantij						1000	1000
Chikhli						1000	1000
<b>Total :</b>		<b>2130</b>	<b>2130</b>	<b>2000</b>	<b>2000</b>	<b>7000</b>	<b>15260</b>

**ONGOING / PLANNED INTRA STATE TRANSMISSION SYSTEM**

B 220/132 & 220/66 KV GSS NEW (Transformation capacity in MVA)						
i) Capacity addition (MVA) due to creation of new substations						
2015-16	220/66 KV	220/132 KV		2016-17	220/66 KV	220/132 KV
Atul	320			Barejadi	320	
Charadava	320			Wankaner	480	300
Modasa	320			Sankhari	320	300
Mogar	320			Bhachunda	320	
Chharodi	320			Santej	320	
Total...	1600	0		Total...	1760	600
2017-18	220/66 KV	220/132 KV		2018-19	220/66 KV	220/132 KV
Gotri	480	300		Zalod	320	300
Babara	320	300		Gariyadhar	320	
Bagodara	320			Songadh (Virpor)	320	
Fedra	320			Shapar	320	
Kalavad	320			Bechraji	320	
Total...	1760	600		Total...	1600	300
13th FYP	220/66 KV	220/132 KV		2015-16	132/66 KV	132/11 KV
Vesu	480			Padavala	100	
Halol	320			Zoz	100	
Balasinor	320			Mota Dahisara	100	
Metoda	320			Bhavnath		50
Rajkot-II	320			Total...	300	50
Bagasara	320			2016-17	132/66 KV	132/11 KV
Dhanaj	320			Tankara	100	
Gondal-II	320			Vaghasiya	100	
Umargam	320			Total...	200	0
Bil	320			13th FYP	132/66 KV	132/11 KV
Khajod	320			Vakhatpar		50
Olpad	320			Total...	0	50
Moti Gop	320					
Keshod	320					
Pipavav	320					
Chhara	320					
Prantij	320					
Maglana	320					
Makansar	320					
Bhogat	320					
Khambhalia	320					
Veraval	320					
Rajula	320					
Kawat		300				
Talaja	320					
Total...	7840	300				
	220/66 KV	220/132 KV			132/66 KV	132/11 KV
Upto - 2019	6720	1500		Upto - 2019	500	50
Upto - 2022	7840	300		Upto - 2022	0	50
	14560	1800			500	100

**ONGOING/ PLANNED INTRA STATE TRANSMISSION SYSTEM**

<b>C) Capacity addition (MVA) due to augmentation of existing substations (FY 2015-16-17-18-19)</b>				
<b>Sub-station</b>	<b>220/66 KV</b>	<b>220/132 KV</b>		
Gondal		100		
Ranavav		100		
Limbdi		50		
Charanka	100			
Wagra	50			
Kapadwanj	100			
Agiyol	100			
Bhutiya	100			
Hadala	160			
Moti Paneli	100			
Shapur	100			
Visavadar	100			
Viramgam	100			
Amreli	100			
Tappar	160			
Kukma	100			
Nanikhakhar	100			
Panandhro	50			
Gavasad	100			
Sankhari	50			
Thavar	110			
Timbdi	100			
Otha	160			
Savarkundla	120			
Nakhatrana	160			
Sachin	120			
Karamsad	270			
Asoj	160			
Jambuva	160			
Zerda	160			
Palanpur	160			
Kim	160			
Tharad	160			
Asoj	60			
Asoj		150		
Jambuva	60			
Kheralu	220			
Bhat	220			
Ukai	200			
Ichchhpor	160			
Mota	110			
Botad	160			
Botad		150		
Ranasan		100		
Visavadar		300		
Zagadia	100			

**ONGOING/ PLANNED INTRA STATE TRANSMISSION SYSTEM**

<b>C) Capacity addition (MVA) due to augmentation of existing substations (FY 2015-16-17-18-19)</b>				
<b>Sub-station</b>	<b>220/66 KV</b>	<b>220/132 KV</b>		
Kangasiyali	180			
Shivlakha	100			
Deodar	160			
Vartej	220			
Keshod	160			
Charanka	300			
<b>Total...</b>	<b>6080</b>	<b>950</b>		
	<b>132/66 KV</b>			
Nadiad	100			
Ranasan	100			
Gondal	100			
Paliyad	150			
Bhayavadar	90			
Dhandhuka	60			
Vikram	100			
Manjusar	100			
Barvala	50			
<b>Total...</b>	<b>850</b>			
<b>Tentative Augmentation Plan</b>				
<b>Year / KV</b>	<b>220/132 KV</b>	<b>220/66 KV</b>	<b>132/66 KV</b>	<b>Total</b>
<b>2015-16</b>	250	1580	200	<b>2030</b>
<b>2016-17</b>	300	1500	250	<b>2050</b>
<b>2017-18</b>	300	1500	200	<b>2000</b>
<b>2018-19</b>	100	1500	200	<b>1800</b>
<b>Total..</b>	<b>950</b>	<b>6080</b>	<b>850</b>	<b>7880</b>

<b>(D) Summary of year-wise MVA capacity addition of GSS (400/220 KV, 220/132 KV, 220/66 KV, 132/66 KV, 132/11 KV)</b>						
<b>Year / KV</b>	<b>400/220 KV</b>	<b>220/132 KV</b>	<b>220/66 KV</b>	<b>132/66 KV</b>	<b>132/11 KV</b>	<b>Total</b>
<b>2015-16</b>	4075	250	3180	500	50	<b>8055</b>
<b>2016-17</b>	2945	900	3260	450	0	<b>7555</b>
<b>2017-18</b>	2815	900	3260	200	0	<b>7175</b>
<b>2018-19</b>	3000	400	3100	200	0	<b>6700</b>
<b>13th FYP</b>	9500	300	7840	0	50	<b>17690</b>
<b>Total...</b>	<b>22335</b>	<b>2750</b>	<b>20640</b>	<b>1350</b>	<b>100</b>	<b>47175</b>

**ANNEXURE -V**

**INTRA STATE YEAR WISE INVESTMENT PLAN (FOR FY 2015-16 to FY 2018-19)**

Amount in Rs Lacs					
Sl. No	Particulars	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19
	<b>New Projects</b>				
1	400 KV Sub Station	32795	14608	23702	18019
2	400 KV Lines	68824	59414	64119	45104
3	220 KV Sub Station	24701	18814	31758	28018
4	220 KV Lines	28454	21831	25143	27616
5	132 KV Sub Station	3294	2237	2766	1120
6	132 KV Lines	1520	1452	1486	1232
7	66 KV Sub Station	25393	42761	34077	40698
8	66 KV Lines	19671	33818	28345	32525
9	Bus Reactor	0	1500	1500	1500
10	Capacitor Bank	0	3200	3200	3200
11	SVC	0	194	194	194
	<b>Total</b>	<b>204652</b>	<b>199829</b>	<b>216288</b>	<b>199226</b>
	<b>R&amp;M</b>				
1	Renovation and Modernization	17360	10000	15000	15000
2	Augmentation of Sub-station/ Lines	13560	41880	37720	50000
	<b>Total</b>	<b>30920</b>	<b>51880</b>	<b>52720</b>	<b>65000</b>
1	OPGW	2901	1451	2175.78	3175
	<b>Total</b>	<b>238473</b>	<b>253159</b>	<b>271183</b>	<b>267401</b>
	<b>(in Rs crores)</b>	<b>2385</b>	<b>2532</b>	<b>2712</b>	<b>2674</b>
1	Total Fund Requirement till FY 2018-19	2385	2532	2712	2674
2	Fund raise from Green Energy Corridor Project (Rs. 1962.12 Crore upto 2020)	0	392	589	589
2.a	NCEF Grant (40%)	0	157	177	235
2.b	Loan from KfW (40%)	0	157	235	235
2.c	Equity (20%)	0	78	118	118
3	Fund requirement Excluding GEC	2385	2139	2123	2085
3.a	Debt: 80% of the total Fund Requirement from Nationalized bank & ADB	1908	1711	1699	1668
3.b	Equity: 20% of total Fund Requirement (Including TASP & Sagarkhedu share equity)	477	428	425	417

**TRANSFORMER METERING STATUS**

Sl. No.	Particulars	Transformers as on March-15			Planning				
		Total	Metered	Unmetered	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20
1	DGVCL	94205	64237	30586	12000	12000	6586	6100	
2	MGVCL	101074	99267	1807	1807				
3	PGVCL	486829	*335181	151648	29000	29500	31000	31000	31148
4	UGVCL	199268	147320	51948	5500	11500	11600	11800	11548
	<b>Total</b>	<b>881376</b>	<b>310824</b>	<b>235989</b>	<b>48307</b>	<b>53000</b>	<b>49186</b>	<b>48900</b>	<b>42696</b>

	Category	Total	Metered	Unmetered
<b>GUVNL</b>	RESIDENTIAL	10267164	10267164	0
	COMMERCIAL	127991	127991	0
	INDUSTRIAL LT	1497713	1497713	0
	PUBLIC LIGHTING	30388	30388	0
	WATER WORKS	66581	66581	0
	AGRICULTURE	1184303	698829	485474
	INDUSTRIAL HT	12032	12032	0
	RAILWAYS	13	13	0
		0	0	0
	<b>TOTAL</b>	<b>13186185</b>	<b>41943493</b>	<b>485474</b>

**ANNEXURE-VII**

**THE CIRCLE WISE DETAILS OF PROGRESS OF R-APDRP**

DGVCL	1	2	3	4	5	6	7	8										
Town	Surat	Vyara	Valsad	Vapi	Bilimora	Bharuch	Jambusar	Rajpipla	DGVCL Total									
Sanction Amount (Cr)	142.18	2.62	17.04	13.1	4.09	15.47	3.2	2.86	200.56									
Booked Amount (Cr)	109.53	2.59	14.91	13.91	3.94	16.41	2.88	2.39	166.56									
% Achv.	0.77	0.99	0.88	1.06	0.96	1.06	0.9	0.84	0.83									
MGVCL	1	2	3	4	5	6	7	8	9	10	11	12						
Name of Circle	ANAND					BARODA (O&M)		GODHRA					MGVCL Total					
Name of Town	Balasino	Chaklasi	Mehmdabad	Borsad	Kapadvanj	Padra	Dabhoi	Godhra	Halol	Lunawada	Anand	Dahod	Total					
Sanction Amount (Cr)	3.57	1.89	4.25	4.61	6.51	5.44	4.15	37.6	5.22	2.97	29.22	13.95	177.86					
Booked Amount (Cr)	3.57	1.89	4.25	6.51	4.61	5.44	4.15	25.6	5.22	2.97			64.21					
% Achv.	1	1	1	1	1	1	1	68.09	1	1			84.25					
PGVCL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Circle	AMR	AMR	AMR	AMR	AMR	AMR	BHJ	BHJ	BHJ	BHJ	BTD	BVN	BVN	BVN	BVN	BVN	JMN	JMN
Name of Town	Amreli	Una	S'kundla	Kodinar	Bagasara	Rajula	Bhuj	G'dham	Anjar	Mandvi	Botad	Bhavna gar	Mahuva	Palitana	Gariadhar	Siho r	Jamnagar	K'BHALIA
Sanction Amount (Cr)	8.9	4.15	4.38	4.87	2.71	2.51	10.41	16.27	6.39	4.62	8.61	62.02	5.81	7.67	4.38	3.57	145.31	5.24
Booked Amount (Cr)	7.11	3.62	3.96	4.55	2.31	2.3	8.41	12.4	5.56	4.26	6.78	32.01	5.6	5.57	3.72	3.5	60.36	4.79
% Achv.	0.8	0.87	0.9	0.93	0.85	0.92	0.81	0.76	0.87	0.92	0.79	0.52	0.96	0.73	0.85	0.98	0.42	0.91





Sl. No.	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	PGVCL TOTAL
Circle	JMN	JND	JND	MRB	MRB	PBR	PBR	RCC	RRC	RRC	RRC	RRC	RRC	SNR	SNR	SNR	SNR	
Name of Town	Dwarka	Junagadh	Veraval	Morvi	Wankaner	Keshod	Mangrol	Rajkot	Jetpur	Upleta	Gondal	Dhoraji	Jasdan	Wadhwan	D'dhara	Thangadh	Limbdi	
Sanction Amount (Cr)	1.81	37.84	40.33	16.76	5.87	3.43	1.88	156.19	6.86	3.95	8.22	5.53	7.8	31.35	8.78	7.34	4.9	656.69
Booked Amount (Cr)	1.68	31.33	30.49	14.69	4.76	3.17	1.75	67.96	5.93	3.34	6.82	4.28	3.01	19.4	6.54	5.54	3.83	391.32
% Achv.	0.93	0.83	0.76	0.88	0.81	0.92	0.93	0.44	0.87	0.85	0.83	0.77	0.39	0.62	0.75	0.75	0.78	0.6
UGVCL	1	2	3	4	5	6	7											
Town	Bavla	Viramgam	Sanand	Dehgam T	Kalol	Radhanpur	Ahmedabad Peri	Total										
Sanction Amount	4.04	7.69	2.68	1.84	6.36	2.01	106.05	89.12										
Booked Amount	3.88	6.42	2.68	1.78	6.38	2.03		23.17										
% Achv.	0.96	0.83	1	0.97	1	1.01		0.94										

**ANNEXURE-VIIA**

**DISCOM WISE PROGRESS OF R-APDRP-A and R-APDRP-B**

DISCOM	Scheme	No. of Towns Sanctioned	Sanctioned Amount Rs. in Crore	% Share		Total		
				Central	State Govt./ DISCOM	No. of Towns Completed	Amount Released	Amount Utilised
							Rs. in Crore	Rs. in Crore
DGVCL	R_APDRP Part-A	11	30.81	100.00	0.00	11.00	17.96	18.50
	R_APDRP Part-B	8	200.56	25.00	75.00	6.00	140.70	166.56
	SCADA Part-A	1	14.84	100.00	0.00		4.56	1.09
MGVCL	R_APDRP Part-A	17	89.49	100.00	0.00	17.00	55.03	48.75
	R_APDRP Part-B	12	177.86	25.00	75.00	10.00	79.20	68.21
	SCADA Part-A	1	26.18	100.00	0.00		8.04	2.11
PGVCL	R_APDRP Part-A	36	75.11	100.00	0.00	36.00	60.35	58.84
	R_APDRP Part-B	35	656.36	25.00	75.00	32.00	323.23	391.32
	SCADA Part-A	3	63.67	100.00	0.00		19.55	4.11
UGVCL	R_APDRP Part-A	20	35.31	100.00	0.00	20.00	21.18	23.44
	R_APDRP Part-B	7	89.12	25.00	75.00	6.00	3.69	23.17
	SCADA Part-A	1	33.82	100.00	0.00		10.38	2.01
<b>Total</b>	R_APDRP Part-A	84	230.72	100.00	0.00	84	154.52	149.53
	R_APDRP Part-B	62	1123.90	25.00	75.00	54	546.82	649.26
	SCADA Part-A	6	138.51	100.00	0.00	0	42.52	9.32
<b>Total</b>							<b>743.86</b>	<b>808.11</b>

R-APDRP Part-A						
Particulars		DGVCL	MGVCL	PGVCL	UGVCL	Total
Town		11	17	36	20	84
GIS Consumer Survey	No. (Lakhs)	8.54	8.9	14.73	6.16	38.04
	% Completed	100%	100%	100%	100%	100%
GIS Asset Mapping	Total No. of Fdrs	122	260	565	226	1173
	% Completed	100%	100%	100%	100%	100%
Meter & Modem Installation Progress	Total No. of Meter & Modems	7793	7025	20860	9422	50178
	% Completed	100%	100%	100%	100%	100%
Integrated towns		11	17	36	20	84
Go-live Towns		11	17	36	20	84
% Data availability in MDAS		66%	94%	73%	62%	75%

R-APDRP Part-B						
Sl. No.	Particulars	DGVCL	MGVCL	PGVCL	UGVC L	Total
1	Town	8	12	35	7	62
2	Population	3372467	827184	5338480	298668	9836799
3	Consumers	600386	240430	1418943	91377	23511436
4	Sanctioned DPR Cost (Crores)	200.56	177.86	656.66	89.12	1124.2
5	Amount arranged by PFC (25%)	50.14	44.465	164.165	22.28	281.05
6	1st tranche received from PFC (Crores) (15%)	30.08	26.68	99.4	3.08	159.24
7	Amount received from BoB (Crores)	110.62	52.52	223.83	0	386.97
8	Amount Utilized (Crores)	166.56	68.21	391.32	23.17	649.26
9	Completed Town	6	10	32	6	54
10	% Utilization w.r.t. sanctioned cost	83%	38%	60%	26%	58%

**ANNEXURE- VIII**

**DISTRICT WISE FINANCIAL STATUS OF CLOSURE OF RGGVY**

Name of Dist	Project Sanctioned Cost (Revised) Rs. In lacs	Amount Released Rs. In lacs				Expenditure Amount Rs. In lacs	During Year 2013-14	
		Loan Amt.	Subsidy Amt.	Interest	Total		Amount Released Rs. In lacs	Expenditure Amount Rs. In lacs
Bharuch	1857.44	184.79	1663.09	0	1847.88	1857.44	0	0
Dang	365.54	11.31	190.9	0	202.21	298.24	0	0
Narmada	1643.98	163.66	1472.93	0	1636.59	1636.59	0	0
Navsari	543.4	31.8	495.78	0	527.58	514.7	0	0
Surat/Tapi	3020.76	260.99	2348.93	0	2609.92	2609.46	0	0
Valsad	1689.67	147.58	1328.17	0	1475.75	1587.1	0	0
DGVCL	9120.79	800.13	7499.8	0	8299.93	8503.53	0	0
Anand	1247	111.1161	479.0897	0	590.2058	697	0	0
Dahod	1656.61	169.9437	1185.851	0	1355.795	1503.17	0	0
Kheda	2355.68	122.6765	1104.088	0	1226.765	1051.48	0	0
Panchmahal	3206	300.8144	2707.33	0	3008.144	3008.14	0	0
Vadodara	1170	114.8153	1062.227	0	1177.043	1176	0	0
MGVCL	9635.29	819.3659	6538.586	0	7357.951	7435.79	0	0
Bhavnagar	1015.98	90.0666	810.5996	0	900.6662	1122.44	0	0
Amreli	1030.43	91.3574	822.2163	0	913.5737	1384.47	0	0
Jamnagar	728.8	61.9441	577.146	0	639.0901	659.16	0	0
Junagadh	1309.45	50.8365	947.7183	0	998.5548	1182.29	0	0
Kutchh	2200.85	132.0542	1509.192	0	1641.246	2056.52	0	0
Porbandar	235.37	13.983	160.2488	0	174.2318	243.18	0	0
Rajkot	1044.26	39.9279	754.2885	0	794.2164	1020.9	0	0
S'Nagar	2132.37	127.9495	1549.381	0	1677.33	2009.4	0	0
PGVCL	9697.51	608.1192	7130.79	0	7738.909	9678.36	0	0
Ahmedabad	723.26	65.0934	606.4956	23.62	695.209	801.24	0	0.45
Banaskantha	3014.29	178.82	1633.77	63.63	1876.22	134.23	0	84.55
Gandhinagar	249.3	19.22772	153.526	5.98	178.7337	774.56	0	1.65
Mehsana	826.82	70.2797	664.5933	25.88	760.753	798.51	0	2.2
Patan	782.83	69.39788	638.9989	24.89	733.2868	2529.46	0	1.24
Sabarkantha	2650.8	253.0527	2156.157	83.98	2493.19	2893.49	0	0
UGVCL	8247.3	655.8714	5853.541	227.98	6737.393	7931.49	0	90.09
<b>Total</b>	<b>36700.89</b>	<b>2883.486</b>	<b>27022.72</b>	<b>227.98</b>	<b>30134.18</b>	<b>33549.17</b>	<b>0</b>	<b>90.09</b>

**ANNEXURE-IX****DISTRICT WISE PROGRESS OF RGGVY**

Sl. No.	District	Zero Date of Project	Target Date of Project Completion	Particular	Target by REC	Cumulative Achievement		Remark
						Total Achie.	% Achie.	
1	Bharuch	18.04.2006	17.12.2008	BPL H/H	25891	25891	1	Project Completed & final claim approved.
				HTLine	69	69	1	
				LT Line	432.6	432.6	1	
				Trans.	234	234	1	
2	Dang	06.03.2008	31.12.2013	BPL H/H	14446	11926	0.825557	Project Completed & final claim approved.
				HTLine	49	10.13	0.206735	
				LT Line	506	283.73	0.560731	
				Trans.	64	31	0.484375	
3	Narmada	07.12.2008	06.06.2008	BPL H/H	37014	37014	1	Project Completed & final claim approved.
				HTLine	55.77	55.77	1	
				LT Line	349	348.74	0.999255	
				Trans.	146	146	1	
4	Navsari	03.07.2009	02.07.2011	BPL H/H	16097	15684	0.974343	Project Completed & final claim approved.
				HTLine	6.01	7.05	1.173045	
				LT Line	118.5	121.26	1.023291	
				Trans.	5	15	3	
5	Surat	25.05.2009	31.12.2012	BPL H/H	82062	83373	1.015976	Project Completed & final claim approved.
				HTLine	34	18.68	0.549412	
				LT Line	744	590.8	0.794086	
				Trans.	54	56	1.037037	
6	Valsad	03.07.2009	31.12.2013	BPL H/H	34117	35886	1.051851	Project Completed & final claim approved.
				HTLine	49	33.398	0.681592	
				LT Line	526.47	514.35	0.976979	
				Trans.	53	55	1.037736	
	DGVCL			BPL H/H	209627	209774	1.000701	
				HTLine	262.78	194.028	0.738367	
				LT Line	2676.57	2291.48	0.856126	
				Trans.	556	537	0.965827	
7	Anand	06.03.2008	05.03.2010	BPL H/H	24230	24230	1	Project Completed &

Sl. No.	District	Zero Date of Project	Target Date of Project Completion	Particular	Target by REC	Cumulative Achievement		Remark
						<b>Total Achie.</b>	<b>% Achie.</b>	
				HTLine	12.5	20.59	1.6472	final claim approved.
				LT Line	240	133.97	0.558208	
				Trans.	25	43	1.72	
8	Dahod	22.07.2009	21.07.2011	BPL H/H	28735	28735	1	Project Completed & final claim approved.
				HTLine	27.4	17.36	0.633577	
				LT Line	882.9	635.76	0.720082	
				Trans.	40	40	1	
9	Kheda	23.07.2009	22.07.2011	BPL H/H	23630	23630	1	Project Completed & final claim approved.
				HTLine	28.3	28.12	0.99364	
				LT Line	457.53	281.44	0.615129	
				Trans.	50	60	1.2	
10	Panchmahal	04.10.2008	03.04.2008	BPL H/H	102536	102536	1	Project Completed & final claim approved.
				HTLine	20	18	0.9	
				LT Line	1015.1	1066.84	1.05097	
				Trans.	40	16	0.4	
11	Vadodara	06.03.2008	05.03.2010	BPL H/H	32626	32626	1	Project Completed & final claim approved.
				HTLine	53.7	52.07	0.969646	
				LT Line	251.75	258.9	1.028401	
				Trans.	146	146	1	
	MGVCL			BPL H/H	211757	211757	1	
				HTLine	141.9	136.14	0.959408	
				LT Line	2847.28	2376.91	0.8348	
				Trans.	277	305	1.101083	
12	Amreli	27.11.2009	26.11.2011	BPL H/H	27439	27446	1.000255	Project Completed & final claim approved.
				HTLine	59	60.01	1.017119	
				LT Line	187	213	1.139037	
				Trans.	161	209	1.298137	
13	Bhavnagar	28.04.2008	27.04.2010	BPL H/H	22076	22076	1	Project Completed & final claim approved.
				HTLine	83	83	1	
				LT Line	224	224	1	
				Trans.	184	187	1.016304	
14	Jamnagar	27.11.2009	26.11.2011	BPL H/H	17835	11352	0.636501	Project Completed & final claim approved.
				HTLine	40	33.07	0.82675	
				LT Line	189.04	122	0.645366	

Sl. No.	District	Zero Date of Project	Target Date of Project Completion	Particular	Target by REC	Cumulative Achievement		Remark
						<b>Total Achie.</b>	<b>% Achie.</b>	
				Trans.	108	120	1.111111	
15	Junagadh	27.11.2009	26.11.2011	BPL H/H	35201	23684	0.672822	Project Completed & final claim approved.
				HTLine	58	46	0.793103	
				LT Line	314.869	174	0.552611	
				Trans.	185	236	1.275676	
16	Kutchh	27.11.2009	26.11.2011	BPL H/H	48595	34996	0.720156	Project Completed & final claim approved.
				HTLine	215	124	0.576744	
				LT Line	567.5	436	0.768282	
				Trans.	332	253	0.762048	
17	Porbandar	27.11.2009	26.11.2011	BPL H/H	5211	3652	0.700825	Project Completed & final claim approved.
				HTLine	23	13.7	0.595652	
				LT Line	50.645	45	0.888538	
				Trans.	40	54	1.35	
18	Rajkot	23.11.2009	22.11.2011	BPL H/H	26567	18786	0.707118	Project Completed & final claim approved.
				HTLine	57	29.62	0.519649	
				LT Line	242	170	0.702479	
				Trans.	173	208	1.202312	
19	S'nagar	27.11.2009	26.11.2011	BPL H/H	60289	43594	0.723084	Project Completed & final claim approved.
				HTLine	118	73.83	0.625678	
				LT Line	357.62	282	0.788547	
				Trans.	344	364	1.05814	
	PGVCL			BPL H/H	243213	185586	0.76306	
				HTLine	661	463.23	0.700802	
				LT Line	2132.674	1666	0.781179	
				Trans.	1484	1631	1.099057	
20	Ahmedabad	16.05.2008	30.11.2011	BPL H/H	25500	22207	0.870863	Project Completed & final claim approved.
				HT Line	6	4.7	0.783333	
				LT Line	170	161.2	0.948235	
				Trans.	2	2	1	
21	Banaskanth a	26.05.2008	31.12.2013	BPL H/H	41817	39557	0.945955	Project Completed & final claim approved.
				HT Line	54.475	43.385	0.79642	
				LT Line	1238.654	1048.414	0.846417	



Sl. No.	District	Zero Date of Project	Target Date of Project Completion	Particular	Target by REC	Cumulative Achievement		Remark
						<b>Total Achie.</b>	<b>% Achie.</b>	
				Trans.	64	63	0.984375	
22	Gandhinagar	05.01.2009	30.11.2011	BPL H/H	5000	3985	0.797	Project Completed & final claim approved.
				HT Line	0	0	#DIV/0!	
				LT Line	100	39.36	0.3936	
				Trans.	0	0	#DIV/0!	
23	Mehsana	16.05.2008	30.11.2011	BPL H/H	18000	19933	1.107389	Project Completed & final claim approved.
				HT Line	8	3.119	0.389875	
				LT Line	325	251.295	0.773215	
				Trans.	12	11	0.916667	
24	Patan	16.05.2008	30.11.2011	BPL H/H	18000	24180	1.343333	Project Completed & final claim approved.
				HT Line	8	3.67	0.45875	
				LT Line	250	270.4	1.0816	
				Trans.	12	7	0.583333	
25	Sabarkantha	13.05.2008	30.11.2011	BPL H/H	29000	28481	0.982103	Project Completed & final claim approved.
				HT Line	137	122.69	0.895547	
				LT Line	1185	993.482	0.838381	
				Trans.	171	175	1.023392	
	UGVCL			BPL H/H	137317	138343	1.007472	
				HT Line	213.475	177.564	0.831779	
				LT Line	3268.65	2764.151	0.845655	
	<b>TOTAL</b>			<b>Trans.</b>	<b>261</b>	<b>258</b>	<b>0.988506</b>	
	GUVNL			BPL H/H	801914	745460	0.929601	
				HT Line	1279.155	970.962	0.759065	
				LT Line	10925.17	9098.541	0.832805	
				Trans.	2578	2731	1.059348	

**FUND REQUIREMENT FOR STATE GOVERNMENT SCHEMES**

Sl. No.	Name of the GOG Schemes	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	Total
1.	TASP for sub stations / lines	160.00	160.00	160.00	160.00	<b>640.00</b>
2.	Electrification of Hutments	20.00	20.00	20.00	20.00	<b>80.00</b>
3.	Kutir Jyoti Scheme	3.75	3.75	3.75	3.75	<b>15.00</b>
4.	TASP for Rural Electrification wells & petaparas	370.65	370.65	370.65	370.65	<b>1482.60</b>
5.	Scheduled Caste Sub Plan	5.00	5.00	5.00	5.00	<b>20.00</b>
6.	Energy Conservation	40.00	40.00	40.00	40.00	<b>160.00</b>
7.	Sagar Khedu Sarvangi Vikas Yojana	425.00	425.00	425.00	425.00	<b>1700.00</b>
8.	KHUSHY for PGVCL – Equity	150.00	150.00	150.00	150.00	<b>600.00</b>
9.	Share capital for Agri. Connection	1158.14	1158.14	1158.14	1158.14	<b>4632.56</b>
10.	Solar Pump Sets (AG)	60.00	60.00	60.00	60.00	<b>240.00</b>
11.	Scheduled Caste Sub Plan AG Connection (Capital)	35.00	35.00	35.00	35.00	<b>140.00</b>
12.	Share Capital Contribution to GUVNL for shifting/replacement of Poles and Distribution Lines in the area of Municipal Corporations and Nagarpalikas	100.00	100.00	100.00	100.00	<b>400.00</b>
13.	Assistance to State PSEs for providing solar based Decentralized Electrification in non-electrified areas (New item)	50.00	50.00	50.00	50.00	<b>200.00</b>

## DISCOMS WISE DETAILS OF DDUGJY SCHEME IN THE STATE OF GUJARAT

Sl. No.	Description	Particular	Unit	DGVCL		MGVCL		PGVCL		UGVCL		Total	
				Qty	Project Cost	Qty	Project Cost	Qty	Project Cost	Qty	Project Cost	Qty	Project Cost
1	Strengthening of sub-transmission and distribution network	66/11 KV New Sub station		3.00	15.25	10.00	15.00	0.00	0.00	2.00	10.20	15.00	40.45
2		New 66 KV line proposed		27.00	7.50	0.00	0.00	0.00	0.00	17.00	3.91	44.00	11.41
3		11 kV New Line/Crossing		0.00	0.00	1575.00	27.56	0.00	0.00	273.70	7.09	1848.70	34.65
4		11 kV Line : New Feeder/ Feeder Bifurcation		745.08	25.60	0.00	0.00			19.78	0.99	764.86	26.59
a		11 kV Line B/F feeder Bay	Nos.	0.00	0.00			229.00	13.42	0.00	0.00	229.00	13.42
b		11 kV Line : New Feeder/ Feeder Bifurcation	Kms.	0.00	0.00			1244.16	25.90	0.00	0.00	1244.16	25.90
5		Augmentation /Renovation of 11 KV Feeder	Kms.	12.90	0.44	218.60	3.83	3065.98	54.18	21.55	3.71	3319.03	62.16
6		LT Line : Augmentation / Renovation	Kms.	13.20	0.40	0.00		1095.21	13.40	207.76	5.16	1316.17	18.96
7		Aerial Bunched Cables		8082.74	88.13	0.00				1800.53	35.86	9883.27	123.99
a		3ph 4W conversion of LT line to ABC 50mmsq	Kms.					3074.82	39.55			3074.82	39.55
b		1ph 2W conversion of LT line to ABC 35mmsq	Kms.					2040.51	8.93			2040.51	8.93
8		Nos. of feeders proposed for HVDS	Nos.	19.80	0.69	0.00				77.00	0.49	96.80	1.18
a		11 KV prop. New HT line	Km					0.00	0.00			0.00	0.00

**DISCOMS WISE DETAILS OF DDUGJY SCHEME IN THE STATE OF GUJARAT**

Sl. No.	Description	Particular	Unit	DGVCL		MGVCL		PGVCL		UGVCL		Total	
				Qty	Project Cost	Qty	Project Cost	Qty	Project Cost	Qty	Project Cost	Qty	Project Cost
b		LT to HT conversion	Km					1337.10	17.58			1337.10	17.58
9		Reconductoring by HT ABC	Km	0.00	0.00	0.00		371.02	21.08	130.54	11.54	501.56	32.62
10		Repl. of 1 phase PVC service line with XLPE/Armored s/l	Km	0.00	0.00	0.00		384.11	2.03	0.00	0.00	384.11	2.03
11		Reactivation of DTC Earthing	Km	14699.00	5.88	0.00		39911.00	4.12	1655.00	1.00	56265.00	11.00
12		HVDS-New DTR proposed		2049.00	20.08	13200.00	169.62			1327.00	17.90	16576.00	207.60
a		10 KVA TC	No					6792.00	60.92			6792.00	60.92
b		16 KVA TC	No					680.00	6.47			680.00	6.47
c		25 KVA TC	No					279.00	2.95			279.00	2.95
d		63 KVA TC	No					42.00	0.70			42.00	0.70
e		100 KVA TC	No					0.00	0.00			0.00	0.00
13		NEW 1PH connection proposed	No	0.00	0.00	0.00	0.00	0.00	0.00	8034.00	2.14	8034.00	2.14
14		LT Metering(Shifting of Meter)	No	0.00	0.00	0.00	0.00	0.00	0.00	23184.00	4.67	23184.00	4.67
15	Metering	1 PH Static Meters	No	105118.00	8.28	330000.00	35.18	500374.00	53.34	135411.00	11.03	1070903.00	107.83
16		3 PH Static Meters	No	13741.00	2.77	27676.00	8.24	60327.00	17.97	8943.00	2.66	110687.00	31.64
17		Providing Meters with MMB on DTR	No	21278.00	6.59	0.00	0.00	17921.00	12.56	2789.00	3.23	41988.00	22.38
18		Others	No		4.43			0.00	0.00	0.00	0.00	0.00	4.43
		<b>Total :</b>			<b>186.04</b>		<b>259.61</b>		<b>356.84</b>		<b>122.16</b>		<b>924.70</b>

**ANNEXURE-XI**

**DISTRICT WISE OVERALL PLAN AND FUND REQUIREMENT AGAINST PROJECTS TO BE COVERED (IPDS)**

Total			DGVCL		MGVCL		PGVCL		UGVCL		Total	
Sl. No.	Particular	Unit	Qty	Project Cost (Rs. In Cr.)	Qty	Project Cost (Rs. In Cr.)	Qty	Project Cost (Rs. In Cr.)	Qty	Project Cost (Rs. In Cr.)	Qty	Project Cost (Rs. In Cr.)
1.	66/11 KV S/S : New	Nos	17	86.70	12	71.41	8	116.88	2	0.00	39	274.99
2.	33/11 KV S/S : Additional Transformer	Nos.	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
3.	33/11 KV S/S : Transformer capacity enhancement	Nos.	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
4.	Renovation & Modernisation of 33/11 kV SS	Nos.	0	0.00	11	7.51	0	0.00	0	0.00	11	7.51
5.	New 66 KV new feeders/Bifurcation of feeders:	Kms	80	24.00	40	12.00	0	0.00	0	0.00	120	36.00
6.	66 KV feeders Reconductoring/Augmentation	Kms	0	0.00	24	12.85	0	0.00	0	0.00	24	12.85
7.	33 kV Line Bay Extension at EHV station	Nos	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
8.	11 kV Line : New Feeder/ Feeder Bifurcation	Kms	78	7.95	265	23.35	107	5.71	12	0.14	463	37.14
9.	11 kV Line : Augmentation/Reconductoring	Kms	0	0.00	467	4.39	112	0.41	85	3.51	664	8.31
10.	Arial Bunched Cable	Kms	1224	12.07	1817	27.66	2208	27.81	1004	32.10	6252	99.64
11.	UG Cable	Kms	282	42.30	445	66.80	856	117.68	160	36.33	1743	263.11
12.	11 KV Bay Extension	Kms	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
13.	Installation of Distribution Transformer	Nos.	96	2.15	352	8.95	6885	78.60	66	1.69	7399	91.39
14.	Capacity enhancement of LT sub-station	Nos.	0	0.00	9	0.11	0	0.00	0	0.00	9	0.11
15.	LT Line : New Feeder/ Feeder Bifurcation	Kms	13	0.28	197	15.31	0	0.00	40	0.95	250	16.54
16.	LT Line : Augmentation/Reconductoring	Kms	0	0.00	0	0.00	10	0.02	0	0.00	10	0.02
17.	Capacitor Bank	Nos.	0	0.00	27	0.41	0	0.00	0	0.00	27	0.41
18.	HVDS	Nos.	0	0.00	293	4.36	367	3.60	40	0.32	700	8.28



**DISTRICT WISE OVERALL PLAN AND FUND REQUIREMENT AGAINST PROJECTS TO BE COVERED (IPDS)**

Total			DGVCL		MGVCL		PGVCL		UGVCL		Total	
Sl. No.	Particular	Unit	Qty	Project Cost (Rs. In Cr.)	Qty	Project Cost (Rs. In Cr.)	Qty	Project Cost (Rs. In Cr.)	Qty	Project Cost (Rs. In Cr.)	Qty	Project Cost (Rs. In Cr.)
19.	Metering	Nos.	38338	5.28	319500	92.91	272342	47.66	77319	12.19	707499	158.04
20.	Provisioning of solar panel	Lot	30	0.21	61	0.43	575	4.03	247	3.22	913	7.88
21.	RMU,Sectionaliser, Auto reclosures, FPI etc.	Lot	43	1.51	1259	2.77	8934	21.59	201	10.31	10437	36.17
22.	Others	Lot	20429	4.60	49464	21.72	38669	35.72	20709	1.31	129271	63.35
	<b>GRAND TOTAL</b>			<b>187.04</b>	<b>0</b>	<b>372.92</b>	<b>0</b>	<b>459.70</b>	<b>0</b>	<b>102.22</b>		<b>1121.88</b>

**ANNEXURE-XIA**

**SYSTEM STRENGTHENING ACTIVITIES OF THE DISTRIBUTION NETWORK AND EXPENDITURE THEREOF**

	Particulars	Unit	system strengthening work done		Planning of system strengthening work								System strengthening work approved under IPDS & DDGJY		Net Planning of system strengthening work							
			Average of last two Year		2015-16		2016-17		2017-18		2018-19		Total		2015-16		2016-17		2017-18		2018-19	
			Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs
<b>DGVC L</b>	Creation of New SS	No											20	102	0	0	0	0	0	0	0	0
	Augmuntation of Power Transformer	No											107	32	0	0	0	0	0	0	0	0
	Addition of new power transformer in Existing SS	No											0	0	0	0	0	0	0	0	0	0
	Feeder Bifurcation & Link line	No.	103	43	115	48	120	50	130	54	140	58	91	8	106	47	75	46	94	51	140	58
	DTC Review	No.	112	2	110	2	120	2	130	2	120	2	14699	6	0	0	0	0	0	0	120	2
	Conductor Replacement	KM	795	5	800	5	850	5	900	5	950	5	13	0	799	5	843	5	895	5	950	5
	Providing of LT ABC	in KM	1128	8	1100	7	1400	9	1600	10	1800	11	1224	12	978	6	788	3	1110	5	1800	11
	Providing of 5 KVA T/c	No.	144	1	170	1	200	1	250	1	250	1	96	2	160	1	152	0	212	0	250	1
	AG HVDS	feeder	2	2	4	4	5	5	5	5	6	6	2049	20	0	0	0	0	0	0	6	6
	Fund Req. in Crore			61		67		72		77		83	0	182	0	59	0	53	0	60	0	83
<b>MGVC L</b>	Creation of New SS	No											22	86						0	0	
	Augmuntation of Power Transformer	No											40	12						0	0	
	Addition of new power transformer in Existing	No											0	0	0	0	0	0	0	0	0	0





**SYSTEM STRENGTHENING ACTIVITIES OF THE DISTRIBUTION NETWORK AND EXPENDITURE THEREOF**

	Particulars	Unit	system strengtheni ng work done		Planning of system strengthening work								System strengthenin g work approved under IPDS & DDGJY		Net Planning of system strengthening work							
			Average of last two Year		2015-16		2016-17		2017-18		2018-19		Total		2015-16		2016-17		2017-18		2018-19	
			Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lac s	Phy	Exp in Lacs	Phy	Exp in Lac s	Phy	Exp in Lacs
	SS																					
	Feeder Bifurcation & Link line	No.	78	1	80	1	90	1	100	1	110	1	484	27	32						110	1
	DTC Review	No.	281	7	300	7	400	9	500	11	600	13	0	0	300	7	400	9	500	11	600	13
	Conductor Replacement	KM	348	9	400	10	450	11	500	12	550	13	467	4	353	10	216	9	313	10	550	13
	Providing of LT ABC	in KM	2264	15	2500	16	3000	19	3500	22	4000	25	1817	28	2318	13	2091	5	2773	11	4000	25
	Providing of 5 KVA T/c	No.	0	0	0								352	9							0	0
	AG HVDS	TC	560	5	560	5	560	5	560	5	560	5	3493	174	211						560	5
	Fund Req. in Crore			37		39		45		51		57	0	341	0	30	0	23	0	32	0	57
<b>PGVC L</b>	Creation of New SS	No	59	234	103	412	45	180	40	160	40	160	8	117	102	400	41	122	37	113	40	160
	Augmuntation of Power Transformer	No	62	31	17	9	56	30	60	32	58	31	0	0	17	9	56	30	60	32	58	31
	Addition of new power transformer in Existing SS	No	53	58	46	51	20	22	52	57	40	44	0	0	46	51	20	22	52	57	40	44
	Feeder Bifurcation & Link line	No.	319	27	250	21	200	17	210	18	190	16	4646	99							190	16
	DTC Review	No.	571	3	300	2	250	2	260	2	240	2	39911	4				0		0	240	2
	Conductor Replacement	KM	2188	9	5000	20	3500	14	3500	14	3000	12	6322	62	4368	14	339		971		3000	12
	Providing of LT ABC	in KM	3873	50	4500	58	4000	52	3500	46	3200	42	2579	49	4242	53	2711	28	2469	26	3200	42



**SYSTEM STRENGTHENING ACTIVITIES OF THE DISTRIBUTION NETWORK AND EXPENDITURE THEREOF**

	Particulars	Unit	system strengthening work done		Planning of system strengthening work								System strengthening work approved under IPDS & DDGJY		Net Planning of system strengthening work							
			Average of last two Year		2015-16		2016-17		2017-18		2018-19		Total		2015-16		2016-17		2017-18		2018-19	
			Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs
	Providing of 5 KVA T/c	No.	2745	14	2500	13	2000	10	1800	9	1600	8	6885	79	1812	5					1600	8
	AG HVDS	feeder	86	90	70	73	80	83	75	78	70	73	8160	75		66		46		48	70	73
	Fund Req. in Crore			515		659		410		416		388	0	485	0	598	0	247	0	277	0	388
<b>UGVC L</b>	Creation of New SS	No	32	148	22	104	24	113	25	118	20	94	4	10	22	103	22	108	23	114	20	94
	Augmentation of Power Transformer	No											17	4		0					0	0
	Addition of new power transformer in Existing SS	No											0	0	0	0	0	0	0	0	0	0
	Feeder Bifurcation & Link line	No.	172	19	235	26	200	22	180	20	150	17	34	4	232	26	183	20	166	18	150	17
	DTC Review	No.	49	1	55	1	60	1	55	1	70	1	1655	1		1		1		1	70	1
	Conductor Replacement	KM	87	1	80	0	80	0	90	0	120	0	293	9	51						120	0
	Providing of LT ABC	in KM	179	1	250	2	275	2	325	2	400	2	1134	44	137						400	2
	Providing of 5 KVA T/c	No.	0	0	0								66	2							0	0
	AG HVDS	feeder	11	6	18	10	13	7	10	5	10	5	1367	18		8					10	5
	Fund Req. in Crore			176		143		145		146		119	0	91	0	137	0	128	0	133	0	119
<b>Total</b>	Creation of New SS	No	90	382	125	516	69	293	65	278	60	254	54	315	124	503	63	229	60	227	60	254
	Augmentation of Power Transformer	No	62	31	17	9	56	30	60	32	58	31	164	47	17	9	56	30	60	32	58	31



**SYSTEM STRENGTHENING ACTIVITIES OF THE DISTRIBUTION NETWORK AND EXPENDITURE THEREOF**

	Particulars	Unit	system strengtheni ng work done		Planning of system strengthening work								System strengthenin g work approved under IPDS & DDGJY		Net Planning of system strengthening work							
			Average of last two Year		2015-16		2016-17		2017-18		2018-19		Total		2015-16		2016-17		2017-18		2018-19	
			Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lacs	Phy	Exp in Lac s	Phy	Exp in Lacs	Phy	Exp in Lac s	Phy	Exp in Lacs
	Addition of new power transformer in Existing SS	No	53	58	46	51	20	22	52	57	40	44	0	0	46	51	20	22	52	57	40	44
	Feeder Bifurcation & Link line	No.	672	90	680	96	610	90	620	93	590	92	5255	139	369	73	258	66	260	69	590	92
	DTC Review	No.	1013	13	765	12	830	14	945	16	1030	18	56265	11	300	8	400	9	500	12	1030	18
	Conductor Replacement	KM	3419	23	6280	35	4880	30	4990	31	4620	30	7095	76	5570	28	1399	14	2179	15	4620	30
	Providing of LT ABC	in KM	7444	73	8350	83	8675	82	8925	80	9400	80	6754	132	7675	72	5590	36	6352	43	9400	80
	Providing of 5 KVA T/c	No.	2888	14	2670	14	2200	11	2050	10	1850	9	7399	91	1972	6	152		212	0.14	1850	9
	AG HVDS	feeder	659	104	652	92	658	100	650	93	646	89	15069	287	211	74	0	46	0	48	646	89
	Fund Req. in Crore			789		908		672		690		647	0	1099	0	824	0	452	0	503	0	647
<b>This segment is not included in State / Central Govt. Schemes. It is funded from DISCOM's own fund. This segment should be covered as fund requirement under PFA</b>																						

**ANNEXURE-XII****AVERAGE BILLING RATE**

<b>ABR FOR FUTURE YEARS-STATE GOV DISCOMS</b>							
<b>Description/item</b>	<b>As per GoG (FY 2015-16)</b>	<b>FY 2016-17</b>		<b>FY 2017-18</b>		<b>FY 2018-19</b>	
		<b>MU</b>	<b>Cr Rs</b>	<b>MU</b>	<b>Cr Rs</b>	<b>MU</b>	<b>Cr Rs</b>
Domestic/General	4.94	11,580	5,717	12,767	6,303	14,077	6,950
Others incl Agriculture	5.17	58,465	30,229	62,558	32,346	66,937	34,610
<b>Total</b>		<b>70,045</b>	<b>35,946</b>	<b>75,325</b>	<b>38,649</b>	<b>81,014</b>	<b>41,560</b>
<b>ABR(Rs/unit)</b>	<b>5.13</b>	<b>5.13</b>		<b>5.13</b>		<b>5.13</b>	

<b>ABR for future years-Private DISCOM</b>							
<b>Description/item</b>	<b>Tariff order FY 2015-16</b>	<b>FY 2016-17</b>		<b>FY 2017-18</b>		<b>FY 2018-19</b>	
		<b>MU</b>	<b>Cr Rs</b>	<b>MU</b>	<b>Cr Rs</b>	<b>MU</b>	<b>Cr Rs</b>
Domestic/General	5.31	3,756	1,994	4,169	2,214	4,628	2,457
Others incl Agriculture	6.59	7,651	5,042	8,187	5,395	8,760	5,773
<b>Total</b>		<b>11,407</b>	<b>7,036</b>	<b>12,356</b>	<b>7,609</b>	<b>13,388</b>	<b>8,230</b>
<b>ABR(Rs/unit)</b>	<b>6.22</b>	<b>6.17</b>		<b>6.16</b>		<b>6.15</b>	

**ANNEXURE-XIII****EXTERNAL TRAINING SUMMARY (TECH/NON TECH) FOR THE FY 2014-15**

Sl. No.	Subject	Type of Training	Organisation	Place of Training Institute
1	Two days conference on Effective Management of Commerical contracts	NT	International Business Conferences	Mumbai
2	5 National conference on Emerging Vistas of Technology in 21st Century Power System, Power Electronics, Intelligent Control & Renewable Energy system.	TECH	Parul Institute of Engineering & Technology,	Vadodara
3	5 National conference on Gas Insulated substation	TECH	Central Board of Irrigation & Power	New Delhi
4	Emergency Medicine Procedural and Clinical Training	NT	Apollo Hospitals International Ltd.	Ahmedabad
5	Conference participant for "5th Annual International summit COALGAS 2014"	NT	Mission Energy foundation	Mumbai
6	Evaluation, Repair and Protection of structures against corrosion	TECH	Nirma University	Ahmedabad
7	Round Table conference on "Managing business Driven HR Transformation"	NT	BMA	Vadodara
8	One day workshop on Making training stick	NT	BMA	Vadodara
9	3 Annual conference on "Industrial water management and Desalination (Demand & Supply, Technology and Solutions)	TECH	India Infrastructure publishing Pvt. Ltd.	New Delhi
10	Behavioural training Module for MGVCL's officers (Batch - 1)	NT	School of Petroleum Management, (PDPU)	Gandhinagar
11	Behavioural training Module for MGVCL's officers (Batch - 2)	NT	School of Petroleum Management, (PDPU)	Gandhinagar
12	4 days Laboratory Quality system, Management & Internal Audit as per IS/ISO/17025	NT	Bureau of Indian Standards,	Noida
13	9th National Conference on Indian Energy Sector - "Synergy with Energy".	TECH	Saket Project Ltd.	Ahmedabad
14	Protection, Automation and Metering	TECH	Adani Power Training and Research Institute	Mundra
15	Best practices in water and coal chemistry in Power Plants	TECH	ESCI	Hyderabad
16	Strategies for Leading change, A research-based training solution for leaders	NT	Leadership Conulting, Vital Smarts Ind.	Mumbai
17	5 days training on "Boiler"	TECH	BHEL	Tiruchirapalli



Sl. No.	Subject	Type of Training	Organisation	Place of Training Institute
18	Effective presentation Skills - Need for Today	NT	BMA	Vadodara
19	3rd Annual Master Class on LNG & Gas contract, pricing Methodologies and Strategies	NT	Metis business solutions knowledge redefined	New delhi
20	5th T&D conclave & Round Table Meet - A Healthy T&D secotr - for a Sustainable Power Sector.	TECH	India- Tech Secretariat	Mumbai
21	23rd Annual Award for Outstanding Young Managers)	NT	BMA	Vadodara
22	Innovative Measure for Grid Stability including phase shifting Transformers & WAMs."	TECH	CBIP	New delhi
23	Occupational and environmental safety guidelines for handling PCBs, PCBs containing equipment.	TECH	Gujarat Pollution Control Board	Gandhinagar
24	12 weeks training in Live Line maintenance Techniques (95th Batch) using Hot Stick Method (HSM) up to 220 KV lines.	TECH	National Power Training Institute	Bangalore
25	Advance training on Photoshop, page Maker and Corel Draw	NT	Image Institute of Digital Technology Ltd.	Vadodara
26	National workshop on Geotechnical Consideration for Power Equipment Foundation	TECH	Indian Geotechnical Society	Vadodara
27	Failure of Distribution transformers and Remedial Measures	TECH	ESCI	Hyderabad
28	Grid Operation & Monitoring and Equipment Health Assessment	TECH	GETCO & ABB	Ahmedabad
29	Power Quality Harmonics & their control	TECH	International Business conference (IBC)	Mumbai
30	Transformer Residual Life Enhancement	TECH	Knowledge Cluster Pvt. Ltd.	Mumbai
31	Evaluation of Cables & Accessories	TECH	ERDA	Vadodara
32	Earthing Practices and Safety Measures in Electrical Installations	TECH	CIRE, REC	Hyderabad
33	Best practices in Power Distribution Management	TECH	CIRE, REC	Hyderabad
34	Safety in Power Distribution Utility	TECH	AIPM	Kolkata
35	Construction - Quality Control & Site Inspection	TECH	Marcep Inc.	Mumbai

Sl. No.	Subject	Type of Training	Organisation	Place of Training Institute
36	CII's 3rd edition of IR Conference 2014 "Industrial Relations at Crossroad."	NT	CIR,	Vadodara
37	Managing Commercial Contracts	NT	FORE School of Management	New Delhi
38	Laboratory Quality System Management and Internal Audit (IS/ISO 17025).	NT	CII Institute of Quality	Bangalore
39	Life After Retirement (GOI)	NT	SPIPA	Ahmedabad
40	7 <sup>th</sup> Annual conference on Solar Power in India	TECH	India Infrastructure Pvt. Ltd.	New Delhi
41	IRD Mechanalysis Vibration Training Module 1 (MVT1)	TECH	IRD Mechanalysis	Mumbai
42	15th Regulators & Policymakers Retreat - 2014	NT	Independent Power Producers Association of India (IPPA)	New Delhi
43	Distribution Automation SCADA and Smart Grid	TECH	Central Institute for Rural Electrification (CIRE)	Hyderabad
44	Technical workshop on "Best O&M"	TECH	Knowledge N Techniques	Mumbai
45	Inventory AND Spare parts Management	NT	Trivedi & Associates Tecknical services (P) Ltd.	Vadodara
46	CII Conference on Company Act 2013	NT	Confederation of Indian Industry	Vadodara
47	Key to communication - A programme on Interpersonal Effectiveness	NT	BMA	Vadodara
48	Latest Testing Trends in Transformers and Advancements of Battery Testing	TECH	CBIP	New Delhi
49	Development of Power Sector at International Level	TECH	CBIP	New Delhi
50	Latest Trends in Metering, Billing and Collection	TECH	CIRE	Hyderabad
51	Power Sector Accounting with reference to Indian Standards & IFRS	NT	CIRE	Hyderabad
52	Contract Mining in India	NT	ASCI	Hyderabad
53	MDP on "Key to Communication - A program on Interpersonal Effectiveness"	NT	BMA	Vadodara
54	Fly Ash Utilization	TECH	Mission Energy Foundation	Mumbai
55	Workshop on "Concrete Mix Design"	TECH	Ambuja Knowledge Initiative	Vadodara
56	Two days programme "Metering in India"	TECH	Power Line	New Delhi



Sl. No.	Subject	Type of Training	Organisation	Place of Training Institute
57	"AT&C Loss Management and Advance Metering Practices in Power Distribution".	TECH	Asia Institute of Power Management	Kolkatta
58	Workshop on "Witnessing Acceptance, Routine and type tests on Surge Arresters	TECH	CPRI	Bangalore
59	Condition Monitoring and Health Assessment of Transformers	TECH	ERDA	Vadodara
60	Diagnostic Techniques to improve Performance and Reliability of Boilers	TECH	India Boiler dot com	Vadodara
61	7 <sup>th</sup> Annual Conference on "Power Transmission in India"	TECH	Power Line	New Delhi
62	Metallurgical Aspects of Power Plant(CRM seats for Customer's participation in PMI Programme (FY 14-15) Schedule during July 2014 - March 2015.)	TECH	Power Management Institute, NTPC Ltd.	Noida
63	India LNG Partnership Summit	NT	Metis Business Solutions	New Delhi
64	Air Pollutation control & Monitoring- issues & solutions	TECH	Federation of Indian Chambers of Commerce and Industry	New Delhi
65	Power and Distribution Transformers – Efficient Operation and Maintenance	TECH	CIRE	Hyderabad
66	Condition Monitoring and Health Assessment of Transformers	TECH	ERDA	Vadodara
67	CII Conference on Company Act 2013	NT	Confederation of Indian Industry	Vadodara
68	Data Management and Analysis using Advanced Excel	NT	FORE School of Managemnet	New Delhi
69	Workshop on Cyber Security.	NT	India Smart Grid Forum (ISGF)	New Delhi
70	Flow Measurements in Open Channeis & Closed Conduits	TECH	Knowledge n Techniques	Mumbai
71	Two day training programme on Fundamentals of "Power Plant Chemistry"	TECH	MARCEP Inc.,	Mumbai
72	Conference on Western India Regional Practicing Company Secretary	NT	The Institute of Company Secretaries of India	Vadodara
73	One day conference "CII's Enviro Tech 2014"	TECH	Confederation of Indian Industry	Vadodara
74	Two days workshop on Smart Transmission through wide Area Measurements & Control of Large Power System	TECH	Power Systems Division Central Power Research	Bengaluru



Sl. No.	Subject	Type of Training	Organisation	Place of Training Institute
			Institute	
75	Orientation Programme on "Documentation of Energy Conservation Efforts for Gujarat Government Departments/PSUs".	TECH	National Productivity Council (NPC) and Gujarat Energy Development Agency (GEDA)	Ahmedabad
76	Specialist level course on "Power System Reliability" (Short term training programme during 2014-15, PSTI, Bangalore)	TECH	Power System Training Institute	Bangalore
77	Specialist level course on "Power System Reliability" (Short term training programme during 2014-15, PSTI, Bangalore)	TECH	Power System Training Institute	Bangalore
78	Leadership & People Development (DPE)	NT	Department of Public Enterprises (DPS)	New Delhi
79	Two day Annual Conference on "IT in Power"	TECH	Power Line Magazine	New Delhi
80	Earthing Systems	TECH	CBIP	New Delhi
81	Operation & Maintenance of Cooling Towers, Circulating Water system and Air Cooled Condenser	TECH	CBIP	New Delhi
82	"Cable fault location, testing and diagnostics and fault location on overhead Transmission Lines."	TECH	CBIP	New Delhi
83	Workshop on "Smart Initiatives in Energy Systems	TECH	IEEE Power & Energy Society (IEEE PES)	Bangalore,
84	Protection, Automation & Metering	TECH	Adani Power Training & Research Institute	Mundra
85	Short term Course on "Modeling and simulation of Sub Synchronous Resonance in Power System."	TECH	Indian Institute of Technology Bombay	Mumbai
86	3rd Annual Conference on "Solar Power in India : Technologies, Opportunities & Challenges".	TECH	Infraline Energy	Noida
87	CII workshop on Labour Laws	NT	CII	Vadodara
88	Laboratory Managemnet based on ISO/IEC 17025 : 2005 INCLUDING Internal Auditing	NT	Engineering Staff College of India	Hyderabad
89	4th India Smart Utilies week and Peer to Peer workshop	TECH	World Smart Grid	Delhi

Sl. No.	Subject	Type of Training	Organisation	Place of Training Institute
90	Gujarat Manufacturing show 2014 "Growth and Sustainability of Electrical and Electronic Industry for India Power Sector"	TECH	Confederation of Indian Industry	Ahmedabad
91	Workshop on "Mind Power"	NT	Baroda Management Association	Vadodara
92	Power System Economics	NT	National Power Training Institute	Faridabad
93	Gujarat State Level 25 <sup>th</sup> Silver Jubilee Convention on Quality Concepts VCCQC – 2014.	NT	Quality Circle Forum of India	Vadodara
94	Certificate Course on Dispute Settlement Mechanism under the ID Act.1947	NT	Gujarat Natinal Law University	Gandhinagar
95	National Conference on “Power Transmission and Distribution”.	TECH	Indian Power Management Academy	Bhopal
96	Technical Seminar on New Comprehensive system for cable testing & Diagnosis alongwith fault location.	TECH	Megger India Pvt. Ltd.	
97	Fundamental of Vibration Monitoring & Vibration Analysis	TECH	Reliability Conference	Hyderabad
98	New Challenges in Coal Handling Plant (CRM seats for Customer's participation in PMI Programme (FY 14-15) Schedule during July 2014 - March 2015.)	TECH	Power Management Institute, NTPC Ltd.	Noida
99	Variable Frequency Drives : Design & Maintenance (CRM seats for Customer's participation in PMI Programme (FY 14-15) Schedule during July 2014 - March 2015.)	TECH	Power Management Institute, NTPC Ltd.	Noida
100	Dynamic Life Management and Stress free Living (Skill Development training programme for executive and Employees of SLPEs)	NT	Department of Public Enterprises (DPS)	New Delhi
101	Project Management (Skill Development training programme for executive and Employees of SLPEs)	NT	Department of Public Enterprises (DPS)	New Delhi
102	Teriff Policy & Submission of ARRs-Regulatory Compliance.	TECH	Central Institute for Rural Electrification of Rural Electrification corporation Ltd.	Hyderabad
103	workshop on Power Reliability	TECH	Asia Institute of Power Management	Kolkata

Sl. No.	Subject	Type of Training	Organisation	Place of Training Institute
104	Punctured Insulator Detection (PID)	TECH	National Power Training Institute	Bangalore
105	Employees- certificate course on "Contract and Procurement Management."	NT	Gujarat National Law University	Gandhinagar
106	2 days workshop on "Managerial Excellence for Line Managers".	NT	Centre for Excellence	Ahmedabad
107	Workshop on Safety Audit	TECH	N MARC India	Mumbai
108	3rd Annual Convention on Lean Six Sigma - 2014	NT	Concept Business Excellence Pvt. Ltd.,	Vadodara
109	Substation Design, Engineering & Construction	TECH	The Society of Power Engineers(India)	Vadodara
110	Web Development using PHP & MYSQL	TECH	Engineering Staff College of India	Hyderabad
111	Management Development	NT	Baroda Management Association	Vadodara
112	Emotional Intelligence Leadership	NT	Baroda Management Association	Vadodara
113	Handling Chemistry in Power Plant (CRM Seats for Customer's participation in PMI programme (FY 14-15)	TECH	NTPC Ltd., PMI	Noida
114	ESP and Ash handling system (CRM Seats for Customer's participation in PMI programme (FY 14-15)	TECH	NTPC Ltd., PMI	Noida
115	Root cause analyses of failure of Elect.(CRM Seats for Customer's participation in PMI programme (FY 14-15)	TECH	NTPC Ltd., PMI	Noida
116	Specialist level course on "Power System Reliability" (Short term training programmes during 2014-15, PSTI, Bangalore.)	TECH	Power System Training Institute	Bangalore
117	Executive Certificate Programme in Power Management (Batch - V)	NT	School of Petroleum Management	Gandhinagar
118	8th India Energy Summit 2014	TECH	West Bengal State Electricity Distribution Company Ltd.	Kolkata
119	GIS Application	TECH	Engineering Staff College of India	Hyderabad
120	Earthing Practices and Safety measures in electrical installations	TECH	Central Institute for Rural Electrification of Rural electrification Corp. Ltd.,	Hyderabad
121	9th Conference on "Power Distribution in India."	TECH	Power Line Magazine	New Delhi



Sl. No.	Subject	Type of Training	Organisation	Place of Training Institute
122	Environment friendly Technologies for indian Power Sector- CFBC Boiler/Coal Blending	TECH	Excellence Enhancement Centre	New Delhi
123	CFBC Technology latest Trends and Advances	TECH	Indian Power Management Academy	Bhopal
124	Condition Monitoring, Maintenance & Testing of Electrical Equipments.	TECH	Marcep Inc.,	Mumbai
125	Planning and Project work of new projects for GSECL Engineers	TECH	Power Management Institute	Noida
126	Two days "WASTECH International Summit & Expo"	TECH	Confederation of Indian Industry	Ahmedabad
127	Wide Area Monitoring, Protection and Control (WAMPAC) - Novel Solutions using Phasor Measurement unit	TECH	Power Systems Division, Central Power Research Institute	Bengaluru
128	National Conclave on "Circuit Breakers and Protection Testing"	TECH	Central Board of Irrigation & Power (CBIP)	New Delhi
129	Laboratory Management system & International Audit as per ISO:17025, 2005"	NT	NITS	Hyderabad
130	Live Line Maintenance Techniques (LLMT) using Bare Hand Method (BHM) upto 400 KV lines.(20th Batch)	TECH	National Power Training Institute	Bangalore
131	26th Annual Management Convention	NT	Baroda Management Association	Vadodara
132	Smart Capacitors for Smart Grids - CAPACIT 2014	TECH	IEEMA	New Delhi
133	Revenue Management and Dynamic Pricing	NT	Indian Institute of Management Ahmedabad	Ahmedabad
134	HR Round Tables (Future of HR)	NT	VCCI, (nimspl)	Vadodara
135	Basic Level Course on "Power System Operation" (Short term training programmes during 2014-15, PSTI, Bangalore.)	TECH	Power System Training Institute	Bangalore
136	Performance Evaluation and setting Professionally Goal Oriented (Skill Development training programme for Exectutive and Employees of SLPEs, DPS, New Delhi.	NT	Department of Public Enterprises (DPS)	New Delhi

Sl. No.	Subject	Type of Training	Organisation	Place of Training Institute
137	Strategic Thinking for Growth and Sustenance (Skill Development training programme for Executive and Employees of SLPEs, DPS, New Delhi.	NT	Department of Public Enterprises (DPS)	New Delhi
138	Corporate Governance (Skill Development training programme for Executive and Employees of SLPEs, DPS, New Delhi.	NT	Department of Public Enterprises (DPS)	New Delhi
139	Quality Assurance & Quality Control in Civil Engineering Construction Project	TECH	Engineering Staff College of India	Hyderabad
140	Methodology/Techniques of Source emission monitoring and corrections to be applied.	TECH	Pollution Control Research Institute, BHEL	Haridwar
141	One day 2nd edition of Industrial Safety Summit 2014	TECH	Confederation of Indian Industry	Vadodara
142	Process Heat, Boilers & Steam System Management	TECH	Marcep Inc.	mumbai
143	Corporate Restructuring, M&A, Buyouts and Divestitures"	NT	Indian Institute of Management	Bangalore
144	Workshop on "Power Theft in Distribution System"	TECH	Central Power Research Institute	Bangalore
145	5th HR Convention - 2014 on Organizational Transformation : Necessity for Sustainable growth	NT	Gujarat Employers' organisation	Vadodara
146	Power Cable (HT & EHT) - selection, laying, testing, Termination, Maintenance and Causes of Failures"	TECH	Engineering Staff College of India	Hyderabad
147	ESP Design O&M and performance optimize (CRM Seats for Customer's participation in PMI Programme (FY - 14-15)	TECH	NTPC Ltd., Power Management Institute	Noida
148	Performance of Boiler and air pre-heater (CRM Seats for Customer's participation in PMI Programme (FY - 14-15)	TECH	NTPC Ltd., Power Management Institute	Noida
149	Specialist level course on "Power System Reliability" (Short term training programmes during 2014-15, PSTI, Bangalore.)	TECH	Power System Training Institute	Bangalore
150	Use of Construction Chemical in Construction Industries	TECH	Engineering Staff College of India	Hyderabad

Sl. No.	Subject	Type of Training	Organisation	Place of Training Institute
151	Revenue Management and Loss Recuction (R-APDRP of Ministry of Power, Govt. of India)	TECH	Indian Institute of Technology Roorkee	Roorkee
152	12th India Doble Power Forum on various topics	TECH	The DOBLE Engineering Pvt. Ltd.	Vadodara
153	12th India Doble Power Forum on various topics	TECH	The DOBLE Engineering Pvt. Ltd.	Vadodara
154	12th India Doble Power Forum on various topics	TECH	The DOBLE Engineering Pvt. Ltd.	Vadodara
155	Executive Certificate programme in Power Management (Batch - V) (Part - I)	NT	PDPUP	Gandhinagar
156	High Voltage Distributin system	TECH	Central Institute for rural Electrification of Rural electrification Corp. Ltd.	Hyderabad
157	56 <sup>th</sup> National cost convention – 2015.	NT	The Institute of cost Accountants of India	New Delhi
158	Hydro Power in India : Continuing Challenges, Emerging Solutions and New Opportunities".	TECH	Sai Cad Centre	New Delhi
159	Indo-European Modeling week and study Group Meeting on Industrial Problems.	NT	The Center for Industrial Mathematic, M.S.University of Baroda,	Vadodara
160	AutoCAD training for Engineer	TECH	Sai Cad Centre	Mehsana
161	Laboratory Managemnet based on ISO/IEC 17025 : 2005 INCLUDING Internal Auditing	NT	Engineering Staff College of India	Hyderabad
162	INTELECT - 2015	NT	IEEMA	Mumbai
163	Cyber security for Power Systems	TECH	Indian Smart Grid Forum	New Delhi
164	Inida Gas Infrastructure Summit 2015	NT	Metis Knowledge Redefined	New Delhi
165	36th State level Annual Safety Conference	TECH	Gujarat Safety Council	Vadodara
166	International Seminar on Implementation of PAT	TECH	STEAG Energy services (India) Pvt. Ltd.	Noida
167	Introduction to ISO 9001: 2015 (Draft International Standard).	NT	TUV India Pvt. Ltd.,	Vadodara



Sl. No.	Subject	Type of Training	Organisation	Place of Training Institute
168	18 <sup>th</sup> National Conference on eGovernance.	NT	Department of Administrative reforms & Public Grievances (DARPG),	Gandhinagar
169	Seminar on “Be Ready for GST”	NT	The Institute of Cost Accountants of India,	ahmedabad
170	Crane Safety Workshop 2015	TECH	Ocean Conference	Mumbai
171	Specialist Level Course on “Regulatory Framework in Power Sector” (PSTI, NPTI, Bangalore.)	TECH	NPTI, PSTI	Bangalore
172	GIS Application (Training programme under R-APDRP of Ministry of Power, Govt. of India)	TECH	India Institute of Technology Roorkee	Roorkee
173	Metering Technology & AMR applications (Training programme under R-APDRP of Ministry of Power, Govt. of India)	TECH	India Institute of Technology Roorkee	Roorkee
174	Revenue Management and Loss Reduction (Training programme under R-APDRP of Ministry of Power, Govt. of India)	TECH	India Institute of Technology Roorkee	Roorkee
175	Revenue Management & Loss Reduction (Training programme for A&B level officers under R-APDRP of Ministry of Power, Govt. of India.)	TECH	Reliance Energy Management Institute (REMI)	Mumbai
176	Metering Technologies & AMR Applications. (Training programme for A&B level officers under R-APDRP of Ministry of Power, Govt. of India.)	TECH	Reliance Energy Management Institute (REMI)	Mumbai
177	GIS Application (Training programme for A&B level officers under R-APDRP of Ministry of Power, Govt. of India.)	TECH	Reliance Energy Management Institute (REMI)	Mumbai
178	Revenue Management & Loss Reduction (Training programme for A&B level officers under R-APDRP of Ministry of Power, Govt. of India.)	TECH	Reliance Energy Management Institute (REMI)	Mumbai
179	Metering Technologies & AMR Applications. (Training programme for A&B level officers under R-APDRP of Ministry of Power, Govt. of India.)	TECH	Reliance Energy Management Institute (REMI)	Mumbai
180	GIS Application (Training programme for A&B level officers under R-APDRP of Ministry of Power, Govt. of India.)	TECH	Reliance Energy Management Institute (REMI)	Mumbai

Sl. No.	Subject	Type of Training	Organisation	Place of Training Institute
181	Revenue Management & Loss Reduction (Training programme for A&B level officers under R-APDRP of Ministry of Power, Govt. of India.)	TECH	Reliance Energy Management Institute (REMI)	Mumbai
182	Communication & Customer Relations with reference to Post-Go Live Scenario (R-APDRP Scheme training programme in Post-Go-Live Scenario)	NT	Central Institute for Rural Electrification	Hyderabad
183	Revenue Management and Loss Reeducation in Post- Go Live Scenario (R-APDRP Scheme training programme in Post-Go-Live Scenario)	TECH	Central Institute for Rural Electrification	Hyderabad
184	Management of Stress & Anger for Employed Women	NT	Faculty of family and Community Sciences	Vadodara
185	Electrical System Grounding & Electromagnetic Interference Analysis	TECH	Safe Engineering Services & Technologies India Pvt. Ltd.	Noida
186	GIS Application (R-APDRP)	TECH	Engineering Staff College of India	Hyderabad
187	Construction Site Supervision	TECH	Infrastructure Skill Development Academy	Ghaziabad
188	Modern Construction Practices including segmental Construction	TECH	National Council for Cement and Building Materials	Hyderabad
189	Refresher Course for EE/ SE/ CE levels (Leadership Skills & Stress Management)	NT	Infrastructure Skill Development Academy	Ghaziabad
190	condition Monitoring of Rotating Machines	TECH	Marcep Inc.	Mumbai
191	Venture-Learning Programme	NT	Baroda Management Association	Vadodara
192	HR Convention on "Organizational Excellence through HR & CSR	NT	Faculty of Social Work	Vadodara
193	Electricity Act (Amendment) Bills.2014	TECH	IPPAI	Mumbai
194	Seminar on "Challenges ahead in the Backdrop of Ealted role of company secretary"	TECH	Royal Orchid,Vadodara	Vadodara
195	Coal characteristics Blending Mill performance and combustion optimization."	TECH	Central Board of Irrigation and power	New Delhi

Sl. No.	Subject	Type of Training	Organisation	Place of Training Institute
196	Accident Investigation, Analysis & prevention:	TECH	N Mark India, Mumbai	Mumbai
197	Basic Level Course on "Power System Operation" (PSTI, NPTI, Bangalore.)	TECH	Power System Training Institute	Bangalore
198	Specialist Level Course on "Regulatory Framework in Power Sector" (PSTI, NPTI, Bangalore.)	TECH	Power System Training Institute	Bangalore
199	Metering Technology & AMR applications (Training programme under R-APDRP of Ministry of Power, Govt. of India)	TECH	India Institute of Technology Roorkee	Roorkee
200	Revenue Management and Loss Reduction (Training programme under R-APDRP of Ministry of Power, Govt. of India)	TECH	India Institute of Technology Roorkee	Roorkee
201	GIS Application (Training programme under R-APDRP of Ministry of Power, Govt. of India)	TECH	India Institute of Technology Roorkee	Roorkee
202	GIS Application (Training programme for A&B level officers under R-APDRP of Ministry of Power, Govt. of India.)	TECH	Reliance Energy Management Institute (REMI)	Mumbai
203	Revenue Management & Loss Reduction (Training programme for A&B level officers under R-APDRP of Ministry of Power, Govt. of India.)	TECH	Reliance Energy Management Institute (REMI)	Mumbai
204	Metering Technologies & AMR Applications. (Training programme for A&B level officers under R-APDRP of Ministry of Power, Govt. of India.)	TECH	Reliance Energy Management Institute (REMI)	Mumbai
205	GIS Application (Training programme for A&B level officers under R-APDRP of Ministry of Power, Govt. of India.)	TECH	Reliance Energy Management Institute (REMI)	Mumbai
206	Cost Management for Competitive Advantage (Management Development Programme for the month of January & February - 2015)	NT	National Institute of Industrial Engineering	Mumbai
207	Financial statement analysis for executives (Management Development Programme for the month of January & February - 2015)	NT	National Institute of Industrial Engineering	Mumbai
208	Communication & Customer Relations with reference to Post-Go Live Scenario (R-APDRP Scheme training programme in Post-Go-Live Scenario)	NT	Central Institute for Rural Electrification	Hyderabad

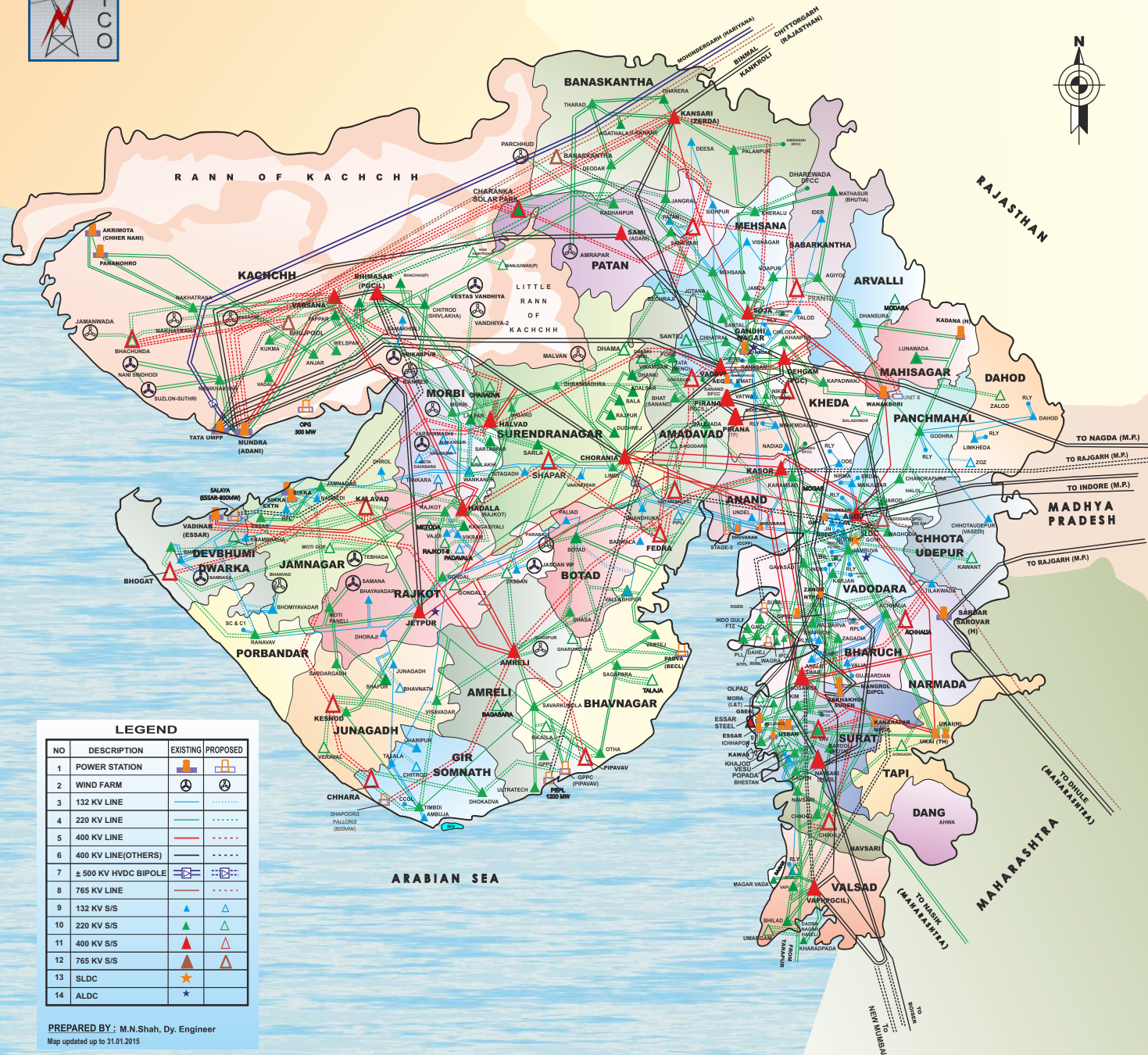
Sl. No.	Subject	Type of Training	Organisation	Place of Training Institute
209	Revenue Management and Loss Reduction in Post Go Live Scenario (R-APDRP Scheme training programme in Post-Go-Live Scenario)	TECH	Central Institute for Rural Electrification	Hyderabad
210	Revenue Management and Loss Reduction in Post Go Live Scenario (R-APDRP Scheme training programme in Post-Go-Live Scenario)	TECH	Central Institute for Rural Electrification	Hyderabad
211	Construction Maintenance of Concrete Roads	TECH	Engineering Staff College of India	Hyderabad
212	IT in Distribution	TECH	Engineering Staff College of India	Hyderabad
213	Construction Management - Best Practices and Modern Technologies.	TECH	Engineering Staff College of India	Hyderabad
214	Forensic Accounting & Investigative Audit	NT	Institute of Forensic Accounting & Investigative Audit	Noida
215	Life after retirement	NT	SPIPA	A'bad
216	Electrical Safety procedures and Accident Prevention	TECH	Marcep Inc.	Mumbai
217	Project management in construction Industry	NT	ESCI, Hyderabad	ESCI, Hyderabad
218	Chai pe ki urja ki charcha	TECH	IPPAL,	Mumbai
219	Workshop for construction supervisors	TECH	Ambuja Foundation, A'bad	A'bad
220	Seminar on "Safety Beyond Statutes"	TECH	Trivedi & Associates Technical Services (P) Ltd.	Vadodara
221	workshop on "Union budget,2015-16, Provisions of Central Excise, Service tax & Customs Laws"	NT	Indian Institute of Materials management	Vadodara
222	International conference and Exhibition on Smart Grids and Smart cities.	TECH	India Smart Grid Forum, Power Line	Bangalore
223	High Voltage Distribution system	TECH	Central Institute for rural Electrification of Rural electrification Corp. Ltd.	Hyderabad
224	Physical & Mental Fitness	NT	SPIPA	Ahmedabad
225	Corporate Social Responsibility & its Effective Management	NT	Bombay Academy of Management Studies,	Mumbai

Sl. No.	Subject	Type of Training	Organisation	Place of Training Institute
226	CII – CAP Workshop for CSR Teams	NT	Confederation of Indian Industry	Ahmedabad
227	Workshop on ‘Corporate Grooming Etiquette & personality Development’	NT	GFORD Institute of Management Pvt. Ltd	New Delhi
228	Challenges & issues for environment management (CRM Seats for Customer's participation in PMI Programme (FY - 14-15)	TECH	NTPC Ltd., Power Management Institute	Noida
229	Power system protection (CRM Seats for Customer's participation in PMI Programme (FY - 14-15)	TECH	NTPC Ltd., Power Management Institute	Noida
230	Revenue Management and Loss Reduction (Training programme under R-APDRP of Ministry of Power, Govt. of India)	TECH	India Institute of Technology Roorkee	Roorkee
231	GIS Application (Training programme under R-APDRP of Ministry of Power, Govt. of India)	TECH	India Institute of Technology Roorkee	Roorkee
232	Metering Technology & AMR Applications (Training programme under R-APDRP of Ministry of Power, Govt. of India)	TECH	India Institute of Technology Roorkee	Roorkee
233	Revenue Management & Loss Reduction (Training programme for A&B level officers under R-APDRP of Ministry of Power, Govt. of India.)	TECH	Reliance Energy Management Institute (REMI)	Mumbai
234	Metering Technologies & AMR Applications. (Training programme for A&B level officers under R-APDRP of Ministry of Power, Govt. of India.)	TECH	Reliance Energy Management Institute (REMI)	Mumbai
235	Communication & Customer Relations with reference to Post-Go Live Scenario	NT	Central Institute for Rural Electrification	Hyderabad
236	Communication & Customer Relations with reference to Post-Go Live Scenario	NT	Central Institute for Rural Electrification	Hyderabad
237	Revenue Management and Loss Reeducation in Post- Go Live Scenario	TECH	Central Institute for Rural Electrification	Hyderabad
238	Revenue Management and Loss Reeducation in Post- Go Live Scenario	TECH	Central Institute for Rural Electrification	Hyderabad





# POWER MAP OF GUJARAT



## LEGEND

NO	DESCRIPTION	EXISTING	PROPOSED
1	POWER STATION		
2	WIND FARM		
3	132 KV LINE		
4	220 KV LINE		
5	400 KV LINE		
6	400 KV LINE(OTHERS)		
7	± 500 KV HVDC BIPOLE		
8	765 KV LINE		
9	132 KV S/S		
10	220 KV S/S		
11	400 KV S/S		
12	765 KV S/S		
13	SLDC		
14	ALDC		