



24X7 POWER FOR ALL DADRA AND NAGAR HAVELI

A Joint Initiative of Government of India and
Administration of UT of Dadra and Nagar Haveli





Government of India



Piyush Goyal

Union Minister of State (IC)

Power, Coal, New & Renewable Energy

Foreword

Electricity consumption is one of the most important indices that decide the development level of a nation. The Government of India is committed to improving 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.

This joint initiative of Government of India and Administration of Dadra and Nagar Haveli aims to further enhance the satisfaction levels of the consumers and improve the quality of life of people through 24x7 power supply. This would lead to rapid economic development of the UT in primary, secondary & tertiary sectors resulting in inclusive development.

I compliment the Administration of Dadra and Nagar Haveli and wish them all the best for implementation of this programme. The Government of India will complement the efforts of Administration of Dadra and Nagar Haveli in bringing uninterrupted quality power to each household, farmer, small & medium enterprises and establishment in the UT.



Administration of Dadra
and Nagar Haveli



Vikram Dev Dutt, IAS **Administrator of Dadra and Nagar Haveli**

Foreword

The Power Sector plays a pivotal role in the economic development of the country. The efficient power sector is a sine qua non for the optional development of the nation. The availability of the reliable, uninterrupted and quality power supply to all the categories of the consumers is imperative to achieve this goal.

I would like to thank the Government of India, Ministry of Power for preparing this document for the UT of Dadra & Nagar Haveli under the scheme of implementation of Power for All (PFA) programme.

The UT of Dadra & Nagar Haveli is a small Union Territory situated in the Western Part of the country which is sandwiched between the States of Gujarat and Maharashtra.

The UT has a geographical area of 491 Sq. Km. and is a tribal dominated territory. The Government of India has extended various benefits for the industrial development in the territory since 1982 as a result of which, homogenous industrial development has taken place. The power sector has been a prime mover in the overall development of the territory.

Our Administration is fully prepared to transform DNH into a power cut-free State within a short period and provide every citizen access to reliable and affordable electricity with cooperation from the Central Government. The UT has initiated all necessary steps to provide adequate infrastructure facilities like Capacity Addition, strengthening of Transmission and Distribution network, encouraging Renewable Generation of power and reduction of Aggregate Technical and Commercial losses.

The Power for All programme is an excellent platform for addressing these issues and it would further provide an opportunity to improve the power sector of the territory and achieve the goal as envisaged by the nation.



Government of India



Administration of Dadra and Nagar Haveli

Joint Statement

The Government of India, Ministry of Power has selected Dadra and Nagar Haveli as one of the Union Territories for Power for All (PFA) programme. This Programme will be implemented by Administration of Dadra & Nagar Haveli with active support of Government of India, Ministry of Power.

The objective of the programme is to supply 24x7 quality, reliable, uninterrupted and affordable power supply to all Domestic, Commercial, Agricultural and Industrial category of consumers within the territory. All unconnected households will be provided electricity as the goal of 100% electrification.

The Administration of UT Dadra & Nagar Haveli is giving highest priority to power sector of the territory and has created adequate infrastructure to ensure better power supply.

The Administration of Dadra & Nagar Haveli 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 renewables, energy efficiency measures, and reduction of AT & C losses and following good governance practices in implementation of all Central and State Government schemes.

Government of India (GOI) would supplement the efforts of Union Territory through additional allocation of power from Central Generating Stations.

It is envisaged to cover entire territory under PFA programme in a phased manner and provide 24 x 7 power supply to all Domestic, Industrial Agricultural and Commercial consumers by March 2017.

The matter would be reviewed by the Central Government and Administration of UT Dadra & Nagar Haveli and would meet regularly to review the progress of the programme over the next 3 years and would strive to achieve the objectives of the programme by taking the necessary actions as envisaged in the PFA document.

Jyoti Arora, IAS
Joint Secretary
Ministry of Power (GoI)

J. B. Singh, IAS
Secretary, Power Department,
Administration of Dadra and Nagar Haveli

EXECUTIVE SUMMARY

24x7- Power for All (24x7 PFA) is a Joint Initiative of Government of India (GoI) and State Governments/UT Administrations with the objective to provide 24x7 power available to all households, industry, commercial businesses, public needs, any other electricity consuming entity and adequate power to agriculture farm holdings by FY 19. This roadmap document aims to meet the above objectives for the UT of Dadra and Nagar Haveli.

As per 2011 census, the population of UT of Dadra and Nagar Haveli was 3.44 lakhs. The power department of UT has been corporatized recently and DNHPDCL is the distribution licensee in the UT. The UT has the highest per capita annual consumption of 13,769 units (FY 15) in the country which is way higher than national average of 1010 units during the same year (CEA). The same is due to about 97% industrial consumption in the UT.

CONNECTING THE UNCONNECTED

Based on 2011 Census, there were around 3505 un-electrified households in the UT but as per UT Administration, there is no un-electrified household in the UT at present.

FEEDER SEGREGATION

Keeping in view of the negligible sales in agriculture category, the UT does not have any feeder segregation and also has not estimated any expenditure on this account.

24 X 7 SUPPLY

The UT is already supplying power to the extent of 24 hours in urban areas and rural areas except for maintenance and operational issues. However, UT is meeting the time line of power supply restoration as per the Standards of Performance notified by JERC.

GROWTH IN DEMAND

In order to achieve the objective of 24 x 7 supply in the state, the state would see an increase in peak demand from 714 MW in FY 15 to 1013 MW in FY 19

with corresponding increase in energy requirement from 5304 MU in FY 15 to 7715 MU in FY 19.

In the present conditions, the peak demand of 714 MW in FY 15 was almost fully met owing to power allocation from central generating stations and purchases on medium / long term basis by UT. However some of the industrial consumer are opting for open access and this issue may vary the projected energy & maximum demand of the UT in future.

The future demands have been derived by estimating household consumption after 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 hand. It has also been assumed that un-electrified consumers arrived as per census projection would be electrified in FY 17. Individual category-wise growth rate equivalent to the 5 year CAGR has been considered for other than domestic sectors.

The daily household consumption has been computed for households for FY 15 and escalated by 9.23% annually in rural areas and urban areas (from 4.66 units to 6.63 units) to arrive at the daily household consumption up to FY 19 while CAGR for non-domestic consumption has been taken at 8% growth rate for computation of demand by the end of FY19.

SUPPLY ADEQUACY

UT does not have its own generation and is meeting the most of the demand through allocation from Central Generating Stations. The present long-term availability of the state is 1028.30 MW from all sources including share from unallocated quota from Central Generating Stations.

In FY 15 about 65% of the power was sourced from NTPC stations and 25% power from IPP (EMCO). Rest Power was drawn from nuclear and renewable based plants and from UI mechanism

In order to meet the increasing demand, the UT has been allocated 168.07 MW from CGSs (tentative) in a

phased manner by FY 19. The UT has also planned to set-up or procure 94.27 MW solar power by investing Rs 126.39 Crores for own generation.

As Dadra and Nagar Haveli will be having projected energy availability of almost 100% through long-term share in FY 19, there is no requirement of purchase through short term power as of now. However 609.57 MW of unallocated power is assigned to the UT from CGS which is not reliable in long run, hence a part of unallocated power needs to be converted to firm allocation by Ministry of Power. However, there may be a reduction in demand of the tune of about 200 MW in case some of existing industrial consumers would go for open access.

Accordingly, UT needs to optimize its power purchases as per requirement on short term basis and should look forward for selling the surplus power to prospective deficit states in case more consumers opt for open access. .

ADEQUACY OF TRANSMISSION NETWORK

Presently, UT is getting power at 400 KV and 220 KV from Western Grid through PGCIL Substations. PGCIL has constructed a 400/220 KV, 2x315 MVA S/S in UT (at Kala) exclusively for UT and UT is also getting supply from 400/220 KV, 3x315 MVA S/S at Vapi. The existing ISTS transmission line capacity and transformation capacity is adequate for meeting the present as well as future requirements.

The present 220 KV intra state capacity of 1000 MVA is proposed to be increased to 1520 MVA by adding 520 MVA capacities at Vagchipa and Sayali S/Ss in the UT.

The existing intra-state transmission system with the planned investment of Rs 160 Crores towards capacity addition would be adequate to meet the requirement as envisaged for 24x7 PFA.

ADEQUACY OF DISTRIBUTION NETWORK

There are about 65000 consumers in the UT with 1389 MVA connected load. The 66/11 KV S/S capacity in UT is about 712 MVA along with DT capacity of about 219 MVA. Out of max demand of 714 MW, about 400 MW load is being supply to HT

consumers at 220 KV and 66 KV levels and keeping in view the load incident at 66 KV and 11 KV, the existing transformation capacities are adequate.

The UT has envisaged a requirement of Rs 180 Crores in strengthening of infrastructure in urban areas under IPDS and Rs 129 Crores in strengthening of infrastructure in rural areas under DDUGJY out of which Rs 5 Crore cost has been approved by central government. Further, Rs. 37 Crores have been envisaged for strengthening of infrastructure. Also, Rs 65Crores is estimated for IT initiatives to ensure better consumer service and roll-out of smart grid.

The UT has planned capacity addition of 240 MVA at 66/11 kV level and 74 MVA at distribution transformer level.

The existing distribution network with projected addition would be adequate under projected peak load conditions but the UT has to take necessary steps to complete the planned works within scheduled time period.

The T&D Losses (including intra-state transmission losses) are also projected to be remain almost constant at 4.70% by FY 19 from present level of 4.78% and AT&C is projected to reduce to 4.70% by FY 19 from the present level of 5.76% owing to increase in collection efficiency.

FINANCIAL TURNAROUND

DNHPDCL is showing a net profit of Rs 43 Crores during FY 15 and the accumulated financial profit (surplus) of DNHPDCL stands as Rs 110 Crores in FY 15. Since Power Purchase cost constitute 97% of total expense, the utility will be profitable for future years also if only increase in power purchase expense is allowed in tariff by the regulator. The utility also incurs capital expenditure from budgetary support of central government and has cash (and equivalent) of Rs 545 Crore, hence it is also comfortably placed in terms of cash flow.

On the basis of above considerations, a roadmap to achieve '24x7 Power for All' targets has been formulated and detailed in the report.

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CHAPTER 1:INTRODUCTION

Power sector is a critical infrastructure element for growth of an economy. The availability of reliable, quality and affordable power is vital for rapid growth in agriculture, industry and for overall economic development of a state/UT. For this an efficient, resilient and financially healthy power sector is an essential requirement for growth of a state/UT and economic empowerment of the common man.

Under the Indian Constitution, electricity is a concurrent subject. As per Electricity Act 2003, it is the duty of a distribution licensee to develop and maintain an efficient, coordinated and economical distribution system in the mandated area of supply as well as to supply electricity in accordance with the provisions contained in the Act. The State Electricity Regulatory Commission (SERC), as per the provisions of the act, specifies and enforces the standards with respect to quality and reliability of supply by licensees and also monitors the performance of distribution companies (Licensees) on the basis of notified performance standards.

OBJECTIVES AND KEY OUTCOMES OF THE 24X7 POWER FOR ALL – JOINT INITIATIVE

The 24x7 Power for All (24x7 PFA) is a Joint Initiative of Government of India (GoI) and Administration of Dadra and Nagar Haveli with the objective to make 24x7 power available to all households, industry, commercial businesses, public needs, any other electricity consuming entity and adequate power to agriculture farm holdings.

Towards this goal the 24x7 PFA initiative seeks to:

- i. Ensure reliable 24x7 supply to consumers within a period of four years of commencement of the program. The hours of supply for agriculture consumers will be decided by the State Government as per requirement.
- ii. Ensure that all unconnected households are provided access to electricity in a time bound manner in the next four years i.e. by end of FY 19.
- iii. Ensure adequate capacity addition planning and tie ups for power from various sources at affordable price to meet the projected power demand in future.
- iv. Strengthen the transmission and distribution network to cater to the expected growth in demand of existing as well as future consumers.
- v. Assess the financial measures including optimizing investments and undertaking necessary balance sheet restructuring measures to ensure liquidity in the finances of the utility.
- vi. Put in place a strategy to ensure reduction of AT&C losses as per the agreed loss reduction trajectory and methodology and steps required to be taken at every level of distribution.
- vii. Identify steps for implementation and adoption of modern technologies to monitor reliability of supply.
- viii. Identify steps for monitoring timely commissioning of various generating plants and transmission and distribution infrastructure to meet the expected growth in demand.

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

This document is an action plan has been drawn to achieve the above aims and objectives. The plan will be executed by the Administration of Dadra and Nagar Haveli with the support of Government of India, wherever necessary, as per their approved plans, schemes and policies.

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

The plan aims at the following:

- (1) bridging the gap between the demand and supply for the already identified/registered consumers and other consuming entities,
- (2) connecting the unconnected households and unconnected farm holdings.

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 commercial, industrial and agriculture consumers based again on past data and historical CAGR recorded during the past five years.
- 3) Assess the power requirement of un-electrified households and draw up a time bound plan for electrification of all households.
- 4) Project the annual energy requirement and maximum demand by aggregating the requirement of all consumer

categories and applying an appropriate load factor.

- 5) Draw up a broad plan to meet power demand in future through
 - ✓ UT's own upcoming generation resources.
 - ✓ Allocation from upcoming central sector power plants
 - ✓ Quantum for additional procurement required.
- 6) Assess the additional energy requirement for providing 24x7 power supply to all households in the state/UT as well as to other consumer categories and determine financial implications on utilities for procuring additional energy and its implication on tariff.
- 7) Assess the adequacy of the network - both inter-state and intra state transmission as well as distribution so as to meet the increased / expected / projected power requirement of all consumer categories of the state/UT.
- 8) To incorporate futuristic initiatives like smart grid, energy efficiency measures etc.
- 9) Conduct sensitivity analysis for cost of service and resulting financial gap under multiple scenarios, namely, tariff hike, reduction in power procurement cost and increase in interest and moratorium period and AT&C loss reduction, etc.
- 10) Set monitorable targets to achieve the goal of 24x7 Power for All in a cost effective manner to the consumers of the state/UT.

CHAPTER 2: FACTS ABOUT DADRA AND NAGAR HAVELI



Key Facts	
Constituted on	11 th August 1961
As per 2011 Census	
Total Area	491 Sq. Km
- Rural Areas	- 445 Sq. Km (90.69%)
- Urban Areas	- 46 Sq. Km (9.31%)
Administrative Districts	1
No. of Villages	
- Inhabited villages	- 65
Population	3,43,709
- Rural	- 1,83,114
- Urban	- 1,60,595

Dadra and Nagar Haveli (DNH) got independence from Portuguese control in 1954 and was formally merged in India on 11 August 1961. It is bordered by Gujarat in the north and Maharashtra in the south.

The forests cover almost two-fifth area of the Dadra and Nagar Haveli. Northeast and Eastern region of UT has got hilly terrain and elevations up to 300 meters can be found. Central plains near Dadra are lowlands which come under the watershed areas of the Daman Ganga River and the tributaries.

Economy of DNH is primarily dependent on Agriculture and Tourism. Agriculture is considered as the economic activity that contributes most to the economy. Paddy, raggy and millets are main crops. Approximately 60% of working population is engaged in agriculture and allied activities.

DNH Power Distribution Corporation Ltd (DNHPDCL) deemed licensee under Section 14 of the Electricity Act 2003, is mainly engaged in the procurement and distribution of electricity to various consumer categories in the Union Territory (UT) of DNH. DNHPDCL is part of the Administration of Union Territory of Dadra & Nagar Haveli and headed by the Secretary (Power). DNHPDCL does not have its own power generating station (except small solar plants) and relies mainly on power from Central Generating Stations (CGSs) such as NTPC Ltd.

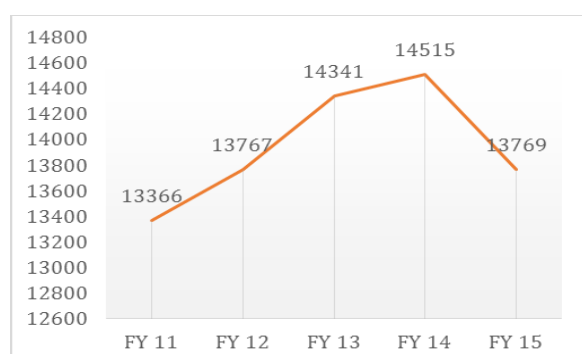
The power sector of UT is regulated by Joint Electricity Regulatory Commission for State of Goa and UTs (JERC-UTS).

CHAPTER 3: CONSUMPTION PATTERN AND ELECTRIFICATION STATUS

ELECTRIFICATION STATUS AND PER-CAPITA CONSUMPTION

The population of Dadra and Nagar Haveli has grown from 2,20,490 in 2001 to 3,43,709 in 2011 at a decadal CAGR of 4.54%. This growth rate has been considered for estimating the population beyond 2011. Based on the annual energy availability from FY 11 to FY 15, the per-capita consumption of electricity in the period has been as shown below:

Figure 1: Per-Capita Consumption of Electricity (kWh per person) in recent years



STATUS OF ELECTRIFICATION AND PROJECTION OF HOUSEHOLDS FOR FY 15

The summary of electrified and un-electrified households as per 2001 and 2011 census and projections for FY 15 based on CAGR for past 10 years is tabulated below:

Table 1: Projection of households based on Census 2001 and 2011

Particulars	Electrified Households	Un Electrified Households	Total Households
Total			
2001	37,813	6,160	43,973
in %	85.99%	14.01%	100.00%
2011	69,558	3,505	73,063

Particulars	Electrified Households	Un Electrified Households	Total Households
in %	95.20%	4.80%	100.00%
CAGR	6.28%	-5.48%	5.21%
FY 15 (Projected Households)	86,656	2,861	89,516
Rural			
2001	27,088	5,695	32,783
in %	82.63%	17.37%	74.55%
2011	32,452	2,956	35,408
in %	91.65%	8.35%	48.46%
CAGR	1.82%	-6.35%	0.77%
FY 15 (Projected Households)	41,108	2,274	43,382
Urban			
2001	10,725	465	11,190
in %	95.84%	4.16%	25.45%
2011	37,106	549	37,655
in %	98.54%	1.46%	51.54%
CAGR	13.22%	1.67%	12.90%
FY 15 (Projected Households)	45,548	587	46,135

From above it is inferred that:

- In 2011, 48.46% of the households are in rural areas and 51.54% are in urban areas.
- In 2011, 95.20% households are electrified of which Urban areas have electrification of 98.54% and rural areas have electrification of 91.65%.
- Overall number of households has grown at a decadal CAGR of 5.21% with urban areas showing higher decadal growth rate of 12.90% as compared to 0.77% in rural areas.

Expected numbers of households in both urban and rural areas have been arrived for FY 15 by projecting them at decadal CAGR of total households in the UT. Number of un-electrified households in rural and urban areas in FY 15 have been projected by escalating them by respective CAGR of un-electrified households in rural and urban

areas. As per projections, about 2861 households are un-electrified in the UT but as per UT Administration, UT has achieved 100% electrification and there is no un-electrified household in the UT.

UT Administration has shown only 53,193 electrified domestic consumers in FY 15 as against the above projected figures of 86,656, electrified households derived by extrapolating Census 2011 data.

The difference in census projections and records of DNHPDCL is due to the fact that a household may have single electrical consumption but may have been considered as separate household in census. For the projection of daily household consumption (for the estimation of demand) of both rural and urban consumers in future years, following methodology has been adopted:

The figure of the domestic consumers in FY 15 as given by DNHPDCL has been considered as electrified households. However different figures for urban and rural consumers and their consumptions are not available. Therefore for projection

consumers of DNHPDCL have been treated as one entity

The issue of demand projections for future years was discussed with the UT. For the projection of daily household consumption (for the estimation of demand) of both rural and urban consumers in future years, following methodology has been adopted:

- (1) The figures of the domestic consumers in FY 15 as given by DNHPDCL has been considered as electrified households.
- (2) The figures of the un-electrified households in FY 15 has been considered as per census projection by methodology explained above for demand projection only, however there is no un electrified household in the UT as per UT Administration.

Based on the above, the number of electrified and un-electrified households in Dadra and Nagar Haveli in FY 15 have been arrived at. Accordingly, the demand projections for the UT have been worked out in the next chapter.

CHAPTER 4: DEMAND AND SUPPLY SCENARIO

PRESENT POWER SUPPLY POSITION

The actual energy and demand scenario during the past 6 years is shown below:

Figure 2: Energy Requirement vs. Availability¹ (in MU)

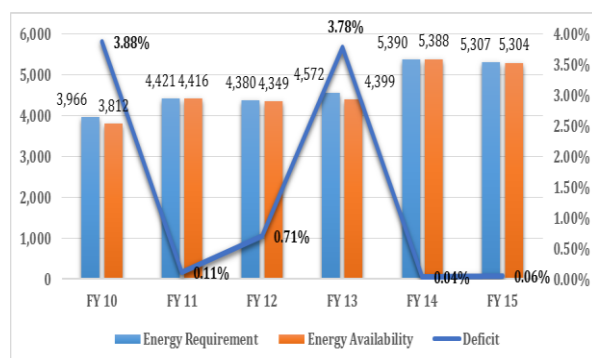
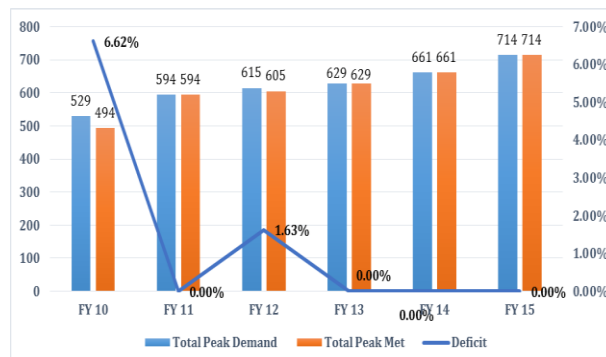


Figure 3: Peak Demand vs. Peak Met (in MW)



- *The peak demand deficit is being progressively bridged by DNHPDCL*

As per DNHPDCL it is currently providing 24x7 Power supply to all consumers except for operational/maintenance issues

DEMAND PROJECTIONS

The present energy requirement of Dadra and Nagar Haveli during FY 15 was 5304 MU.

With 24x7 supply to be provided across the UT, the demand is likely to increase. The demand can be classified in three broad categories.

- Demand on account of 24x7 power supply to already electrified and newly built domestic households
- Demand from electrification of un-electrified domestic households.
- Demand on account of 24x7 power supply to other than domestic category.

DETERMINATION OF AVERAGE GROWTH RATE IN DAILY HOUSEHOLD CONSUMPTION

The actual daily household consumption of registered domestic consumers has increased marginally from 2.99 kWh in FY 11 to 4.66 kWh in FY 15 at CAGR of 9.23%. The high growth in daily household consumption is because of higher growth in number of normal consumers as compared to BPL consumers having less consumption. The same escalation has been considered for escalating daily household consumption beyond FY 15.

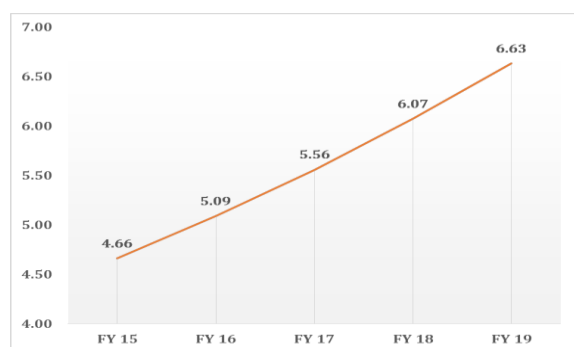
DETERMINATION OF CONSUMPTION OF HOUSEHOLDS (ELECTRIFIED AND UN-ELECTRIFIED)

The average daily household consumption of existing electrified households in FY 15 has been arrived at by dividing the actual sales in the UT (as per the information provided by DNHPDCL) by number of consumers as per DNHPDCL

¹ As per the data available in the CEA

The projected daily household consumption in the UT is shown below:

Figure 4: Projected Daily Household Consumption Electricity (kWh per person) for future years



However, it may also be kept in view that the geographical features of the UT (i.e. the location, accessibility, weather) along with current tariff levels play a significant role in determining the current and future demands.

The number of electrified households is expected to grow at the decadal CAGR of 5.21% in the UT. For purpose of Demand projection it has been assumed that all un-electrified households would be electrified in FY 17.

Accordingly, the annual consumption of the domestic households is tabulated below:

Table 2: Projected Sales from Existing and Newly Electrified Households

S. N.	Particulars	FY 15	FY 16	FY 17	FY 18	FY 19
A	Electrified Consumers (Existing + Projected Growth)					
	Electrified Consumers (in Nos.)	53,193	55,964	58,879	61,945	65,172
	Daily Household Consumption (in kWh)	4.66	5.09	5.56	6.07	6.63
	Projected Annual Consumption (in MU)	90	104	120	139	159
B	Electrification of Un-Electrified Consumers					
	Targeted Annual Addition (in Nos.)	-	0	2,861	0	0
	Cumulative Annual Addition (In Nos.)	-	0	2,861	2,861	2,861
	Projected Annual Consumption (in MU)	-	0	3	6	7
C=A+B	Total Projected Consumption (MU)	90	104	122	144	165

DETERMINATION OF CONSUMPTION OF OTHER CONSUMERS

For projection of sales for FY 15 to FY 19, the CAGR of previous 5 years has been considered for all categories except public water works. Consumption in Public Water Works have started in FY 15 only and an

escalation of 5% has been considered for projecting consumption till FY 19.

Based on this, the category-wise sales is as per table below:

Table 3: Projected Category-wise Sales (In MU)

Categories	CAGR Considered	FY 16	FY 17	FY 18	FY 19
Domestic Category		103.93	122.34	143.60	164.67
LT Category - Other than domestic					
Commercial	7.32%	29.03	31.16	33.44	35.88
Agriculture	7.52%	4.63	4.98	5.36	5.76
Industrial LT	8.45%	203.35	220.53	239.16	259.37
Public Lighting	25.43%	9.73	12.21	15.31	19.20
Public Water Works	5.00%	3.39	3.56	3.74	3.93
Temporary Supply	11.63%	2.90	3.24	3.62	4.04
HT/EHT Category					
Industrial (IHT)	9.10%	5,281.37	5,762.23	6,286.87	6,859.28
Grand Total		5638.34	6160.25	6731.09	7352.13

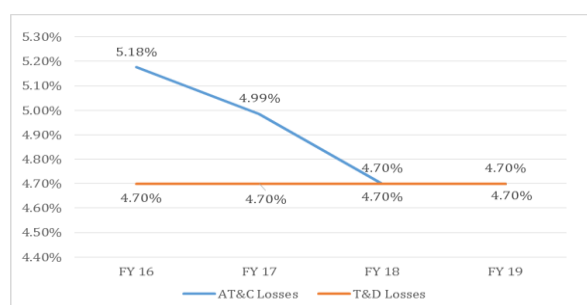
- As seen from above, the share of industrial sales (LT, HT) will continue to form bulk of demand at 97%, however in order to meet objective of Power Supply to all 24 x 7 percentage of power consumption by domestic segment will increase from 1.85% to 2.25%.

ENERGY AND DEMAND REQUIREMENT

The trajectory for T&D (including intra-state transmission) and AT&C loss reduction for DNHPDCL has been taken as submitted by it for FY 2015-16 to FY 2018-19

Considering the collection efficiency proposed by DNHPDCL, the T&D and AT&C Loss trajectory is shown below:

Figure 5: Projected Loss Reduction Trajectory



Based on the loss reduction trajectory approved as above, the energy and demand requirement for the future years is tabulated in table 5 below:

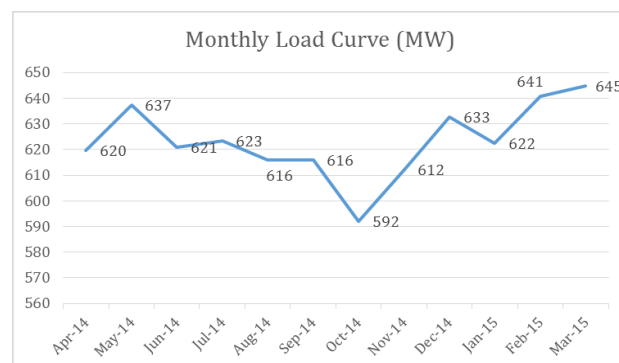
The load factor has been taken as average of last 3 years actual PLF at 86.97%.

As seen from the above, the maximum demand requirement of the UT is projected to increase from 714 MW in FY 15 to **1013 MW in FY 19**. Additionally there is 76 MVA

maximum demand of OA consumers which at 0.9 power factor arrives at 68 MW. Hence total maximum demand handled by Transmission and Distribution system has been assumed as 1081 MW. The energy consumed by OA consumer is 25 MU

As per projections made in 18th EPS of CEA, the projected energy demand and peak load for the UT of Dadra and Nagar Haveli was 7064 MU and 1072 MW in FY 19 as against the now calculated energy demand of 7739 MU and peak load of 1081 MW in FY 19.

LOAD CURVE



As can be seen from above graph seasonal load-curve of the UT is almost flat with value ranging from +/- 5%. The same is also possible as most of the load is industrial which do not exhibit much seasonal variation.

Table 4: Energy Requirement (In MU) and Peak Demand (in MW)

Particulars	Energy and Demand Scenario			
	FY 16	FY 17	FY 18	FY 19
Energy Requirement within UT				
Sale within UT	5,638	6,160	6,731	7,352
Intra-State Transmission and Distribution Losses	4.70%	4.70%	4.70%	4.70%
Total Energy Requirement within State	5,916	6,464	7,063	7,715
Load Factor	86.97%	86.97%	86.97%	86.97%
Maximum Demand Requirement (DNHPDCL)	777	848	927	1,013
Maximum Demand (Open Access)	68	68	68	68
Maximum Demand (UT)	845	916	995	1081

However, the energy requirement and maximum demand may vary in case more industrial consumers opt for open access, but UT has to establish & maintain the transmission system to handle the total projected power of the UT.

CHAPTER 5: GENERATION PLAN

CUMULATIVE GENERATION AVAILABILITY

DNHPDCL does not have any power plant of its own and is dependent upon Central Generating stations (CGS) and IPP. Long Term allocation of the UT from CGS and IPP as on 31.03.2015 stands at 1035 MW as detailed in table below. The same also includes 609 MW unallocated power from CGS which has been allocated by Central Government to Dadra and Nagar Haveli.

Station wise details are at Table 29 in Annexure – 2. Coal based capacity constitutes about 75% of total capacity followed by gas based 18%.

Table 5: Availability Mix from Long-term Sources in FY 15 (in MW)

Source	Latest Long term Entitlement in MW	In %age
Availability Outside UT		
Central Generating Stations		
Coal	579.71	69.93%
Gas	178.10	21.50%
Nuclear	70.49	8.44%
Total	828.30	80.67%
Independent Power Producer		
Coal	200	100%
Total	200	19.45%
Grand Total	1028.30	

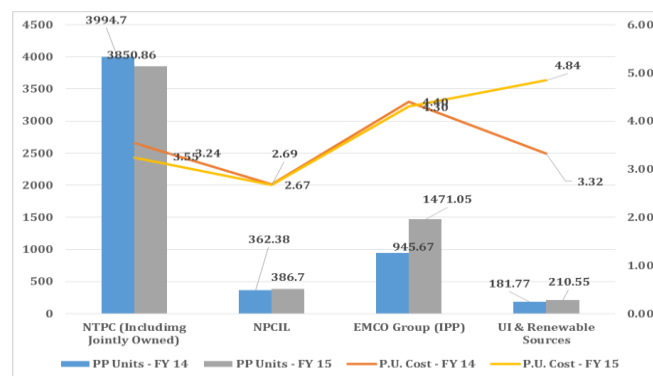
Dadra and Nagar Haveli has met a maximum demand of 714 MW in FY 15 and the present annual energy requirement of the UT is of the order of 5307 MU.

The maximum demand (for DNHPDCL) is expected to increase to 1013 MW in FY 19 and the energy requirement is projected to

rise to 7715 MU in FY 19, taking into account additional energy requirement for providing 24x7 power supply to the UT over the normal load growth.

The actual energy availability from various sources in FY 14 and FY 15 is summarized below:

Figure 6: Availability Mix from Various Sources in FY 14 and FY 15 (in MU)



- During FY 15, about 65% of the power is being sourced from NTPC Plants whose average rate has decreased from Rs. 3.55/unit in FY 14 to Rs. 3.24/unit in FY 15 due to reduction in power offtake from costly RGGPL.
- Another 25% power is being sourced from coal based IPP (EMCO Energy Ltd) whose average rate is Rs 4.30/Unit.

PLANNED CAPACITY ADDITION

UT has the allocation of about 168.07 MW from CGS which are planned to be commissioned up to FY 19. Along with the same 94.27 MW power is expected from Solar Plants. The additional capacity available from various sources (along with the expected year of commissioning) is summarized below:

Table 6: Summary of Additional Long-term Availability from Various Sources

Sr. No.	Source	Type	Capacity (MW)	Latest Long term Entitlement		Availability
				%	MW	
	Availability Within UT					
A	Renewable Energy Sources					
	Solar Rooftop	Solar	0.37	100.00%	0.37	FY 16
	Solar Velugam	Solar	3.00	100.00%	3.00	FY 17
	Solar Kala	Solar	0.90	100.00%	0.90	FY 18
	Solar Kharadpada	Solar	10.00	100.00%	10.00	FY 18
Subtotal	Renewable Energy Sources		14.27	100.00%	14.27	
	Availability Outside UT					
C	CGS and Solar Plants - New					
	Solar JNNSM	Solar	5.00	100.00%	5.00	FY 17
	Solar Bidding	Solar	75.00	100.00%	75.00	FY 17
	Vindhyachal STPS - 5	Coal	1000.00	0.56%	5.55	FY 16
	Lara STPS	Coal	1600.00	0.56%	9.00	FY 18
	Gadawara	Coal	1600.00	0.7%	11.00	FY 18
	Dhruvan	Coal	1980.00	1.26%	24.95	FY 18
	Mouda STPP-2	Coal	1320.00	1.11%	14.65	FY 17
	Solapur	Coal	1320.00	1.11%	14.65	FY 17
	Khargaon	Coal	1320.00	1.89%	24.95	FY 19
	Barh	Coal	1320.00	0.42%	5.54	FY 18
	Karpakkar APS 3-4	Nuclear	1400.00	0.56%	7.78	FY 17
	NSPCL Rourke;a	Coal	250.00	20.00%	50.00	FY 17
Subtotal	CGS - New		13190.0	1.28%	248.07	

* Share allocation of some of the CGS is tentative as long-term allocation is yet to be done by MoP.

Share from Lara TPP, Solapur TPP, Mouda TPP St-II and Gadarwara TPP is tentative and MoP allocation order yet to be issued. Share from Vindhyachal TPP-V & KAKRAPARA NPP U-3 & 4 is firm.

The table below summarizes the availability of power from various sources including the existing and upcoming capacity availability in FY 19:

Table 7: Projected Long-term Share Allocations from Various Sources (in MW)

Sr. No.	Source	Capacity Available in MW			
		FY 16	FY 17	FY 18	FY 19
	Availability Within UT				
A	R.E. Sources – Solar	0.37	3.37	14.27	14.27
Subtotal	Availability Within UT	0.37	3.37	14.27	14.27
	Availability Outside UT				
D	CGS and IPP	1028.30	1028.30	1028.30	1028.30
E	CGS and Solar Plants – New	5.55	172.63	223.12	248.07
Subtotal	Availability Outside UT	1033.85	1200.93	1231.42	1276.37
Total Availability from long-term sources		1034.22	1204.30	1245.69	1290.64

As seen from above, after the completion of allocated CGS, the capacity availability from FY 15

to FY 19 for UT would be around 1276.37 MW from conventional sources and solar power outside UT along with 14.27 MW from Solar Plants inside the UT. (Date of commissioning of CGS are based on the latest expected dates of commercial operation as available with Central Electricity Authority).

However, the availability is also from renewable sources which inherently have

low capacity utilization factor and same has been appropriately factored for computation of energy availability from existing and upcoming generating stations.

Accordingly, the projected energy availability from the above mentioned sources for future years is summarized in table below.

Table 8: Projected Energy Availability from Long-term Share/Long Term Tie-Ups (in MU)

Source	Adequacy of Energy Availability			
	FY 16	FY 17	FY 18	FY 19
Total Energy Requirement within UT	5,916	6,464	7,063	7,715
Energy Availability from Long-term Tie-ups	6,445	7,171	7,520	7,684
<i>Energy Availability from Long Term Tie-ups (In %age)</i>	<i>108.93%</i>	<i>110.93%</i>	<i>106.47%</i>	<i>99.60%</i>
<i>Targeted Energy Availability from Long Term Tie-ups (In %age)</i>	<i>90.00%</i>	<i>90.00%</i>	<i>90.00%</i>	<i>90.00%</i>
Targeted Energy Availability from Long Term Tie-ups (In MU)	5,325	5,818	6,357	6,943
Adequacy of Power Supply	Adequate	Adequate	Adequate	Adequate
Additional Energy Required on Long Term Basis (in MU)	0	0	0	0
Additional Long-term Tie-up Required (80% PLF) on RTC Basis (in MW)	0	0	0	0
Additional Energy Required on Short Term Basis (in MU)	0	0	0	31

It is seen from above table that the availability from already tied-up long-term share will remain in range of 100%-109% of the energy requirement.

As Dadra and Nagar Haveli will be having projected energy availability of more than 100% through long-term share in FY 19, the UT has to just optimize the power purchase and sale planning. The availability of excess energy might be more in case more industrial consumers opt for open access in future.

It is also worth mentioning that the long-term tie-ups consist of 609.57 MW from un-

allocated power of western region which can't be considered as reliable source in the long run. Hence proper substitute of the same should be searched. The breakup of the power allocation from firm/ unallocated /specific quota of power plants is given in Table 31 in Annexure-2.

FUND REQUIREMENT

As all the UT allocations is from CGS, there is no fund requirement for conventional generation for UT. However, the fund requirement for solar projects in UT is summarized below:

Table 9: Fund Requirement for UT Generation Projects (in Rs Crores)

Sl. No.	Category	Fund Requirement (in Rs Crores)				
		FY 16	FY 17	FY 18	FY 19	Total
1	Own Solar Power Plant Kharadpada (22 MW)	-	31.00	33.00	35.60	99.60
2	Solar Power Plant Velugam (3 MW)	18.77	5.00	-	-	23.77

Sl. No.	Category	Fund Requirement (in Rs Crores)				
		FY 16	FY 17	FY 18	FY 19	Total
3	Solar Power Plant Athal (200 kW)	1.82	-	-	-	1.82
4	Solar Power Plant Rooftop (170 kW)	1.2	-	-	-	1.2
	Total Fund Requirement (Generation)	21.79	36.00	33.00	35.60	126.39

However the same has not been considered for capex requirement in projected audited account of DNHPDCL and the cost has been projected to be incurred as power-purchase cost in future years as per Orders of JERC

ACTION POINTS FOR THE UT

OPTIMIZED POWER PURCHASE AND SALE PLANNING

As seen from previous sections, there is considerable surplus (0%-8%) available with the UT. The UT needs to optimize its power purchase and should look forward for selling the surplus power to prospective deficit states so as to earn revenue for the UT. It is also expected that cost of power procured from central generating stations could increase in near future. Hence DNHPDCL may go for Case-I bidding in order to minimize its power procurement cost. If successful in the endeavor it can also surrender unallocated power assigned to it from CGS

TIMELY COMPLETION OF PLANNED SOLAR POWER PLANTS

The UT will need to commission solar power plants based on PV technology timely to ensure availability of power as planned. The UT would also needs to select developer for solar power plant timely using Case-I bidding. Further timely completion of solar

plant by the chosen bidder should be ensured by providing timely clearances and infrastructure.

GOVERNMENT OF INDIA INTERVENTION

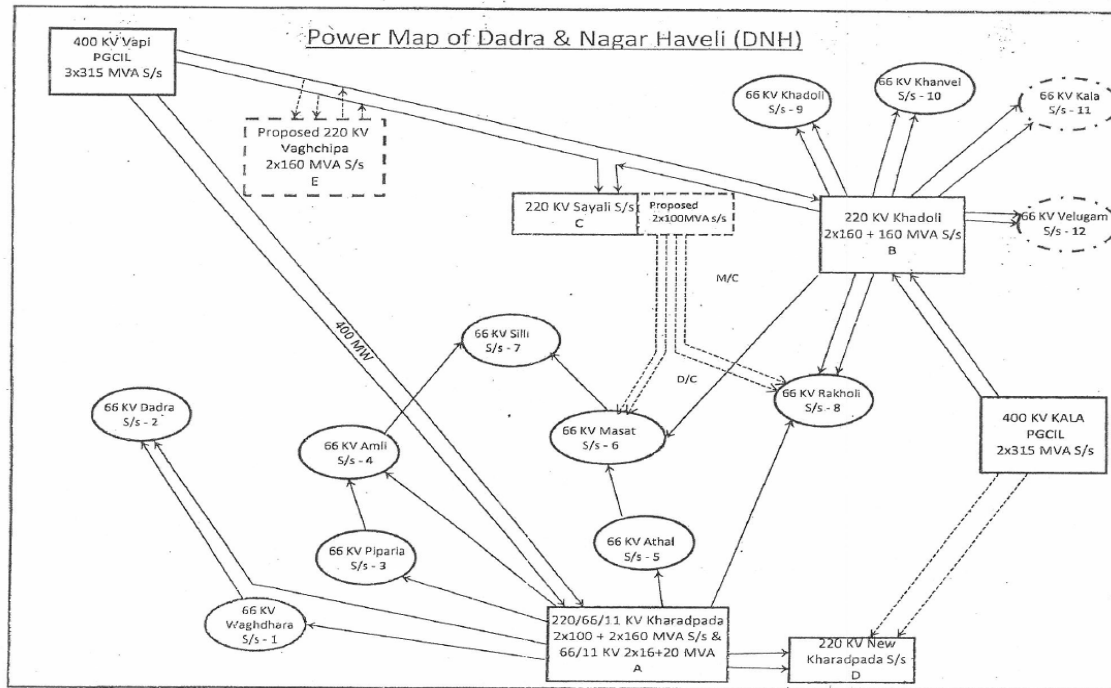
UN-ALLOCATED SOURCE OF POWER

At Present 609 MW of power assigned to DNH is from un-allocated quota. The same forms more around 67% of present demand of the UT and can create issues if the source is allocated to other states/UT. The UT has also apprehension that due to many industrial consumers migrating to open access route its demand will fall and consequently this will lead to un-scheduling of power from unallocated share. If this scenario persists Government of India may withdraw unallocated power assigned to the UT. However if afterwards OA consumers come back to DNHPDCL due to commercial reasons, it will not have enough power to cater to their needs. Hence Government of India needs to take opinion of the UT before committing any changes in un-allocated/specific allocation of the UT.

CHAPTER 6: TRANSMISSION PLAN

POWER MAP OF DADRA AND NAGAR HAVELI

Figure 7: Power Transmission Map of Dadra and Nagar Haveli



EXISTING INTER-STATE TRANSMISSION SYSTEM (ISTS)

Dadra and Nagar Haveli is getting power from following PGCIL sub-stations situated in Gujarat and DNH:

- i. Vapi :400/220kV : 3x315MVA
- ii. Kala: 400/220kV :2x315MVA

The Vapi sub-station also feed neighboring state of Gujarat and UT of Daman & Diu.

PLANNED INTER-STATE TRANSMISSION SYSTEM (ISTS)

PGCIL has planned installation of additional 500 MVA Transformer in 400 kV Substation at Kala. In addition Kala-Kudus section of Vapi Kudus 400 kV Transmission line is to be completed by FY 17.

EXISTING INTRA STATE TRANSMISSION SYSTEM

At present, there are 2 Nos of 220/66 KV Sub-stations in UT with existing transformation capacity available at 220 KV for import from the western grid is **840 MVA** as give under-

Table 10: Existing Intra State Substations (in MVA)

Sl. No.	Name	Voltage Ratio (kV)	Transformation Capacity (In MVA)
1	Kharadpada	220/66	520
2	Khadoli	220/66	320
Total Transformation Capacity (in MVA)			840

Recently an additional transformer of 160 MVA has been installed at Khadoli taking total installed capacity at 1000 MVA. Maximum import of power from western

grid is around 714 MW or 793 MVA and out of which 139 MVA is consumed directly at level of 220 kV, the available transmission system is adequate to meet the power supply requirement of Dadra and Nagar Haveli during peak demand.

PLANNED INTRA STATE TRANSMISSION SYSTEM (ISTS)

ED DNH-Transmission wing has planned two new 220 kV sub-stations having combined transformational capacity of 520 MVA to be connected to existing 220 kV transmission lines by LILO arrangement. In addition the department also has planned 27 Ckm of 220 kV D/C transmission line emanating from 400 kV sub-station Kala to Kharadpada.

The target date of commissioning of these transmission lines and sub-stations is till FY 2016-17. The details are shown in below tables:

Table 11: Planned Intra State Transmission Sub-stations

Sl. No.	Name of the Project	Total MVA	Target Date
1	220/66 kV S/s at Vaghchippa	320	Mar-17
2	220/66kV S/s at Sayli	200	Mar-17
Total: 220/132kV Transformers		520	

Table 12: Planned Intra State Transmission Lines

Sl. No.	Name of the Project	Ckt kms	Target Date
1	220 kV D/C from 400 kV Kala to 220 kV Kharadpada Sub-station	27	Mar-16
2	220 kV D/C from 400 kV Kala to 220 kV Khadoli Sub-station	6.2	Mar-16
3	LILO of Vapi-Khadoli line for proposed Vaghchhipa Sub-station	4.6	Mar-18
TOTAL		37.8	

The peak demand of the UT is expected to reach 1081 MW or 1201 MVA by FY 19. Currently 139 MVA load is served at 220 kV

level. This load is projected to increase to 210 MVA by FY 10. Hence total peak load for 220 KV Sub-stations in FY 19 would be 990 MVA (1201-210). Expected capacity of 220 kV transformers in FY 19 is expected to reach 1520 MVA. Hence the peak loading of 220 kV Sub-station would be 65.14% which is within comfort zone.

INTRA-STATE LOAD FLOW STUDY BY PGCIL

PGCIL has conducted load flow study for Intra-state transmission system of Dadra and Nagar Haveli. The study has shown that most of transmission lines are loaded sub-optimally at present, which leaves a scope for accommodating future load growth. However there are a few individual lines, for example 220 KV transmission line feeding Kharadpada which becomes overloaded at time of peak loading. However it is expected that with coming of two nos. new sub-stations loading of this line will reduce by 2019. 66 kV sub-transmission lines feeding 66 kV sub-station at Athal, Masat and Nakholi-1 also become over-loaded at time of peak load. Distribution utility should study the feasibility of increasing capacity of said lines.

It has also been observed in the study that voltage at 66 kV sub-stations fall to as low as 57 kV at time of overloading specially at sub-stations located at end of sub-transmission lines. To improve the same the utility will have to strengthen existing transmission lines and to install capacitor banks.

SYSTEM ANALYSIS UNDER PEAK DEMAND OF 1081 MW IN FY 19

GENERAL

Results of load flow study will be required to assess the adequacy of the power drawl by the UT corresponding to FY 19 condition.

FUND REQUIREMENT

The fund requirement for UT projects is summarized below:

Table 13: Fund Requirement for UT Transmission Projects (in Rs Crores)

Sl. No.	Category	Fund Requirement (in Rs Crores)				
		FY 16	FY 17	FY 18	FY 19	Total
1	Intra UT - Transmission Lines	42.31	0.0	6.38	0.0	48.69
2	Intra UT - Substations	6.63	55.00	50.00	0.0	111.63
	Total Fund Requirement (Transmission)	48.94	55.00	56.38	0.0	160.32

ACTION POINTS FOR THE UT

- ED-Transmission is required to complete all the proposed works within the time limit.
- To provide appropriate energy meters at all interface points of the distribution company of D&NH and compute the monthly transmission loss based on the energy input into the transmission grid

from various sources and the energy outgo measured at interface points of the DNHPDCL and EHT consumers.

- The ED-Transmission is also required to provide the transmission loss reduction trajectory for the period FY 2016-17 to FY 2018-19 (three years) based on the actual transmission loss during FY 2015-16.

ADOPTION OF BEST PRACTICES:

1. Monthly Thermal Vision with thermal camera to identify areas of preventive maintenance.
2. Implementation of EMS system
3. New Sub stations to be GIS to save space.

CHAPTER 7: DISTRIBUTION PLAN

EXISTING DISTRIBUTION SYSTEM

The Electricity Department of UT of DNH has been corporatized recently and DNHPDCL is the only distribution licensee in the UT of Dadra and Nagar Haveli. It is serving more than 65,182 consumers of the UT and providing 24 hours supply to all the consumers in spite of hilly terrain and difficult areas in the UT. Dadra and Nagar Haveli is having a hilly terrain of which 75% is covered by forest and the population also consist of tribal populations (65%).

The category wise No of consumers and energy being consumed during 2014-15 is as under-

Table 14: Category-wise consumer number and energy sales (MU)

S. No.	Category	Number	Energy Sales (MU)
1	Domestic	53,193	90.43
2	Commercial	6,986	27.05
3	Agriculture	1,179	4.31
4	LT Industries	2,001	187.51
5	HT Industries	887	4840.64
6	Public Lightening	310	7.76
7	Public water works	307	3.23
7	Temporary	319	2.60
	Grand Total	65,182	5163.53

As it can be seen from above table majority of sales is done to HT Industries. As per Census 2011, there were about 2861 no of un-electrified Households in the UT but it is informed that DNHPDCL has provided access to electricity to each household in the UT. However, a small fraction of tribal households may be there which have not chosen to get electrified due to various socio-economic reasons.

A snapshot of the existing distribution system serving Dadra and Nagar Haveli is given below.

Table 15: Existing Distribution System as on March 2015

Particulars	Qty.
Electricity Consumers	65,182
Connected Load	1389 MW
Peak Demand	714MW
Maximum Demand (66 kV & above)	408 MVA
Maximum Demand (11 kV Consumers)	435 MVA
66/11 KV Sub-stations	13 No.
Capacity of 66/11 KV Sub-stations	380 MVA
66KV Line	269 Km.
11 KV Line	831 Km.
LT Line	1775 Km.
11/0.4 KV DTR	1091 No.
Capacity of 11/0.4 KV DTR	219.54 MVA

The detail of existing 66/11 kV sub-stations is given in Table 28 in Annexure-I.

INVESTMENTS PROPOSED FOR URBAN AND RURAL INFRASTRUCTURE

FOR URBAN INFRASTRUCTURE

The UT has now assessed the requirement of strengthening of urban infrastructure and accordingly proposed work amounting to Rs 180.03 Crores to be undertaken under the new IPDS scheme which is summarized in below table

Table 16: Work proposed for strengthening of Urban Infrastructure

S. No.	Item	Unit	Quantity	Cost (Rs Crores)
1	66/11 KV SS : New	Nos.	1	8.14
	66/11 KV SS : Additional Tr	Nos.	1	2.70

S. No.	Item	Unit	Quantity	Cost (Rs Crores)
	66/11 KV SS : Capacity Enhancement	Nos.	3	5.78
2	66/11 KV SS : R&M	Nos.	4	0.48
3	New 66 KV feeders- Bifurcation	Km	3	3.77
	66 KV feeders-Reconductoring/ Augmentation	Km	30	2.56
4	66 kV Bay extension	Nos.	1	3.18
5	Distribution Transformer-New	Nos.	231	47.34
6	Distribution Transformer-R&M	Nos.	562	15.14
7	Capacitor Bank	Nos.	5	2.12
8	Aerial Bunched Cables	Km	24	1.74
9	Under-ground cables	Km	231	69.91
10	Solar Panels with Net metering (in Government establishment)	KW	372	8.66
11	Metering	Nos.	17886	16.21
12	RMU Sectionalizes	Nos.	51	2.34
13	Others	Nos.	507	5.07
	Grand Total			180.03

FOR RURAL INFRASTRUCTURE

The expense to be incurred for DDUGJY scheme is detailed in the below table:

Table 17: Work proposed for Rural Infrastructure.

Item	Total Amount in Rs. Crores
New 66 kV Sub-stations	30.97
66 kV Sub-stations Augmentation	58.75
11 kV Transmission Works	9.52
HT Capacitor Bank	2.7
Meter (Distribution Transformer, Consumers, Feeders)	1.68
Rural Household Electrification Works	25.05
Sansad Adarsh Gram Yojna	0.21
Grand Total	128.90

However Central government has only approved project cost of Rs 5 Crore. Component wise details of proposed DDUGJY scheme is mentioned in Table 27 in Annexure 1.

OTHER SCHEMES

DNHPDCL is also carrying out other schemes to increase reliability of supply, reduce losses and improve consumer service. The details of works being under-taken by DNHPCL are as follows:

Erection of various capacity of new distribution transformer, extension of HT/LT line work, releasing of new service connection of all type of category under Normal Development scheme

The following works are being taken up under this Scheme:

- Erection /Extension of HT Line Works
- Erection /Extension of LT Line Works
- Erection of Distribution Transformer Centre
- Release of Service Connections to various categories of consumers.
- System improvement works.
- Strengthening of Electric lines

DNHPDCL has planned to incur Rs 3.0 Crore on the scheme till FY 19.

Upgradation and modernization of network

The scheme has been undertaken to upgrade and modernize the present LT distribution network of DNHPDCL to cater to the growing energy demand of the UT of Dadra and Nagar Haveli.

DNHPDCL plans to incur Rs. 11.00 Crore on the scheme till FY 19.

Upgradation and Modernization of existing 66/11 kV sub-station

The scheme is aimed to upgrade the existing Amli, Khadoli and Masat sub-stations by replacing circuit breakers, CTs and relays. DNHPDCL would incur Rs 15 Crore till FY 19 on the scheme.

Installation of Capacitor Bank

DNHPDCL plans to install capacitor banks at various sub-station to increase power factor to ensure reduction in line losses. DNHPDCL would incur Rs 5 Crore on the scheme till FY 19.

Procurement of fully automatic meter test bench

As per the regulations of the JERC the meter of the premises with connected load more than 500 kVA needs to be tested twice every year and the premises with connected load less than 500 kVA needs to be tested once every year. In order to comply the same, DNHPDCL is in the process to procure fully automatic meter test bench to meet the growing need of meter testing in its distribution area. DNHPDCL would incur Rs 3 Crore on the scheme till FY 19.

Table 18: Schemes undertaken by DNHPDCL.

S.N.	Work	Outlay (Rs Crore)
1	Normal Development Schemes	3
2	Upgradation and Modernization of network	11
3	66 kV Substations: Up-gradation and Modernization	15
4	Installation of Capacitor Bank	5
5	Procurement of fully automatic meter test bench	3
	Total	37

ASSESSMENT OF ADEQUACY OF DISTRIBUTION SYSTEM

AT 66/11 LEVEL

The transformation capacity at 66/11 kV level is projected to grow from 712 MVA in FY 15 to 952 MVA in FY 19.

The peak demand of the UT, including demand of large industrial consumers at 220 kV and 66 kV level, has been recorded at 714 MW in FY 15.

The billed maximum demand of 2 nos. EHT consumers is about 140 MVA and of 32 nos. HT consumers at 66 kV is 268 MVA. Thus, the peak demand of direct 66 kV and above consumers works out to be 408 MVA or 367 MW (considering a power factor of 0.9). Thus, a demand of 347 MW (=714-367) is met at 11 kV and below which corresponds

to 386 MVA considering a power factor of 0.9.

Against this peak demand, the aggregate installed capacity of 66/11 kV substations available in the UT is 712 MVA. This translates to an average loading of 54.19% on 66/11 kV transformers under peak demand conditions which is well within comfort zone.

Following similar logic and taking the projected peak demand of 1081 MW in FY 19 and assuming the proportion of demand met at EHT and 66 kV in relation to the total peak demand remains the same as at present, the contribution of EHT and 66 kV direct consumers to the peak demand of the UT comes to 555 MW.

Correspondingly, the demand met at 11 kV and below comes to 525 MW (1080-555) which corresponds to 583 MVA considering a power factor of 0.9. Against this peak requirement, the installed capacity of 66/11 kV transformers in FY 19 is projected at 952 MVA. This translates to an average loading of 61.29% on 66/11 kV transformers under peak demand conditions.

AT 11/.04 KV LEVEL

The transformation capacity at 11/0.44 kV level is projected to grow from 219.53 MVA in FY 15 to 293.78 MVA in FY 19.

The peak demand of the UT, including 367 MW demand of large industrial consumers at 220 kV and 66 kV level, has been recorded at 714 MW in FY 15. Thus, about 347 MW is being met at 66 KV and below level.

At present maximum demand by consumers at 11 kV level is about 265 MW thus, a demand of 82 MW (=714-347-265) is met at LT level which corresponds to 91 MVA considering a power factor of 0.9.

Against this peak demand, the aggregate installed capacity of distribution

transformer available in the UT is 219.53 MVA. This translates to an average loading of 41.27% on distribution transformers under peak demand conditions which is well within comfort zone.

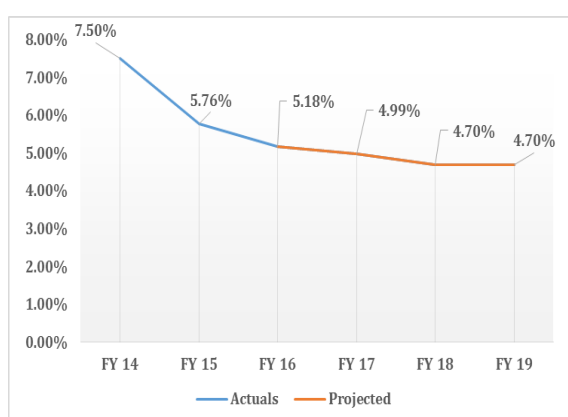
Following similar logic and taking the projected peak demand of 1081 MW in FY 19 and assuming the proportion of demand met at HT/EHT in relation to the total peak demand remains the same as at present, the contribution of HT/EHT direct consumers to the peak demand of the UT comes to 957 MW.

Correspondingly, the demand met at LT level comes to 124MW (=1081-957) which corresponds to 137 MVA considering a power factor of 0.9. Against this peak requirement, the installed capacity of distribution transformers in FY 19 is projected at 293.78 MVA. This translates to an average loading of 46.67% on distribution transformers under peak demand conditions.

AT&C LOSSES

The actual and projected AT&C losses is summarized below:

Figure 8: AT&C Losses over the years



The AT&C losses which were order of 7.50% in FY 14 and have further decreased to 5.76% in FY 15. The low level of losses indicate that they are primarily technical losses with negligible commercial losses.

The same is only possible because of high level of sale to industrial consumers (97%).

DNHPDCL has further aimed to reduce loss by strengthening network under IPDS and DDUGJY Schemes. Further steps like AMR meters on Industrial consumers, laying of ABC and underground cables have also been implemented to reduce commercial losses.

RELIABILITY INDICES

As per JERC Standards of Performance (SoP) Regulations, 2009 DNHPDCL has calculated SAIFI for FY 15 as 36.41 translating to average of every one sustained interruption every 10 days. Further the SAIDI is calculated to be 40 hours. This also translate to wire availability of 99.39% at feeder level which is better than reliability of 98% as specified in JERC MYT Regulations. DNHPDCL is required to maintain these reliability indices in future also.

IT INITIATIVES TAKEN BY DNHPDCL

Scheme for integrated solution for Electrical network modelling and distribution analysis software with allied study of power sector in the territory

The objective of the scheme is undertaking Consumer Indexing, GIS Mapping and Asset Database Management System, establishment of Customer Care Centres, Meter Data Acquisition System and Workflow Management, Document Management, Business Intelligence etc. DNHPDCL has to incur Rs 35 Crore on the scheme till FY 19.

Scheme for Smart Grid in SMC Area of Silvassa

The scheme will assist in implementing Smart Grid technologies in Silvassa Municipal Corporation (SMC) area to address issues of energy efficiency and

AT&C losses and will also help in technology upgradation of the distribution system of DNHPDCL.

The project covers implementation of AMI, DTMU, Integration of roof top solar through net metering and Sub-station automation system. The following areas can be improved using Smart Grid technologies:

- Online visualization of energy consumption upto consumer level
- Improvement in Billing Process including correct recording of meters and timely raising of bills
- Continuous two way communication facility between utility and consumers and empowering consumers to participate in Energy Management Process

- Monitoring of Outage & Quality of power upto consumer level
- Online information for utilization of assets like distribution transformer, LT lines etc.
- Preventive maintenance of distribution transformer
- Control and monitoring of sub-station equipment
- Utilization of renewable resources towards sustainability & green energy benefits by net metering

DNHPDCL has to incur Rs 30 Crore on the scheme till FY 19.

FUND REQUIREMENT

The fund requirement for UT projects is summarized below:

Table 19: Fund Requirement for Distribution Projects (in Rs Crores)

Sl. No.	Category	Fund Requirement (in Rs Crores)				
		FY 16	FY 17	FY 18	FY 19	Total
1	IPDS	45.01	45.01	45.01	45.01	180.03
2	DDUGJY	32.22	32.22	32.22	32.22	128.90
3	Other Schemes	16.00	9.00	6.00	6.00	37.00
4	IT Initiatives	-	32.00	23.00	10.00	65.00
	Total Distribution	103.23	118.23	106.23	93.23	410.93

ACTION POINTS FOR UT

DNHPDCL will do a survey regarding unconnected households in UT and will prepare plan to electrify them as per trajectory specified in the report.

DNHPDCL will focus on energy efficiency programs for Government Offices/ Institutions/ Panchayat / Municipal Corporation and street lighting.

DNHPDCL will convene monthly public grievance meetings with the consumers to

sort out issues related to the supply of power/electricity/connections by the Department.

DNHPDCL will ensure 100% metering. Presently all consumers except 8% of Low Income Domestic Consumers have been provided metered supply. Proper steps would be taken to convert remaining un-metered consumers to metered consumers.

DNHPDCL will follow guaranteed standard of performance to ensure reliable and quality power supply.

DNHPDCL will improve the forecasting of requirement of power especially by industry to procure power at reasonable rate.

DNHPDCL will prepare a scheme to ensure un-interrupted supply to industries and a separate commercial mechanism.

DNHPDCL will prepare a road map for reduction in Cross Subsidy between industries and other category of consumers.

GOVERNMENT OF INDIA INTERVENTION

In order to ensure reliable and secure 24x7 quality power supply to all, the UT requests that the investment sought under IPDS and DDUGJY needs to be sanctioned expediently by PFC/REC.

The Government of India is also requested to consider the proposal for implementation of Smart Grid in Dadra and Nagar Haveli.

The request of Government of Dadra and Nagar Haveli would be considered by Government of India as per its policies/ frameworks or otherwise Government of Dadra and Nagar Haveli would make arrangements for funding from other sources.

CHAPTER 8: RENEWABLE ENERGY INITIATIVES

ACHIEVEMENTS IN RENEWABLE ENERGY

DNHPDCL has recently commissioned 0.37 MW Solar Power Plant at various locations in the UT including grid-connected rooftop solar plant at starting of FY 15-16.

RENEWABLE ENERGY POLICIES IN THE UT

The UT has got the target to install 449 MW Solar Capacity as a part of national goal achieving 1 Lakh MW solar capacity by FY 22. Keeping in view small size of the UT, it can have PPA with solar plants situated outside the UT to achieve the target.

RPO AND REC STATUS IN DADRA AND NAGAR HAVELI

RENEWABLE PURCHASE OBLIGATION – CURRENT STATUS

Joint Electricity Regulatory Commission has notified JERC (Procurement of Renewable Energy) First Amendment Regulations, 2014 in which it has specified Solar and Non-Solar Renewable Purchase Obligation for distribution licensees at a defined minimum percentage of the total consumption of all the consumers in its area during a year.

As per “JERC (Procurement of Renewable Energy) Regulations, 2010” If the Obligated Entity does not fulfill its commitment towards Renewable Purchase Obligation during any year as provided under JERC Regulations, and also does not purchase adequate certificate for meeting the shortfalls, the Commission may direct the Obligated Entity to deposit into a separate RPO Fund such amount as the Commission may determine on the basis of the shortfall

in units of RPO and at the forbearance price. The defaulter shall also be liable for penalty as may be decided by the Commission under section 142 of the Act notwithstanding its liability for any other action under prevailing laws:

Table 20: Existing Status of RPO Compliance

Particulars		FY 12	FY 13	FY 14	FY 15
Compliance Requirement					
Wind	In %age	4232	4591	4960	5164
	In MU	2.0%	3.0%	3.0%	3.3%
Other	In %age	85	138	149	139
	In MU	1.7%	2.6%	2.6%	2.7%
Solar	In %age	72	120	129	31
	In MU	0.3%	0.4%	0.4%	0.6%

Additionally there was 39 MU of RPO in FY 11. Against the RPO DNHPDCL has only purchase REC certificate of 281MU (30 Solar) and 51.2 MU of renewable power. There is cumulative gap of 61 MU of Solar RPO and 185 MU of Non-Solar RPO. Due to failure by DNHPDCL in meeting its RPO JERC levied a fine of Rs 110 Crore as per Regulation 4 of JERC (Procurement of Renewable Energy) Regulations, 2010. However later the same was revoked on the condition that the licensee will meet its RPO till FY 2014-15 latest on 09.02.2015.

As per National Tariff Policy, 2016 the UT will have to procure 8% of its energy needs from solar plants by March 2022. The same translates to the UT to have 502 MW solar power. Keeping in view small size of the UT, it can have PPA with solar plants situated outside the UT to achieve the target.

RENEWABLE ENERGY CERTIFICATES

JERC has designated Executive Engineer DNHPDCL as the State Agency for

accreditation and recommending the renewable energy projects for registration with Central Agency and to undertake certain others functions as mention in the Regulation 3 of JERC Procurement of Renewable Energy Regulations 2010.

The Commission through sub clause 3.3 of above said regulation has also provided the responsibility to MNREDA for intimating quarterly status of RPO compliance by the distribution licensee to the Commission.

However as of now no renewable generator has been accredited for REC certificate by the Nodal agency.

PLAN FOR RENEWABLE ENERGY ADDITION UP TO FY 19

PROPOSED ADDITION OF SOLAR CAPACITY

DNHPDCL has planned to commission additional 22 MW grid connected solar plant

Table 21: Proposed Capacity Addition

Sl. No.	Name of scheme	Total physical target	Existing	Year wise Physical Target			
				FY 16	FY 17	FY 18	FY 19
1.	Grid Connected Solar Plant	13.7 MW	0 MW	0.37 MW	3 MW	10.9 MW	0 MW
2	Off-Grid Rooftop Solar Plant at Government buildings	2 MW	0 MW	0 MW	0 MW	1 MW	1 MW

at cost of Rs 151 Crore at Kharadpada. However out of 22 MW capacity only 10 MW solar capacity would be commissioned till FY 19 at total capex of Rs 100 Crore.

SOLAR POWER PROCUREMENT FROM JNNISM PROJECTS AND CASE-1 BIDDING

DNHPDCL has contracted 5 MW power from JNNISM Solar Plants and has also floated bid documents to procure 120 MU Solar Power annually from 75 MW Solar PV Plants.

OFF-GRID RENEWABLE POWER

DNHPDCL plans to install 2 MW Off-Grid Solar Power at various government buildings till FY 18.

Accordingly, the proposed capacity addition in Renewable Initiatives is summarized below:

PROPOSED INVESTMENT IN RENEWABLE ENERGY

The proposed investment in additional renewable energy projects is shown below:

Table 22: Proposed Investment in New Renewable Projects (in Rs Crores)

Sl. No.	Name of scheme	Total project cost	Share	FY 16	FY 17	FY 18	FY 19	Total
1	Off-Grid Rooftop Solar Plant at Government buildings		Central					
			UT	0	8	8	0	16
			Beneficiaries					

CHAPTER 9: ENERGY CONSERVATION AND ENERGY EFFICIENCY PROGRAM

PRESENT STATUS OF ENERGY CONSERVATION ACTIVITIES

ACTIVITIES/SCHEMES INITIATED UNDER ENERGY EFFECIENCY SERVICES LTD.

DNHPDCL has implemented Domestic Efficient Lighting Program (DELP) for LED bulbs in the UT of DNH under Demand Side Management (DSM) programme, a scheme has prepared in consultation with EESL and accorded JERC approval on the same. Key features of the scheme will be to:

1. EESL will provide 2 LED bulbs each to all domestic Consumers in the entire Licensee area.
2. LED will be given at an upfront cost of Rs. 10 each. The balance cost towards the actual price of the LED bulb will be recovered from the consumer's electricity bill over a period of 10 months subject to maximum of Rs. 10 for each LED bulb every month.
3. The total annual savings of energy is around 5.77 million kWh which, at the average power purchase cost of Rs 3.66 per kWh, will lead to annual cost savings of Rs. 2.11 Crore.
4. The implementation of DELP in its entire area of operation would result into reduction in power procurement cost of Rs. 6.34 Crore over a period of three years.

The total annual energy savings from the above schemes would be **5.77 MU**.

EESL'S NATIONAL LEVEL LED PROGRAMME

Domestic Efficient Lighting Programme (DELP): The service model enables domestic households to procure LED lights at an affordable price of Rs. 10 each and the balance on easy instalment from their electricity bill. DELP is under implementation in AP, Delhi, Rajasthan, UP, Himachal Pradesh, Maharashtra. EESL is providing to consumers at a rate of Rs. 10 each as against their market price of Rs. 200-350. The average cost saving per LED for a domestic consumer is estimated between Rs. 160 – Rs. 400 (depending upon replacement of CFL or ordinary bulb) based on 4 hour use every day is more than the total cost of LED bulb. The total cost charged to consumers by EESL is Rs. 95-105 (based of applicable VAT/Octroi in a state) and is less than the savings of 1 year. The bulb will function for at least 10-15 years and all savings after one year is of the consumer. The cost of LED bulbs and programme administration cost is recovered from consumers by deduction of easy instalments of Rs. 10 every month for 8-12 months from their electricity bills. The programme is delivering energy savings of 400 m kWh in Puducherry and AP as per the online monitoring system installed by EESL. So far more than 106 Lakh LED bulbs have been distributed in 22 cities across India.

Street Light National Programme (SLNP): EESL has evolved a service model to enable Municipalities to replace conventional lights with LEDs at no upfront cost. The balance cost is recovered through the municipalities by monetizing the energy savings. EESL has

implemented about 92,000 street light retrofit project in Vizag this project will reduce the energy consumption by 50%. The entire upfront capital of Rs. 64 crore has been invested by EESL and will be recovered over a 7 year period. The municipality will pay EESL a sum of Rs. 18.5 crore every year whereas its overall costs savings would be Rs. 31 crore annually. The actual energy saving achieved 50% in electricity bill of Greater Vizag Municipal Corporation (GVMC) during January to April this year as compared to same period last year. More than 2.3 Lakh LED Street Lights have been installed so far across India. Replacement work of conventional Street light with LED

Street light is completed in 8 ULBs in Rajasthan, Tripura, AP & installation work is under progress in about 90 ULBs.

ACTION POINTS FOR UT

The UT will co-ordinate with BEE to conduct a load research study with a view to improve load factor and to reduce energy demand by promoting energy efficiency. The UT has 97% Industrial Sales and hence improvement brought by energy efficiency in other categories would be negligible. Hence major focus of the study would be industrial load.

CHAPTER 10: FINANCIAL VIABILITY OF DISTRIBUTION COMPANY

FINANCIAL POSITION OF DISTRIBUTION UTILITIES

The existing accumulated profit for DNHPDCL (Surplus) as per the audited financial accounts of FY 14 stands at Rs. 70.79 Crores, which has increased to 110.29 Crores in FY 15 (unaudited figures).

The existing Profit and Loss statement of the DNHPDCL for FY 15 is given below:

Table 23: Profit and Loss Statement of the DNHPDCL – FY 15 (In Rs Crores)

Particulars	FY 15
Opening Accumulated profit	₹ 70.79
Income	
Income from Sale of Power	₹ 2,297
Other Income	₹ 90.42
Total Income	₹ 2,388
Expenditure	
Transmission Charges	₹ 165
Power & Fuel Cost	₹ 2,110.83
Employee Cost	₹ 9.09
R&M cost	₹ 1.15
A&G Expenses	₹ 8.04
Total Expenses	₹ 2,294
<i>Operating Profit</i>	₹ 94
PBDIT	₹ 94
Interest	₹ 5
PBDT	₹ 89
Depreciation	₹ 14
Prior Period and Exceptional Items	₹ 2
Profit Before Tax	₹ 74
Provision for bad and doubtful debts	₹ 7

Particulars	FY 15
<i>PBT (Post bad and doubtful debts)</i>	₹ 67
Tax	₹ 24
Reported Net + Profit /- Loss	₹ 43
Transfer to Reserve + Dividend	1.76
Accumulated Profit	₹ 110

FUTURE COURSE

Power Purchase expense (including transmission cost) constitutes Rs 2276 Crore out of total Rs 2294 Crore operational expenditure and Rs 2345 Crore total expenditure including interest, depreciation, taxes and other items. Since power purchase cost constitutes 97% of total expense of the utility, therefore, if future increase in power purchase expenditure is allowed as pass-through in tariff by JERC, the utility will be in a position to repeat the financial performance it has clocked in FY 15.

Capital Expenditure for proposed work would also be incurred through budgetary support of central government and the utility already has cash (and equivalent) of Rs 545 Crore. Hence the utility is also comfortably placed in terms of cash flow for financing future projects.

CHAPTER 11: OTHER INITIATIVES

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 DNHPDCL for looking at activities of overall communication strategy.

To solicit consumer cooperation, DNHPDCL should clearly communicate its plans on implementing the reliable 24x7 supply scheme along with the other reliability and efficiency improvement measures that it are implementing. A high level of involvement of the Administration of DNH will also be required:

Table 24: Proposed Communication Responsibilities

Communication Objective	Responsibility	Frequency
"Power for All" - Roll Out Plan	Secretary, (Power)	Quarterly
Status update on Deliverables	Secretary, (Power)	Quarterly
Generation Projects <i>Physical Progress, Achievements and Other Relates Issues</i>	Executive Engineer (Div Office)	Quarterly
Inter-State Transmission Projects <i>Physical Progress, Achievements and Other Relates Issues</i>	Director (Projects), PGCIL	Monthly
Intra-State Transmission Projects <i>Physical Progress, Achievements and Other Relates Issues</i>	Executive Engineer (Div Office)	Monthly

Communication Objective	Responsibility	Frequency
Distribution <i>Progress, Achievements, Losses, Consumer Initiatives etc.</i>	Executive Engineer (Div Office)	Monthly
Renewable Power	Executive Engineer (Div Office)	Quarterly

INFORMATION TECHNOLOGY

The need to adopt IT in every sphere of utility operation is self-evident. 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.

- ✓ Power procurement planning and optimization tools will be implemented to reduce the power procurement costs and improve supply reliability. This will 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.
- ✓ Implementation of Enterprise Resource Planning Systems (ERP) which 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.

- ✓ In order to curb the malpractices being done at the level of meter readers while entering the meter reading of the consumers, “**Mobile Based Photo Meter Reading & Billing System**” may be adopted.
- ✓ Centralized Information & Monitoring System for operational, enforcement & litigation, vigilance activities and analysis have to be operationalized.
- ✓ Power management would require 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 very useful for improving reliability and reduction of network downtime.
- ✓ Project monitoring tools shall be incorporated in the PMU to ensure that progress on the investments in the UT are monitored rigorously and bottlenecks identified.
- ✓ Standards of service specified under Section 57 of the Electricity Act 2003 will be monitored. The utilities shall use IT tools to gather the information with regard to service standards with minimal manual.

The above measures, need to be implemented on priority basis by DNHPDCL and also 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 undertaken 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 Government - where necessary. The committee may be constituted with the following members – PFC, REC, CEA, SECI, EESL, BEE, Ministry of Power, MoEF and MNRE.
- **UT administration Level Committee:** It is proposed that a UT level committee headed by the Secretary (Power) 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.
- **Department Level Committee:** It is proposed that a Department level committee headed by the Nodal Officer will be formed which 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.
- **District Level Committee** – It is proposed to constitute a district level committee headed by the A.E. 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.

- **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, Power 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 applications in the Transmission & Distribution system and to meet the expectations of 24x7 power supply for the consumers in the UT, it is important to focus on capacity building of the employees for enhancement of technical know-how and keeping abreast with latest technological developments. 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 that for transforming the distribution utility into a customer friendly one, change of mind-set of the employees would be required. It is critical that Change Management initiatives are rolled out and institutionalized for achieving better results.

In view of the importance of training on new technologies, there is a requirement for development and implementation of a well-structured Human Resource Training Programme to help realize the dream of 24x7 power supply system in the UT in its true sense.

There is already a provision for Demand Side Management (DMS) training under various programmes of Bureau of energy Efficiency (BEE) and the same should be implemented to achieve the goal of 24 x 7 power.

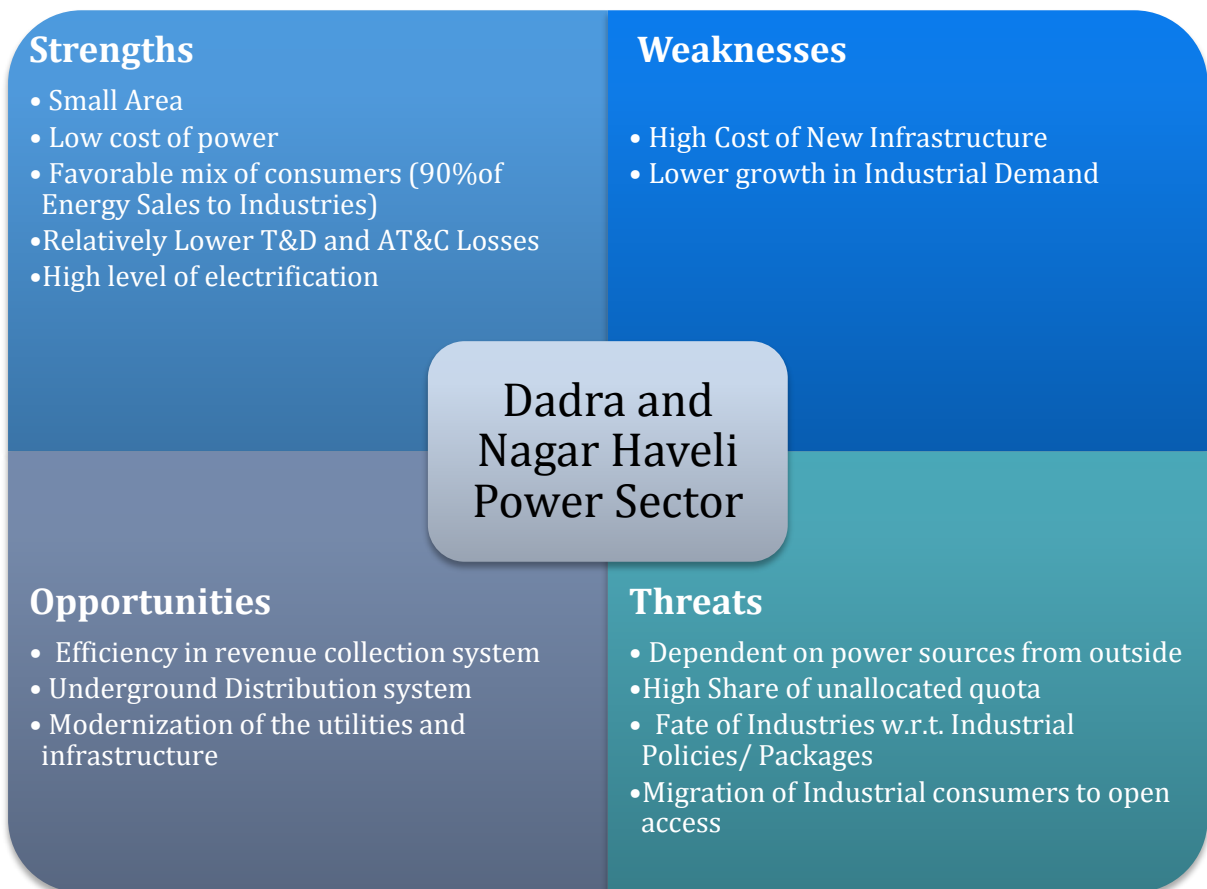
A UT level officers training institute may be required to be opened in the UT to fulfil the ongoing training requirement for employees of DNHPDCL. This also helps in training of subordinate technical staff. Following training programmes are proposed to be implemented for the utility:

- ✓ Two Weeks trainings for technical staff including officers & engineers once in every two years.
- ✓ One week training for non-technical officers every two years.
- ✓ One week training for subordinate technical staff at each district headquarters every year.

CHAPTER 12: YEAR WISE ROLL OUT PLAN

SWOT ANALYSIS

In the above sections we have discussed in detail the existing status and its future needs. We have also provided some actionable targets which will help Dadra and Nagar Haveli in achieving the set goal. Before structuring the above targets, SWOT analysis of existing power sector in Dadra and Nagar Haveli has been discussed. The exercise has been done to bring out some of the key risk indicators which affect the overall market in Dadra and Nagar Haveli along with advantages present.



From the above analysis it is quite evident that most of the threats are external factors which would need continuous efforts from Dadra and Nagar Haveli to mitigate them as soon as possible. Further, from the weaknesses tabulated it is seen that, with some strong and bold measures Dadra and Nagar Haveli will be able to attain the target.

Based on the above observations, a road map for Dadra and Nagar Haveli has been developed to mitigate the above weaknesses and threats.

ROAD MAP FOR POWER FOR ALL

Table 25: Roll Out Plan

Sl. No.		Category	Base year scenario (FY 15)	Rollout Plan					Total expected capacity FY 19
			FY 16	FY 17	FY 18	FY 19	Total		
GENERATION									
A	Availability (MW):								
1	Renewable	0.00	0.37	83.00	10.90	0.00	94.27	94.27	
	Solar	0.00	0.37	83.00	10.90	0.00	94.27	94.27	
	Central Sector								
2	Thermal-Gas	178.10	0.00	0.00	0.00	0.00	0.00	178.10	
3	Thermal-Coal	779.71	5.55	79.30	50.49	24.95	160.29	940.00	
4	Nuclear	70.49	0.00	7.78	0.00	0.00	7.78	78.27	
Total Availability (MW)		1028.30	5.92	170.08	61.39	24.95	262.34	1290.64	
B	Peak Demand (MW):								
1	Peak Demand (MW)	714	777	848	927	1,013		1,013	
2	Per Capita Consumption	5,304	5,916	6,464	7,063	7,715		7,715	
TRANSMISSION									
C	Transmission Lines (CKM):								
1	Inter State	77	0	175	0	0	175	252	
	400 kV	77	0	175	0	0	175	252	
2	Intra State	59.44	33.2	0	4.6	0	37.8	97.24	
	220 kV	59.44	33.2	0	4.6	0	37.8	97.24	
Total Transmission Line		136.44	33.2	175	4.6	0	212.8	349.24	
D	Transformation Capacity (MVA):								
1	Inter State	630	0	0	500	0	500	1130	
	400/220 kV	630	0	0	500	0	500	1130	
2	Intra State	840	160	0	520	0	680	1520	
	220/66 kV	840	160	0	520	0	680	1520	
Total Transformation Capacity		1470	160	0	1020	0	1180	2650	
DISTRIBUTION									
E	Efficiency Improvement								
1	T&D Losses	4.78%	4.70%	4.70%	4.70%	4.70%		4.70%	
2	AT&C Losses	5.76%	5.18%	4.94%	4.70%	4.70%		4.70%	
F	Capacity Addition/Augmentation								
1	66 kV Substation (MVA Capacity)	712.00	0.00	20.00	20.00	200.00	240.00	952.00	
2	66kV Lines (CKT Km.)	269.2	0	5	6	15	21	290.2	
3	11 kV Lines (CKT Km.)	830.88	15	25	25	40	105	935.88	
4	LT Lines (CKT Km.)	1775.22	20	20	20	50	110	1885.22	
5	DTs (MVA Capacity)	219.54	0	22.71	24.62	26.92	74.24	293.78	
RENEWABLE INITIATIVES									
1	Solar PV at Government Building (MW)	0	0	0	1	1	2	2	

CHAPTER 13: FUND REQUIREMENT

The fund requirement for various schemes (ongoing and proposed) for Generation, Transmission, Distribution and Renewable energy plan as discussed in previous chapters is tabulated below:

Table 26: Fund Requirement

Sl. No.	Category	Fund Requirement (in Rs Crores)				
		FY 16	FY 17	FY 18	FY 19	Total
A	Generation					
1	Own Solar Power Plant Kharadpada (22 MW)	-	31.00	33.00	35.60	99.60
2	Solar Power Plant Velugam (3 MW)	18.77	5.00	-	-	23.77
3	Solar Power Plant Athal (200 kW)	1.82	-	-	-	1.82
4	Solar Power Plant Rooftop (170 kW)	1.2	-	-	-	1.2
	Total Fund Requirement (Generation)	21.79	36.00	33.00	35.60	126.39
B	Transmission					
1	Intra State - Transmission Lines	42.31	0.0	6.38	0.0	48.69
2	Intra State - Substations	6.63	55.00	50.00	0.0	111.63
	Total Fund Requirement (Transmission)	48.94	55.00	56.38	0.0	160.32
C	Distribution					
1	IPDS	45.01	45.01	45.01	45.01	180.03
2	DDUGJY	32.22	32.22	32.22	32.22	128.90
3	Other Schemes	16.00	9.00	6.00	6.00	37.00
4	IT Initiatives	-	32.00	23.00	10.00	65.00
	Total Fund Requirement (Distribution)	103.23	118.23	106.23	93.23	410.93

The request of Government of Dadra and Nagar Haveli for funds under IPDS and DDUGJY would be considered by Government of India as per its policies/ frameworks or otherwise Government of Dadra and Nagar Haveli would make arrangements for funding from FIs/Banks/Multilateral funding agencies.

ANNEXURES

ANNEXURE – 1

Table 27: Work proposed Under DDUGVY scheme

Particulars	Unit	Qty	Amount in Crores
A. Strengthening of Sub-Transmission and Distribution Network			
66/11 KV SS :			
New substation	Nos.	3	30.79
Augmentation Enhancement			58.74
11 KV feeders			
New	Ckt. Kms.		9.52
Capacitor Bank	MVarh		2.70
Metering			
a) Feeder & Boundary (33Kv)	Nos.		1.68
b) Feeder & Boundary (11Kv)	Nos.		
Distribution Transformer	Nos.		
Consumer	Nos.		
3-Phase	Nos.		
1-Phase	Nos.		
Sansad Adarsh Gram Yojna		1	0.21
Rural Household Electrification Works			25.06
Grand Total			128.90

Table 28: Details of existing 66/11 kV Sub-stations

Name of 66/11 kV Sub stations	Transformers	Capacity (MVA)
Wagdhara	1 x 20 MVA + 1 x 15 MVA	35
Dadra	1 x 10 MVA + 4 x 20 MVA	90
Kharadpada	2 x 16 MA + 1 x 20 MVA.	52
Amli	3 x 15 MVA + 2 x 20 MVA	85
Athal	2 x 20 MVA	40
Mast	1 x 10 MVA + 3 x 15 MVA + 1 x 20 MVA	75
Silli	2 x 15 MA + 1 x 20 MVA.	50
Rakholi	4 x 20 MVA.	80
Khadoli	3 x 10 MVA + 4 x 15 MVA	90
khanvel	1 x 10 MVA + 1 x 15 MVA	25
Piparia	2 x 20 MVA	40
Velugam	1 x 15 MVA	15
Kala	1 x 20 MVA + 1 x 15 MVA	35
Total		712

ANNEXURE – 2

Table 29: Long-term entitlement in FY 15 (in MW)

Source	Type	Latest Long term Entitlement in MW
Availability Outside UT		
Central Generating Stations		
Korba STPS I & II	Coal	62.28
Korba STPS Unit-7	Coal	26.95
Vindhyachal STPS-1	Coal	51.73
Vindhyachal STPS-2	Coal	39.31
Vindhyachal STPS-3	Coal	41.31
Vindhyachal STPS-4	Coal	55.06
Sipat Stage -II	Coal	37.56
Sipat Stage -I	Coal	107.02
Kawas GBS	Gas	81.29
Bhilai TPS	Coal	100.43
Ratnagiri GPS	Gas	38.00
Karpakkar APS	Nuclear	19.82
Tarapur Unir 3-4	Nuclear	50.67
Gandhar GBS	Gas	58.81
Mauda	Coal	55.06
EMCO Enrgy Limited	Coal	200.00
Kahalgaoon STPS II	Coal	3.00
Total		1028.30
Availability Outside UT		1028.30
Total Availability from long-term sources		1028.30

Table 30: Year-wise Projection of Power Purchase/Availability (in MU)

Source	Average Per Units Charges (Rs/kWh	Energy Availability in MU					Power Purchase Cost (in Rs Crores)				
		FY 15	FY 16	FY 17	FY 18	FY 19	FY 15	FY 16	FY 17	FY 18	FY 19
Availability within UT											
Renewable Energy Sources- Upcoming											
Solar Rooftop	7.00	0	1	1	1	1	0.0	0.4	0.4	0.4	0.4
Solar Velugam	7.00	0	0	5	5	5	0	0	3	3	3
Solar Kala	7.00	0	0	0	1	1	0	0	0	1	1
Solar Kharadpada	7.00	0			16	16	0	0	0	12	12
Own Generating Stations		0	1	6	24	24	0	0	4	16	16
Availability Within State		0	1	6	24	24	0	0	4	16	16
Korba STPS	1.59	424	424	424	424	424	67	67	67	67	67
Korba STPS Unit-7	1.97	184	184	184	184	184	36	36	36	36	36
Vindhyachal STPS-1	2.10	352	352	352	352	352	74	74	74	74	74
Vindhvachal STPS-2	2.02	268	268	268	268	268	54	54	54	54	54

Source	Average Per Units Charges (Rs/kWh)	Energy Availability in MU					Power Purchase Cost (in Rs Crores)				
		FY 15	FY 16	FY 17	FY 18	FY 19	FY 15	FY 16	FY 17	FY 18	FY 19
Vindhyachal STPS-3	2.43	281	281	281	281	281	68	68	68	68	68
Vindhyachal STPS-4	2.73	375	375	375	375	375	102	102	102	102	102
Sipat Stage -II	3.02	256	256	256	256	256	77	77	77	77	77
Sipat Stage -I	3.22	729	729	729	729	729	235	235	235	235	235
Kawas GBS	3.61	484	484	484	484	484	174	174	174	174	174
Bhilai TPS	3.72	684	684	684	684	684	254	254	254	254	254
Ratnagiri GPS		0	0	0	0	0	0	0.00	0.00	0.00	0.00
Karpakkar APS	2.31	143	143	143	143	143	33	33	33	33	33
Tarapur Unir 3-4	2.76	366	366	366	366	366	101	101	101	101	101
Gandhar GBS	4.42	350	350	350	350	350	155	155	155	155	155
Mauda	4.13	375	375	375	375	375	155	155	155	155	155
EMCO Enrgy Limited	4.30	1363	1363	1363	1363	1363	586	586	586	586	586
Kahalgaon STPS II	4.83	20	20	20	20	20	10	10	10	10	10
Central Generating Stations		6655	6655	6655	6655	6655	2183	2183	2183	2183	2183
CGS and RE - New											
Vindhyachal STPS - 5	3.11	0	38	38	38	38	0	12	12	12	12
Solar JNNM	7.00	0	0	8	8	8	0	0	6	6	6
Solar Bidding	7.00	0	0	124	124	124	0	0	87	87	87
LARA STPS	3.11	0	0	0	61	61	0	0	0	19	19
Gadawara	3.11	0	0	0	75	75	0	0	0	23	23
Dhruvan	3.11	0	0	0	170	170	0	0	0	53	53
Mouda STPP-2	3.11	0	0	100	100	100	0	0	31	31	31
Solapur	3.11	0	0	100	100	100	0	0	31	31	31
Khargaon	3.11	0	0	0	0	170	0	0	0	0	53
Barh	3.11	0	0		38	38	0	0	0	12	12
Karpakkar APS 3-4	2.31	0	0	56	56	56	0	0	13	13	13
NSPCL Rourkela	3.11	0	0	361	361	361	0	0	112	112	112
CGS - New											
Availability Outside UT		1679	1706	1903	1973	1973	546	555	623	648	648
Less: Interstate Losses		60.45	61	69	71	71					
Net Availability outside UT		1619	1644	1835	1902	1902					
Total Availability from long-term sources		1619	1651	1855	1929	1936	546	560	637	666	669

Table 31 Type of Allocation from Power Plants

Power Plant	Total Allocation (MW)	Firm Allocation (MW)	Allocation from Un allocated quota (MW)	Specific Allocation (MW)
Korba STPS	62.28	0.00	52.28	10.00
Korba STPS Unit-7	26.95	2.20	24.75	0.00
Vindhyachal STPS-1	51.73	5.00	46.73	0.00
Vindhyachal STPS-2	39.31	4.00	35.31	0.00
Vindhyachal STPS-3	41.31	6.00	35.31	0.00
Vindhyachal STPS-4	55.06	5.55	49.51	0.00
Sipat Stage -II	37.56	4.00	33.56	0.00
Sipat Stage -I	107.02	9.00	98.02	0.00
Kawas GBS	81.29	25.00	0.30	55.99
Bhilai TPS	100.43	100.43	0.00	0.00
Ratnagiri GPS	38.00	38.00	0.00	0.00
Karpakkar APS	19.82	2.00	17.82	0.00
Tarapur Unir 3-4	50.67	7.00	43.67	0.00
Gandhar GBS	58.81	2.00	0.35	56.46
Mauda	55.06	5.55	49.51	0.00
EMCO Enrgy Limited	200.00	200.00	0.00	0.00
Kahalgaon STPS II	3.00	3.00	0.00	0.00
Total	1028.30	418.73	487.12	122.45

