

A Joint Initiative of



सत्यमेव जयते

Government of India



Government of Jammu and Kashmir

Power for All

Jammu & Kashmir



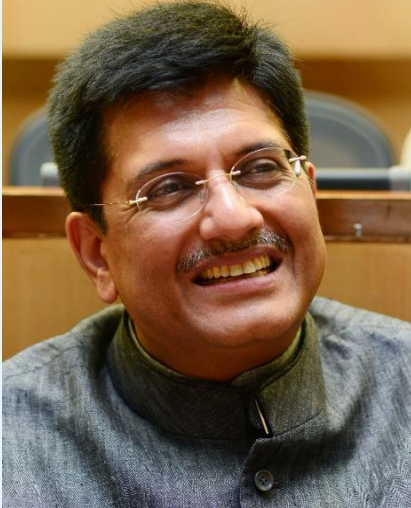
Foreword

Piyush Goyal

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



Government of India



Electricity consumption is one of the most important indices that decides 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' program is a major step in this direction.

Jammu & Kashmir being situated in the northernmost part of India has significant hydropower potential for development due to its predominantly mountainous terrain. The state is one of the popular global tourist destinations in the country. However, slow pace of economic development has hindered its growth story. Access to electricity, being major factor for the economic development, will be a stepping stone in its journey towards economic progress.

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

I compliment the Government of Jammu and Kashmir and wish them all the best for implementation of this Program. The Government of India will complement the efforts of Government of Jammu and Kashmir in providing uninterrupted quality power to each household, industry, commercial business, small & medium enterprise and adequate power to agriculture consumer as per state policy.

Foreword



Mehbooba Mufti

Chief Minister, Jammu & Kashmir



One of the key elements of growth and mass development is the availability of electricity to light up the dreams of millions of citizens of the State.

The electricity sector has been of great significance to the State Government. The State Government has already taken initiatives to increase the electricity access in leaps and bounds. The State is committed to live up to the challenges and extend electricity access to the remaining unconnected households and provide all the households with 24X7 electricity.

JKPDD has lined up various programs of investments to achieve the objectives of the 24X7 Power for All Program.

The State Government will provide all necessary support to the power utilities in achieving the various milestones and targets outlined in this PFA Roadmap.

I would like to thank the Government of India, Hon'ble Prime Minister and Hon'ble Union Minister of State for Power, for supporting Jammu and Kashmir towards implementation of 'Power for All' program.

Foreword



Dr. Nirmal Kumar Singh

*Deputy Chief Minister and Minister for Power Development and Housing and Urban Development.
Jammu & Kashmir*



The Government of Jammu and Kashmir is committed to accelerated economic and social development of the State. In this journey, access to quality and reliable electricity supply will be one of the key drivers for achieving the targeted socio-economic developmental goals

The 24X7 Power for All Roadmap for the State outlines measures to overcome the legacy issues of access, high peak deficit, continuance of high AT&C losses and financial viability and also provides guidance for embracing more progressive measures for development renewable energy sources, enthusing energy efficiency measures etc.

The State Government has also entered into an MoU with the Ministry of Power, Government of India for implementation of the Ujjwal Discom Assurance Yojana (UDAY) and is committed to achieving the targets agreed therein.

I would like to thank the Ministry of Power, Government India for its assistance to the State on the “24X7 Power for All” Program and assure full support and cooperation of the State for its implementation.



सत्यमेव जयते

Government of India

Joint Statement



Government of Jammu & Kashmir

24X7 Power for All Program for the State of Jammu and Kashmir will be implemented by the Government of Jammu and Kashmir with active support from the Government of India. The Program aims at providing 24X7 electricity supply to all consumers and providing access to all unconnected households in the State.

This PFA Roadmap document highlights all-encompassing power sector interventions including generation, transmission, distribution, renewable energy and energy efficiency/DSM measures proposed to be implemented during FY16 to FY19.

The Government of Jammu and Kashmir shall continue to support the power sector through targeted capital subsidy schemes aimed at supporting the poor and marginal consumers and elimination of regional disparities in the State.

The State Government is committed to supporting the utilities and other development agencies engaged in the power sector in implementation of the various measures and targets considered in the PFA Roadmap.

The State Government will put in place appropriate/ suggested State level governance mechanisms for periodic review and monitoring of the PFA Roadmap implementation.

The Ministry of Power, GoI would supplement the efforts of State on various issues to be dealt with at the Central Government level including those listed in this document. The MoP, GoI shall also endeavor to support the State in availing concessional financing arrangements for power utilities in the State.

The State Government shall endeavor to support utilities in improving/ maintaining their financial sustainability and credit worthiness.

The Central and State Governments would meet regularly over the next four years to review and monitor the progress on the rollout plan and strive to achieve the objectives of the program by taking the necessary steps as envisaged in the PFA Roadmap document.


Jyoti Arora, IAS

Joint Secretary

Ministry of Power

Government of India


Dheeraj Gupta, IAS 16/6/16

Commissioner/Secretary

Jammu and Kashmir Power Development
Department

Government of Jammu and Kashmir

Contents

1. Executive Summary	1
2. Background	4
3. Power Supply Scenario.....	9
4. Generation Plan	15
5. Transmission Plan.....	27
6. Distribution Plan	35
7. Renewable Energy Plan	47
8. Energy Efficiency Plan	54
9. Financial Position of utility (JKPDD)	58
10. Roll out Plan	66
11. Institutional Arrangement for monitoring	68
12. Annexures	69
13. List of Abbreviations	101

List of Figures

Figure 1: Per Capita Income Jammu & Kashmir vs National Average (in Rupees at Constant Prices: 2004-05)	5
Figure 2: District Wise Urban and Rural Divide: No. of HHs (2011 Census)	5
Figure 3: Energy requirement, availability (MU) and deficit (%).....	9
Figure 4: Peak Demand, availability (MW) and Deficit (Source: CEA Monthly reports)	9
Figure 5: Sales Growth.....	10
Figure 6: Consumer & Consumer-wise Sales Mix (FY15)	10
Figure 7: Projected Energy Sales (MU) for FY16 to FY19	12
Figure 8: Rural vs Urban Sales	12
Figure 9: Energy Requirement (MU) and Peak Demand (MW) (EPS vs PFA)	14
Figure 10: Comparative statement (month wise) Generation Figures of JKSPDC (MUs)	15
Figure 11: Source-wise Energy Availability (MU)	20
Figure 12: Energy requirement and Availability during FY16 to FY19 (MU)	21
Figure 13: Peak Demand and Availability in MW for FY16 to FY19	21
Figure 14: Peak and Off Peak Demand and Supply (MW)	22
Figure 15: DT failure rates (FY15)	37
Figure 16: Region-wise AT&C Loss for JKPDD (FY 14-15).....	37
Figure 17: Status of JKPDD Restructuring.....	44
Figure 18: Proposed Restructuring of JKPDD	44
Figure 19: Components of Approved cost of supply for FY15	58
Figure 20: ACS vs ABR (Source: JKPDD Year Book)	58

List of Tables

Table 1: Key Highlights of State: Jammu & Kashmir	4
Table 2: Jammu & Kashmir Power Sector at a Glance.....	6
Table 3: State's Peak Deficit (%).....	9
Table 4: Estimated Un-electrified Households (end of FY16).....	11
Table 5: Per HH per day consumption for JKPDD (kWh)	11
Table 6: Grid Electrification Plan – J&K (Urban & Rural HHs Nos.)	12
Table 7: Energy Requirement & Peak Demand Projections	13
Table 8: Installed Capacity (MW) as on November 2015	16
Table 9: Status of Existing State Power Plants*	16
Table 10: Plant wise details of allocated capacity from Central sector projects (Dec 2015)	17
Table 11: Roadmap for Capacity Addition in 12 th /13 th Plan	18
Table 12: Upcoming Capacities from State, Centre and Private Sources	19
Table 13: Energy availability from various sources (MU) FY16-19.....	21
Table 14: Investment Plan - JKSPDC (Rs. Crs.).....	24
Table 15: Action Points & Timelines	25
Table 16: Intra-state Transmission System (2014-15)	27
Table 17: Inter- state Transmission System.....	28
Table 18: Proposed Capacity Addition by JKPDD – Intra State Transmission Network	30
Table 19: ISTS schemes under PGCIL and TBCB	31
Table 20: Inter-State Proposed Capacity Additions	32
Table 21: Year-wise fund requirement (Rs. Cr.) – (J&K)	33
Table 22: Action Points & Timelines	34
Table 23: Existing Distribution System Capacity.....	36
Table 24: AT&C Loss Reduction Targets.....	36
Table 25: Metering Status as on March 2015	38
Table 26: Status of Works under Part A of R-APDRP Scheme	39

Table 27: Status of Works under Part B of R-APDRP Scheme	40
Table 28: Infrastructure addition program under various schemes for JKPDD	41
Table 29: Proposed investments in Distribution Network by FY19 (Rs. Crs.)	41
Table 30: District Wise HH Electrification Plan	42
Table 31: Action Points & Timelines	46
Table 32: MNRE Targets for J&K under 40 GW Grid connected Solar Rooftop	47
Table 33: RPO Targets % (Solar & Non-Solar).....	48
Table 34: Installed Capacity of RE in the State.....	48
Table 35: Status of Off-grid Application by JAKEDA	48
Table 36: JKSPDC - Status of SHPs under Development.....	50
Table 37: Status of SHP IPPs under Development	50
Table 38: RE (Grid Connected) Development Plan (MW)	52
Table 39: RE (Grid Connected) Fund Requirement Plan (In Rs Crore)	52
Table 40: Action Points & Timelines	52
Table 41: EE Planned Activities and Sanctioned Budget	55
Table 42: Energy efficiency Plan under DELP	56
Table 43: Year Wise Indicative EE Plan for Jammu & Kashmir.....	56
Table 44: Action Plan	57
Table 45: Proposed Fund requirement (Rs Crs.)	57
Table 46: Assumptions for various parameters.....	59
Table 47: Parameters for Base Case	60
Table 48: Profit and Loss Statement (Base Case)- Rs. Cr.	61
Table 49: Impact on tariff (Base Case)	61
Table 50: ABR vs ACS In Rs./kWh for Base Case	61
Table 51: Parameters for Scenario 1	62
Table 52: P&L account for Scenario 1 (Rs. Cr.).....	62
Table 53: Parameters for Scenario 2 (Non Availability of Grants)	63
Table 54: P&L Statement for Scenario 2 (Rs. Cr.)	64
Table 55: Parameters for Scenario 3	64
Table 56: P&L Statement for Scenario 3 (Rs. Cr.)	65
Table 57: Institutional Arrangement for Monitoring	68

1. Executive Summary

1.1. Introduction

24x7 Power for All (24x7 PFA) is a joint initiative of the Government of India (GoI) and State Governments, aiming to achieve 24x7 availability of reliable and quality power to all households, industrial, commercial and all other electricity consuming entities by the end of FY19. This document sets a roadmap to achieve the underlying objective of the PFA Program in the State of Jammu & Kashmir (J&K).

Situated in the northern part of the India, Jammu & Kashmir shares its borders with Punjab and Himachal Pradesh and also shares international borders with Tibet, Pakistan and China.

The Jammu & Kashmir Power Development Department (JKPDD) was earlier responsible for generation, transmission & distribution of electricity in the state for the J&K. Subsequently, the Power Development Corporation (PDC), a fully State Government Owned Company, was established in 1999, when the operation and maintenance of existing generating stations and future generating stations were entrusted to this corporation.

1.2. Power Supply Scenario

The energy demand has gradually increased over the last five years at an annual rate of about 5% to 6%. According to the 18th EPS, the power requirement of the State is expected to reach 21,884 MU during 2021-22.

Peak deficit has decreased from 28% in FY12 to 23% in FY15. The State's performance on peak deficit has consistently remained poorer than the national average.

Considering the State has already achieved significant level of electrification over the past 5

years. The remaining un-electrified households (HHs), which are assessed at 3,56,000 as of December, 2015, are targeted to be connected by FY19.

The energy sales for JKPDD is expected to increase by about 100%, from 6,135 MUs in FY15 to 12,168 MUs in FY19. The share of rural HH sales in the overall domestic category sales which stands at 58% in FY15 is projected to increase to 65% in FY19. The overall increase in projected energy sales translates into increase in peak demand from existing 2,650 MW in FY15 to 2,983 MW in FY19.

1.3. Generation Plan

Jammu & Kashmir's (J&K) power demand is mostly met by the Central Generating Stations (CGS) and the State's own sources. The State's own installed generation capacity is 1,419.37 MW comprising of 1,110 MW of Hydroelectric Power Stations, 198 MW thermal (Gas turbine) and 110.96 MW of SHPs. The State owned plants contribute to 45 % of the total energy requirement. Allocations from CGS contributes to the majority (53%) of the power supply and remaining (2.0 %) is sourced from private sector.

JKPDD is expecting a capacity addition/ increased allocation totaling 228.9 MW from CGS which currently stands at 1,671.25MW. Generation capacity available from private players (Including Solar/Wind) is expected to increase by 787.5 MW by 2018-19. As the peak demand for power is projected to increase to 2,983 MW by FY19, the State is expected to face a peak deficit of 270 MW. However, in terms of energy availability, the State is likely to face a deficit of 1,060 MU in FY19.

1.4. Transmission Plan

JKPDD operates and maintains the intra-state transmission network having a transformation capacity of 4,050 MVA at 220/132 KV level and 4,503 MVA at 132/66-33 KV level along with transmission lines of 1,220 Ckt kms at 220 kV and 2,134 Ckt kms at 132 kV, spread over the entire stretch of the State. This is supported by the inter-state transmission systems totaling 2,648 ckt kms of transmission lines and a transformation capacity of 3,465 MVA.

The JKPDD has proposed a capacity addition of 6,105 MVA and 2,293 Kms of transmission lines in the intra-state transmission systems during the period FY16 to FY19. Additionally, inter-state transmission system capacity additions totaling 315 MVA and 1,181 ckt kms of transmission lines are being taken for construction during the period up by PGCIL/ private players under TBCB route.

The total funding requirement for the proposed additional intra-state transmission network by FY19 is Rs 5,667 Crore. Out of the PM package of Rs. 4,145 Cr. provided for the power sector reforms, Rs 1,263.95 Crore is earmarked for intra-state transmission strengthening by JKPDD. Projects worth Rs. 1,925 Cr are proposed to be executed through TBCB route. Suitable financing arrangements need to be put in place for the remaining gap of Rs. 2,478 Crore for implementing the proposed inter-state transmission system capacity additions by FY19.

1.5. Distribution Plan

JKPDD, viz. Power Development Department, Government of Jammu & Kashmir is the sole transmission and distribution utility in the State. JKPDD is presently distributing electricity to 2,077,275 urban (5,83,564) and rural (14,93,711) household consumers across 22 districts of the State.

The JKPDD has prepared its plans for distribution system capacity addition and network augmentations required in view of the needs arising out of the PFA Roadmap for the State. JKPDD has proposed to invest a total of about Rs. 7,179 Cr. by FY19.

The State has an availability of Rs. 3,033 Cr from the Government of India schemes viz. IPDS, DDUGJY, RAPDRP and RGGVY. The proposed investments under these schemes are targeted towards increasing access, feeder segregation, reduction of technical and commercial losses etc.

Out of the PM package of Rs. 4,145 Cr. provided for the power sector reforms, Rs 2,881 Crore is earmarked for the distribution related investments by JKPDD. Further, Rs 425 Cr is expected to be funded by the State Government. In total, out of the total investment requirement of Rs. 7,179 Cr., the JKPDD has availability of Rs. 6,339 Cr. thereby leaving a gap of Rs. 840 Cr. JKPDD may need to tie up with suitable funding agencies for bridging the gap.

The proposed capacity additions by JKPDD will add 238 substations having 2,827 MVA capacity in FY19. Similarly, the addition in lines is expected to improve the HT:LT ratio which will result in reduction of technical losses.

The JKPDD will undertake significant initiative in improving the extent and quality of metering and ensure 100% consumer metering and deployment of the most modern techniques including prepaid/ smart metering etc. by FY19. These investments along with additional necessary actions to curb commercial losses will facilitate the utility to achieve the targeted AT&C loss level of 25% by FY19 from existing losses of 64% (FY15).

1.6. RE and EE

The State's existing Renewable Energy (RE) sources comprises mostly of Small and Mini Hydro power generation sources. The state's own and private sector SHPs contribute to 5% of the total energy requirement. The state utility, JKPDD, is also planning to procure renewable energy from other sources to fulfill its RPO requirements.

The generation capacity of JKSPDC's RE sources, primarily SHPs, is expected to rise by 103.5 MW by FY19. The State has a target of addition of 175 MWp through Roof top solar under the MNRE targets for Grid-connected Roof Top Solar PV

systems by FY19. 811 MWp of Solar based generation capacities over the next 5 years (2015-20) at a cost of Rs 4,866 Cr. In addition, the LREDA and KREDA have proposed RE capacity addition of 57.2 MW and 140.05 MW respectively with a fund requirement of Rs. 375 Cr and Rs 1,240.30 Cr. respectively.

JAKEDA is also responsible for off-grid systems in the State. About 8,000 kW off-grid SPPs of different capacities ranging from 1-200 kW have already been set-up in different parts of the State including Leh & Kargil.

The total capacity additions through RE Projects is 734.6 MW by FY19.

With the projected capacity addition the state is likely to achieve Solar-RPO targets set the JKSERC Further, JKPDD is also expected to achieve the revised compliance targets under Amended National Tariff Policy.

EESL is carrying out UJALA scheme for distribution of LED to each household in the state. Under this scheme EESL will provide upto five 9W LED Bulbs to each registered Domestic Consumer at subsidized cost of Rs. 20/- per LED bulb.

1.7. Financial Sustainability

JKPDD functions as a Government Department and does not maintain commercial accounts. Due to the gap between average billing rate and cost of supply, the JKPDD is faced with huge revenue deficit. The JKPDD is likely to face a revenue gap of about Rs. 2,457 Cr in FY19. The utility requires annual tariff increase of about 16.8% to reduce revenue support from State Government by FY19. To reduce the financial burden and improve operational efficiency, The J&K government has entered into a MoU with MoP, GoI for implementation of UDAY scheme, which will allow the state to repay the outstanding dues of Rs. 3,537 Cr towards CPSUs.

2. Background

2.1. The State of Jammu & Kashmir

Jammu & Kashmir strategically located in the north-west corner of India, comprising of Ladakh, Jammu and Kashmir valley and shares international boundaries with Pakistan, Tibet and China and borders the states of Punjab and Himachal in the south and south-east. The State is spread over an area of about 222,236 sq. km. making it the 10th largest state in the country in terms of area. The population density per sq. Km. is about 56 which is fairly below the national average, mainly due to the presence of snow covered hills and mountain ranges in the majority part of the state.

The level of urbanization in Jammu and Kashmir has remained relatively low with urban areas accounting for only 27.38% of its population in 2011. Nevertheless, urban population during 2001

to 2011 has increased by 36 percent, which is considerably higher than the national average of 31.2%. The district wise urban and rural break-up of HHs in Jammu and Kashmir is shown in Figure 2.

Jammu and Kashmir's per capita income at constant prices (2004-05) stands at Rs. 31,773 as against the national per capita income of Rs. 38,856 at the end of FY14, as depicted in Figure 1. The gap between the national and State's per capita income has been rising since 1993-94, indicating that the State needs more focus on achieving economic growth. The electricity sector could be one of the key enabling and driving forces to achieve this growth. Table 1 provides the key highlights of the state.

Table 1: Key Highlights of State: Jammu & Kashmir

Parameter	Information
Year of Creation	15 th August 1947
Population & Demographics	<p>Total Population at 12,541,302 as per 2011 census</p> <ul style="list-style-type: none"> 72.62 %% Rural, 27.38 %Urban Decadal population growth: 23.64 %
Area	<p>222,236 square kilometers (6.76% of country)</p> <ul style="list-style-type: none"> Forest cover – 19.95% Total cropped area (2012-13) –7.35% of its geographical area and 30.84 % of reported area.
Administrative Set-up	<ul style="list-style-type: none"> 22 Districts 2- Revenue Divisions 82 Tehsils 143 Blocks 6551 Villages
Natural Resources	<ul style="list-style-type: none"> The estimated hydro power potential of the state is 20,000 MW spread over Chenab, Jhelum, Indus and Ravi Basins.
Neighboring States	<ul style="list-style-type: none"> West: Pakistan East: China South East:: Himachal Pradesh

Parameter	Information
	<ul style="list-style-type: none"> South: Punjab
HHs	As per Census, 2011 Total 2,015,088 HHs (85.13% Electrified) <ul style="list-style-type: none"> Urban 507,030 (98.03% Electrified) Rural 1,208,527 (80.68% Electrified)

Figure 1: Per Capita Income Jammu & Kashmir vs National Average (in Rupees at Constant Prices: 2004-05)

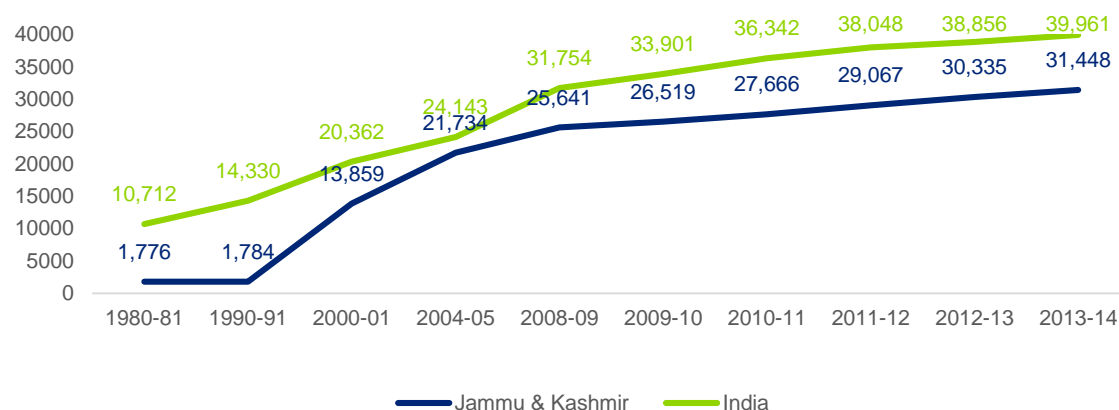
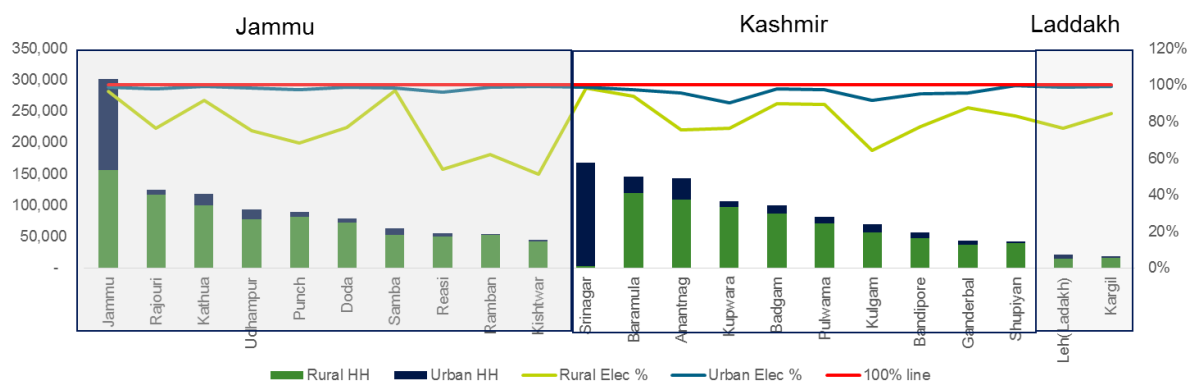


Figure 2: District Wise Urban and Rural Divide: No. of HHs (2011 Census)



The need for power in the state of Jammu and Kashmir (J&K) has been growing. Energy demand has gradually increased during last five years at an annual rate of 5% to 6%. According to the 18th EPS, power requirement of the State is expected to reach 21,884 MU during FY22. As per the State Economic Survey (2014-15) report, out of the identified potential, only 2,813.46 MW i.e. 17 % (of identified potential) has been exploited so far, consisting of 761.96 MW in State Sector from 21 power projects, 2,009 MW in Central Sector from 7 projects and 42.5 MW in private sector from 4 projects. In order to transfer the Power from point of generation to

point of consumption effectively, the Transmission and Distribution infrastructure needs development. T&D losses in the State are very high of the order of 55%. The main reasons for such high losses are technical as well as commercial. The high technical losses are due to existence of outdated distribution network and such system needs up-gradation and improvements. Commercial losses include theft, unaccounted and uncontrolled consumption of power beyond agreement load, poor status of consumer metering, unregistered consumers, lesser contract demand etc.

2.2. Jammu & Kashmir -Power Sector At a Glance

The power sector in J&K has witnessed significant growth in the past couple of decades. Jammu & Kashmir Power Development Department (JKPDD) was earlier responsible for generation, transmission and distribution of electricity in the state. Subsequently, the J&K State Power Development Corporation Limited (JKSPDCL), a fully Govt. Owned Company, was established in 1999, when the operation and maintenance of existing and future generating stations were entrusted to this corporation.

Presently, JKPDD is looking after Transmission and Distribution (T&D) functions only. These functions have been further entrusted to various wings of the department. Two Electric Maintenance and Rural Electrification (EM&RE) wings look after distribution in Jammu and Kashmir provinces. Two more System and Operation (S&O) wings look after Transmission in the state. Besides, there are three more wings namely, Planning & Design (P&D), Procurement & Material Management (P&MM) and Commercial & Surveys (C&S) which support EM&RE and S&O Wings.

The JKPDD is currently discharging the following functions:-

- Procurement of electricity from the Power Development Corporation (PDC), Central Public Sector Undertakings and other agencies carrying out the work of transmission and distribution / supply in the State and preparing and carrying

out the schemes for transmission and distribution for promoting the use of electricity within the state.

- Supplying electricity in Jammu & Kashmir as per the requirements of the J&K Electricity Act 2010.
- Operating few small generating stations under its control

The Government of Jammu & Kashmir (GoJK), vide GO no. 264 PDD of 2012 dated 5th September, 2012, ordered for unbundling of JKPDD and setting up of one transmission company, two distribution companies (one each for Jammu and Kashmir divisions) and one trading company with the function of a holding company. In line with the above order, GoJK has ordered for setting up of the following companies vide GO no. 285 PDD of 2012 dated 21st September, 2012:

- Jammu & Kashmir State Power Transmission Company Limited
- Jammu & Kashmir State Power Trading Company Limited
- Jammu Power Distribution Company Limited
- Kashmir Power Distribution Company Limited.

However, unbundling continues to be a work-in-progress as the newly formed companies have not yet taken charge of their respective functions. Table 2 below shows the key highlights of the power sector in the State.

Table 2: Jammu & Kashmir Power Sector at a Glance

Aspect		Key Highlights		
Demand Position	Supply	The state's demand supply is not at par with the National Average (3.6% Energy Deficit and 4.7% Peak Deficit). The FY15 demand supply situation is highlighted in the table below:		
		Item	Peak	Energy
		Requirement	2,650 MW	16,214 MU
		Availability	2,043 MW	13,119 MU
		Surplus/(Deficit)	23% (607)	19% (3,095)

Aspect	Key Highlights					
	Per capita consumption (At generation bus bar including all losses) in kWh for last five years (Source: CEA)					
		FY11	FY12	FY13	FY14	FY15
	J&K	988	1,015	1,043	1,066	1,169
Generation	The total generation capacity available to the state (March, 2016) is as depicted below:					
	Sector	Thermal	Hydro	RE	Total (MW)	
	State	198.41	1,110	110.96	1,419.37	
	Private	-		42.50	42.50	
	Central	630	1,041	-	1,671.00	
	Total	828	2,151	153.46	3,132.87	
	The diesel based power generation, which is under JKPDD is put to use on need basis only, mostly in emergency situations.					
Transmission	JKPDD is the state transmission utility for Jammu and Kashmir. The total intra and inter-state transmission systems available to J&K (March, 2016) are summarized in the table below:					
	Mode			Transformation Capacity (MVA)	Line Length (ckt kms)	
	Intra-state		220/132KV	4,050.00	1,220.10	
			132/33-66 KV	4,503.00	2,134.07	
			Total	8,553*	3,354.17*	
	Inter-state		400/220 kV	3,465 (4 Substations)	1,005	
			400/220 kV	3,465 (4 Substations)	1,823	
			132 KV	-	262.3	
			765 kV	-	562.5	
			Total	3,465	2,648	
	*including under-construction sites in PMRRP scheme					
	Distribution	JKPDD is the sole distribution utility in the State of Jammu and Kashmir. The sub-transmission and distribution infrastructure (March, 2015) are as summarized below:				
Parameters			Unit	Total		
Distribution Capacity		66-33/11-6.6 kV	MVA	4,958.85		
		66-33/11-6.6 kV	Nos	503.00		
		11-6.6/0.4 kV	MVA	5,763.15		
		11-6.6/0.4 kV	Nos	47,764.00		
Distribution Lines		HT Lines	Ckt. Kms	38107.9		
		LT Lines	Ckt. Kms	73,259.80		

Aspect		Key Highlights			
	Consumers	Domestic	Nos	13,90,856	
		Commercial	Nos	1,81,116	
		Industrial	Nos	20,214	
		Others	Nos	33,236	
		Total	Nos	16,25,422	
Financial Position	<ul style="list-style-type: none">JKPDD operates as a State Government Department and does not maintain commercial accounts giving a true reflect of its financial performance.Being a State Government Department, JKPDD's annual revenue gap is directly borne by the State Government which has not led to accumulation of accrued losses in its books of accounts.However, the JKPDD has been posted a net deficit of 3,445.15 Crores during FY14 (True-up petition)Additionally, the JKPDD owes Rs. 3,537 crores to CPSUs as on Sep 2015Given the above, operational viability of the JKPDD is a matter of serious concern as it becomes a corporatized entity under the proposed unbundling.				

3. Power Supply Scenario

3.1. Power Supply Position

Jammu & Kashmir's peak demand for power has grown by over 8% during the period from 2011 to 2015. Peak deficit has decreased from 28% in FY12 to 23% in FY15.

Table 3: State's Peak Deficit (%)

Particulars	FY12	FY13	FY14	FY15
Peak Demand (MW)	2,500	2,550	2,600	2,650
Peak Available (MW)	1,789	1,817	1,998	2,043
Peak Shortage (%)	28.44	28.75	23.42	22.91

High share of hydro in the generation mix combined with outages in transmission and generation sources has led to seasonal variations in power availability situation in the State. During Apr, 2014 to Mar, 2015, energy shortage and peak shortage have largely remained to be constant at 20%, except for the peak winter season starting December till March. Figure 4 shows the seasonal trend of peak and energy shortages for the period Apr, 2014 to Mar, 2015.

The state is perpetually energy deficient and has to rely on power purchases from Northern Region Grid to meet its requirements especially during winters when demand peaks and own generation reduces drastically. As such, there remains a huge gap between the requirement and availability of energy. As per estimates of JKPDD, the total restricted energy availability of power for the year 2014-15 remain to be 13,701 MUs against the unrestricted energy requirement of about 18,000 MUs.

Figure 3: Energy requirement, availability (MU) and deficit (%)

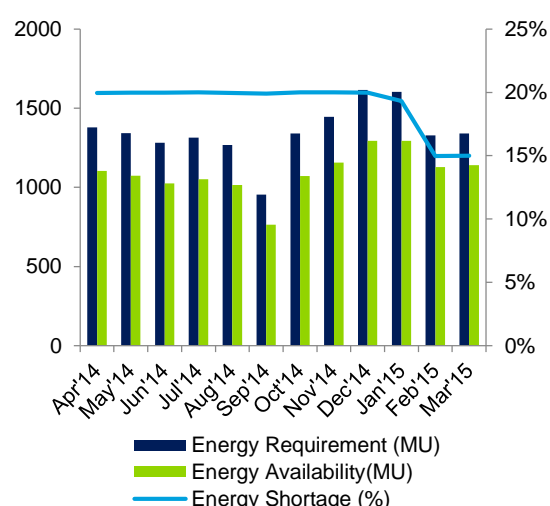
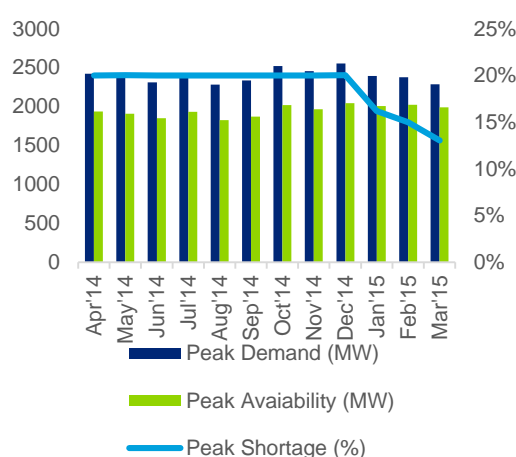


Figure 4: Peak Demand, availability (MW) and Deficit (Source: CEA Monthly reports)



3.2. Consumer & Sales Mix

Figure 5: Sales Growth

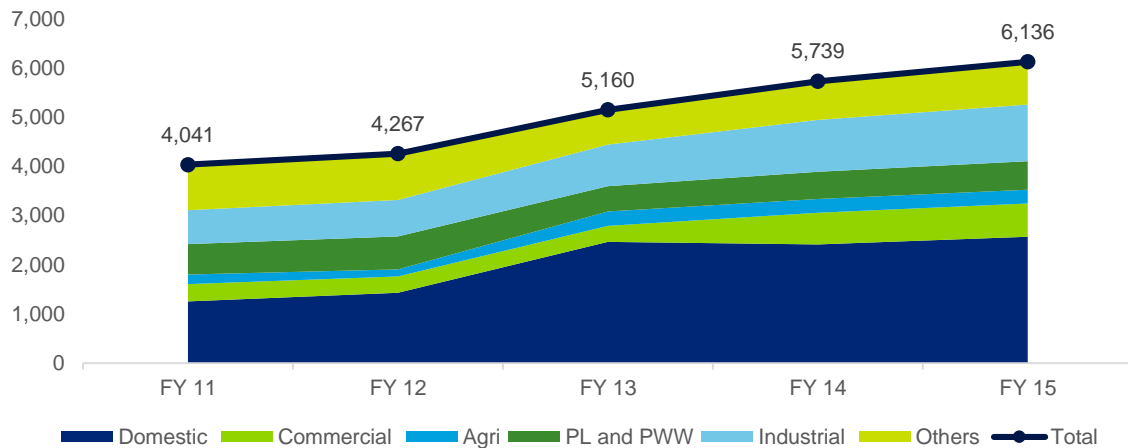
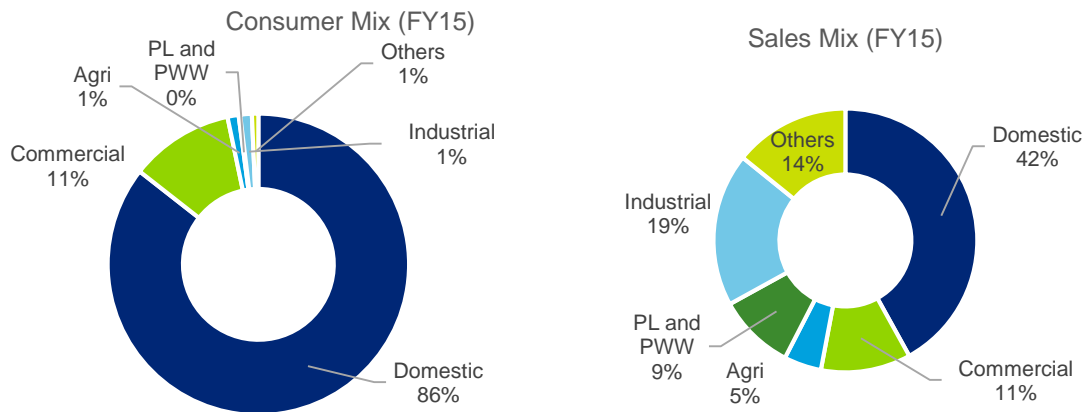


Figure 6: Consumer & Consumer-wise Sales Mix (FY15)



JKPDD serves electricity to over 16 Lakh consumers in the State (FY15). The mix in terms of number of consumers and energy sales for the predominant consumer categories is provided in Figure 6. The domestic consumer category comprises over 86% of JKPDD consumer base and contributes to over 42% of its energy sales. Other categories comprising over 2.34 lakh consumers (14%) contributes to around 58% energy sales. The State has added significant number of domestic/ HH consumers (above 3 lakhs) during the last 5 years which has led to a substantial increase in the contribution of the domestic category in the consumer mix as well as the sales mix of the JKPDD, as can be inferred from the trend illustrated

in Figure 5. The number of consumers and consumption have shown growth (CAGR) of 6.2% and 11%, respectively, over the last five years.

3.3. Methodology for Demand Projections

In line with the objective of PFA program, to provide 24X7 power to all HHs, the demand projection has been done separately for electrified and un-electrified rural and urban HHs. Whereas, for rest of the consumer categories, a growth rate based on JKPDD's estimation of the expected growth along with a review/ validation with the past trend has been considered. The following steps detail out the

approach adopted for estimation of energy requirement for the State.

Estimation of Rural and Urban electrified and un-electrified HHs

The number of rural and urban HHs as on date are estimated based on the available census data for 2011, extrapolated with past 10 years CAGR.

In addition to the level of electrification in rural areas as per 2011 census data, the actual rural HHs electrified since 2011 has been considered to arrive at the present level of electrification. In case of urban areas, J&K has achieved 100% electrification as on March 2015. The estimated urban and rural HHs along with the status of electrification as at the end of FY14 is provided in Table 4

Table 4: Estimated Un-electrified Households (end of FY16)

Particulars	Urban	Rural	Total
Total HHs	5,95,232	17,01,179	22,96,411
Electrified	5,95,232	13,45,179	19,40,411
Balance (covered under PFA)	0	3,56,000	3,56,000

Estimation of Energy Requirement from HHs

The energy requirement from domestic category consumers (HHs) has been estimated using the end use method under the following broad categories:

- Latent demand from existing HHs on account of increase in specific consumption (kWh/HH/day) for each of the electrified HH due to life style advancements and natural growth;
- Additional energy requirement due to electrification of un-electrified HHs;
- Additional energy requirement due to construction of new urban and rural HHs; and

Latent demand growth from already electrified HHs has been estimated based on expected increase in consumption levels in accordance with the objectives of the PFA program. The growth in per HH per day consumption is expected to increase due to increased availability and natural growth in consumption levels due to lifestyle changes. The average per HH per day consumption for rural and urban HHs, which has been arrived at on the basis of the consumption trend and expected impact of reduction of commercial losses, is detailed in Table 5

Table 5: Per HH per day consumption for JKPDD (kWh)

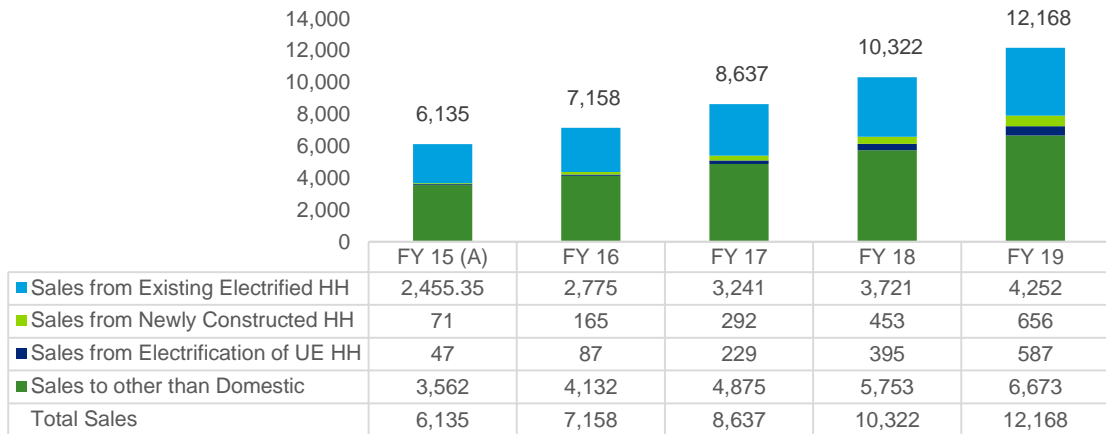
Particulars	FY15	FY16	FY17	FY18	FY19
Urban	4.7	5.2	5.9	6.6	7.4
Rural	2.6	3.0	3.7	4.3	4.9

Considering the State has already achieved significant level of electrification over the past 5 years, the remaining rural consumers are likely to be connected by FY19, as detailed in Table 6. The corresponding energy requirement from newly connected HHs is estimated based on per HH per day consumption as listed in Table 5. The corresponding energy requirement from new HHs is also estimated based on the estimated per HH per day consumption.

JKPDD must take adequate precautions if these consumption levels are to be achieved. As the sales in the state is mostly through unmetered connections at flat rate it is imperative that JKPDD moves towards 100% metered sales. Going forward, there is a risk of non-recovery of consumption dues if there continues to be a predominance of flat rate billing. Alternatively, if JKPDD is successful in metering all consumers, there is a possibility of reduction of per day per HH consumption for which JKPDD may need to revisit these consumption targets.

It may be noted that in the absence of focus on recovery, the proposed increased in specific consumption levels by domestic HHs will call for a

Figure 7: Projected Energy Sales (MU) for FY16 to FY19



significant increase in subsidy/ revenue gap support to the JKPDD or its successor entities by the State Government to ensure financial viability of the sector.

Estimation of Energy Requirement from Other Consumer Categories

The energy requirement projections from other consumer categories have been done factoring the expected natural growth as well as the additional growth arising out of increased availability of

electricity in accordance with the objectives of the PFA Roadmap.

For the remaining consumer categories such as commercial, public lighting, agriculture, public water works etc. CAGR of 16-18% has been considered to arrive at the projected demand. This is to accommodate the increased availability due to increase in supply hours across categories.

Figure 8: Rural vs Urban Sales

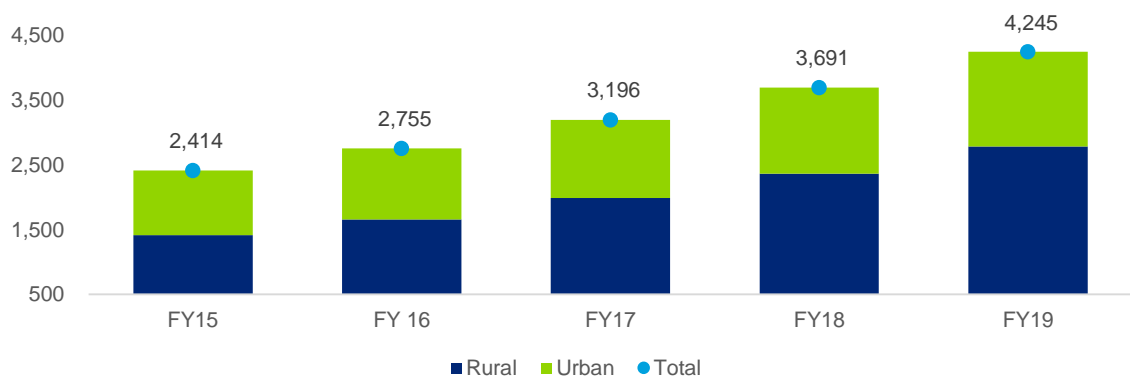


Table 6: Grid Electrification Plan – J&K (Urban & Rural HHs Nos.)

Particulars	FY15 (A)	FY16	FY17	FY18	FY19
Urban					
Opening Un-electrified HHs	0	0	0	0	0

Particulars	FY15 (A)	FY16	FY17	FY18	FY19
Electrification of Newly Constructed HHs	16,974	17,458	17,955	18,467	18,994
Electrification of Existing UE HHs (Opening of FY15)	0	0	0	0	0
Balance Un-electrified HHs	0	0	0	0	0
Rural					
Opening Un-electrified HHs	4,05,840	3,56,000	320,400	213,600	106,800
Electrification of Newly Constructed HHs	43,849	44,979	46,138	47,327	48,547
Electrification of Existing UE HHs (Opening of FY15)	49,840	35,600	106,800	106,800	106,800
Balance Un-electrified HHs	356,000	320,400	213,600	106,800	0

3.4. Demand Projections

Based on above steps, the energy sales for JKPDD is expected to increase by about 100%, from 6,135 MUs in FY15 to 12,168, MUs in FY19, as presented in Table 7.

As can be seen in Figure 7, despite an increasing growth trajectory, the share of energy requirement from other than domestic category consumers is expected to reduce from 58% in FY15 to about 51% in FY19.

The share of energy requirement from urban and rural HHs is projected to grow significantly in the future due to the quantum leap in access and availability of electricity in rural areas. The share of rural HH sales in the overall domestic category sales which stands at 58% in FY15 is expected to increase to 65% in FY19 as can be seen in Figure 8.

The energy input requirement at the State periphery has been calculated after applying savings from AT&C loss reductions and improved collection efficiency as shown in Table 7.

The AT&C loss reduction targets used for the purpose of energy input requirement assessment have been taken as per the targets set by JKPDD as per the MoU for UDAY.

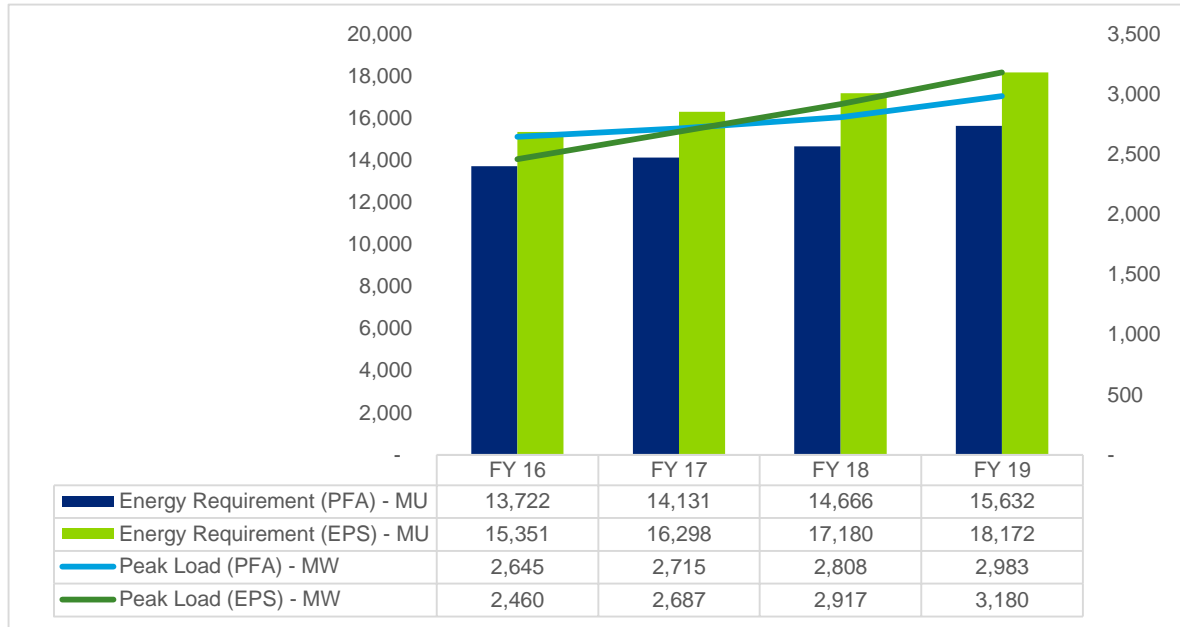
The peak demand for the State is expected to increase from 2,650 MW in FY15 to 2,983 MW in FY19.

The consideration of rapid increase in electrification levels and improved power availability position in the State has enhanced the projected energy requirement and the peak demand projections up to the period FY19. A comparison of the projected figures under the PFA Roadmap vis-à-vis the 18th EPS is shown in the bar chart in Figure 9

Table 7: Energy Requirement & Peak Demand Projections

Particulars	Units	FY15 (A)	FY16	FY17	FY18	FY19
Energy requirement/ Sales	MU	6,135	7,158	8,637	10,322	12,168
Collection Efficiency	%	80.4%	84.4%	88.4%	92.4%	96.4%
AT&C Losses	%	64.02%	56.00%	46.00%	35.00%	25.00%
T&D Losses	%	55.22%	47.84%	38.88%	29.62%	22.16%
Energy Input Requirement	MU	13,701	13,722	14,131	14,666	15,632
Load Factor	%	59.0%	59.2%	59.4%	59.6%	59.8%
Peak Demand	MW	2,650	2,645	2,715	2,808	2,983

Figure 9: Energy Requirement (MU) and Peak Demand (MW) (EPS vs PFA)



4. Generation Plan

4.1. Generation Capacity Requirement

The requirement of electricity in energy and peak demand terms for the State are expected to increase from the present level of 13,701 MU and 2,650 MW in FY15 to 15,632 MU and 2,983 MW in FY19. The State needs to relook its generation capacity addition and power procurement plans in order to meet the electricity demand in accordance with the projections under the 24X7 PFA Roadmap. This chapter elaborates on the aspect of adequacy of the tied-up and upcoming generation capacities for the State and identifies the key action points to address the identified gaps therein.

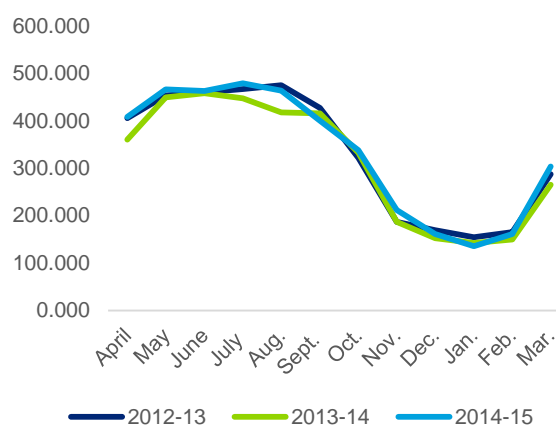
4.2. Existing Generation Capacity

The state's own installed generation capacity is 1,410.37 MW comprising of 1,110 MW of Hydro Power Stations based, 198 MW thermal (Gas turbine) and 101.96 MW of SHPs. The state owned plants contribute to 45% of the total energy requirement. Allocations from CGS contribute to the majority (53%) of the power supply and remaining (2.0%) is sourced from private sector projects. Break-up of the installed capacity by ownership and fuel mix is provided in Table 8.

Jammu and Kashmir State Power Development Corporation Ltd (JKPDC) is the State generation company carved out of JKPDD, the state's only Distribution Utility. The states own generation capacity is mainly of Hydro based power plants. The present status of the State sector plants and other allocations are from central sector are summarized in Table 9 and Table 10, respectively.

The hydro based projects (State & Centre) are unable to generate to their full capacities due to low hydrology during the period September to March (As can be seen in Figure 10). In addition most of the plants remain completely or partially shut down having impact on the total generation capacity. Due to non-availability of any state owned thermal generation plants, the JKSPDC is unable to meet the base load support. During the winter season (September to March), demand increases drastically, particularly in the Kashmir region compelling the JKPDD to purchase costly power from the open market.

**Figure 10: Comparative statement (month wise)
Generation Figures of JKSPDC (MUs)**



State owned thermal power plants mostly remain non-operational due to high per unit generation cost. However, diesel based generation units are used to meet the requirements of Ladakh region as emergency backup.

Table 8: Installed Capacity (MW) as on November 2015

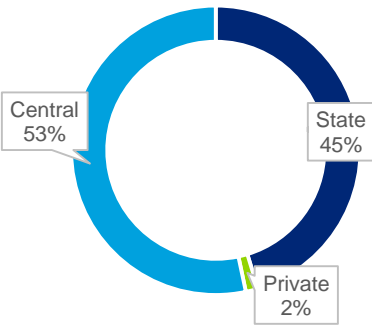
Share	Sector	Thermal	Hydro	RE	Total
	State	198.41	1,110	101.96	1,410.37
	Private	-	0	42.50	42.50
	Central	630	1,041	-	1,671.00
	Total	828.41	2,151	142.46	3,124.00

Table 9: Status of Existing State Power Plants*

Name of Plant	Fuel	Installed Capacity (MW)	PLF (FY15)	Remarks
A. Own Generating Station - Hydro (State Sector - JKSPDC)				
USHP - II (3 x 35 MW)	Hydro	105	46.13%	Year of commissioning 2000-02. In operation.
LJHP (3 x 35 MW)	Hydro	105	62.84%	Year of commissioning 1977-79. This project is under Renovation & Modernization Plan and term loan has been raised from PFC.
Baglihar I (3x150 MW)	Hydro	450	60.83%	Year of commissioning 2008. Record generation since commissioning. 50% power sold to JKPDD & remaining 50% is sold through PTC. JKSPDC raised loan of Rs. 2,253 crore from consortium of banks led by PFC.
Baglihar – II (3x150 MW)	Hydro	450	33.03%	Year of commissioning 2015. JKSPDC has raised loan for BHEP-II from PFC & JK Bank for an amount of Rs.2,179 crore
Sub- Total A. (Hydro)		1,110		
B. Own Generating Station- Thermal				
JKPDD Own Generation (Diesel)	Diesel	23.41	-	The diesel based power generation, which is under JKPDD is also run as per need based only when required and mostly remain non-operational.
JKSPDC Gas Turbine-I	Thermal (Diesel)	75	-	The thermal (diesel based) based power generation, remains shut down due to high per unit generation cost.

Name of Plant	Fuel	Installed Capacity (MW)	PLF (FY15)	Remarks
JKSPDC Gas Turbine-II	Thermal (Diesel)	100	-	The thermal (diesel based) based power generation, remains shut down due to high per unit generation cost
Sub Total B.-Thermal		198.41 MW		
Total (A+B)		1,308.41 MW		

*This excludes SHPs, which are detailed in the Renewable Energy (RE) Plan.

Table 10: Plant wise details of allocated capacity from Central sector projects (Dec 2015)

Plant Name	Fuel	Capacity (MW)	Allocated Capacity (MW)
Central Plants			
Salal	Hydro	690	237
Dulhasti	Hydro	390	82
Uri-I	Hydro	480	163
Sewa-II	Hydro	120	23
Nimo Bazgo	Hydro	45	38.25
Uri-II (unit 1,2 ,3&4)	Hydro	240	49
Chutak	Hydro	44	44
Rihand STPS	Thermal	1,000	70
Rihand STPS Stg. - II	Thermal	1,000	94
Rihand STPS Stg. - III (Unit 5&6)	Thermal	1,000	66
Unchahar - I TPS	Thermal	420	14
Unchahar - II TPS	Thermal	420	30
Unchahar - III TPS (Unit 5)	Thermal	210	13
Dadri NCGPS	Gas	830	56
Anta GPS	Gas	419	29
Auraiya GPS	Gas	663	44
Narora Atomic Power Station(NAPS)	Atomic	440	33
Chamera HPS- I	Hydro	540	21
Chamera HPS- II	Hydro	300	19
Chamera HPS- III	Hydro	231	16
Tanakpur HPS	Hydro	94	7
Dhauliganga HEP	Hydro	280	17
Nathpa Jhakri HPS	Hydro	1,500	105
Tehri Stage - I (4 Units)	Hydro	1,000	48
Koteshwar HEPS (Unit 1,2,3 & 4)	Hydro	400	18
Parbati-III HEP(Unit-1,2,3,4)	Hydro	520	36

Plant Name	Fuel	Capacity (MW)	Allocated Capacity (MW)
Rampur HEP (Unit#1,2,3,4,5,6)	Hydro	412	29
Koldam HEP (800 MW)	Hydro	800	89
Farakka STPS (1600 MW)	Thermal	113	14
Kahalgaoon - I (840 MW)	Thermal	261	31
Mezia unit 6 (250 MW)	Thermal	150	18
Kahalgaoon - II (1500 MW) [498 MW firm+ 343MW in lieu of Tala]	Thermal	841	83
Rajasthan Atomic Power Station (RAPS U-3 &4) - Firm power	Atomic	374	35
Diverted Unallocated power from Western Region to J&K		100	100
Total		16,327	1,771.25*

*1,771.25 MW includes diverted unallocated share.

4.3. Generation Plan

JKSDPC has drawn up a roadmap for systematic capacity addition in the 12th/13th Plan which is anticipated to make the state energy surplus by utilizing its large hydel potential. Summary of the sector wise projects and capacities in the roadmap are indicated in Table 11. As detailed in subsequent sub-section, some of proposed projects are delayed. The State may need to focus on expediting these projects for meeting its medium and long term energy requirements. The following sections review the present situation of upcoming state and central generation capacity/allocations forming part of the state's generation plan.

Table 11: Roadmap for Capacity Addition in 12th/13th Plan

Sl.	Sector	No. of Projects	Capacity (MW)
i.	State	14	5895.5
ii.	Central	5	1350 (including Burser 1020 MW)
iii.	IPP (Big) Ratle	1	850
iv.	IPP (Small)	37	376

Sl.	Sector	No. of Projects	Capacity (MW)
	Total	57	8,471.5 MW

State Sector

The status of development activities and readiness of the advanced State sector projects is summarized in Table12. As can be seen from the project wise (State, Centre & JV's) status, with the additions in allocation from CGS (currently 1,671.25 MW) the total available capacity for the state from CGS is expected to increase by 228.9 MW and from private players (Including Solar/Wind) is expected to increase by 787.5 MW by FY19.

In the State Sector, timely DPR approvals/clearances, contracting, works monitoring would be key to ensuring timely commissioning of the proposed projects. Some of the major projects such as 850 MW Ratle HEP which was awarded on competitive basis to a private developer is now stalled as the developer has not commenced construction of the project due to disputes related to water and taxation. Likewise, EPC contracts in respect of projects like New Ganderbal (NGHEP) of 93 MW are yet to be awarded. The reconstituted Board of directors of the JSPDCL is yet to take a decision on this.

Delays in planning and award of contracts are adversely impacting timely implementation of

projects. The current status indicates that JKSPDC may not be able to meet its targeted capacity addition and there could be significant delays in commissioning of projects beyond the planned dates.

The reduction in the existing installed available capacities, due to ageing of HEPs, may further worsen the future availability of generation sources if the planned projects fail to take off.

State Hydel Policy

With the objective of attracting private investment in the development of hydropower projects, the state government framed the State Hydel Policy 2003. To make the policy more investor friendly, new state hydel policy was announced in July, 2011 replacing with State Hydel Policy, 2003. Ten number of projects with an aggregate capacity of 110.5 MW were awarded to various Independent Power Producers (IPPs) through competitive bidding, out of which four projects with aggregate capacity of 42.5 MW have been constructed (refer Chapter 7 Renewable Energy Plan) and are operational while remaining are at different stages of implementation. It may be noted that, none of the upcoming IPPs have firm PPA's with the JKPDD. Table 12 shows the status of the upcoming state (State, JVs & IPPs) and central sector projects having capacity addition by FY19 to the tune of 218.50 MW and 228.79 MW, respectively, to the state of Jammu & Kashmir. NHPC and NTPC in particular have a significant

role from the perspective of being the largest supplier of power to the State of Jammu & Kashmir, having a combined share even greater than the JKSPDC.

4.4. R&M Plan

JKSPDC has prepared a program for taking up Renovation & Modernization of seven HEPs at a cost of Rs. 208.96 crores. The State Government vide its letter dated 14.01.2008 has approved taking of R&M of these seven major HEPs. Loan assistance of Rs. 133.95 crores has been tied up with Power Finance Corporation out of which Rs. 32.93 crores has already been availed. Further, Ministry of New & Renewable Energy (MNRE) has also approved subsidy support of Rs.32.94 crores in respect of six HEPs. Works on these projects have already been started since 2009-10. After full completion of R&M works there will be increase in annual generation from these HEPs. Likely increase in annual energy generation as worked out by CEA during its appraisal report after R&M of four main HEPs namely, LJHP, Chenani-I, USHP-I and Ganderbal is 192 MU. RMU will ensure that these old power stations operate for additional period without any major overhauling requirements.

4.5. Anticipated Power Availability Position

During FY16 to FY19, the state is expecting capacity additions of 613 MW and 156 MW through

Table 12: Upcoming Capacities from State, Centre and Private Sources

Project Name	Fuel	Owner	Capacity (MW)	Allocated Capacity in MW	Expected CoD	Status
Kishenganga	Hydro	NHPC	330	73	Nov-16	Under Construction
Vishnugarh Pipulkoti*	Hydro	THDC	445	24	Dec-19	Under Construction
Unchahar IV*	Thermal	NTPC	500	67.15	Jan-18	Under Construction
Tanda TPP*	Thermal	NTPC	660	88.64	U-I (Nov 2018), U-II (May 2019)	Under Construction
Total Allocations Centre			2,955	228.79 (By FY19)		

Project Name	Fuel	Owner	Capacity (MW)	Allocated Capacity in MW	Expected CoD	Status
Lower Kalnai	Hydro	State	48	48	Sep-17	Under Construction
Parnai	Hydro	State	37.5	37.5	Oct-17	Under Construction
New Ganderbal (NGHEP)	Hydro	State	93	93	FY19	Tendered out (Not Awarded yet) - to be completed 48 months from date of Award.
Total State			178.5	178.5		
Small IPPs (Ans -I)	Hydro	Private	40	40	FY18	DPR Under Preparation
Total Private			40	40		

* Tentative Allocations

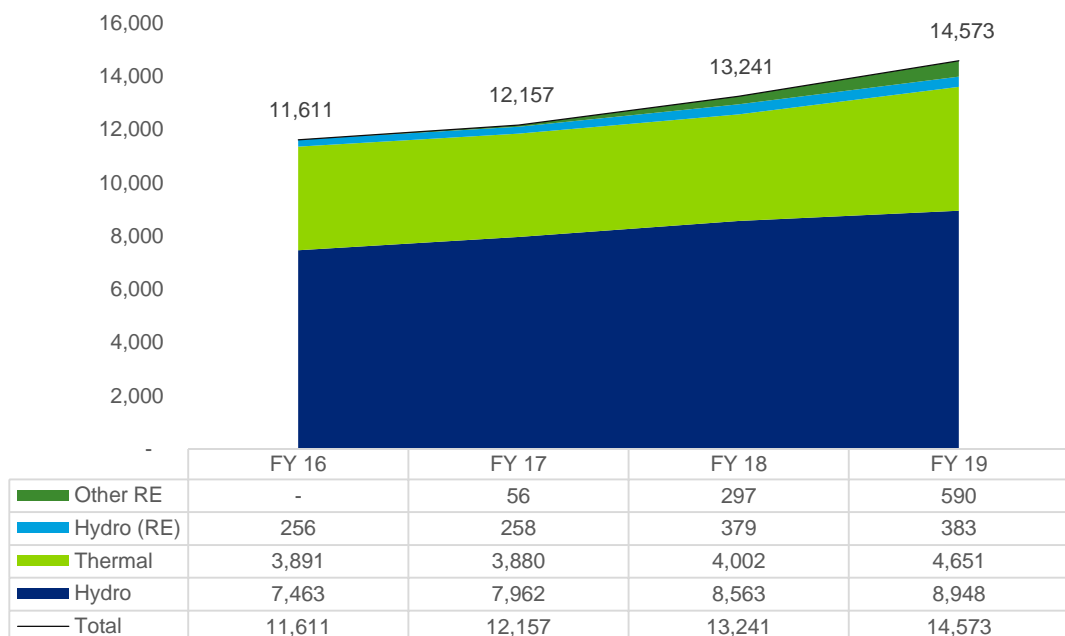
hydro and thermal sources, respectively. Additionally, during the period FY16 to FY19 a total of 586 MW is expected from RE sources, including SHPs. During the period FY16 to FY19 majority of energy is expected from hydro sources (64% of the total volume available) while the share of Renewables is expected to be 18% followed by minimal share of thermal (4%).

Due to the anticipated capacity additions, the available capacity to JKPDD is expected to increase to 2,713MW by FY19.

As the peak demand for power is expected to be 2,983 MW in FY19, the State is expected to face deficit of 270 MW. Figure 13 shows the available capacity for JKPDD. Also, in terms of energy availability JKPDD is likely to face a deficit of 1,060 MU in FY19

The peak and energy availability figures have been derived using the availability figures of various generating stations as per the National Electricity Plan . Energy availability figures for state generating stations are as per the tariff petition

Figure 11: Source-wise Energy Availability (MU)



submitted by JKPDD. Energy availability for central generating stations are projected using actual PLF. While for upcoming central generating stations PLF

of 85% for thermal units and 50% for hydro stations have been used.

Figure 12: Energy requirement and Availability during FY16 to FY19 (MU)

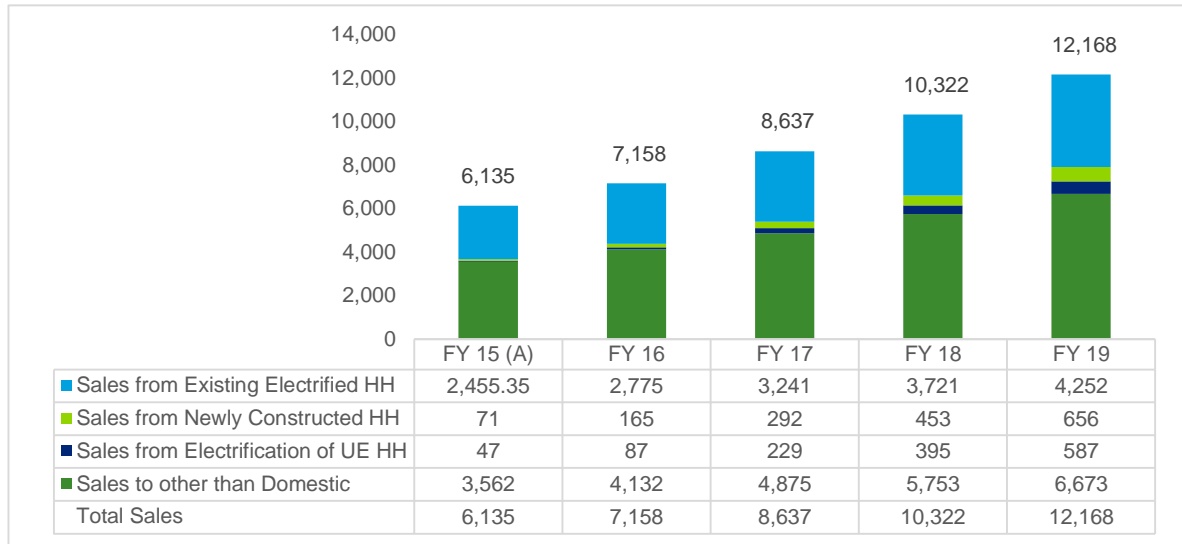


Figure 13: Peak Demand and Availability in MW for FY16 to FY19

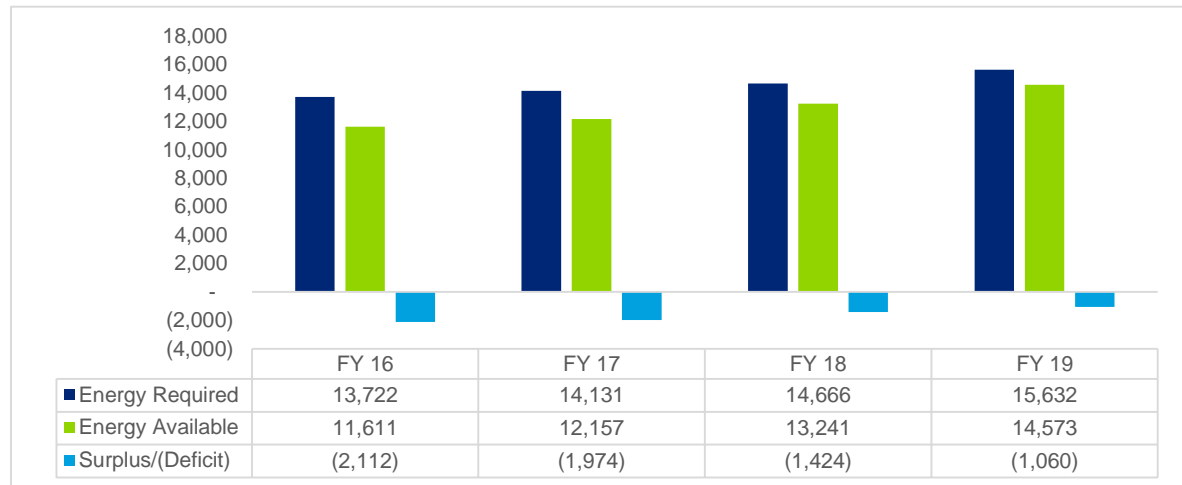


Table 13: Energy availability from various sources (MU) FY16-19

	State	Central	Private	Total
FY16				
Hydro	2,499	4,965	-	7,463
Thermal	-	3,891	-	3,891
Hydro (RE)	182	-	74	256
Other RE	-	-	-	-
Total	2,681	8,855	74	11,611

	State	Central	Private	Total
FY17				
Hydro	2,880	5,082	-	7,962
Thermal	-	3,880	-	3,880
Hydro (RE)	182	-	76	258
Other RE	-	-	56	56
Total	3,062	8,963	132	12,157
FY18				
Hydro	3,292	5,271	-	8,563
Thermal	-	4,002	-	4,002
Hydro (RE)	298	-	82	379
Other RE	-	-	297	297
Total	3,590	9,273	378	13,241
FY19				
Hydro	3,675	5,271	2	8,948
Thermal	-	4,651	-	4,651
Hydro (RE)	298	-	86	383
Other RE	-	-	590	590
Total	3,973	9,922	677	14,573

4.6. Power Procurement Planning

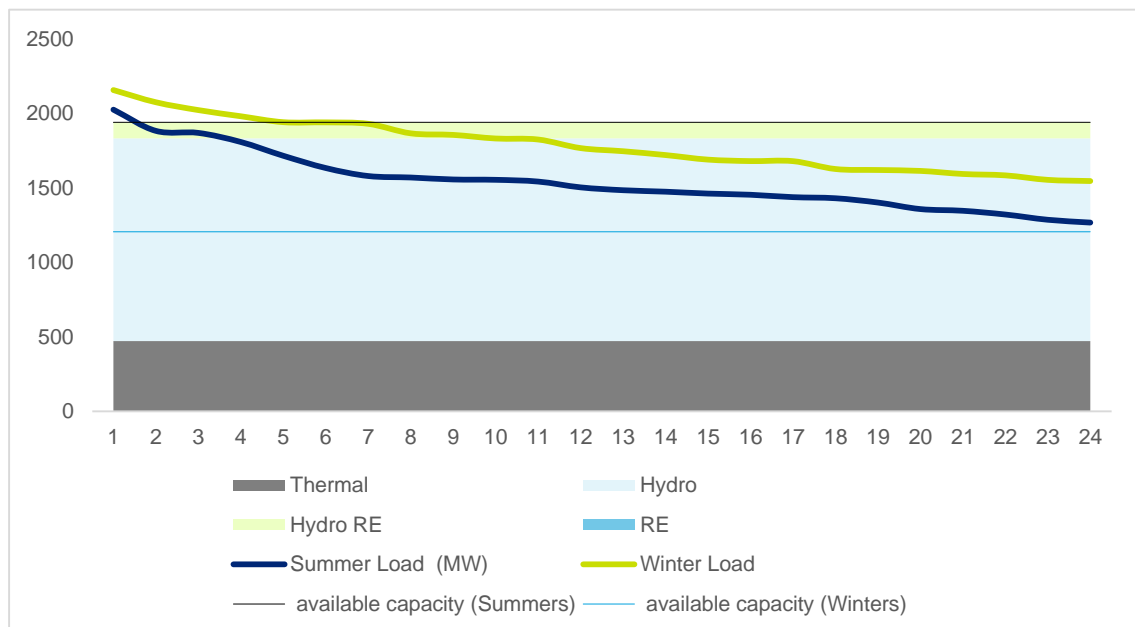
Analysis of the load curves for J&K gives an insight into the peak and off-peak deficit faced by the state.

It can be seen that the state faces peak and off-peak deficit mainly in the winters. This is particularly important for high-hydro states like J&K. The state's

load curve during summer and winter along with the available capacity from various sources of generation is illustrated in Figure 14.

During winter season, the peak deficit increases to about 800 MW. JKPDD has made banking arrangements with neighboring states to meet this deficit. However, such arrangement is short-term.

Figure 14: Peak and Off Peak Demand and Supply (MW)



JKPDD needs to prepare medium and long term plans to address this issue.

Some of the suggested methods for optimizing the power purchase portfolio are:

- Analysis of the peak and off peak slot-wise daily demand pattern in light of increased availability. This will help in arriving at the anticipated base and peak load.
- Consider medium and short-term power procurement from thermal sources to meet the anticipated deficit till FY22.
- Increase in allocations from thermal sources or setting up of own thermal plant for long-term base load support.
- Re-align the portfolio in the light of expected availability of renewable energy sources and achieve the targets under the amended Tariff Policy.

Considering the above, JKPDD has requested 300 MW of bundled thermal power from NTPC. Further, another MoU with NTPC for exploitation of 396 MW of Coal Block has been signed. The benefits of this MoU are expected beyond FY19.

The above steps will help in long term sustainability of power supply, further as bulk of the hydro power additions are expected by FY22 the peak availability to the State will be strengthened.

4.7. Generation Planning Issues

For success of the generation plan, it is important that the projects achieve their targeted commissioning schedules. One of the major risk factors impacting execution of a large number of projects, especially those being developed by the JKPDD, are highlighted in the previous sections. Delay in timely DPR approvals/clearance, contracting and commissioning of the proposed projects are some of the key concerns for timely completion of the projects.

Owing to the fact that a significant proportion of the proposed generation capacities comprises of hydro-generating sources, such projects are often

faced with delays including those arising from floods, environmental/ hydrological/ ecological/ seismic compliances, land acquisition, access to project sites.

4.8. IT Initiatives

JKPDC has implemented an Enterprise Resource Planning (ERP) based on-line automation solution (finance module) for switching over from Single Entry Cash based Accounting System to Accrual based Double Entry Accounting System due to various advantages of the later system besides complying with the provisions of Companies Act, IT Act and recommendations of C&AG.

The following IT initiatives have been taken along with the implementation of ERP:

- State of art IT Data Centre has been set up in JKSPDC Corporate office Jammu and IT equipment like IBM Blade Centre Servers with allied hardware and software infrastructure have been installed. The Data Centre is equipped with latest data backup technology and recovery in case of data loss.
- For high speed network accessibility and usage and for instant data updation for reporting and management perspective, a dedicated 2 mbps internet lease line for data center and point to point connectivity between Jammu and Kashmir offices has been subscribed with PGCIL.
- The switchover to double entry system of accounting with ERP implementation has been affected from 1st April 2009.
- ERP with IFS Solutions has been implemented in all the JKSPDC locations across all the three regions of J&K State by using 75 named user licenses.
- Complete "Go Live" achieved on 15th June 2012 and all the 64 sites of JKSPDC are working on-line in the new system.
- Domain hosting on Z-net for Citrix IFS user and mailing services.

- Installation of V-Sats at various field locations for improved and better internet based services.
- Installation of Video-conferencing setup at corporate office, Jammu, Corporate office, Srinagar and BHEP, Chanderkote.
- Hosting of other modules of ERP like HR Module, Inventory module and Project management module.
- JKSPDCL Website hosting by National Informatics Centre (NIC).

The funding requirement for the State sector projects by the end of 12/13th Year Plan covers 11 projects totaling 5,592.5 MW of proposed generation capacity addition. Out of this, 4 projects totaling 103 MW (Project Cost Rs. 1,497 Crore) are expected to be commissioned by FY19. The total fund requirement and sourcing for the generation plan are outlined in Table 14.

JKSPDC has raised loan for BHEP-II from PFC and JK Bank for an amount of Rs. 2,179 crore, Rs. 139 crore for Dah and Hanu HEP and Rs. 403.80 crore for Lower Kalnai HEP.

4.9. Fund Requirement

Table 14: Investment Plan - JKSPDC (Rs. Crs.)

Project	Capacity (MW)	Project Cost	Est. Exp. Upto FY15	FY16 to FY19	Beyond FY19	Fund Availability	Fund Sourcing
Sawalkote	1,856	18,302	162	4,037	14,103	70% debt and 30% equity	PFC has Sanctioned, however, JICA also to be approached as directed by MoF, Gol.
Kirthai-II	930	10,342	-	3,173	7,168	70% debt and 30% equity	PFC has Sanctioned, however, JICA also to be approached as directed by MoF, Gol
Kirthai-I	390	3,324	3	1,287	2,034	67% debt and 33% equity	PFC has Sanctioned, however, JICA also to be approached as directed by MoF, Gol
New Ganderbal	93	1,265	81	1,051	133	70% debt and 30% equity	Offer received from 7 Financial Institutions but yet to sanctioned
Lower Kalnai	48	577	45	532		70% debt and 30% equity	PFC – Loan Agreement signed – Initial Disbursement of Rs.45 Crs. released
Parnai	38	640	83	557		80% debt and 20% equity	Sanctioned from J&K Bank for Irrigation and REC for Power
DAH	9	134	24	101		70% debt and 30% equity	Sanctioned by REC
HANU	9	146	26	111		70 % debt and 30% equity	Sanctioned by REC
Pakaldul*	1,000	10,427	122	1,570	1,563	70 % debt and 30% equity	PFC has sanctioned
Kiru*	660	5,644				So far an amount of Rs. 122.25 Crore only has been the equity contribution of JKSPDC in the JV Company upto 28.02.2014 as per the requirement. The equity requirement during the upcoming years may get reworked accordingly. EC obtained, CEA Clearance awaited.	

Project	Capacity (MW)	Project Cost	Est. Exp. Upto FY15	FY16 to FY19	Beyond FY19	Fund Availability	Fund Sourcing
Kawar*	560	6,070				DPR under preparation	
Total	5,593	56,872	545	12,421	25,001		

4.10. Action Plan & Support Required

With the anticipated generation capacity addition plan, by FY19, the State will have over 64% of its energy available from hydroelectric plants. The State needs to tie-up with alternative generating sources for being able to meet the demand supply gap during the winter months from September to March. The winter season is faced with sharp decline in availability of allocated and unallocated capacity from State and Central HEPs. Due to Non availability of any state owned thermal generation

plants, the JKSPDC is unable to meet the base load support. The State may need to undertake a detailed assessment over medium to long-term horizon in respect of additional thermal capacities it needs to tie up with to satisfactorily meet its load support requirements. The year wise additional capacities required are shown in Figure 12. The action points have been identified for respective stakeholders in Table 15 which are deemed necessary to be able to make suitable arrangements for making adequate power available for the State in accordance with the requirements of the PFA Roadmap.

Table 15: Action Points & Timelines

Stakeholder	Action Points
JKSPDC, J&K Govt.	<ul style="list-style-type: none"> Resolve tendering issues of New Ganderwal HEP Re-tendering of Ratle HEP
MOC/ MOEF	<ul style="list-style-type: none"> Kudnali Laburi Coal Block, with a geological reserve of 396 MT, has been jointly allocated to JKSPDC and NTPC. The allocation letter for the same is yet to be issued to the JV Company. Environmental clearance is awaited for this coal block, the EIA and the EM for which has already been submitted. The State requests for GOI support for necessary clearances required for exploitation of this coal block as this would be critical to providing base load support through the 660 MW thermal generation plant to be set up by the JV Company.
JKPDD	<ul style="list-style-type: none"> JKPDD to undertake a detailed exercise to assess additional power purchase requirements over short/ medium-term arising out of lack of thermal support to base load and reduced availability of hydroelectric sources during winter season. Such exercise shall be completed within 3 months of signing of this PFA Roadmap. The JKPDD will explore additional banking arrangements with appropriate states to bridge the winter deficits. The JKPDD will hold and conclude suitable competitive processes for procurement of additional power based on the need identified from the above exercise within a period of 6 months.

Stakeholder	Action Points
	<ul style="list-style-type: none"> The JKPDD will explore the possibility of hiring external expertise in minimizing/ optimizing its power procurement/ scheduling related activities. JKPDD shall initiate the process for implementation for sophisticated load forecasting tools for improved decision making in respect of day-ahead, short/ medium power procurement.

5. Transmission Plan

5.1. Transmission requirement capacity

The transmission function in the state of Jammu and Kashmir is performed by Jammu and Kashmir Power Development Department (JKPDD). The Government of Jammu & Kashmir, vide GO no. 264 PDD of 2012 dated September 05, 2012, has ordered for unbundling of JKPDD and setting up of a Transmission company (Jammu & Kashmir State Power Transmission Company Limited). However, the Transmission Company has not commenced operations and JKPDD continues to operate as an integrated transmission and distribution utility. Inter-state transmission of power is primarily undertaken by PGCIL. Well planned and strong intra and inter-state transmission systems are required for optimal utilization of transmission capacities which would further facilitate achieving ultimate objective of cost effective delivery of reliable power to end consumers.

The requirement of electricity in energy and peak demand terms for the State are expected to increase from the present level of 13,701 MU and 2,650 MW in FY15 to 15,632 MU and 2,983 MW in FY19.

Generation and RE plans have outlined the upcoming projects. The transmission plan proposed in this Chapter aims at supporting PFA Objectives by strengthening of the existing intra-state transmission systems, removing regional disparities in availability of supply and providing back-end support to the proposed electrification of new HHs. Additional, the proposed plan also aims at ensuring adequacy of transmission infrastructure for evacuation of power from the inter-state boundary/ proposed generating plants to the end

consumers located across various geographies of the State.

5.2. Existing Transmission System

Intra State Transmission System

The intra-state transmission system infrastructure under JKPDD as at the end of FY15 is summarized below:

Table 16: Intra-state Transmission System (2014-15)

Intra-State Transmission network	Transformation Capacity (MVA)		Line Length (ckt kms)	
	220/132kV	132/66-33kV	220kV	132kV
Kashmir Capacity	2,020	2,581	704	1,000
Kashmir Existing capacity	1,700	2,431	244	800
Under Construction PMRP Projects	320	150	460	200
Jammu Existing capacity	2,030	1,922	516	1,134
Grand Total Capacity	4,050	4,503	1,220	2,134
Total	8,553		3,354	

The details of under construction PMRP projects in Kashmir include 320 MVA Capacity at Alusteng Grid Station (220/132kV); 50 MVA at Bandipora Grid Station and 100 MVA at Alusteng Grid Station (132/66-33kV). As regards the line length, 254ckt kms are proposed to be added at Zainakote-Alusteng-Mirbazaar, 60 ckt kms at Zainakote-Badgam-Wagoora, 41 ckt kms at Zainakote-Amargarh and 105 ckt kms at Wagoora-Mirbazaar under 220kV and 68 ckt kms at Badgam-Bandipora, 60 ckt kms at Rawalpura-Bemina-Badgam, 36 ckt kms at Chadoora and 36 ckt kms at Khrew.

As on November, 2015, the average intra-state transmission losses in the state were at 4.12%, which was a significant improvement from 4.66% recorded in FY14.

The intra-state transmission systems needs strengthening to meet the expected growth in demand in future.

Inter-state Transmission System

At present, the inter-state transmission system in J&K has about 2,648 ckt kms of transmission lines along with a total transformation capacity of 3,465 MVA. Voltage wise break-up of the inter-state system is shown in Table 17

Table 17: Inter- state Transmission System

Voltage	Transformation Capacity (MVA)	Line Length (ckm)
400/220 kV	3,465 (4 Substations)	1,823
132 KV	-	262.3
765 kV	-	562.5
Total	3,465	2,648

The existing inter-state transmission systems are adequate to cater to the present requirements of the State. However, the system would need significant strengthening and augmentation in view of the anticipated demand growth by FY19.

5.3. Adequacy of Transmission System & Related Issues

Key issues related to adequacy of transmission systems in J&K are summarized below:

Inter State transmission related issues

- Samba and New Wanpoh Connectivity:
 - 2x315 MVA, 400/220kV Samba & New Wanpoh had been commissioned by PGCIL

in April, 2013 and October, 2013, respectively. For drawl of power, the underlying 220 kV network was to be provided by JKPDD. Due to absence of the 220 kV network, the substations are not being utilized.

- Augmentation of transformation capacity at Samba by 2106-17 has also been approved. If 220 kV lines are not implemented, the same would also remain underutilized.
- J&K had requested that the 220 kV transmission works may be taken up as ISTS, which was agreed for consideration by the MoP, Gol. The issue was discussed in the 36th Standing Committee Meeting of Power System Planning of Northern Region held on 13/7/15 and was not agreed to by the constituents.
- Hydro Projects in Chenab Valley (Pakaldul – 1,000 MW, Kiru – 660 MW, Kwar – 560 MW, Bursar – 1,020 MW, Sawalkot – 1856 MW, Ratle – 850 MW, Kirthai-I & II – 350 MW + 990 MW etc.):
 - Tentative schedule for commissioning of these plans is 13th Plan.
 - For evacuation of power (about 7,500 MW), a Master Plan has been prepared and approved in 31st Standing Committee meeting of Transmission Planning of Northern Region held on 2/1/13. Developers need to apply for Connectivity and LTA so that system can be taken up matching with the generation.
- Due to incompleteness of 220 kV Wagoora – Budgam – Zainakotee transmission line and 220/132kV Grid Station Alugstong, overloading of some segments of transmission are experienced at present, which shall be overcome once funds as per revised DPR of PMRP are made available during 2016-17.

- d. Similarly a number of Grid Stations are getting overloaded at present like 220 kV Grid Station Pampore, 132 kV Grid Station Kulgam, Rawalpore, Mattan, Habak and Lassipora.
- e. The evacuation from 330 MW kishanganga HEP being constructed by NHPC and targeted for commissioning during 2016 has been planned by PGCIL through 220kV Kishanganga – Amargarh and 220kV Kishanganga – Alusteng transmission line which have not been taken up for construction until now.
- f. The evacuation of power from proposed Solar Mega Power Project in Ladakh region needs to be expeditiously resolved. The State has already requested for MoP, GoI assistance on this aspect in national interest.

Intra-State Transmission related Issues

- a. The existing transmission system needs significant augmentation/ capacity addition to cater to the increased demand proposed under PFA Roadmap.
- b. ROW for transmission lines in J&K is becoming increasingly challenging and has caused delays in implementation of several projects/ schemes.
- c. The intra-state transmission network has faced severe damages due to flash floods, which has called for increased investments in the systems.
- d. Insufficient operations & maintenance (O&M) grant of Rs 4.85 Cr annually for assets worth Rs. 1,220 (Kashmir alone) Cr is adversely affecting upkeep and maintenance of intra-state transmission systems.
- e. Shortage of manpower and residential accommodation at Grid Stations are adversely impacting grid operations.

- f. Poorly defined Delegation of Power within JKPDD is causing delays in execution of minor works/ supplies.

1.2. Intra-state Transmission Plan

Proposed schemes

JKPDD is working on a number of transmission projects with the financial assistance of GoI and the Government of Jammu & Kashmir to improve network infrastructure and to ensure reliability and quality of supply to end consumers.

JKPDD has identified such projects in order to meet the following requirements:

- a. Meet demand for power arising from existing and future end-consumers in various load centers/ pockets in the state;
- b. Providing connectivity for evacuation of power from various upcoming intra and inter-state power plants and for onward delivery of such power to load centers/ drawl points;
- c. Improving the availability and reliability of the intra-state transmission systems in the State; and
- d. Improving efficiency by way of reducing technical losses in the intra-state transmission systems.

The planned schemes for proposed capacity additions at various voltage levels are summarized in Table 18. The regions wise details of proposed intra-state transmission system have been provided in Annexure 2a, 2b & 2c.

The proposed substations scheduled to come up by FY19 are:

- a. 400/220 kV projects:- Akhnoor, Jatwal,
- b. 220/132 KV projects (Augmentation):- Ramban (120 MVA to 320 MVA), Udampur (240 MVA to 320 MVA), Bishnah (320 MVA to 480 MVA), Barn

- (320 MVA to 480 MVA), Delina (160 MVA), Mir Bazar (160MVA), Budgam (160MVA).
- c. 220/132 KV projects (Creation of New Grid):-Kathua, Chowadhi, Domana, Akhnoor, Ramnagar, Reasi, Samba, Rajouri –II, Lassipora (320 MVA), Wahipora (160 MVA), Batpora Telbal
- d. 132/33 kV projects (Augmentation):- Udampur (70 MVA to 120 MVA), Kathua (120 MVA to 150 MVA), Janipur (100 MVA to 150 MVA), Miran Sahib (90 MVA to 120 MVA), Khellani (40 MVA to 70 MVA),
- e. 132/33 kV projects (Creation of New Grid):- Basant Garh, Sangal Dhan, Sawalakote, Chatha, Chowadhi, D
- omana, RS Pura, Nagrota, Akhnoor-II, Ramnagar, Bhaderwah, Jammu East (GIS), Kishtwar, Kathua, Udhampur-II, Ramgarh, Reasi (u/c), Rajouri, Siot, Basholi, Nowshera, Mendhar, Reasi, Gurah Kalyal, Samba II.
- f. 220kV transmission line between Alusteng and Leh approved for providing grid connectivity to Ladakh Region at a cost of Rs. 1788.41 Crores including 4 no. 220/66 kV S/Stns at Drass, Kargil, Khalsi & Leh. The implementation has been entrusted to PGCIL. Work started and is expected to be completed by 2017.

Table 18: Proposed Capacity Addition by JKPDD – Intra State Transmission Network

Description	Unit	Proposed Capacity Addition				Total Capacity Addition by End of FY 19
		FY 16	FY 17	FY 18	FY 19	
220/66kV Grid Stations	MVA	64	256	320	0	640
220/33kV Grid Stations	MVA	193.48	787.07	1146.67	467.78	2595
220/132kV Grid Stations	MVA	88.33	284.23	368.27	99.17	840
220kV Trans. lines	KM	44.07	171.54	182.1	43.69	441.4
220kV Line Bays	No	0.42	2.25	3.87	2.46	9
Reconductoring of 220kV Trans. Line	Km	40.28	161.12	201.4	0	402.8
132/33kV Grid Stations	MVA	130.31	593.46	880.95	305.28	1910
132/66kV Grid Stations		8	32	40	0	80
New 66/132kV Sub-stations	MVA	0	8	12	20	40
132kV Trans. lines	Km	28.71	188.35	273.23	226.11	716.4
132kV Line Bays	No	4.12	9.74	10.7	0.44	25
66KV Line	Km	0	23.1	34.65	57.75	115.5
Construction 33kV Line feeders	MVA	0	29.23	27.42	137.35	194
Reconductoring of 132KV Trans. Line	Km	53.93	215.72	269.65	0	539.3
66kV Line Bay	No	0	0.8	1.2	2	4
33kV Line Bay	No	0	0.6	0.9	1.5	3

JKPDD is also taking initiatives to strengthen diagnostics, communication and emergency response systems comprising of the following:

- Modern diagnostic tools are planned to be installed in each transmission circle;
- Strengthening of Communication Network i.e. Optical Ground Wire etc.;
- Proposal for Zone wise Remote Control Centers;
- Implementation of Emergency Restoration System (ERS); and
- Mobile Substations/ transformers.

Strengthening of the inter-state transmission systems in the Jammu and Kashmir is planned with a focus on capacity augmentation of existing substations and transmission lines.

The expansion plan in the inter-state network includes a mix of the following ongoing projects being undertaken by PGCIL and by Private Developer(s) under TBCB route as detailed in Table 19.

Proposed New Schemes

The inter-state transmission plan includes 315 MVA of 400/200 kV at Samba which is proposed to be completed by August 2016 & 630 MVA proposed to be added under TBCB route in Amargarh. The plan also includes the following new schemes in respect of evacuation arrangements associated with future generation projects (mostly in Chenab Valle), the implementing agency for which is yet to be finalized:

1) Ratle HEP (850MW) Evacuation

1.3. Inter-state Transmission System Plan

Ongoing schemes

Table 19: ISTS schemes under PGCIL and TBCB

Scheme	Target Date	Details
PGCIL Schemes		
NRSS –XVI	June, 2016	<ul style="list-style-type: none"> Kishenpur-New Wanpoh 400kV D/c – 274 ckm
Transmission System for Kishen Ganga (Commissioning Schedule	September, 2016	<ul style="list-style-type: none"> Kishenganga – Wagoora 220 kV D/c – 206 ckm – Mar'18 Kishenganga – Amargarh 220 kV D/c-102 ckm – Jul'17 (Efforts to commission this line earlier matching with commissioning of Kishenganga HEP)
NRSS-XXXIV	July, 2017	<ul style="list-style-type: none"> LILO of Sarna- Hiranagar 220kV S/c at 400/220kV Samba S/s - 34 ckm
Augmentation of transformation capacity in NR for FY17 conditions	March, 2016	<ul style="list-style-type: none"> Augmentation of transformation capacity by 1 X 315 MVA at Samba

Scheme	Target Date	Details
SVC in Northern Region	August, 2016	<ul style="list-style-type: none"> New Wanpoh substation: (+) 300 MVAR/ (-) 200 MVAR
NRSS-XXIV	June, 2016	<ul style="list-style-type: none"> Dulhasti – Kishenpur 400 kV D/c (Quad) – Single Circuit Strung – 115 km
TBCB Schemes		
NRSS-XXIX (Sterlite was the successful bidder. Share purchase agreement signed on 4/08/14.)	<p>June, 2017 for Jallandhar Samba 400 kV D/C;</p> <p>October, 2018 for rest of the System</p>	<ul style="list-style-type: none"> Jullandhar – Samba 400 kV D/c – 170 km Samba –Amargarh 400 kV D/c – 250 km LILO of both circuits of Uri – Wagoora 400 kV D/c line at Amargarh-10 km 2X315 MVA; 400/200 kV GIS Substation at Amargarh

- LILO of one ckt of Dulhasti- Kishenpur 400kV D/c (single ckt strung) at Ratle- Oct.'18(Tr. Sys. for connectivity)
- Kishenpur- Ratle 400kV S/c (Quad) (second circuit of Dulhasti- Kishenpur 400 kV to be strung from Kishenpur end upto Ratle HEP)-Jan.'19(Tr. Sys. for LTA)

2) Future Hydro Projects of J&K in Chenab Basin(6200 MW)

- High Capacity Corridor-I (2,840 MW): Triple HTLS 400kV D/c line from Reoli Dugli HEP (from HP) to Kirthai-II (990MW) via Kirthai-I (350MW) and 400 kV D/c (Quad HTLS) line from Kirthai-II HEP (HP) – Kishtwar Pooling station
- Bursar HEP (1020 MW) is also to be pooled at Kishtwar.
- Sawalkote HEP (1856MW): LILO of both circuits of 400kV Kishenpur-Wagoora D/c and 400kV Kishenpur-New Wanpoh D/c at Sawalkote and charging of Kishenpur-Gurdaspur/Sirhind at 765kV.

- High Capacity corridor-II (2220 MW): 400 kV D/c (Triple HTLS) from Kiru HEP (660MW)–Kishtwar Pooling stn. via Kwar HEP (560MW) & Pakaldul HEP (1,000 MW)

The proposed addition in Transmission Lines envisage construction of 389 ckt. km. of 400 kV lines, detailed breakup includes 274 ckt. km. at Kishenpur - New Wanpoh and 115 ckt. km. at Dulhasti – Kishenpur. In addition to this, a total of 324 ckt. km. of 220 kV lines are also envisioned with 206 ckt. km. at Kishenganga – Wagoora, 78 ckt. km. at Kishenganga – Amargarh & 40 ckt km. at Gladni – Hiranagar.

Table 20: Inter-State Proposed Capacity Additions

Description	Unit	Existing Capacity/ CKms	Under Construction/ Planned
400/220 kV level	MVA	3,465 (4 Substations)	315 (No Substation, ICT augmentation at Samba) 630 (Amargarh - 2x315 under TBCB)

Description	Unit	Existing Capacity/ CKms	Under Construction/ Planned
400 kV Level Lines	ckm	1005	389
220 kV Level Lines	Ckm		324

1,263.95 Cr. is earmarked for intra-state transmission strengthening by JKPDD, towards schemes which are an immediate priority for the State. The State Government will initiate necessary approvals from MoP, GoI towards allocation of such amounts towards transmission system strengthening.

The State has planned to take up intra-state transmission schemes totaling around Rs. 1,925 Crores under TBCB route. The remaining gap of Rs. 2,478 Crore remains as additional financial assistance requirement to implement the proposed transmission network by FY19. The year wise phasing of the proposed works and the status of fund availability is summarized in Table 21

1.4. Fund Requirement (Intra-state only)

The total funding requirement for the proposed additional intra-state transmission systems by FY19 is Rs 5,667 Crore. Out of the PM package of Rs. 4,145 Cr. provided for the power sector reforms, Rs

Table 21: Year-wise fund requirement (Rs. Cr.) – (J&K)

Description	Funding Requirement				Total funding required by end of FY 19
	FY 16	FY 17	FY 18	FY 19	
220/66kV Grid Stations	23	94	117	0	235
220/33kV Grid Stations	103	418	609	248	1378
220/132kV Grid Stations	29	93	121	33	276
220kV Trans. lines	65	253	268	64	651
220kV Line Bays	1	7	12	8	29
Reconductoring of 220kV Trans. Line	18	71	89	0	177
132/33kV Grid Stations	46	211	314	109	680
132/66kV Grid Stations	1	4	5	0	10
New 66/132kV Sub-stations	0	6	10	16	32
132kV Trans. lines	23	154	223	185	585
132kV Line Bays	9	21	24	1	55
66KV Line	0	11	17	28	55
Construction 33kV Line feeders	0	2	2	11	15
Reconductoring of 132KV Trans. Line	24	95	119	0	237
66kV Line Bay	0	0	0	1	1
33kV Line Bay	0	0	0	1	1
Other works like Training Institute, Diagnostic Lab/ Construction of	4	15	19	-	39

Description	Funding Requirement				Total funding required by end of FY 19
	FY 16	FY 17	FY 18	FY 19	
additional bays and 33KV Feeders etc.					
Total	347	1458	1949	703	4,457
Evacuation Plans					1,210
Total Fund Required					5,667
PMRRP					1,264
TBCB					1,925
Total Availability					3,189
Gap					2,478

1.5. Action Plan & Support Required

In line with the proposed transmission plan, the action points shown in table below: have been identified for respective stakeholders to be able to make suitable arrangements for making adequate

power transmission systems available for the State in accordance with the requirements of the PFA Roadmap:

Table 22: Action Points & Timelines

Stakeholder	Action Points
JKPDD	<ul style="list-style-type: none"> Implementation of 220kV lines for augmentation of transformation capacity at Samba by 2016-17. Completion of 220 kV Wagoora –Budgam –Zainakotee transmission line and 220/132kV Grid Station Alugstong. Sufficient operations & maintenance (O&M) funds for upkeep and maintenance of transmission systems.
MoP, Gol	<ul style="list-style-type: none"> State is seeking MoP, Gol approval in respect proposed utilization of Rs. 1,264 cr. for Transmission projects under PMRRP already approved for Distribution in J&K. The State is seeking MoP, Gol support in making suitable arrangements for bridging the funding gap of Rs. 2,478 crores in the transmission system investments by FY19. The State is keen to avail multilateral funding in view of the following: <ul style="list-style-type: none"> Improvement procurement discipline Longer tenure of loan (25 years +) to help in minimizing tariff impact; and Associated Technical Assistance component and focus on reforms MoP, Gol to relook into the issue of providing transmission systems for evacuation of power from mega solar power projects in the Laddakh region.
PGCIL	<ul style="list-style-type: none"> 220kV Kishanganga-Alusteng transmission line which have not been taken up for construction at yet.

6. Distribution Plan

6.1. Introduction

JKPDD, is the sole transmission and distribution utility in the State of Jammu and Kashmir. The Government of Jammu & Kashmir, vide GO no. 264 PDD of 2012 dated September 05, 2012, has ordered for unbundling of JKPDD and setting up of a Transmission company and 2 distribution companies (Jammu Power Distribution Company Limited and Kashmir Power Distribution Company Limited). However, the distribution companies have not commenced operations and JKPDD continues to operate as an integrated transmission and distribution utility. JKPDD presently distributes electricity to over 22 lakh consumers across 22 districts of Jammu & Kashmir.

6.2. Objectives of the Distribution Plan

The energy requirement and peak demand for Jammu & Kashmir are expected to increase from the present level of 13,701 MU and 2,650 MW in FY15 to 15,632 MU and 2,983 MW in FY19. This is due to natural increase in demand from the present consumer base and more importantly because of the initiatives proposed under this PFA Roadmap which aims to achieve 100% electrification in the rural areas of the State and provision for 24X7 supply to all consumers in the state.

Accordingly, the objectives of this distribution plan, in accordance with the 24X7 PFA objectives, includes the following:

- a. Making provision for 24X7 supply to all connected consumers through capacity augmentations and building redundancies

in the upstream network for improving reliability of supply;

- b. Ensuring provision of electricity access to the rural unconnected villages and households in the State by FY18;
- c. Provision of 24X7 supply to support demand growth from existing consumers and that arising from new consumer growth in the State;
- d. Making system improvements for reducing AT&C losses in accordance with the targets agreed with the MoP; and
- e. Adopting appropriate technologies and systems to support RE integration and EE/DSM measures in the State.

The distribution plan encompasses an appraisal of the existing distribution system, assessment of additional infrastructure requirements, investment needs and different schemes – ongoing and proposed, to fund such expansion. It also lays down the level as well as nature of intervention required from the State and Central governments to ensure adequate infrastructure is developed to meet the PFA program objectives.

6.3. Existing Distribution System

JKPDD's distribution system comprises of 66 KV, 33 KV and 11 kV sub-transmission systems. This sub-transmission backbone feeds the LT network providing connectivity to the consumers in the state. Summary of JKPDD's network infrastructure in terms of installed transformation capacity and line-

lengths of feeders at various voltage levels is provided for reference in Table 23.

Table 23: Existing Distribution System Capacity

Particulars	Unit	Capacity
Transformer		
66-33/11-6.6 kV	MVA	4,958.85
66-33/11-6.6 kV	Nos	503.00
11-6.6/0.4 kV	MVA	5,763.15
11-6.6/0.4 kV	Nos	47,764.00
Lines		
66kV Line Length	Ckt. Kms	434.00
33k/22V Line Length	Ckt. Kms	4,230.80
11kV Line Length	Ckt. Kms	33,004.70
6.6kV Line Length	Ckt. Kms	438.40
LT Line Length	Ckt. Kms	73,259.80

Jammu & Kashmir has made significant improvement in rural HH electrification levels since 2011. The state has added about 1,36,652 HHs in the period FY11 to FY15.

7,500 HHs in Leh and 8,500 HHs in Kargil are electrified though off-grid systems (DG based). On completion of new 220 kV transmission line to Leh District, and the underlying transmission network most of the said households are proposed to be connected to the grid.

AT&C Loss

The JKPDD is presently faced with AT&C losses to the tune of 64% (FY15) as shown in Figure 16. Region wise AT&C loss levels suggest that the average AT&C losses for Kashmir region are higher at 74.73%, whereas, for Jammu region the AT&C losses are 48.81%. While Kathua, Samba and Udhampur have AT&C loss below 40%.

High level of AT&C losses in J&K is one of the reasons for continuance of demand and supply gap. Abnormally high proportion of unmetered consumption is the primary cause for high AT&C losses in the State. JKPDD has planned for 100% metering for reduction in commercial losses. In addition to the commercial losses, technical losses in the JKPDD's systems are also very much on the higher side due to old/ overloaded lines and poor HT: LT ratio. The investment plan laid out by JKPDD is aimed towards reducing the HT:LT ratio which in turn would help in reduction of technical losses. JKPDD Investment plans, presented in Table 28 and Table 29, are targeted towards bringing AT&C loss to 25% by FY19.

Table 24: AT&C Loss Reduction Targets

AT&C Loss	FY 15	FY 16	FY17	FY 18	FY 19
JKPDD	64% (A)	56%	46%	35%	25%

Figure 15: DT failure rates (FY15)

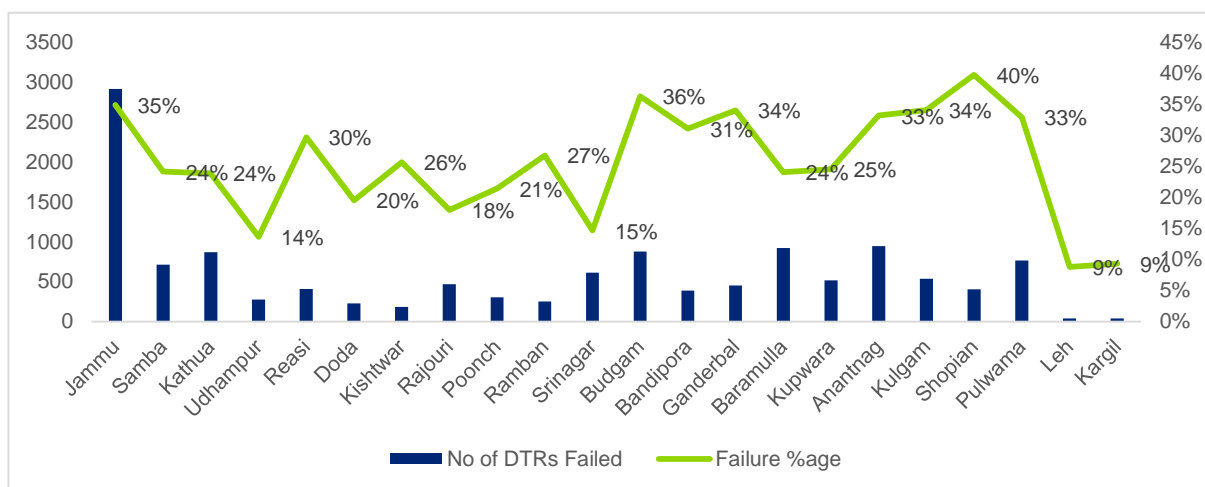
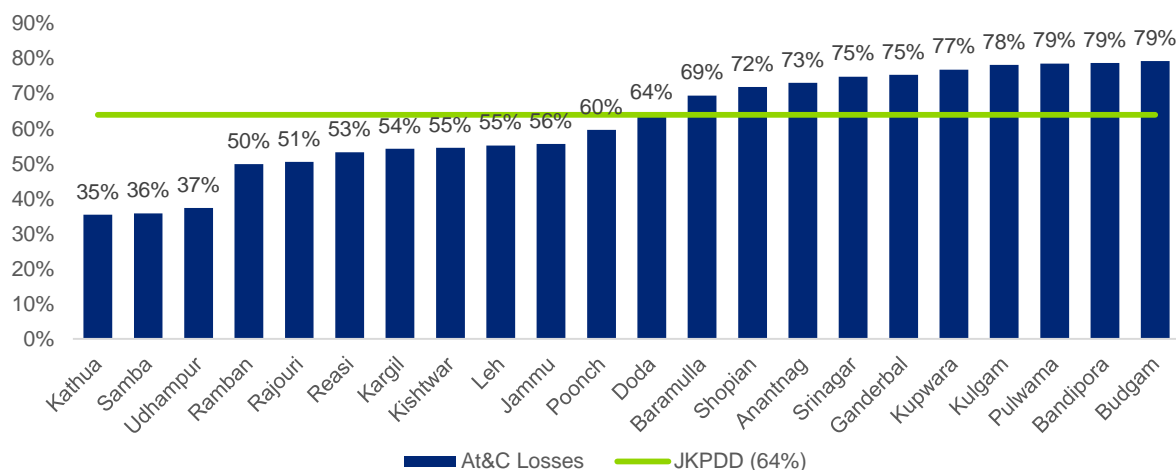


Figure 16: Region-wise AT&C Loss for JKPDD (FY 14-15)



DTR Failure and reliability indices

In addition to the outages in the upstream network, the customers connected at lower voltages are subject to additional interruptions arising out of failures in the DTR and below level systems. The average DTR failure rate of JKPDD is 26.79%, which varies across the regions between 8% and 40%. Leh and Kargil had the lowest DTR failure rates at around 8% while Shopian and Budgam had the highest DTR failure rates at 39.73 % and

36.30%, respectively, as shown in Figure 15: DT failure rates (FY15). The DTR failure rate shows little variation between rural and urban regions. But it varies from district to district. SAIDI for Jammu and Srinagar stands at 30 hours per month and for Leh stands at 24 hours per month. JKPDD is investing in its urban network through the R APDRP and IPDS schemes to bring down the DTR failure rates in urban areas along with improvement in reliability and quality of supply.

Metering

As on March 2015, JKPDD had 55 % metering at consumer level. Un-metered consumers with the continuance of flat-billing is the primary reasons for high of commercial losses in the state.

The following table shows the metering status as on March 2015.

Table 25: Metering Status as on March 2015

Particulars	Jammu	Kashmir	Ladakh	Total
Total Consumers	783,543	801,606	40,273	1,625,422
Electronic Meters	451,131	363,214	19,052	833,397
Electromechanical	60,642	0	0	60,642
Total Metering	511,773	363,214	19,052	894,039
% Metering	65%	45%	47%	55%

JKPDD's immediate focus is achieving 100% metering at consumer level. In addition to metering of all un-metered consumers, the metering plan proposed by JKPDD aims at replacement of all old, defective, faulty and electromagnetic meters with tamper proof static meters with advanced features.

The JKPDD shall undertake Prepaid metering for all Government Connections in the State by March, 2017. Such prepaid metering may leverage of deployment of Smart Meters, dovetailing with the targets under the Uday Scheme. This would be useful in improving effectiveness and ensuring longevity of benefits realized from Prepaid metering, which otherwise implemented through deployment of token based standalone meters, has yielded sub-optimal results in certain states.

The JKPDD has planned to engage with PGCIL or any other suitable agency for undertaking the implementation of metering plan on turnkey basis. Such agency will be responsible for all activities including procurement, storing, installation, sealing,

enabling communication systems, MDAS, MDMS systems, and uploading of meter replacement particulars in billing database. The payments for such works may be linked with the final outcome of reflection of such meter replacement in the consumer records in billing database. The specifications of meters and the communications systems under the proposed metering plan shall be finalized carefully by JKPDD keeping in view smart metering and emerging trends in India and internationally.

6.4. Central and State Government Schemes

The collective objective of all the Central/ State Government schemes has been to enhance the reach, reliability and quality of electricity supply to end consumers and to improve the financial position of utility by way of reducing AT&C losses. The following schemes are presently underway at various stages of implementation in Jammu & Kashmir:

Rural Electrification Schemes: RGGVY and DDUGJY

JKPDD is carrying out village electrification since the 10th Plan period. During the 10th, 11th and 12th plan periods a total of 3,267 villages were covered for intensive electrification out of which 2,906 villages have been electrified. These projects also covered 68,435 BPL HHs for electrification.

Scheme	Villages Covered (Intensive electrification)	HH Covered
10 th Plan	840	23,432
11 th Plan	2,066	45,003
12 th Plan	Ongoing	Ongoing

JKPDD's plans for extending the distribution network to rural areas are mainly covered through works proposed under the RGGVY and DDUGJY schemes of Government of India. Out of the 6,337

villages in the State, 98.3% i.e. 6,231 villages have been electrified (As on 31.10.2015) while 1.7% i.e. 108 villages are still un-electrified which are covered and sanctioned under DDUGY, SAGY and RGGVY. During the 11th plan period, a total of 14 districts have been covered under the RGGVY program focusing on un-electrified villages and already electrified villages for intensive electrification, at an estimated cost of Rs. 954.06 Crs (As on 30/11/2014). During the 12th Plan period, the fund layout for RGGVY is Rs. 101.28 crores for 25 un-electrified villages has been approved. Further, the State has proposed electrification of remaining villages under DDUGJY scheme covering 83 un-electrified villages with a fund layout of about Rs. 619.67 Crs.

The above rural-network expansion project aims to electrify all remaining 3.56 lakh HHs in the State. The investments proposed under DDUGJY aim to electrify 1.19 Lakh HH including 3,567 HH to be electrified through off-grid projects. Remaining HHs are covered under various other Schemes.

Urban Schemes: Integrated Power Development Scheme (IPDS) and R-APDRP

Under R-APDRP, 30 towns (19 – Kashmir & 11 – Jammu) have been identified as project areas in J&K state with a population of above 10,000 as per 2001 census. Gol has sanctioned Rs 191.25 crores for part-A and Rs 1,665.27 crores for part-B under the R-APDRP scheme. The DPR for SCADA / DMS for Jammu and Srinagar cities has been approved by Gol at an estimated cost of Rs. 52.89 crores. For execution of Part-B of the program, 2 cities and 28 towns have been divided into nine clusters, four in Jammu Division and five in Kashmir Division. The status of various works under Part-A & B of the scheme are shown in Table 26 & Table 27, respectively.

Table 26: Status of Works under Part A of R-APDRP Scheme

Description	Progress
Part-A (IT)- 30 Towns	
DC Commissioning along with HW, OS & availability of network connectivity	<ul style="list-style-type: none"> DC Commissioned with HW /SW installation complete. MPLS connectivity provided on Bharti-Airtel Network. Fixtures and Furniture to be put in place for whole building
GIS survey & validation	
Asset mapping & Consumer indexing	<ul style="list-style-type: none"> Asset Mapping – 100% Completed and 97.54% validated by Utility. Consumer Indexing- 100% Completed and 90.52% validated by Utility
Meters & Modem Installation at DTs, Feeders, Boundary points, HT Consumers etc.	<ul style="list-style-type: none"> Ring Fencing /Feeder meters- 16 out of 30 towns. Leh /Kargil –yet to be awarded. DT Meters- One town in Kashmir Completed. DT metering under progress in Srinagar Town. 629 Meters installed. Sumbal town 35 out of 42 DT meters installed. Modem installation- Installation completed in Pilot town of Pattan. A total of 281 Modems installed
Baseline reports	<ul style="list-style-type: none"> Reports submitted -11 towns Accepted by PFC- 11 towns. Under Preparation – 1 Town (Sopore)
Go-Live	<ul style="list-style-type: none"> Pattan completed. R. S. Pura under progress

Description	Progress
Part-A SCADA (2 Towns)	
Sanction /Awards of SCADA towns	<ul style="list-style-type: none"> Award placed in September'13. Kick-off meeting was held in November 2013. Site Survey is completed. IO List/GTP of Servers are being reviewed for approval.

Table 27: Status of Works under Part B of R-APDRP Scheme

Description	Progress
Jammu Division (4 clusters; 11 towns)	
Strengthen Distribution System in the identified project areas	<ul style="list-style-type: none"> Completed survey of all the 22 existing 33/11 kV substations of Cluster I, II & IV. Submitted SLDs of 17 substations of Cluster I & II which has been approved. Out of 5 substations in Cluster-IV, SLDs of 04 has been approved and the balance has been submitted for approval. Out of 141 no. 11 kV Feeders in the project areas of Cluster I, II & IV have completed survey of 90 Feeders. Submitted SLDs of 48 no. 11 kV Feeders including HVDS and AB cabling. Out of these 11 SLDs have been recommended by PMA and 05 have been approved by JKPDD. Started survey of 33 kV lines where re-conductoring is to be carried out. Started the civil works of 33/11 kV additional transformers at substation Nanak Nagar, Railway Complex, Trikuta Nagar, Transport Nagar and ChanniHimmat. Started the civil works for augmentation of 33/11 kV substations at Gadigrah, Greater Kailash and Sainik Colony. Erected 10 MVA Power Transformer at 33/11 kV Gadigrah and Nanak Nagar substations. Started civil work of New 33/11 kV Manda substation. Started erection work of one Feeder (RC-I) of Cluster-I and two Feeders (C-22 and R-7) of Cluster-II.
Srinagar Division (4 Clusters: 19 Towns)	
Strengthen Distribution System in the identified project areas	<ul style="list-style-type: none"> First Mobilization Advance paid to the contractor (M/s EMC Ltd) for Cluster-I, II & III.

The IPDS scheme covers 86 Statutory Towns under 12 circles. Detailed Project Reports (DPRs) totaling Rs.450.39 Crores covering 12 circles have been formulated and scrutinized at a revised cost of Rs. 444.50 Crores.

The proposed works under above schemes are shown in Table 28

6.5. Proposed Distribution Infrastructure Addition & Funding

In view of the growing energy requirement and to fulfill the 24X7 PFA objectives, JKPDD will require to undertake a comprehensive distribution system capacity addition plan encompassing significant increase in the existing infrastructure. The following

Table 29 shows the funding requirement for the distribution plans described above.

The total fund requirement for the distribution system works in the state is about Rs. 7,179 Cr, a large proportion of Rs. 3,033 Cr (42%) of which is expected to be funded through the Central Government Schemes (R-APDRP, RGGVY, DDUGJY and IPDS). The details of Planned Capacity Addition envisaged under above mentioned schemes and the additional

requirements are detailed out in the Annexure 1a, 1b, 1c & 1d.

In addition, Rs. 3,790 Cr has been earmarked under the PM package for the power sector reforms in J&K, out of which Rs 2,881 Crore has been kept for the distribution projects by JKPDD. Further, Rs 450 Cr is expected to be funded by the State Government. This indicates additional funds of Rs. 840 Cr is required to finance the overall proposed distribution infrastructure addition plan under the PFA Roadmap.

Table 28: Infrastructure addition program under various schemes for JKPDD

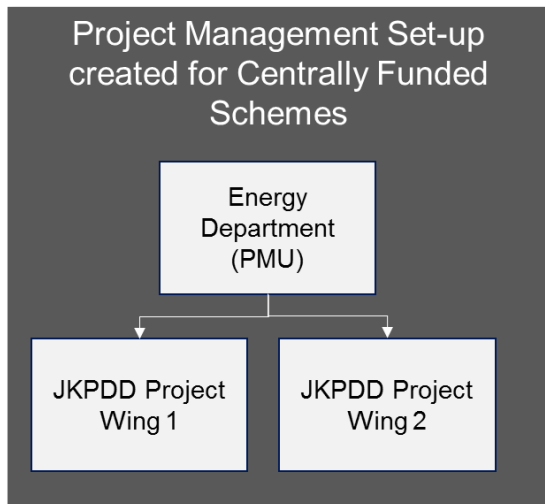
Schemes	New Substation		Augmentation Power T/F		of Additional Power T/F		Total Capacity Addition at 66-33 kV level	HT LINE (Km)		LT LINE(km)	DISTRIBUTION TRANSFORMER
	No	MVA	No	MVA	No	MVA	MVA	66-33 LINE	KV 11 LINE	KV km	MVA
IPDS	21	170	57	295	7	52	516	1,044		2,975	163
DDUGJY	64	348	4	14	2	13	375	2,236	9,461	7,729	303.00
RAPDRP	19	186	35	179	29	249	614	108	1,126	5,683	454.00
PMRRP/ State scheme	134	875	48	220	33	226	1,322	2,147	10,302	11,841	1,520
Total	238	1,579	144	708	71	540	2,827	5,535	20,889	28,288	2,440

Table 29: Proposed investments in Distribution Network by FY19 (Rs. Crs.)

Scheme	FY16	FY17	FY18	FY19	Total
A. Existing Availability / Sanctioned					
DDUGJY	62	185	185	185	617
IPDS	46	133	133	133	445
R APDRP	560	560	750		1870
RGGVY	11	30	30	30	101
PMRRP		982	1,179	720	2,881
State Plan	80	120	125	100	425
Total Availability /Sanctioned	759	2,010	2,402	1,168	6,339
Not Sanctioned/Funds not tied up	335	142	147	216	840
Total Planned Capex by FY19	1,094	2,152	2,549	1,384	7,179

6.6. Key Issues in Distribution Planning

JKPDD's performance on efficient and timely implementation of projects has remained dismal in the past. In the past five years the average capex carried out by JKPDD was about Rs. 100 Cr



annually. In certain occasions, JKPDD has not been able to spend funds allocated under Central Government schemes within the given timelines leading lapse of funds. Additionally, there has been a dearth of interest from qualified turnkey bidders

for undertaking distribution capital works in J&K. In several occasions JKPDD has been forced to retender multiple times and that too with failed outcomes. In order to revamp its abilities to undertake the proposed investments under the PFA Roadmap, JKPDD is looking at introducing all possible measures for augmenting its Project Management capacities. To ensure satisfactory execution of the centrally funded schemes and other investment programs in the state, JKPDD has established two project management units. JKPDD may need further support from central government agencies for taking up turn-key implementation role in for timely implementation of various T&D schemes in the State.

6.7. District Wise Action Plan

The district wise physical rollout plan of the proposed infrastructure additions under the PFA Roadmap comprising all works proposed under various schemes The district wise rollout targets for electrification of UE HH's, as arrived at on the basis of 2011 census numbers and JKPDD 's proposed plan under the PFA Roadmap is provided in Table 30.

Table 30: District Wise HH Electrification Plan

District	FY 16	FY 17	FY 18	FY 19
Jammu	1,377	4,130	4,130	4,130
Samba	366	1,099	1,099	1,099
Kathua	1,912	5,737	5,737	5,737
Udhampur	2,581	7,742	7,742	7,742
Reasi	2,437	7,312	7,312	7,312
Doda	2,536	7,607	7,607	7,607
Kishtwar	2,346	7,039	7,039	7,039
Rajouri	4,900	14,701	14,701	14,701
Poonch	3,602	10,805	10,805	10,805
Ramban	3,265	9,794	9,794	9,794
Srinagar	27	81	81	81
Budgam	1,778	5,333	5,333	5,333
Bandipora	855	2,565	2,565	2,565

District	FY 16	FY 17	FY 18	FY 19
Ganderbal	6	17	17	17
Baramulla	1,940	5,820	5,820	5,820
Kupwara	69	207	207	207
Anantnag	2,480	7,440	7,440	7,440
Kulgam	1,629	4,888	4,888	4,888
Shopian	196	588	588	588
Pulwama	705	2,116	2,116	2,116
Leh	237	710	710	710
Kargil	356	1,069	1,069	1,069
Total	35,600	106,800	106,800	106,800

6.8. JKPDD Restructuring

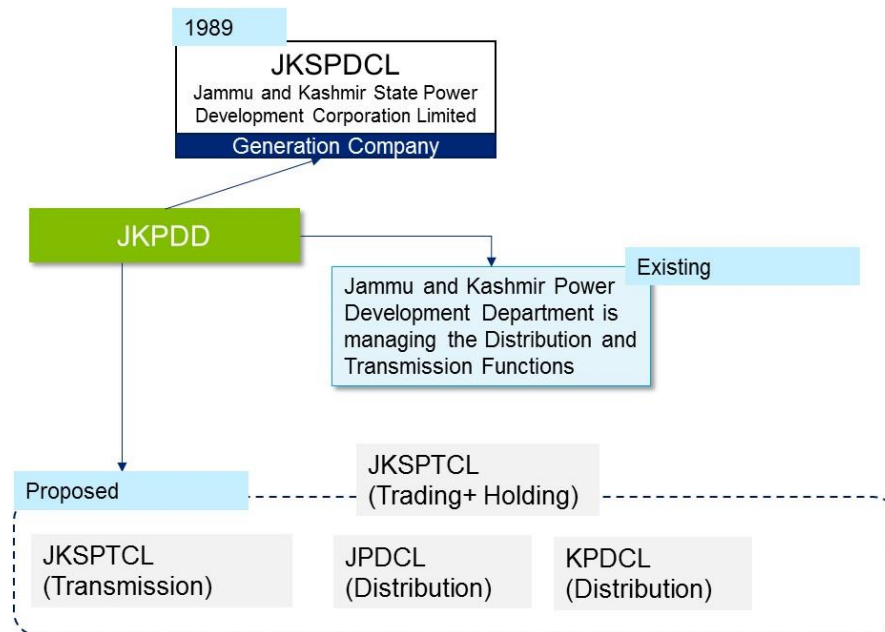
The State Government has commenced restructuring of JKPDD into vertically segregated corporate entities, as per the to-be structure indicated in Figure 18. Under the restructuring plan it is envisaged that the restructured entities would be functioning as a single buyer with the holding company also doubling up as a trading licensee model and undertaking power purchase function on behalf of all distribution licensees in the state. While the successor companies, proposed to take over various functions from the JKPDD have already been incorporated, the companies are not functional due to some formalities related to implementation.

Further, manpower requirement and organizational structure of the entities have already been finalized. The following activities are required to be accomplished in a time bound manner to make the successor companies functional:

- Appointment of BOD:** The state government and JKPDD may initiate proceedings for appointment of Board of Directors for the successor companies.
- Implementation of Migration Plan:** Review and implementation of the Migration plan to be done in discussion with the stakeholders (including employee unions) and the State Government.

Achieved So far	Yet to be achieved
<ul style="list-style-type: none"> Govt. Approval for restructuring accorded; Single Buyer Model finalized with holding company as trading licensee MOA and AOA of new entities has been approved by GoJK Incorporation of successor companies has been done Org. structure and manpower assessment of successor companies is finalized. 	<ul style="list-style-type: none"> Stakeholder consultations is being restarted Appointment of BOD: Implementation of Migration Plan Hiring of Additional Staff for the successor companies Cash flow arrangements between successor companies Preparation of Opening Balance Sheets DoP and Draft Transfer Scheme with stakeholder

Figure 18: Proposed Restructuring of JKPDD



c) **Hiring of Additional Staff for the successor companies:** Due to unbundling there is additional requirement of staff for regular functioning of the successor entities. JKPDD may expedite the process of appointing the key staff for functioning of these organizations. Alternatively, it is recommended that such new recruitments are undertaken directly in the new/ successor companies.

d) **Cash flow arrangements between successor companies:** The proposed cash flow arrangements submitted by the restructuring consultant may be reviewed and adopted. This is essential for achieving financial independence. A draft cash flow arrangement made by the restructuring consultant is already in place.

e) **Delegation of Power among successor companies:** The State Government and JKPDD may review and adopt the DoP prepared by the restructuring consultant.

f) **Preparation of Opening Balance Sheets for Successor Companies:** Opening balance sheet of the companies is important from a financial standpoint. JKPDD and the State Government may expedite the process of preparation of the Opening Balance sheets.

Based on finalization of the above, a transfer scheme for the successor entities may be prepared and implemented.

The State Government shall endeavor to complete the above listed activities and operationalize the successor companies within 6 months from signing of the PFA Roadmap.

6.9. Action Points & Support Required

On 15th March 2016, the Government of J&K has signed MoU for adopting the UDAY (Ujjwal Discom Assurance Yojna) scheme in the State. Under this scheme the JKPDD is expected to undertake the following interventions:

- Reduction of AT&C loss to 15% by FY20.

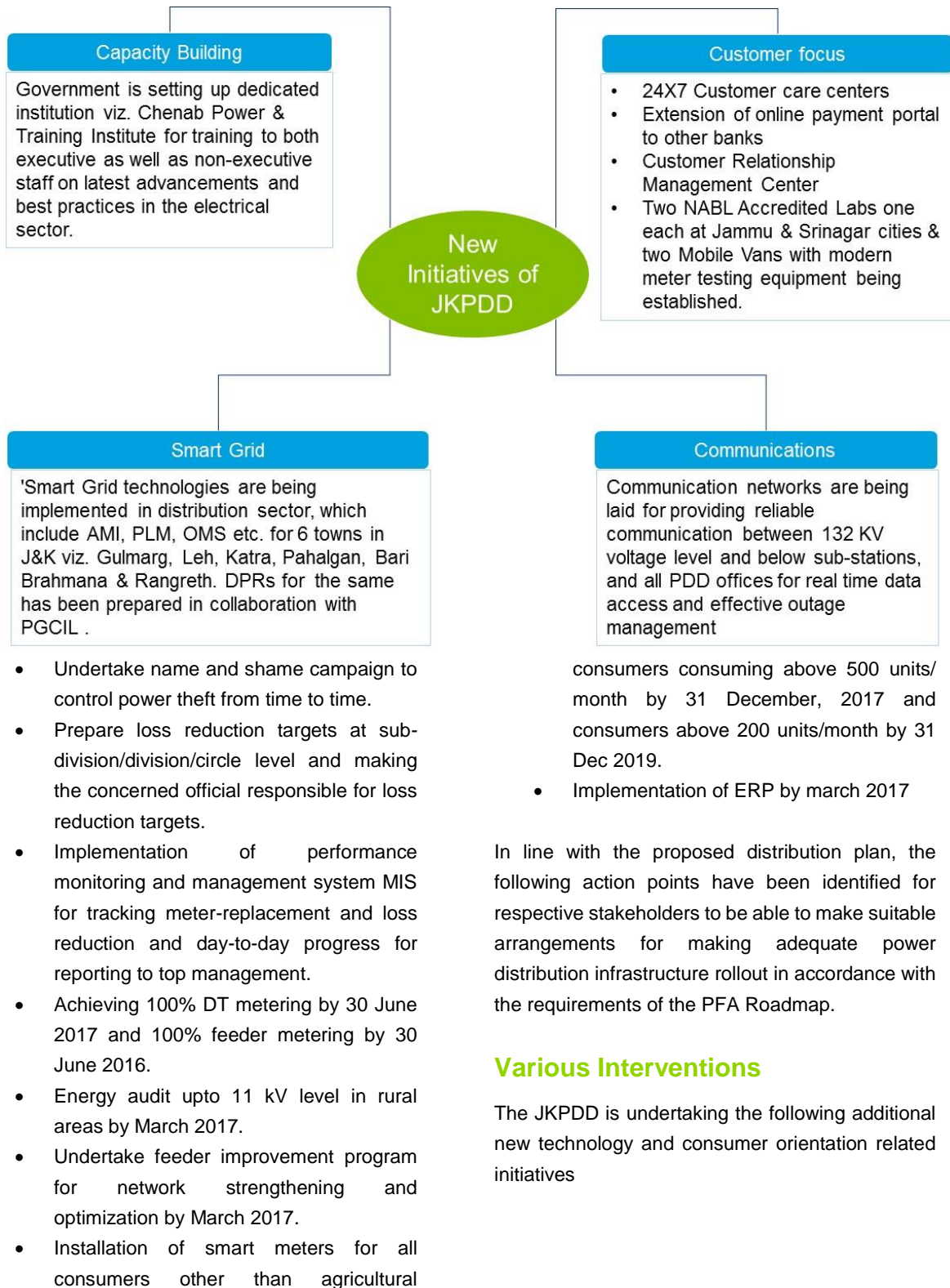


Table 31: Action Points & Timelines

Stakeholder	Action Points
State Government	<ul style="list-style-type: none"> Completion of unbundling of the JKPDD, Operationalization of companies by October, 2016.
JKPDD	<ul style="list-style-type: none"> Ensuring the interventions under UDAY are achieved by establishing adequate monitoring framework JKPDD to prepare plans for overhauling metering, billing and collection processes Appoint of Feeder Managers for focus on efficiency improvement and accountability of losses by March, 2017. 100% consumer metering by March, 2017. Prepaid metering for all Government Connections by March, 2017. Such prepaid metering may leverage of deployment of Smart Meters, dovetailing with the targets under the Uday Scheme. Revamp procurement practices with feedback from potential/ reputed vendors, on the lines of that done in the State of Bihar, to improve participation levels in T&D turnkey tenders in the State. Finalize the terms of engagement with PGCIL or any other suitable agency for undertaking the implementation of metering plan on turnkey basis with end-to-end responsibility.
PFC	<ul style="list-style-type: none"> PFC may provide financial support for capacity building in Unbundling of the JKPDD
PGCIL/NTPC/NHPC	<ul style="list-style-type: none"> Project management and contract management for key central government schemes. PGCIL to support the State by undertaking project management and implementation role in infrastructure and metering plan related works, as may be agreed with the JKPDD/ its successor entities.

7. Renewable Energy Plan

7.1. Renewable energy sector in Jammu & Kashmir

All Renewable Energy (RE) related projects are administered by Jammu and Kashmir Energy Development Agency (JAKEDA), which is the State Nodal Agency working under the administrative control of the Science and Technology Department, J&K Govt., for the promotion and implementation of projects aimed at meeting the energy requirements, in general, and un-electrified areas of the state, in particular, by harnessing new and renewable energy sources of energy. Additionally, the State Government has entrusted JAKEDA with the mandate to implement all micro/mini hydel projects up to 2 MW station capacity.

Ladakh Renewable Energy Development Agency (LREDA) and Kargil Renewable Energy Development Agency (KREDA) are the nodal agencies for implementation of all non-conventional energy programs of the Ministry of New and Renewable Energy, Government of India in Ladakh and Kargil regions, respectively.

Jammu and Kashmir has significant RE potential, mostly though solar. Other potential sources are Small Hydro, Wind and Biomass.

The State's potential from RE sources is given below:

- a) Solar – 1,11,000 MW
- b) Wind – 5,685 MW (8MW identified at Bidda Reasi)
- c) Small Hydro Power – 1,431 MW (807 MW identified from 251 projects through PDC

and 140 MW from 90 projects through JAKEDA)

- d) Biomass – 43 MW
- e) Geothermal – 150 MW

State owned Small Hydro Plants (SHPs) and private sector projects contribute to 5% of the total installed capacity. The state owned SHPs are maintained by JKSPDC. The contribution of other RE sources viz. solar, wind, biomass etc. in the energy mix of J&K is negligible as of now.

As part of the planned 175 GW capacity addition of RE sources in the country, MNRE targets has set a target of 1,155 MW from Solar Plants and 150 MW from SHPs for the State of J&K, to be achieved by 2022. MNRE target includes installation of 450 MW Grid connected Solar Rooftop which will proliferate the existing share of RE in the state. The phased targets for Solar Rooftop installation are provided in Table 32.

**Table 32: MNRE Targets for J&K under 40 GW
Grid connected Solar Rooftop**

Year	Targets
2015-16	2
2016-17	54
2017-18	55
2018-19	74
2019-20	80
2020-21	90
2021-22	95
Total	450

The State has notified the following regulations and state policies for promotion of investments in RE projects:

- Policy for development of Micro/Mini Hydro Power Projects-2011" through SHP projects of capacity upto 2MW.
- Solar Power Policy for Jammu and Kashmir (2013)
- Draft Policy on net metering for Grid Interactive Roof-Top Solar Photo Voltaic Power Plants (2015)
- JKSERC (Renewable Power Purchase Obligation, its compliance and REC Framework implementation) regulation 2011.
- JKSERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2013.(Amendment 2015)
- JKSERC (Grid Interactive Rooftop Solar Photo Voltaic Systems based on Net Metering) Regulations, 2015 (New)

The JKSERC has set RPO targets for JKPDD till FY19 as highlighted in Table 33.

Table 33: RPO Targets % (Solar & Non-Solar)

Year	Solar RPO %	Non-Solar RPO %	Total
FY 14	0.25	4.75	5.00
FY 15	0.75	5.25	6.00
FY 16	0.75	5.75	6.50
FY 17	1.00	6.50	7.50
FY 18	1.25	7.25	8.50
FY19	1.50	8.00	9.50

7.2. Existing RE Capacity

Grid Connected

The state's grid connected RE (SHP based) generation capacity is 153.46 MW, comprising of

state owned 110.96 MW and 42.50 MW from private sector.

The present status of RE is summarized in Table 34.

Table 34: Installed Capacity of RE in the State

Description	Installed Capacity (MW)
Own Generating Station (State Sector - JKSPDC)	110.96
Private Sector (Small IPPs)	42.50
Total	153.46

A large number of the existing SHPs remain completely or partially shut-down which is adversely impacting generation from RE sources. Projects like Sewa III, Stakna, and Ganderbal having aggregate capacity of 28 MW been completely shut down due to breach of canal and/or obsolescence. While some of the other projects; Pahalgam, Igo-Merchellong, Marpochoo, USHP – I, Iqbal Bridge, Sanjak, Chenani I,II&III remained non-operational or partially shut down due minor glitches, overhauling requirement, low discharge etc. as summarized in Table 36

Off-Grid Applications

JAKEDA has set-up approximately 8,000 kW of off-grid SPPs of different capacities ranging from 1-200 kW have in different parts of the State, including Leh & Kargil. The various off-grid programs/schemes implemented in the State summarized in Table 35.

Table 35: Status of Off-grid Application by JAKEDA

Name of the program/scheme	Cumulative achievements till 31.01.2016 (Nos)
Solar Lanterns	43,822
Solar Home Lighting Systems	
a) RVE Program	82,483
b) JNNSM Program	37,100
Solar Power Plants	
a) SADP	4 (56 kW)
b) JNNSM	258 (1,748 kW)
Water Mills	50

Name of the program/scheme	Cumulative achievements till 31.01.2016 (Nos)
Micro Hydel Projects(DPRs)	100
Solar Water Heating Systems	49,100 (lpd)
Wind Mast	8
Gobar Gas plants	500
Biomass Cookstoves	12,500
Box Type Solar Cookers	6,000
Office complex of JAKEDA	1

7.3. RE Development Plan

As mentioned earlier, MNRE has a capacity addition target of 1,305 MW from RE sources till FY22 for Jammu and Kashmir. This includes 1,155 MW from Solar projects and 150 MW from SHPs. Under the solar target, 450 MW of rooftop installations are to be installed.

JAKEDA

JAKEDA's capacity addition plan includes the following proposals:

- 2 MW Solar Roof-top capacity addition during FY16;
- 100 MW Solar Park wherein suitable land has been demarcated in District Samba and its transfer to JAKEDA/ Science & Technology Department is under process;
- 450 MW Solar through a mix of MW Scale and roof-top projects, 50 MW in FY17, 200 MW in FY18 and 200 MW in FY19;
- 253 MW through a mix of Solar and Mini/ Micro Hydro Power Projects in FY20

While proposed RE capacity additions are sufficient for meeting existing JKSERC RPO targets in the long-term, achieving non-solar RPO targets might become a challenge, especially in the short-term (till FY19). The 89 SHPs with capacity of around 200 MW proposed to be developed at a cost of Rs. 2,000 cr. under PMRRP, would help in meeting the non-solar RPO targets successful completion of

these projects. These projects are expected to be available FY20 onwards and hence have not been considered in this roadmap.

For meeting the target of 2 MW Solar Rooftop Power Plants during the current financial year (FY16), the policy for grid connected Rooftop Solar Photovoltaic (PV) Power Plants–2016 has been formulated and submitted to the State Government for its approval. The notification of the Policy would enable JAKEDA to deploy grid connected solar Rooftop Power Plants on a large scale and would be a key enabler to meeting the target of 450 MW.

The solar and mini hydel power policies notified by the Science & Technology Department (Administrative Dept. of JAKEDA) provide for facilitating inter connection points to the solar/mini hydro power developers.

LREDA

LREDA targets to add the following RE generation capacities in the Leh region:

- 20 MW by FY19 from MW Scale Solar Power Projects;
- 3 MW by FY19 under Grid Connected Solar Roof-top Program through addition of about 250-300 small roof-top solar SPV installations;
- 9.1 MW of hydro capacity through SHPs over the next 5 years, expected to be commissioned beyond FY19;
- 60 kW through Wind energy projects over the next 5 years, expected to be commissioned beyond FY19; and
- 5 MW Geothermal generation capacity.

Further RE Capacity addition in Leh district is dependent on construction of 220 kV HT Line which will connect the Leh District to the northern grid. At present, Leh District is not connected to the grid and has an independent grid network of 66/33/11 kV.

KREDA

Similarly, KREDA targets to add the following RE generation capacities in the Kargil region:

- a) Solar 40 MW:
 - Installation of Solar Energy parks totaling 40 MW capacities phased as 15 MW in FY17, 15 MW in FY18, 5 MW in FY19 & 5 MW in FY20 at various locations);
 - Installation of 1,000 Solar green houses around;
 - Installation of 500 SPV Pumps at different Agriculture & private farms; Installation of 8000 Sqm collector area of water heating already sanctioned;
- b) Hydro 100 MW: Execution of Hydro Power projects at seven sites with a total capacity of 11 MW already sanctioned in LREI program.
- c) Wind 50 kWp

JKSPDC

JKSPDC is presently undertaking development of three SHP projects with cumulative capacity of 25 MW. Out of which 2 projects, w.i.z., 9 MW Dah and 9 MW Hanu are expected by FY17, whereas the 7 MW Achura Gurez project is expected by FY20.

The status of the JKSPDC's own projects is summarized in the table below:

Table 36: JKSPDC - Status of SHPs under Development

Project	MW/ Date	Status
Dah Project	9 MW (October, 2016)	Project is under construction. There are some expected delays due to change in proposal for water channel from Open Challen to Tunnel.
Hanu Project	9 MW (October, 2016)	

Project	MW/ Date	Status
Achura Gurez	7 MW (not confirmed)	DPR under preparation

Additionally, JKSPDC has planned R&M of 22.60 MW USHP-I HEP, 23.30 MW Chenani HEP & 15 MW Old Ganderbal HEPs. These projects are very old and have already lived their useful life. These projects are being taken for renovation under MNRE policy.

IPPs/ under Hydro Policy

BY FY17 a cumulative of 33.5 MW is expected to be operational from four projects, whereas another 52 MW of cumulative capacity is expected by FY19 from another four projects.

Table 37: Status of SHP IPPs under Development

Phase	MW/ Date	Projects
Phase 1	33.5 MW (FY17)	<ul style="list-style-type: none"> - 4 MW Kahmil - 12 MW Boniyar - 12.50 MW Mandi - 5 MW Drung
Phase 2	52 MW (FY19)	<ul style="list-style-type: none"> - 12 MW Hirpora - 12 MW Girjan ki Gali - 7 MW Chandawari - 21 MW Patnazi Bunjwah
Phase 3	153.5 MW (FY21)	<ul style="list-style-type: none"> - 24 Projects have been identified. - Bids for 23 projects yet to be awarded.

IPP projects under Phase III (24 Projects with an aggregate capacity totaling 153.50 MW) were tendered out on 15.01.13 wherein bids for 10 projects were received. Out of the 10 bids only one project could be awarded. Remaining projects are proposed to be retendered along with some more projects.

7.4. Fund Requirement

The fund requirement for the proposed state sector SHPs (Dah and Hanu) are already sanctioned by the REC. In addition to the state sector SHPs, Nodal Agency JAKEDA has proposed capacity

addition through grid connected RE of 811 MW over the next 5 years at a total cost of Rs 4,866 Cr. In addition, the LREDA and KREDA have proposed RE capacity addition of 57.2 MW and 140.05 MW respectively with a fund requirement of Rs. 375 Cr and Rs 1,240.30 Cr. respectively. These projects are expected to include, grid connected- solar PV plants, solar rooftops, wind as outlined in Table 36.

In Leh & Kargil District, investment requirement includes earmarked funds to the tune of Rs 250 Cr towards 20 MW Solar Plant which is allocated under PMRRP for Grid connected Solar Projects on demonstration basis.

JAKEDA's proposed 100 MW Solar Park will be developed as an IPP and the rest of the 450 MW are proposed under State's Grid Connected Solar Roof-top policy, the balance funding requirement is to be met through VGF funding.

In Leh district, Rs. 100 Crores has been allocated over the next five years for development of 9.1 MW cumulative capacity (already sanctioned LREI project by MNRE) for Hydro and Rs. 1.8 Crores over next five years for 100 kW for Wind Installation.

Kargil district expects fund requirement to the tune of Rs. 1,240 crore till FY19. As per sanction from the Ministry, KREDA will implement the Projects as per the matching share of the state Govt and Central Government.

JAKEDA is planning to develop 200 MW from Solar Power under Viability Gap Funding. MNRE has been requested to sanction 200 MW Solar Power Plants under its VGF Scheme for which land of 400 hectares shall be required (Minimum land bank of 20 hectares at one location for 10MW SPP). The Divisional Commissioners Jammu and Kashmir have been requested for identification of suitable land for the said purpose.

7.5. RE-Planning Issues

Even though the State is progressing in the direction of achieving NTP level solar purchase targets by FY22, there exists impediments which

need to be addressed to facilitate growth in the renewable landscape.

RE rich states, like Tamil Nadu and Maharashtra, have made provisions for RE-integration by setting up REMC and Green Corridors. Tamil Nadu, for instance, is working towards creating REMC. The State SLDC for TN shall prepare a fresh capital expenditure plan for operationalization of the REMC. Similarly, in Maharashtra, MSETCL has planned to undertake development of a Green Energy Corridor in view of the large scale RE development proposed in the State. The Green Energy Corridor project would facilitate necessary evacuation arrangement for development of pockets/ zones with a large number of grid connected renewable energy projects. The Corridor is also aimed at addressing the RE integration issues by facilitating better scheduling of RE capacities while ensuring grid stability.

The Green Energy Corridor Project planned by MSETCL would facilitate integration of over 5,080 MW of RE projects in transmission zones of Nasik, Karad and Aurangabad. MSETCL envisages to avail funding support under the National Clean Energy Fund (NCEF) from MNRE and KFW.

In view of the above, it is pertinent that, J&K undertakes necessary planning exercise for preparation of its plan for RE integration and management. This may be done through active support of MoP, GoI and TA Support from suitable donor funding agencies.

Table 38: RE (Grid Connected) Development Plan (MW)

Agency	Source	FY16	FY 17	FY 18	FY 19	FY 20	Total
JAKEDA	Solar	2	150	200	200	253	805
	Non-Solar	-	6	-	-	-	6
LREDA	Solar	3.072	15	15	5	5	43.072
	Non-Solar	-	-	-	-	14.1	14.1
KREDA	Solar	-	15	15	5	5	40
	Non-Solar	-	-	-	-	100.05	100.05
JKSPDC	Solar	-	-	-	-	-	0
	Non-Solar	-	51.5	-	52	10	113.5
Total		5.1	237.5	230.0	262.0	387	1,122

Table 39: RE (Grid Connected) Fund Requirement Plan (In Rs Crore)

Agency	FY 16	FY 17	FY 18	FY 19	FY 20	Total Investment By end of FY20
Jammu & Kashmir Region (JAKEDA)	12	936	1,200	1,200	1,518	4,866.00
Leh (LREDA)	18.432	90	90	30	146.60	375.03
Kargil (KREDA)		90	90	30	1,030.3	1,240.30
JKSPDC (Dah and Hanu)	40	40	40	102		280.00
Total						6761.33

Table 40: Action Points & Timelines

Stakeholder	Action Points
JAKEDA/ LREDA/ KREDA	<ul style="list-style-type: none"> Project management and monitoring for RE capacity addition plan for J&K
JKPDD	<ul style="list-style-type: none"> Execution of PPAs with IPPs for development of RE to meet RPO targets.
State Government	<ul style="list-style-type: none"> MNRE has been requested to sanction 200 MW Solar Power Plants under its VGF Scheme for which land of 400 hectares shall be required (Minimum land bank of 20 hectares at one location for 10MW SPP).The Divisional Commissioners Kashmir & Jammu have been requested for identification of suitable land for the said purpose. The State Government's support is necessary for timely completion of land acquisition.

Stakeholder	Action Points
MNRE, GoI	<ul style="list-style-type: none"> Sanctioning of adequate funds for the 6 MW wind power project proposed to be developed at village Bidda, Reasi. Sanction for the development of 200 MW solar power plants under the VGF scheme of the MNRE is awaited from the Ministry.
NHPC	<ul style="list-style-type: none"> For development of Wind farm of 6 MW capacity at village Bidda, Reasi, Land (213 kanals) presently under the possession of Salal Hydro Station, NHPC needs to be transferred to State Government/ JAKEDA. The matter stands taken up with the NHPC authorities.
MOP/CEA	<ul style="list-style-type: none"> Study and action plans for seamless grid integration of proposed RE capacity in J&K. The MoP may facilitate this through an appropriate donor agency funded Technical Assistance program.

8. Energy Efficiency Plan

8.1. Energy Efficiency Plan

JKPDD is SDA (State Designated Agency) to coordinate, regulate and enforce the implementation of various Energy Conservation measures in the State of J&K. A State Level Steering Committee has been constituted to give structured support and guidance to the State Designated Agency (SDA) for carrying out Energy Conservation activities which constitutes of following members.

- Administrative Secretary (Chairperson),
- Development Commissioner Power(Member Secretary),
- Managing Director JKSPDC (Member),
nominee of finance department (Member)
& Nominee of Industries & commerce department (member).

In line with the DSM objectives, wherein every Distribution Licensee shall undertake/ implement DSM related policy/ activity/ program, recently a DSM Cell has been formed in the Commercial and Survey Wing of JKPDD, headed by Chief Engineer.

The following activities have been carried out so far in the area of energy conservation and energy efficiency:

- a) **State Energy Conservation Fund** has been constituted according to sub-section (4) of section 18 of The Jammu & Kashmir Energy Conservation Act 2011 to receive grants from GOI and State Government for the purpose of efficient use of energy and its conservation within the State.

Detailed rules have been framed by JKPDD for the operation of this fund as per Section 18 subsection (4) of J&K Energy Conservation Act.

An amount of Rs. 2 Crores has been received from BEE, GOI as 1st installment as contribution to SECF (State Energy Conservation Fund) along with guidelines for utilizing the fund.

Under the scheme of “strengthening of SDAs on efficient use of energy and its conservation” of GOI during the 12th five year period, one of the component is providing financial support towards institutionalization of enforcement mechanism for various energy efficiency schemes at State level

An amount of 7 lakhs has been allocated towards SDA of J&K for this activity which is to be utilized for conducting training programs and capacity building of State Government officials as inspectors to ensure smooth implementation of enforcement mechanism for energy efficiency in the State.

Further financial assistance of Rs. 114.79 lakhs has been sanctioned by BEE, GOI during the financial year 2013-2014 out of which Rs. 86.79 lakhs has been disbursed as 1st installment towards SDA of J&K. Out of this total sanctioned amount of Rs. 121.79 lakhs as financial assistance to SDA of J&K for the financial year 2013-2014, the J&K

Table 41: EE Planned Activities and Sanctioned Budget

Activity	Sanctioned Budget (In Lakhs)
Training programs and capacity building of officials for enforcement mechanism	7.00
Manufacture & distribution of thermostat built-in emersion rods as a substitute to the crude water boilers	70.00
Conversion of conventional street lights into LED street lights	30.00
Manpower support to SDA of J&K	15.00
Workshops/capacity building of the SDA of J&K	6.79
Total	121.79

SDA has decided to use it towards various activities as highlighted in Table 41

The key initiatives undertaken for energy conservation measures includes

- Tenders have been floated for the manufacture of emersion rods with in-built thermostat.
- Recruitment of manpower for Energy Conservation activities.
- Ban on the use of incandescent lamps.
- Mandatory use of CFLs in Government offices and commercial establishments.
- Mandatory use of 5 star rated electrical appliances in all government offices, educational and commercial institutions.
- Various awareness campaigns; Energy Conservation week, energy conservation workshops, Awareness through print and electronic media
- LED street lights installed at Dal Lake area in Srinagar.

8.2. Proposed schemes

Capacity building of DISCOMs Program under Demand Side Management (DSM):

J&KPDD has signed a MoU with BEE for Capacity building of JKPDD under DSM scheme. The Program provides the following benefits to the JKPDD:

- JKPDD will receive assistance in establishment/ strengthening of DSM cells including consultancy support and implementation of DSM action plan.
- BEE shall allocate funds to EESL for providing manpower support, consultancy support to JKPDD for Load Survey, Load Research and development of DSM Action Plan.
- Commissioner (Power) office for the program. The hiring process for Survey Agency by EESL for load survey is under progress.
- Training of Trainer program by BEE is scheduled to be conducted during 22nd Feb, 2016 to 26th Feb, 2016 at National Power Training Institute, Faridabad.
- On the request of BEE, EESL has already deputed one consultant to the JKPDD.

Domestic Efficient Light Program (DELP) for the State of J&K

The Domestic Efficient Lighting Program (DELP) seeks to promote high quality LED lighting in the domestic sector by overcoming the high initial/ entry cost barrier. DELP will enable sale of LED bulbs from designated places at a cost that is much less than the per unit market price of Rs.400-500 as replacements of Incandescent Lamps (ICLs) and Compact Fluorescent Lamps (CFLs). This would be undertaken once load research study is conducted, it involves provision of distribution of LED lamps to the domestic grid connected HHs in the State and is expected to reduce peak demand. Total number of consumers proposed for DELP in Jammu & Kashmir is expected to be approximately 14.96 Lacs. The proposed number of bulbs to be distributed per HH is upto five 9 W LED Bulbs to each registered domestic consumer (16 lakhs currently) in the state.

Table 42 derives the critical components of the proposed scheme in terms of actual saved energy as a result of power saving per lamp wherein about 80,00,000 bulbs are proposed to be offered which would eventually result in annual energy savings of 179.2 MU.

Table 42: Energy efficiency Plan under DELP

Particulars	Unit	Total
Number of Bulbs offered under this Scheme (financing option)	Number	80,00,000
Wattage of ICL Bulb	Watt	60
Wattage of CFL Bulb	Watt	14
Average Wattage of 2 CFL & 1 ICL Bulb	Watt	29
Wattage of LED Bulb	Watt	9
Power saving per lamp	Watt	20
Hours of Usage	Hrs/Day	3.5
Operating days per year	Days / Year	300
Energy Demand Saved per year	Million Kwhr	168

The State Government has decided to provide Rs. 61.44 Crores subsidy towards implementation of the DELP Program. The LED bulbs will be distribution/ sold to HH's at an upfront cost of Rs. 20 per unit for a 9 Watt LED with no provision for on-bill recovery.

Post implementation of the Program, EESL shall set-up shops in each of the 22 districts of the State for selling LED bulbs at "Program Cost" in the State on a sustained basis. This would ensure there is no reversal of usage to other types of lamps post completion of the sale of subsidized bulbs to HHs.

Municipal DSM Program

LED Based Street Light Program (MuDSM) seeks to replace all the conventional HPSV lights with LED fixtures. A pilot project has already been completed at Dal Lake. JKPDD has planned to start another pilot in the Vaishno Devi Shrine in the next phase. Based on the load research outcome, the detail scope for remaining cities would be prepared.

The State has decided to undertake implementation of a state wide program on LED Street lighting on completion of load research exercise on EESL's annuity based model.

8.3. Action Plan

The load research and analysis project has been recently initiated by EESL. The detailed DSM action plan for the State is yet to be prepared.

The proposed indicative rollout plan prepared by JKPDD is outlined in Table 44 and Table 45

Table 43: Year Wise Indicative EE Plan for Jammu & Kashmir

Year	Interventions
FY 16	<ul style="list-style-type: none"> 100% LED streetlight installation in way to Vaishno Devi from Katra Set up of LED distributing kiosks/teller machine Replacement of the conventional street lights with LED street lights. Roll out of DELP program. Promotion of DSM interventions in new service connection and add message in electricity bill. Initiate program for Super-efficient fans program (Phase I). Promotion of Solar panel for charging of invertors. DSM interventions for Substations illumination. •
FY 17	<ul style="list-style-type: none"> Super-efficient fans phase II. Awareness programs for Domestic consumers Awareness program for builders about ECBC. Conversion of conventional lights to LED lights in all government office

Year	Interventions
FY 18	<ul style="list-style-type: none"> • Introduction of program for DSM interventions for Industrial consumers • Initiation of program for Super-efficient fans phase III • Initiation of program for DSM interventions for commercial consumers

Table 44: Action Plan

Stakeholder	Action Item
JKPDD	<ul style="list-style-type: none"> • Strengthening of DSM Cell. Engage at least two of its officials from middle management level to its DSM cell for undertaking DSM activities, by August, 2016. • Identify technical staffs (senior and middle management level) by June, 2016 to be trained on DSM activities under Training of Trainer programme. • Coordinate with the consultant for load survey, load research, load strategies and development of DSM action plan. • Facilitate the consultants to prepare DSM regulations for the DSM programme implementation. • Submit proposed DSM regulation to J&KSERC for consideration/ adoption. • Submit DSM plan along with petitions for ARR for next MYT Control period to J&KSERC for approval. • Carry out cost benefit for a particular DSM programme for participants, utility and societal point of view and present the same to the J&KSERC. • Provide all necessary support to the BEE/ EESL for implementation of this DSM programme. • Initiate Roll-out of DELP program within next three months. • Finalize plan for State wide implementation of LED Streetlights by September, 2015.
BEE/ MNRE	<ul style="list-style-type: none"> • Allocate funds to EESL for providing manpower support, consultancy support to JKPDD for Load Survey, Load Research and development of DSM Action Plan. • Coordinate with EESL/ JKPDD for timely implementation of activities assigned to them under DSM programme. • Engage training agency for development of training module for JKPDD. • Provide financial support to the JKPDD for organizing workshops for capacity building of its officials.
EESL	<ul style="list-style-type: none"> • Undertake energy audit of all State owned buildings to assess potential of savings from EE lighting/ HVAC interventions. • Implement EE lighting program (LEDs) in all Government buildings in the next 6 months. • Prepare Terms of Reference (TOR) and draft bidding document for implementing the "Manpower Support" program. • Conduct load research and Profiling. • Develop DSM action Plan by July, 2016. • Monitoring and Reporting of DSM projects.

Table 45: Proposed Fund requirement (Rs Crs.)

	FY16	FY17	FY18	FY19
Govt. of India	5	5	5	5
Total Fund Requirement (Rs Crs.)	5	5	5	5

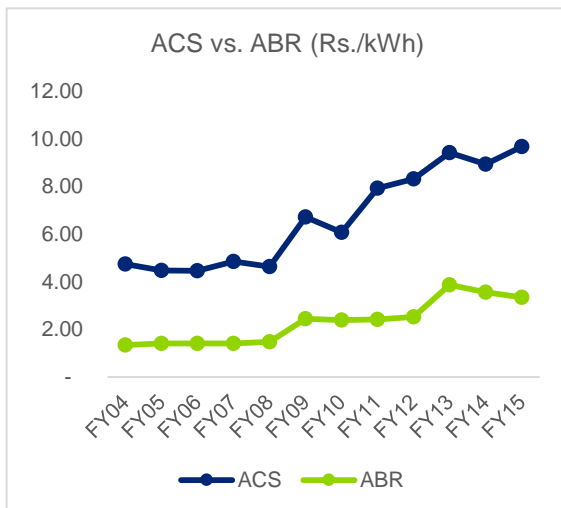
9. Financial Position of utility (JKPDD)

9.1. Introduction

JKPDD being a State Government department, does not maintain commercial accounts. The financial analysis presented in this chapter is based on the tariff/ regulatory filings submitted by JKPDD.

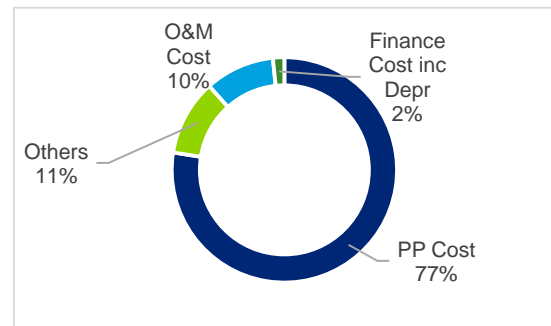
As per the year book the average cost of supply (ACS) for FY15 is 9.66 Rs./kWh. It can be seen from the graph below that the gap between average cost of supply and average billing rate is increasing. Continued high AT&C loss is one of the main reasons for the increasing gap. Further, there has been improvement in billing rate due to tariff hikes and change in sales mix. In the period FY11 to FY15 cost of supply has increased by 22% whereas the billing rate has increased by about 38%. Despite the increase in billing rate, the gap between ACS and ABR has increased. In FY11 the gap was 5.50 Rs./kWh which has increased to 6.32 Rs./kWh in FY15.

Figure 20: ACS vs ABR (Source: JKPDD Year Book)



Being a Government Department JKPDD is able to meet the gap through subsidy (budgetary support) from the state government. In FY15 the

Figure 19: Components of Approved cost of supply for FY15



Government revenue subsidy support was Rs. 4,113 Cr. which is 2.26 times the total revenue billed for the same year. Going forward, JKPDD may prepare for reducing this subsidy support and work towards achieving full financial independence.

Tariff order for FY16 reveals that the cost of supply at approved by the commission is 7.72 Rs./kWh. It may be noted that the commission has determined at AT&C loss level of 42%. However, as per the data published in year book for FY15 the ACS for FY15 is about 9.66 Rs./kWh.

It can be seen from Figure 19 that about 77% of the total approved cost of supply is comprising of power purchase cost. It may be noted that the cost structure of JKPDD is comprising of both transmission and distribution function.

9.2. Commercial Viability

As discussed in the previous section, being a government department, JKPDD does not maintain commercial accounts. The commercial viability of the department hinges solely on reduction of the AT&C losses. Further, the utility may need to revise its tariff structure in order to reduce the subsidy support from the Government.

JKPDD's AT&C loss have reduced from alarming level of 72.8% in FY11 to 64.02% in FY15. However, the department needs to further reduce its losses in order to sustain commercial viability.

JKPDD seeks to achieve 25% AT&C loss level by FY19. The capital investment program as shown in Transmission and Distribution chapter have been

targeted at reduction of the existing AT&C loss and bring them down to 25% by FY19

9.3. Financial Projections

In order to estimate the impact of PFA program on the financials of a utility, it is pertinent to assess the incidental cost of the program vis-à-vis the potential of generating additional revenue due increase in energy sales. As the utility progresses on achieving reduction in AT&C losses, the gap between average cost of supply and average realization is expected to shrink. In line with above, an analysis has been carried out to assess the cost impact of PFA program on tariff as well as financials of the utility. Table 46 presents the assumptions which form the basis for such projections

Table 46: Assumptions for various parameters

Particulars		Assumptions														
Power purchase		<ul style="list-style-type: none">The firm allocation from the Central Generating Stations shall remain stable at current levels (July 2015) over the period of projection (FY16 to FY19)Commissioning of new plants in State sector assumed as per State's projectionsCommissioning of new plants of central sector as per CEA's monitoring reports														
Power Purchase Rate		<ul style="list-style-type: none">The present stations have been projected at current PP Rate as per the data submitted by JKPDDRate of power purchase from new generating stations are projected at Rs.4.5/kWhAllocation from un-allocated capacity of CGS has not been consideredStation-wise power purchase cost as per the MYT petition of JKPDDShort term power purchase 3.50 Rs./unit and medium term power purchase at 4.5 Rs./UnitIt is assumed that 10% of the power procurement for shortfall units would be done through short term purchase and remaining through medium term power purchase.														
Transmission Charges		<ul style="list-style-type: none">Transmission charges based on approved transmission FY15 tariff for JKPDD at 0.44 Rs./Unit escalated at 5% every year														
Revenue and Sales growth		<ul style="list-style-type: none">Revenue calculations based on average billing rate approved by JKSER in FY16 Tariff order and actual sales provided by JKPDD for FY15 for domestic and other than domestic consumers.Sales growth is as per projections in Power Supply Scenario (Chapter 3)														
Losses (%)		<ul style="list-style-type: none">AT&C loss projections as per following trajectory as agreed under UDAY: <table><tr><th>Particulars</th><th>FY16</th><th>FY17</th><th>FY18</th><th>FY19</th></tr><tr><td>AT&C Loss (%)</td><td>56%</td><td>46.0%</td><td>35.0%</td><td>25.0%</td></tr></table>					Particulars	FY16	FY17	FY18	FY19	AT&C Loss (%)	56%	46.0%	35.0%	25.0%
Particulars	FY16	FY17	FY18	FY19												
AT&C Loss (%)	56%	46.0%	35.0%	25.0%												
Capex & capitalization		<ul style="list-style-type: none">Capex as per budgeted plans and requirement to fulfill PFA targets of JKPDDCapitalization based on capitalization plan provided by JKPDD														
Employee cost, R&M, A&G costs		<ul style="list-style-type: none">Employee cost: Based on approved employee cost for FY16 with escalation of 10% YoY over the period of projection (FY 16 to FY19) considering the CPI. Additional 8% escalation in FY17 to accommodate revision for 7th Pay CommissionA&G cost: Based on approved A&G cost for FY15 with escalation of 6% p.a over the period of projection (FY 16 to FY19)R&M cost:<ul style="list-style-type: none">For existing assets: Based on the actual R&M cost as percentage of GFA (Past 2 years Average has been considered)For New Assets – 1% of GFA														
Depreciation		<ul style="list-style-type: none">For existing assets: Based on the existing rate of depreciation approved by JKSERFor new assets: 5.28%														

Particulars	Assumptions
Funding of capital expenditure and financing terms	<ul style="list-style-type: none"> Capital expenditure to be funded through grant, debt & equity based on schemes under which it has been proposed. Under DDUGJY and IPDS, the ratio of grant and debt is 90%, and 10%, whereby 85% grants out of 90% would be available in the same year while additional 5% after 2 years, utilized towards retiring debt Unapproved capital expenditure under proposed schemes to be funded through debt equity in the ratio of 70:30. For other ongoing schemes, funding is based on the tied up debt, equity and envisaged grant portion. For any untied expenditure, debt and equity in the ratio of 70:30 has been considered. Repayment schedule of 10 years Interest on existing debt is considered to be based on weighted average existing interest rate, estimate to be 10% Interest on new debt considered to be 12.5%, Debt to Equity ratio assumed at 70:30 under no grants scenario, only for schemes under which funds have already not been tied up, such as DDUGJY and IPDS
Working capital and cash deficit loan	<ul style="list-style-type: none"> Working capital requirement has been estimated as per regulatory provisions Working capital loan assumed at 13.5% Revenue deficit during the year is assumed to be funded through budgetary allowance of state government. As per the Tariff order for FY16, the revenue gap is met through budgetary support.
Regulatory parameters	<ul style="list-style-type: none"> No disallowance in power purchase or any other cost element No regulatory assets of past have been considered

The projected profit and loss statement of JKPDD suggest that the subsidy requirement for JKPDD may decrease in FY19.

It can be seen that the revenue deficit is expected to decrease due to aggressive loss reduction plans. Following table shows the parameters for Base Case

Table 47: Parameters for Base Case

Particulars	Units	FY 16	FY 17	FY 18	FY 19
Energy related parameters					
Sales	MUs	7,158	8,637	10,322	12,168
T&D losses	%	47.84%	38.88%	29.62%	22.16%
AT&C Losses	%	56.00%	46.00%	35.00%	25.00%
Energy Required	MUs	13,722	14,131	14,666	15,632
Energy Available	MUs	11,611	12,157	13,241	14,573
Energy Surplus/(Deficit)	MUs	(2,112)	(1,974)	(1,424)	(1,060)
Power purchase cost (inc transmission charges)	Rs./kWh	3.49	3.45	3.44	3.55
Revenue & expenditure parameters					
Tariff Increase	%age	0%	0%	0%	0%
Collection efficiency	%age	84.4%	88.4%	92.4%	96.4%
Average billing rate - Domestic	Rs./kWh	2.30	2.30	2.30	2.30
Average billing rate - Other than domestic (weighted avg.)	Rs./kWh	4.50	4.50	4.50	4.50
Employee cost escalation	%age		18.00%	10.00%	10.00%
A&G cost escalation	%age		6.00%	6.00%	6.00%

The estimated Budgetary Support from State Govt. during FY19 is Rs. 2,457 Cr. It can be inferred that the dependence of Govt subsidy to sustain the operation of JKPDD is likely to reduce.

In order to reduce the revenue deficit JKPDD may need to increase the Average Billing rate through tariff hikes. However, it can be seen that the cost of supply is reducing mainly due to aggressive loss reduction targets by JKPDD.

Table 48: Profit and Loss Statement (Base Case)- Rs. Cr.

Details	FY 16	FY 17	FY 18	FY 19
Revenue				
Revenue from Sale of Power	2,553	3,057	3,637	4,264
Govt Revenue Subsidy	-	-	-	-
Revenue from Power Sold outside State	-	-	-	-
Power Purchase cost	4,982	5,058	5,186	5,636
O&M Cost	565	674	758	841
Employee cost	501	591	650	716
A&G Expenses	26	27	29	30
R&M Expenses	39	56	78	95
EBIDTA	(2,994)	(2,676)	(2,306)	(2,214)
Depreciation	17	36	72	91
Interest and finance charges	33	105	168	152
Interest on working capital	-	7	21	31
Interest - Long term	33	98	147	121
Subsidy Support from State Govt.	(3,044)	(2,817)	(2,546)	(2,457)

Table 49: Impact on tariff (Base Case)

Particulars	Derivation	FY 16	FY 17	FY 18	FY 19
Additional recovery due to incremental energy sales (Rs. Cr.)	A	360	864	1,444	2,071
Incremental power purchase cost (inc. transmission charges and incremental transmission cost due to PFA program (Rs. Cr.)	B	1,214	1,290	1,418	1,868
Add: Cost related to capital expenditure (interest, depreciation and equity return, Rs. Cr.)	B1	500	560	611	586
Gap of additional cost and additional recovery	C=(B+B1-A)	1,354	986	585	383
Energy sales (MU)	D	7,158	8,637	10,322	12,168
Cumulative Impact on tariff (Rs./kWh)		1.89	1.14	0.57	0.31

Table 50: ABR vs ACS In Rs./kWh for Base Case

Particulars	FY 16	FY 17	FY 18	FY 19
ABR (Rs./kWh)	3.57	3.54	3.52	3.50
ACS (Rs./kWh)	7.82	6.80	5.99	5.52

8.1. Scenario Analysis

Any change in tariff or under achievement of AT&C losses considered for the base case or non-availability of funding in form of grants will translate into additional impact on the financial position of the utility. Therefore, analysis under following scenarios have been carried out:

1. Increase in tariff to ensure that utility becomes viable by FY19
2. Non-Availability of grants under the schemes where DPRs are not finalized (available only to the extent approved as per DPR) to fund the capital expenditure.
3. Under achievement of AT&C loss targets: considering the utility misses the MOP targets

Scenario 1: Increase in tariff required for the utility to become viable

As the existing ABR is low compared to the ACS, there is a significant gap between income and expenditure. This scenario estimates the YoY tariff hike required from FY17 onwards to recover the full cost of the utility. JKPDD requires YoY tariff hike of about 16.8% during FY17 to FY19, adding which the budgetary support from state government shall become nil. Table 51 shows the parameters for this scenario.

The resultant P&L account is shown in Table 52. It can be seen that the utility is able to turn around by FY19 by posting positive revenue surplus of Rs.15.96 Cr. As compared to budgetary support of Rs.2,457 Cr in base case.

Table 51: Parameters for Scenario 1

Particulars	Units	FY 16	FY 17	FY 18	FY 19
Energy related parameters					
Sales	MUs	7,158	8,637	10,322	12,168
T&D losses	%	47.84%	38.88%	29.62%	22.16%
AT&C Losses	%	56.00%	46.00%	35.00%	25.00%
Energy Required	MUs	13,722	14,131	14,666	15,632
Energy Available	MUs	11,611	12,157	13,241	14,573
Energy Surplus/(Deficit)	MUs	(2,112)	(1,974)	(1,424)	(1,060)
Power purchase cost (inc transmission charges)	Rs./kWh	3.49	3.45	3.44	3.55
Revenue & expenditure parameters					
Tariff Increase	%age	0%	16.8%	16.8%	16.8%
Collection efficiency	%age	84.4%	88.4%	92.4%	96.4%
Average billing rate - Domestic	Rs./kWh	2.30	2.69	3.14	3.66
Average billing rate - Other than domestic (weighted avg.)	Rs./kWh	4.50	5.25	6.13	7.16
Employee cost escalation	%age		18.00%	10.00%	10.00%
A&G cost escalation	%age		6.00%	6.00%	6.00%

Table 52: P&L account for Scenario 1 (Rs. Cr.)

Details	FY 16	FY 17	FY 18	FY 19
Revenue from Sale of Power	2,553	3,570	4,962	6,794
Govt Revenue Subsidy	-	-	-	-
Revenue from Sale of Power Outside State	-	-	-	-

Details	FY 16	FY 17	FY 18	FY 19
Power Purchase cost	4,982	5,058	5,186	5,636
O&M Cost	565	674	758	841
Employee cost	501	591	650	716
A&G Expenses	26	27	29	30
R&M Expenses	39	56	78	95
EBIDTA	(2,994)	(2,162)	(982)	317
Depreciation	17	36	72	91
Interest and finance charges	33	116	198	209
Interest on working capital	-	19	51	88
Interest - Long term	33	98	147	121
Budgetary Support from State Govt.	(3,044)	(2,315)	(1,251)	16

Scenario 2: Non Availability of grants

The dependence of utility on funding of the proposed investments through various State and Central Government schemes can be assessed by the impact on utility's finances under a scenario where grant funding is not available. Under this scenario, the grant availability for the upcoming Central Government schemes including IPDS and DDUGJY, has been considered to be nil. While, for the ongoing schemes where the funds have already

been committed by the State or Central Government, the grants are considered to be as envisaged in the respective schemes. Table 53 summarizes the key parameters of this scenario

Table 54 shows the projected P&L statement for JKPDD. It can be seen that the budgetary support from state government for FY19 increases to Rs. 2,546 Cr as compared to that of Rs. 2,457 Cr in base case.

Table 53: Parameters for Scenario 2 (Non Availability of Grants)

Particulars	Units	FY 16	FY 17	FY 18	FY 19
Energy related parameters					
Sales	MUs	7,158	8,637	10,322	12,168
T&D losses	%	47.84%	38.88%	29.62%	22.16%
AT&C Losses	%	56.00%	46.00%	35.00%	25.00%
Energy Required	MUs	13,722	14,131	14,666	15,632
Energy Available	MUs	11,611	12,157	13,241	14,573
Energy Surplus/(Deficit)	MUs	(2,112)	(1,974)	(1,424)	(1,060)
Power purchase cost (inc transmission charges)	Rs./kWh	3.49	3.45	3.44	3.55
Revenue & expenditure parameters					
Tariff Increase	%age	0%	0%	0%	0%
Collection efficiency	%age	84.4%	88.4%	92.4%	96.4%
Average billing rate - Domestic	Rs./kWh	2.30	2.30	2.30	2.30
Average billing rate - Other than domestic (weighted avg.)	Rs./kWh	4.50	4.50	4.50	4.50
Employee cost escalation	%age		18.00%	10.00%	10.00%
A&G cost escalation	%age		6.00%	6.00%	6.00%

Table 54: P&L Statement for Scenario 2 (Rs. Cr.)

Details	FY 16	FY 17	FY 18	FY 19
Revenue from Sale of Power	2,553	3,057	3,637	4,264
Govt Revenue Subsidy	-	-	-	-
Revenue from Sale of Power Outside State	-	-	-	-
Power Purchase cost	4,982	5,058	5,186	5,636
O&M Cost	565	674	758	841
Employee cost	501	591	650	716
A&G Expenses	26	27	29	30
R&M Expenses	39	56	78	95
EBIDTA	(2,994)	(2,676)	(2,306)	(2,214)
Depreciation	20	44	92	127
Interest and finance charges	36	123	206	205
Interest on working capital	-	7	21	31
Interest - Long term	36	116	185	174
Budgetary Support from State Govt.	(3,051)	(2,843)	(2,605)	(2,546)

Scenario 3: AT&C loss reduction targets missed

Base case analysis, scenario 1 and scenario 2 assumes the achievement of AT&C loss trajectory by the utility. However, in case the utility misses T&D loss reduction and it JKPDD achieves only 50% of the YoY loss reduction targets, the impact on financial position is significant. Table 55 summarizes the key parameters underlying the analysis in

scenario 3. Due to additional cost and under-achievement of T&D loss trajectory there is an adverse impact on the financials of the utility, as presented in Table 56. As can be seen, the budgetary support from state government increases to Rs. 2,801 Cr. as compared to that of Rs. 2,457 Cr in Base Case. It may also be important to note that in this scenario, the funds available as grants under centrally sponsored schemes (IPDS, DDUGJY) are restricted to 85% of project value.

Table 55: Parameters for Scenario 3

Particulars	Units	FY 16	FY 17	FY 18	FY 19
Energy related parameters					
Sales	MUs	7,158	8,637	10,322	12,168
T&D losses	%	51.53%	43.36%	34.25%	25.89%
AT&C Losses	%	56.00%	46.00%	35.00%	25.00%
Energy Required	MUs	14,767	15,249	15,699	16,419
Energy Available	MUs	11,611	12,157	13,241	14,573
Energy Surplus/(Deficit)	MUs	(3,157)	(3,092)	(2,457)	(1,846)
Power purchase cost (inc transmission charges)	Rs./kWh	3.49	3.45	3.44	3.55
Revenue & expenditure parameters					
Tariff Increase	%age	0%	0%	0%	0%

Particulars	Units	FY 16	FY 17	FY 18	FY 19
Collection efficiency	%age	84.4%	88.4%	92.4%	96.4%
Average billing rate - Domestic	Rs./kWh	2.30	2.30	2.30	2.30
Average billing rate - Other than domestic (weighted avg.)	Rs./kWh	4.50	4.50	4.50	4.50
Employee cost escalation	%age		18.00%	10.00%	10.00%
A&G cost escalation	%age		6.00%	6.00%	6.00%

Table 56: P&L Statement for Scenario 3 (Rs. Cr.)

Details	FY 16	FY 17	FY 18	FY 19
Revenue from Sale of Power	2,553	3,057	3,637	4,264
Govt Revenue Subsidy	-	-	-	-
Revenue from Sale of Power Outside State	-	-	-	-
Power Purchase cost	5,442	5,550	5,640	5,982
O&M Cost	565	674	758	841
Employee cost	501	591	650	716
A&G Expenses	26	27	29	30
R&M Expenses	39	56	78	95
EBIDTA	(3,454)	(3,167)	(2,761)	(2,560)
Depreciation	17	36	72	92
Interest and finance charges	33	99	163	150
Interest on working capital	-	2	16	27
Interest - Long term	33	98	148	123
Budgetary Support from State Govt.	(3,504)	(3,303)	(2,996)	(2,801)

9.4. UDAY Scheme

J&K Government has adopted the Ujjwal Discom Assurance Yojna (UDAY) scheme. In this scheme the State Government is allowed to borrow the provisional outstanding dues of various CPSUs amounting to Rs. 3,537 Cr. In J&K, for the unpaid power purchase bills, the interest charged by CPSU's shall be reduced on account of UDAY Scheme.

Further the state government has agreed on various operational efficiency improvement measures which will help JKPDD to achieve AT&C loss of 15% by FY20.

The impact of this scheme is not directly reflected in the financial statements as JKPDD does not maintain commercial accounts

10. Roll out Plan

Particular	Unit	Existing	Year wise addition					Total Till FY19
		ending						
		FY15	FY16	FY17	FY18	FY19		
G E N E R A T I O N								
State Sector	MW	1,419	731	749	834	927	4,660	
Central Sector Allocations	MW	1,671	1,671	1,744	1,811	1,900	8,798	
Private Sector	MW	43	43	207	420	630	1,341	
Total IC including Allocation	MW	3,133	2,444	2,699	3,066	3,457	14,799	
Peak Demand	MW	2,650	2,645	2,715	2,808	2,983	2,983	
T R A N S M I S S I O N (I N T R A S T A T E)								
Grid Substations (Nos)	No.	4	9	16	13	46	84	
Transformation Capacity	MVA							
220/132KV Grid Stations	MVA	4,050	88	284	368	99	4,890	
220/66-33KV Grid Stations	MVA	0	257	1,043	1,467	468	3,235	
132/66-33 KV Grid Stations	MVA	4,503	215	570	864	301	6453	
Sub Total	MVA	8,553	560	1,898	2,699	868	14,578	
D I S T R I B U T I O N								
Substations	No.		45	136	136	136	453	
Substations	MVA		283	848	848	848	2,827	
HT Line	Ckt. km.	38,108	2,642	7,927	7,927	7,927	64,532	
LT Line	Ckt. km.	73,260	2,823	8,468	8,468	8,468	101,488	
Distribution Transformer	No.	10,722	244	732	732	732	13,162	
IPDS								
New Substation	MVA		17	51	51	51	170	
Augmentation of Power T/F	MVA		29.5	88.5	88.5	88.5	295	
Additional Power T/F	MVA		5.2	15.6	15.6	15.6	52	
Total IPDS Substation	MVA		51.7	155.1	155.1	155.1	517	

Particular	Unit	Existing	Year wise addition				Total Till FY19
		ending					
		FY15	FY16	FY17	FY18	FY19	
HT Line	Ckt. Km.		104.4	313.2	313.2	313.2	1,044
LT Line	Ckt. Km.		297.5	892.5	892.5	892.5	2,975
Distribution Transformer	MVA		16.3	48.9	48.9	48.9	163
DDUGJY							
New Substation	MVA		34.8	104.4	104.4	104.4	348
Augmentation of Power T/F	MVA		1.4	4.2	4.2	4.2	14
Additional Power T/F	MVA		1.3	3.9	3.9	3.9	13
Total DDUGJY Substation	MVA		37.5	112.5	112.5	112.5	375
HT Line	Ckt. Km.		1,169.7	3,509.1	3,509.1	3,509.1	11,697
LT Line	Ckt. Km.		772.9	2,318.7	2,318.7	2,318.7	7,729
Distribution Transformer	MVA		30.3	90.9	90.9	90.9	303
RAPDRP							
New Substation	MVA		18.6	55.8	55.8	55.8	186
Augmentation of Power T/F	MVA		17.9	53.7	53.7	53.7	179
Additional Power T/F	MVA		24.9	74.7	74.7	74.7	249
Total RAPDRP Substation	MVA		61.4	184.2	184.2	184.2	614
HT Line	Ckt. Km.		123.4	370.2	370.2	370.2	1,234
LT Line	Ckt. Km.		568.3	1,704.9	1,704.9	1,704.9	5,683
Distribution Transformer	MVA		45.4	136.2	136.2	136.2	454
PMRRP							
New Substation	MVA		87.5	262.5	262.5	262.5	875
Augmentation of Power T/F	MVA		22	66	66	66	220
Additional Power T/F	MVA		22.6	67.8	67.8	67.8	226
Total PMRRP Substation	MVA		132.2	396.6	396.6	396.6	1,322
HT Line	Ckt. Km.		1,244.9	3,734.7	3,734.7	3,734.7	12,449
LT Line	Ckt. Km.		1,184.1	3,552.3	3,552.3	3,552.3	11,841
Distribution Transformer	MVA		152	456	456	456	1520

11. Institutional Arrangement for monitoring

A strong monitoring framework is essential to ensure the success of “Power for All” scheme. The following structure shown in following table is being proposed to undertake regular monitoring of the progress of all initiatives being undertaken in this Roadmap.

Table 57: Institutional Arrangement for Monitoring

Sl.	Institutional arrangement	Responsibilities	Monitoring frequency
1	Government of India (GOI) Committee	It is proposed that this committee will review the overall progress of the scheme and provide necessary support to ensure a coordinated response from Central Government – where necessary. This committee may be constituted with the following members – PFC, REC, CEA, SECI, EESL, BEE, Ministry of Coal, MNRE, MoPNG and Ministry of Power.	Quarterly
2	State Government Level Committee	It is proposed that a State level committee headed by the Secretary (Power) will be formed to review the progress of the scheme. This Committee will monitor the progress of the works undertaken as a part of the scheme and issue directions to enable faster execution.	Quarterly
3	Department Level Committee	It is proposed that a department level committee headed by Nodal Officer will be formed which shall undertake steps required to ensure the projects are progressing as per the action plan.	Monthly
4	Circle Level Committee	It is proposed to constitute a circle level committee headed by CE to take action that is necessary to ensure the projects are completed in a timely manner.	Monthly
5	Project Monitoring Unit (PMU)	A PMU shall be set up for monitoring the progress of works being undertaken under this scheme. The PMU will operate under Secretary (Power) and shall be operated by an independent agency.	Weekly

12. Annexures

Annexure 1a: IPDS Planned Capacity Addition

Sl.	Circle	Project Cost Appraised by PFC (Rs. Crs.)	New Substation		Augmentation of Power T/F		Additional Power T/F		Total Capacity Addition at 66-33 kV level	HT Line kms (33 kV & 11 KV) Bare Conductor & ABC	LT Line Bare Conductor & ABC	DTC (MVA)
			No	MVA	No	MVA	No	MVA				
1	2	3	4	5	6	7	8	9	10 = 5+7+9	11	12	13
1	Srinagar	82.29	5	50.00	5	37.00	0		87.00	150	665	37.80
2	Ganderbal	16.29	2	20.00	0		1	10.00	30.00	41	101.5	4.30
3	Sopore	28.39	1	10.00	1	3.70	0		13.70	68.5	266.5	6.50
4	Pulwama	22.89	3	30.00	2	12.40	0		42.40	16	97	0.40
5	Bijbehara	49.28	2	16.30	2	11.10	6	41.50	68.90	89.9	412	7.00

Sl.	Circle	Project Cost Appraised by PFC (Rs. Crs.)	New Substation		Augmentation of Power T/F		Additional Power T/F		Total Capacity Addition at 66-33 kV level	HT Line kms (33 kV & 11 KV) Bare Conductor & ABC	LT Line Bare Conductor & ABC	DTC (MVA)
			No	MVA	No	MVA	No	MVA				
1	2	3	4	5	6	7	8	9	10 = 5+7+9	11	12	13
6	Budgam	23.07	0	0.00	2	7.40	0		7.40	53.5	224	14.40
7	Leh	20.02	0	0.00	4	14.80			14.80	67	89	5.00
8	Jammu	52.23	1	6.30	17	74.40	0		80.70	61	393	22.75
9	Kathua	45.01	0	0.00	7	38.50			38.50	145.9	177.2	29.29
10	Rajouri	35.00	5	31.50	4	28.90			60.40	136.00	135	13.84
11	Batote	50.02	2	6.30	8	42.05			48.35	182	280.25	13.20
12	Kishtwar	20.01	0	0.00	5	24.25			24.25	33.5	135	8.52
Total		444.50	21	170.40	57	294.50	7	51.50	516.40	1,044.3	2,975.45	163.00

Annexure 1b: DDUGJY Planned Capacity Addition as per Supplementary

Sl.	DISTRICT	PROJECT COST AS PER SUPPLEMENTARY DPRs Rs in Cr	New Substation		Augmentation of Power T/F		Additional Power T/F		Total Capacity Addition at 66-33 kV level MVA	NEW HT LINE (Km)		NEW LT LINE(km)	NEW DISTRIBUTION TRANSFORMER No
			No	MVA	No	MVA	No	MVA		66-33 KV LINE	11 KV LINE	km	
1	2	3	4	5	6	7	8	9	10 = 5+7+9	11	12	13	14
1	Jammu	32.41	3.00	12.60					12.60	117.42	549.34	326.55	450
2	Samba	18.14	2.00	13.15					13.15	74.16	358.75	368.94	198
3	Kathua	28.57	7.00	35.20					35.20	67.98	471.60	499.62	184
4	Udhampur	14.89	3.00	9.45					9.45	154.50	763.66	496.90	200
5	Reasi	27.41	4.00	15.75					15.75	120.51	1,087.93	1,245.37	286
6	Doda	12.82	-						0.00	-	667.90	467.26	200
7	Kishtwar	26.95	-						0.00	-	1,218.08	593.85	348

Sl.	DISTRICT	PROJECT COST AS PER SUPPLEMENTARY DPRs Rs in Cr	New Substation		Augmentation of Power T/F		Additional Power T/F		Total Capacity Addition at 66-33 kV level	NEW HT LINE (Km)		NEW LT LINE(km)	NEW DISTRIBUTION TRANSFORMER
			No	MVA	No	MVA	No	MVA		66-33 KV LINE	11 KV LINE	km	No
1	2	3	4	5	6	7	8	9	10 = 5+7+9	11	12	13	14
8	Rajouri	29.87	3.00	9.45					9.45	108.15	785.94	445.11	172
9	Poonch	29.41	5.00	15.75					15.75	142.14	471.38	740.39	211
10	Ramban	13.39	1.00	3.15					3.15	24.72	354.42	340.72	95
11	Srinagar		0	0	0	0	0	0	0.00	-	-	-	-
12	Budgam	27.34	5	46.3	0	0	1	6.3	52.60	29.00	71.00	115.00	109
13	Bandipora	44.71	2	12.6	0	0	0	0	12.60	84.00	283.55	158.75	140
14	Ganderbal	23.93	1	6.3	0	0	1	6.3	12.60	5.00	106.90	197.90	141
15	Baramulla	37.26	6	37.8	0	0	0	0	37.80	13.00	241.30	94.00	107

Sl.	DISTRICT	PROJECT COST AS PER SUPPLEMENTARY DPRs Rs in Cr	New Substation		Augmentation of Power T/F		Additional Power T/F		Total Capacity Addition at 66-33 kV level	NEW HT LINE (Km)		NEW LT LINE(km)	NEW DISTRIBUTION TRANSFORMER
			No	MVA	No	MVA	No	MVA		66-33 KV LINE	11 KV LINE	km	No
1	2	3	4	5	6	7	8	9	10 = 5+7+9	11	12	13	14
16	Kupwara	61.73	3	18.9	0	0	0	0	18.90	45.00	328.95	401.89	253
17	Anantnag	26.29	3	18.9	1	3.7	0	0	22.60	12.00	163.40	139.00	147
18	Kulgam	21.78	2	12.6	1	3.15	0	0	15.75	16.00	109.15	156.00	113
19	Shopian	19.60	1	6.3	0	0	0	0	6.30	-	90.82	163.00	138
20	Pulwama	29.20	2	16.3	2	6.85	0	0	23.15	14.00	147.17	210.00	104
21	Leh	48.47	7.00	25.20					25.20	661.26	-	290.06	118
22	Kargil	42.44	4.00	32.60					32.60	546.93	1,189.34	278.31	50
Total:		616.61	64.00	348.30	4.00	13.70	2.00	12.60	374.60	2,235.77	9,460.58	7,728.63	3,764

Annexure 1c: RAPDRP Planned Capacity Addition

Sl.	DISTRICT /TOWN	PROJECT COST	New Substation		Augmentation of Power T/F		Additional Power T/F		Total Capacity Addition at 66-33 kV level	NEW HT LINE (Km)	NEW LT LINE(km)		NEW DISTRIBUTION TRANSFORMER / HVDS
			Rs in Cr	No	MVA	No	MVA	No			MVA	66-33 KV LINE	
1	2	3	4	5	6	7	8	9	10 = 5+7+9	11	12	13	14
1	Jammu	610.48	7.00	70.00	9.00	33.30	15.00	150.00	253.30	48.90	180.22	1,331.90	383 DTs (79.7 MVA) 13308 HVDS (123.343 MVA)
2	Akhnoor	13.64	-		-		1.00	6.30	6.30	-	4.40	20.10	21 DTs (2.7 MVA) 323 HVDS (2.675 MVA)
3	Bhaderwah	6.75	-		1.00	5.00	-		5.00	-	3.50	53.00	2 DTs (0.2 MVA) 93 HVDS (0.226 MVA)

Sl.	DISTRICT /TOWN	PROJECT COST Rs in Cr	New Substation		Augmentation of Power T/F		Additional Power T/F		Total Capacity Addition at 66-33 kV level	NEW HT LINE (Km)	NEW LT LINE(km)		NEW DISTRIBUTION TRANSFORMER / HVDS No
			No	MVA	No	MVA	No	MVA			66-33 KV LINE	11 KV LINE	
1	2	3	4	5	6	7	8	9	10 = 5+7+9	11	12	13	14
4	Doda	7.28	-		1.00	3.70	-		3.70	-	2.00	48.50	202 HVDS (1.522 MVA)
5	Kathua	62.41	1.00	6.30	1.00	5.00	-		11.30	-	43.90	15.00	67 DTs (7.9 MVA) 1562 HVDS (21.813 MVA)
6	Kishtwar	7.42	-		-		-		0.00	-	2.70	57.00	7 DTs (0.552 MVA) 198 HVDS (0.22 MVA)
7	Poonch	7.74	-		1.00	5.00	-		5.00	-	4.00	86.00	13 DTs (1.3 MVA) 59 HVDS (0.315 MVA)
8	R.S. Pura	12.36	-		2.00	12.60	-		12.60	-	43.90	89.00	399 DTs (5.250 MVA)

Sl.	DISTRICT /TOWN	PROJECT COST Rs in Cr	New Substation		Augmentation of Power T/F		Additional Power T/F		Total Capacity Addition at 66-33 kV level	NEW HT LINE (Km)	NEW LT LINE(km)		NEW DISTRIBUTION TRANSFORMER / HVDS No
			No	MVA	No	MVA	No	MVA			66-33 KV LINE	11 KV LINE	
1	2	3	4	5	6	7	8	9	10 = 5+7+9	11	12	13	14
													129 HVDS (0.513 MVA)
9	Rajouri	11.72	-		1.00	3.70	-		3.70	-	5.00	140.55	15 DTs (2.603 MVA) 2415 HVDS (193.284 MVA)
10	Samba	10.08	-		1.00	5.00	-		5.00	-	1.80	23.75	15 DTs (2.1 MVA) 186 HVDS (1.169 MVA)
11	Udhampur	25.83	2.00	6.30	-		-		6.30	7.90	21.00	59.00	561 HVDS (0.956 MVA)
12	Srinagar	669.36	6	80.4	13	86.9	13	93	260.30	17.00	262.10	2,824.00	2856 (174.05 MVA)

Sl.	DISTRICT /TOWN	PROJECT COST Rs in Cr	New Substation		Augmentation of Power T/F		Additional Power T/F		Total Capacity Addition at 66-33 kV level	NEW HT LINE (Km)	NEW LT LINE(km)		NEW DISTRIBUTION TRANSFORMER / HVDS No
			No	MVA	No	MVA	No	MVA			66-33 KV LINE	11 KV LINE	
1	2	3	4	5	6	7	8	9	10 = 5+7+9	11	12	13	14
13	Budgam	10.15	0	0	1	2.3	0	0	2.30	11.00	38.60	25.00	40 (39.8 MVA)
14	Bandipora	13.10	0	0	0	0	0	0	0.00	-	34.00	31.00	66 (3.39 MVA)
15	Ganderbal	15.96	0	0	2	7.5	0	0	7.50	-	39.00	19.00	94 (3.62 MVA)
16	Baramulla	73.75	3	22.6	1	3.7	0	0	26.30	14.20	169.95	109.10	525 (11.91 MVA)
17	Kupwara	14.78	0	0	1	5	0	0	5.00	9.20	30.00	15.70	96 (2.41 MVA)
18	Anantnag	44.70	0	0	0	0	0	0	0.00		72.00	455.00	121 (7.37 MVA)
19	Kulgam	6.16	0	0	0	0	0	0	0.00		12.00	35.50	24 (2.23 MVA)

Sl.	DISTRICT /TOWN	PROJECT COST	New Substation		Augmentation of Power T/F		Additional Power T/F		Total Capacity Addition at 66-33 kV level	NEW HT LINE (Km)	NEW LT LINE(km)		NEW DISTRIBUTION TRANSFORMER / HVDS
			Rs in Cr	No	MVA	No	MVA	No			MVA	66-33 KV LINE	
1	2	3	4	5	6	7	8	9	10 = 5+7+9	11	12	13	14
20	Shopian	6.65	0	0	0	0	0	0	0.00		13.60	40.00	9 (0.6 MVA)
21	Pulwama	17.75	0	0	0	0	0	0	0.00		60.40	147.00	32 (4.2 MVA)
22	Leh	9.30	-		-		-		0.00	-	51.00	18.00	247 HVDS (2.992 MVA)
23	Kargil	7.90	-		-		-		0.00	-	30.50	40.00	153 HVDS (3.183 MVA)
Total:		1,665.27	19.00	185.60	35.00	178.70	29.00	249.30	613.60	108.20	1,125.57	5,683.10	4,785 DTs/ 19,436 HVDS (454.52 MVA)

Annexure 1d: Additional Planned Capacity - Distribution Network

Sl.	DISTRICT	PROJECT COST Rs in Cr	New Substation		Augmentation of Power T/F		Additional Power T/F		Total Capacity Addition at 66-33 kV level	NEW HT LINE (Km)		NEW LT LINE(km) km	NEW DISTRIBUTION TRANSFORMER	
			No	MVA	No	MVA	No	MVA		66-33 KV LINE	11 KV LINE		No	MVA
1	2	3	4	5	6	7	8	9	10 = 5+7+9	11	12	13	14	15
1	Jammu	815.03	26	171.20	22	81.80	7	58.90	311.90	315.50	2,100.00	1,621.37	3,113	231.57
2	Samba	53.94	1	10.00	4	15.55	2	16.30	41.85	20.00	175.90	99.00	1,913	24.08
3	Kathua	126.52	7	34.65	1	5.00	-	-	39.65	104.50	313.10	431.20	4,768	47.45
4	Udhampur	297.87	4	19.45	2	7.40	2	12.60	39.45	90.00	1,347.00	857.00	4,200	41.26
5	Reasi	111.02	2	6.30	1	3.15	-	-	9.45	60.00	146.50	332.00	4,163	40.49
6	Doda	67.98	7	28.35	2	6.30	-	-	34.65	67.00	85.50	306.52	4,333	13.60
7	Kishtwar	67.58	3	9.45	-	-	1	6.30	15.75	80.00	367.25	198.25	4,453	12.80
8	Rajouri	235.26	25	94.50	-	-	-	-	94.50	308.00	1,051.11	1,302.92	435	59.08
9	Poonch	128.28	6	22.05	-	-	-	-	22.05	46.00	645.76	1,196.75	403	24.61
10	Ramban	67.64	3	15.75	4	12.60	-	-	28.35	50.00	240.50	176.50	350	23.53
11	Srinagar	570.05	11	160.00	12	88.80	1	6.30	255.10	135.00	700.00	60.00	20.20	520.00

Sl.	DISTRICT	PROJECT COST Rs in Cr	New Substation		Augmentation of Power T/F		Additional Power T/F		Total Capacity Addition at 66-33 kV level	NEW HT LINE (Km) 66-33 KV LINE	11 KV LINE	NEW LT LINE(km) km	NEW DISTRIBUTION TRANSFORMER	
			No	MVA	No	MVA	No	MVA					No	MVA
12	Budgam	128.00	3	30.00	0	-	2	12.60	42.60	30.00	225.00	470.00	500	40.75
13	Bandipora	100.00	2	20.00	0	-	2	12.60	32.60	20.00	210.00	420.00	450	37.60
14	Ganderbal	85.00	2	20.00	0	-	2	12.60	32.60	20.00	160.00	330.00	350	29.45
15	Baramulla	210.00	4	40.00	0	-	3	18.90	58.90	40.00	430.00	895.00	950	78.35
16	Kupwara	145.00	3	30.00	0	-	2	12.60	42.60	30.00	280.00	565.00	600	50.75
17	Anantnag	210.00	4	40.00	0	-	3	18.90	58.90	40.00	450.00	940.00	1,000	83.35
18	Kulgam	105.00	2	20.00	0	-	2	12.60	32.60	20.00	225.00	470.00	500	42.60
19	Shopian	76.97	2	20.00	0	-	2	12.60	32.60	20.00	160.00	330.00	350	29.45
20	Pulwama	170.00	3	30.00	0	-	2	12.60	42.60	30.00	360.00	750.00	800	65.20
21	Leh	195.00	6	22.00					22.00	336.00	300.00	45.00	175	15.00
22	Kargil	180.00	8	32.02					32.02	285.00	330.00	45.00	130	10.00
Total:		4,146.15	134.00	875.72	48.00	220.60	33.00	226.40	1,322.72	2,147.00	10,302.62	11,841.51	54,135.57	1,520.96



Annexure 2a: Additional Financial Requirement for Jammu Region – Intra State Transmission Network Network (In Rs. Lakhs)

Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST	YEAR-WISE FINANCIAL PHASING			SCHEME COST WITH 5% ANNUAL COST ESCALATION
				FY 16	FY 17	FY 18	
I	Grid Stations			(Rs. in Lacs)			
	New Proposed Source						
1	400/220 KV (PGCIL Stations)						
a	Akhnoor 630MVA	630					
2	400/132 KV						
a	Kishtwar 315MVA	315					
[A]	FOR JAMMU CITY & INDUSTRIAL ESTATES						
1	Construction of 220/66-33 KV Grid Stations along with allied Trans. Lines.						
a	Nagrota (2x50)MVA	100	8,770.13	964.714	3,858.856	4,823.57	9,647.14
b	Chowadhi (2x160)MVA	320	11,359.66	1,249.563	4,998.252	6,247.815	12,495.63
c	Samba (2x160)MVA	320	11,650.48	1,281.553	5,126.212	6,407.765	12,815.53
d	Kathua-II (2x160)MVA	320	14,558.82	1,601.47	6,405.88	8,007.35	16,014.7
e	Domana (2x50)MVA	100	10,543.49	1,159.784	4,639.136	5,798.92	11,597.84



Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST	YEAR-WISE FINANCIAL PHASING			SCHEME COST WITH 5% ANNUAL COST ESCALATION
				FY 16	FY 17	FY 18	
	Total(A1)	1,160					
2	Construction of 132/66-33 KV Grid Stations alongwith allied Trans. Lines.						
a	Chatha (2x50)MVA	100	4,608.64	506.95	2,027.8	2,534.75	5,069.5
b	Jammu East (GIS) (2x50)MVA	100	7,784.24	856.266	3,425.064	4,281.33	8,562.66
	Total(A2)	200					
3	AUGMENTATION OF 132/66 – 33 KV GRID SUB STATIONS						
a	Janipur (2x50) to (3x50) MVA	50	687.37	75.61	302.44	378.05	756.1
b	Barn (1x50+1x20) to (2x50) MVA(on going)	30	545.34	59.987	239.948	299.935	599.87
c	Sidhra (2x20) to (2x50) MVA	60	947.86	104.265	417.06	521.325	1,042.65
d	Gangyal (1x50) to (2x50) MVA (on going)	50	590.31	64.934	259.736	324.67	649.34
e	Pounichak (1x50) to (2x50) MVA	50	687.37	75.61	302.44	378.05	756.1
f	Kathua (2x50+1x20) to (3x50) MVA	30	473.93	52.13	208.53	260.66	521.32
	Total(A3)	270					
4	AUGMENTATION OF 220/132 KV GRID SUB STATIONS						



Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST	YEAR-WISE FINANCIAL PHASING			SCHEME COST WITH 5% ANNUAL COST ESCALATION
				FY 16	FY 17	FY 18	
a	Barn (2x160) to (3x160) MVA (On-going)	160	2,219.38	244.132	976.53	1,220.66	2,441
	Total(A4)	160					
5	Re-conductoring of 220 and 132KV Transmission Lines.						
a	Provision for Re-conductoring of 220, 132 KV Transmission Lines from existing Zebra/Panther ACSR to HTLS equivalent conductor to double the current carrying capacity of the lines (221.90 circuit Kms.) @ 40 Km	221.90	8,876	976.36	3,905.44	4,881.80	9,763.6
	Total(A5)	221.90					
6	Construction of Transmission Lines						
a	D/C 220KV Barn-Akhnoor Tr. Line 30Km @ 122.78	30	3,683.4	405.17	1,620.70	2,025.87	4,051.74
b	Additional Line Bays 220KV 4Nos @310.54		1,242.16	136.64	546.55	683.19	1,366.37
	Total(A6)	30					
7	Other works.						
a	Other works viz: Diagnostic Instruments/Lab. Mobile Van for Testing, Filtration Plant (Heavy duty) and other T&P, construction / renovation of offices quarters / office buildings etc.		1,500	165	660.00	825.00	1,650
	Total(A7)						
	TOTAL[A]		90,728.58				99,801.44
[B]	FOR JAMMU PROVINCE OTHER THAN JAMMU CITY & INDUSTRIAL ESTATES OF SAMBA AND KATHUA						



Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST	YEAR-WISE	FINANCIAL PHASING		SCHEME COST WITH 5% ANNUAL COST ESCALATION
				FY 16	FY 17	FY 18	
1	Construction of 220/66-33 KV Grid Stations alongwith allied Trans. Lines.						
a	Gurha Kalyal (2x50)MVA	100	7,883.45	867.179	3,468.716	4,335.895	8,671.79
b	Ramnager (1x50)MVA	50	9,581.74	1,053.99	4,215.96	5,269.96	10,539.91
c	Ramgarh (2x50)MVA	100	9,997.93	1,099.77	4,399.09	5,498.86	10,997.72
d	Katra (2x50)MVA	100	15,416.31	1,695.79	6,783.18	8,478.97	16,957.94
e	UdhampurII (2x100)MVA	200	9,190.59	1,010.97	4,043.86	5,054.83	10,109.65
f	Akhnoor II (2x100)MVA	200	10,641.17	1,170.53	4,682.12	5,852.65	11,705.29
	Total(B1)	750					
2	Construction of 132/66-33 KV Grid Stations alongwith allied Tr. Lines						
a	Bhaderwah (2x20)MVA	40	6,546.48	720.11	2,880.45	3,600.57	7,201.13
b	Kishtwar (2x50)MVA	100	4,321.91	475.41	1,901.64	2,377.05	4,754.1
c	Reasi (1x50)MVA (On going)	50	3,185.03	350.35	1,401.41	1,751.77	3,503.53
d	Basholi (2x20)MVA	40	4,905.35	539.59	2,158.35	2,697.94	5,395.88
e	Mendhar (2x20)MVA	40	5,894.25	648.37	2,593.47	3,241.84	6,483.67



Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST	YEAR-WISE FINANCIAL PHASING			SCHEME COST WITH 5% ANNUAL COST ESCALATION
				FY 16	FY 17	FY 18	
f	Sangaldan (1x50)MVA	50	3,802.94	418.32	1,673.29	2,091.62	4,183.23
	Total(B2)	320					
3	AUGMENTATION OF 132/66 – 33 KV GRID SUB STATIONS						
a	Udhampur (1x50+1x20) to (2X50) MVA	30	473.93	52.13	208.53	260.66	521.32
b	Miran Sahib (1x50+2x20) to (3x50) MVA	60	947.86	104.26	417.06	521.32	1,042.64
c	Khellani (2x20) to (1x50+1x20) MVA	30	473.93	52.13	208.53	260.66	521.32
d	Batote (1x20) to (2x20) MVA	20	237	26.07	104.28	130.35	260.7
e	Ramban (1x20) to (1x50) MVA	30	473.93	52.13	208.53	260.66	521.32
f	Rajouri (3x20) to (1x50+2x20) MVA	30	473.93	52.13	208.53	260.66	521.32
g	Kalakote (1x20) to (1x50) MVA (on going)	30	198.97	21.89	87.54	109.43	218.86
h	Hiranagar (1x50) to (2x50)MVA	50	473.93	52.13	208.53	260.66	521.32
i	Jourian (1x20) to (2x20) MVA	20	450.44	49.55	198.19	247.74	495.48
	Total(B3)	300					
4	AUGMENTATION OF 220/132 KV GRID SUB STATIONS						

Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST	YEAR-WISE FINANCIAL PHASING			SCHEME COST WITH 5% ANNUAL COST ESCALATION
				FY 16	FY 17	FY 18	
a	Ramban (1x120) to (2x160) MVA	200	5,519.65	607.161	2,428.64	3,035.81	6,071.61
b	Replacement of outdated (2x120) MVA Transformer bank at Udhampur (one no. bank to be spared from Ramban grid)		2,000	220	880.00	1,100.00	2,200
	Total(B4)	200					
5	Re-conductoring of 220 and 132KV Transmission Lines						
a	Provision for Re-conductoring of 220 and 132 KV Transmission Lines from existing Zebra/Panther ACSR to HTLS equivalent conductor to increase the current carrying capacity of the lines. including civil works for foundation protection in sliding zone. (694.15 circuit Kms.) @ 40.00 lacs/kms	694.15	27,766	3,054.26	12,217.04	15,271.30	30,542.6
	Total(B5)	694.15					
6	Construction of additional Transmission Lines						
a	220kv additional Transmission lines 17Kms @122.78		2,087.26	229.598	918.39	1,147.99	2,295.98
i	LILO of one circuit of 220KV Hiranagar-Bishnah Tr. Line at 400/220 KV Jatwal Grid Station 3Kms	3	368.34	40.517	162.07	202.59	405.17
ii	LILO of single circuit Hiranagar-Gladni Tr. Line at 400/220 KV Jatwal Grid Station 14Kms	14	1,718.92	189.081	756.32	945.41	1,890.81
b	132kv additional Transmission lines 71kms @89.3		6,340.3	697.433	2,789.73	3,487.17	6,974.33
i	LILO of D/C RKKTL for proposed 400/132KV Grid Station Kishtwar towards Kishtwar 16Kms	16	1,428.8	157.168	628.672	785.84	1,571.68

Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST	YEAR-WISE FINANCIAL PHASING			SCHEME COST WITH 5% ANNUAL COST ESCALATION
				FY 16	FY 17	FY 18	
ii	LILO of D/C RKKTL for proposed 400/132KV Grid Station Kishtwar towards Grid Station Khellani 25Kms	25	2,232.5	245.575	982.3	1,227.875	2,455.75
iii	D/C 132KV Tr. Line from Jhajjar-Kotli to Katra 30Kms	30	2,679	294.69	1,178.76	1,473.45	2,946.9
iv	Construction/Realignment of single circuit line on double circuit tower from Draba to Chandak		2,542	279.62	1,118.40	1,398.10	2,796.2
	Total(B6)	88					
c	132KV Line Bay 2 each at Jhajjar-Kotli and Katra and one bay at Akhnoor @191.69		958.45	105.429	421.72	527.15	1,054.29
7	Other works.						
a	Other works viz: Diagnostic Instruments/Lab. Mobile Van for Testing, Filtration Plant (Heavy duty) and other T&P, construction / renovation of offices quarters / office buildings etc.		500	55	220.00	275.00	550
	Total(B7)						
	TOTAL[B]		143,284.74				157,613.21
	GRAND TOTAL[A+B]		234,013.32				257,414.65



Annexure 2b: Additional Financial Requirement for Kashmir Region – Intra State Transmission Network Network (In Rs. Lakhs)

Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST ON PRICE BASE OF 2013-14	YEAR-WISE FINANCIAL PHASING							SCHEME COST WITH 5% ANNUAL COST ESCALATIO N
				FY 16	FY 17	FY 18	FY19	2019- 20	2020- 21	2021- 22	
	A: Infrastructure at 220 kV Level										
(I)	CONST.OF 220/132 KV GRID SUB STATIONS	MVA									
1.a	Wahipora	160	10,322	1,138	3,585	5,019	2,635	0	0	0	12,377
	TOTAL (I)	160	10,322	1,138	3,585	5,019	2,635	0	0	0	12,377
(II)	AUGMENTATION OF 220/132 KV GRID SUB STATIONS	MVA									
1	Delina 160 to 320 MVA	160	2,565	566	1,188	1,247	0	0	0	0	3,001
2	Budgam 320 to 480 MVA	160	2,458	271	854	1,195	627	0	0	0	2,947
	TOTAL (II)	320	5,023	837	2,042	2,442	627	0	0	0	5,948
(III)	CONSTRUCTION OF 220/33 KV GRID SUB STATIONS	MVA									
1.b	Wahipora (Cost included in 1.a above)	100									



24X7 Power for All -Jammu and Kashmir



Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST ON PRICE BASE OF 2013-14	YEAR-WISE FINANCIAL PHASING							SCHEME COST WITH 5% ANNUAL COST ESCALATIO N
				FY 16	FY 17	FY 18	FY19	2019- 20	2020- 21	2021- 22	
2	Lassipora (GIS)	225	8,396	926	2,916	4,082	2,143	0	0	0	10,067
3	Batpora Tailbal (GIS)	160	7,796	860	2,707	3,790	1,990	0	0	0	9,347
4	Sheeri (GIS)	160	6,663	735	2,314	3,240	1,701	0	0	0	7,990
5	Mattan	160	7,312	0	846	2,666	3,733	1,960	0	0	9,205
6	Sallar	160	6,867	0	0	835	2,629	3,681	1,933	0	9,078
7	Tral	160	6,556	0	759	2,391	3,347	1,757	0	0	8,254
8	Batkote (Pahalgam) (GIS)	50	4,997	0	0	607	1,913	2,679	1,406	0	6,605
9	Khan Sahib (Beerwah)	50	5,667	0	656	2,066	2,893	1,519	0	0	7,134
10	Gulmarg (GIS)	50	4,997	0	0	607	1,913	2,679	1,406	0	6,605
11	Qazigund	50	5,046	0	584	1,840	2,576	1,352	0	0	6,352
	TOTAL (III)	1,325	64,297	2,521	10,782	22,124	24,838	15,627	4,745	0	80,637

Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST ON PRICE BASE OF 2013-14	YEAR-WISE FINANCIAL PHASING							SCHEME COST WITH 5% ANNUAL COST ESCALATIO N
				FY 16	FY 17	FY 18	FY19	2019- 20	2020- 21	2021- 22	
(IV)	CONSTRUCTION OF ADDITIONAL 220 kV LINE BAYS AT EXISTING GRID SUB-STATION										
1	7No. 220kV Line Bays at 400kV Delina, New Wanpoh and 220/132 kV Budgam Grid sub stations	5	1,553	0	180	566	793	416	0	0	1,955
	TOTAL (IV)		1,553	0	180	566	793	416	0	0	1,955
(V)	CONST. OF NEW 220kV TRANSMISSION LINES	KM									
1	LILO of D/C Delina- Kishanganga Transmission Line (PGCIL) at Wahipora	35	4,297	474	1,990	1,567	1,097	0	0	0	5,128
2	LILO of 220kV D/C Wagoora-Mirbazar TL at Lassipora.	6	737	81	341	269	188	0	0	0	879
3	LILO of 1 Ckt. 220 kV Alusteng-New Wanpoh Line at Tailbal	7	859	0	99	313	439	230	0	0	1,081
4	2No.Lines, 400/220kV Delina SS- 220/132kV Delina SS D/C	20	2,456	0	284	597	1,254	987	0	0	3,122



Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST ON PRICE BASE OF 2013-14	YEAR-WISE FINANCIAL PHASING							SCHEME COST WITH 5% ANNUAL COST ESCALATIO N
				FY 16	FY 17	FY 18	FY19	2019- 20	2020- 21	2021- 22	
5	400/220kV G/s Delina - Sheeri D/C Line	13	1,596	176	739	582	407	0	0	0	1,904
6	New Wanpoh-Mattan D/C Line	15	1,842	203	853	672	470	0	0	0	2,198
7	Mattan-Sallar D/C Line	20	2,456	271	1,137	896	627	0	0	0	2,931
8	LILO of One Ckt.of New Wanpoh-Alusteng TL at Tral	12	1,473	162	682	537	376	0	0	0	1,757
9	Sallar-Batkote (Pahalgam) S/C Line	15	1,573	173	728	574	402	0	0	0	1,877
10	Budgam- Khan Sahib (Beerwah) D/C Line	12	1,473	162	682	537	376	0	0	0	1,757
11	Khan Sahib (Beerwah)-Gulmarg S/C Line	22	2,307	254	1,068	841	589	0	0	0	2,752
12	New Wanpoh-Qazigund S/C Line	8	839	92	388	306	214	0	0	0	1,000
13	New Wanpoh-Mir Bazar D/C Line	5.2	638	281	443	0	0	0	0	0	724
14	Termination of 220 kV Mirbazar-Alusteng Line at New Wanpoh	6.2	761	336	529	0	0	0	0	0	865
	TOTAL (V)	196.4	23,307	2,665	9,963	7,691	6,439	1,217	0	0	27,975



Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST ON PRICE BASE OF 2013-14	YEAR-WISE FINANCIAL PHASING							SCHEME COST WITH 5% ANNUAL COST ESCALATIO N
				FY 16	FY 17	FY 18	FY19	2019- 20	2020- 21	2021- 22	
	B: Infrastructure at 132 kV Level										
(VI)	CONST. OF 132/33 kV GRID SUB STATIONS	MVA									
1	Khanyar (GIS)	100	4,469	0	517	2,173	2,281	599	0	0	5,570
2	Tengpora (GIS)	100	4,469	0	517	2,173	2,281	599	0	0	5,570
3	Rafiabad	50	3,020	666	1,748	1,101	0	0	0	0	3,515
4	Hajan	50	3,020	0	350	1,468	1,156	809	0	0	3,783
5	Gagangeer (Sonmarg)	50	2,761	0	0	671	1,057	740	1,166	0	3,634
6	Karnah (Distt.Kupwara)	50	2,899	0	0	0	740	1,554	1,224	428	3,946
7	Gurez (Distt.Bandipora)	50	2,899	0	0	0	740	1,554	1,224	428	3,946
	TOTAL (VI)	450	23,537	666	3,132	7,586	8,255	5,855	3,614	856	29,964
(VII)	AUGMENTATION OF 132/33 kV GRID SUB STATIONS										



24X7 Power for All -Jammu and Kashmir



Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST ON PRICE BASE OF 2013-14	YEAR-WISE FINANCIAL PHASING							SCHEME COST WITH 5% ANNUAL COST ESCALATIO N
				FY 16	FY 17	FY 18	FY19	2019- 20	2020- 21	2021- 22	
1	Chadoora (50 to 100 MVA)	50	787	0	0	0	0	0	664	465	1,129
2	Mattan (50 to 100 MVA)	50	852	0	395	621	0	0	0	0	1,016
3	Amargrah (95 to 150 MVA)	55	978	0	453	713	0	0	0	0	1,166
4	Kulgam (40 to 100 MVA) (under State Plan)	60	0	0	0	0	0	0	0	0	0
5	Kangan (40 to 70 MVA)	30	544	0	0	264	417	0	0	0	681
6	Zainakote (75 to 125 MVA)	50	787	0	0	383	603	0	0	0	986
7	Bemina (150 to 200 MVA)	50	787	0	364	574	0	0	0	0	938
8	Rawalpora (110 to 140 MVA) (under State Plan)	30	0	0	0	0	0	0	0	0	0
9	Cheshmashahi (105 to 140 MVA)	35	549	0	254	400	0	0	0	0	654
	TOTAL (VII)	410	5,284	0	1,466	2,955	1,020	0	664	465	6,570

Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST ON PRICE BASE OF 2013-14	YEAR-WISE FINANCIAL PHASING							SCHEME COST WITH 5% ANNUAL COST ESCALATIO N
				FY 16	FY 17	FY 18	FY19	2019- 20	2020- 21	2021- 22	
(VIII)	CONSTRUCTION OF ADDITIONAL 132 kV Line BAYS AT EXISTING GRID SUB-STATION										
1	132 kV Line Bays at different 132kV Switch-Yards (in No.)	19	3,642	803	1,686	1,771	0	0	0	0	4,260
	TOTAL (VIII)		3,642	803	1,686	1,771	0	0	0	0	4,260
(IX)	CONST. OF NEW 132 KV TRANSMISSION LINES	KM									
1	LILO of 132 kV Habak-Wanganpora Line at (GIS) Grid S/Stn Khanyar using 400mm ² Power Cable , 4 Cables per Ckt with one spare cable (14KM Line Length),Cable=({14x4x2}=} 112Km	14	6,720	0	1,556	3,267	2573	901	0	0	8,297
2	LILO of 132 kV Budgam-Bemina Line at (GIS)Grid S/StnTengpora using 400mm ² Power Cable, 4 Cables per Ckt with one spare cable (2Km Line Length),Cable=({2x4x2}=}16Km	2	960	0	222	467	368	129	0	0	1,186



24X7 Power for All -Jammu and Kashmir



Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST ON PRICE BASE OF 2013-14	YEAR-WISE FINANCIAL PHASING							SCHEME COST WITH 5% ANNUAL COST ESCALATIO N
				FY 16	FY 17	FY 18	FY19	2019- 20	2020- 21	2021- 22	
3	Sheeri-Vilgam S/C trans.line with LILO at Rafiabab	36	2,840	313	1,315	1,726	0	0	0	0	3,354
4	LILO of 1Ckt.of Badampora-Bandipora line at Hajan	6	536	0	62	261	205	144	0	0	672
5	Gagangeer-Sumbal S/C Line from Sumbal Power House	15	1,183	0	0	144	453	634	333	0	1,564
6	Vilgam-Karnah S/C Trans. Line	50	4,912	0	0	0	1254	2,633	2,074	726	6,687
7	Bandipora-Gurez S/C Trans.Line	80	7,858	0	0	0	2006	4,212	3,317	1,161	10,696
8	Wahipora- Arampora D/C Trans.line	11	982	0	0	0	251	658	415	0	1,324
9	Wahipora-Bandipora D/C Trans. Line	22	1,965	0	0	0	502	1,317	829	0	2,648
10	Amargarh-Bandipora D/C Trans. Line	22	1,965	0	0	0	502	1,317	829	0	2,648
11	Shopian- Kulgam D/C Transmission line	22	1,965	0	0	0	0	263	1,382	1,161	2,806
12	Laying of 2nd Ckt on Arampora-vilgam Trans. Line	18.4	191	0	0	139	98	0	0	0	237
13	Laying of HTLS conductor on 132kV Delina-Amargarh TL	7	162	0	0	0	0	217	0	0	217

Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST ON PRICE BASE OF 2013-14	YEAR-WISE FINANCIAL PHASING							SCHEME COST WITH 5% ANNUAL COST ESCALATIO N
				FY 16	FY 17	FY 18	FY19	2019- 20	2020- 21	2021- 22	
	TOTAL (IX)	305.4	32,239	313	3,155	6,004	8,212	12,425	9,179	3,048	42,336
	C: Infrastructure of 33 KV Transmission Lines.										
(X)	CONSTRUCTION OF 33 KV LINE FEEDERS	KM									
1	Tailbal (Batpora)	16	188	0	22	69	144	0	0	0	235
2	Sallar	32	377	0	0	0	192	303	0	0	495
3	Tral	30	353	0	0	0	180	284	0	0	464
4	Khan Sahib (Beerwah)	26	306	0	0	0	156	246	0	0	402
5	Qazigund	35	412	0	0	0	210	331	0	0	541
6	Rafiabad	25	294	0	204	143	0	0	0	0	347
7	Hajan	30	353	0	0	0	180	284	0	0	464
	TOTAL (X)	194	2,283	0	226	212	1,062	1,448	0	0	2,948



24X7 Power for All -Jammu and Kashmir



Sl.	NAME OF THE SCHEME	CAPACITY MVA	SCHEME COST ON PRICE BASE OF 2013-14	YEAR-WISE FINANCIAL PHASING							SCHEME COST WITH 5% ANNUAL COST ESCALATIO N
				FY 16	FY 17	FY 18	FY19	2019- 20	2020- 21	2021- 22	
	GRAND TOTAL (I+II+III+IV+V+VI+VII+VIII+IX+X)		17,1487	8,943	36,217	56,370	53,881	36,988	18,202	4,369	214,970

Annexure 2c: Additional Financial Requirement for Leh & Kargil Region – Intra State Transmission Network Network (In Rs. Lakh)

Parameters						Financial Phasing				
Sl.	Description	Unit	Qty	Unit Rate Rs in lacs	Total amount in Rs. Lacs	Scheme cost with 5% annual cost escalation	2015-16	2016-17	2017-18	2018-19
A	New 66/132KVA Sub-Station	MVA	40	75.86	3,034.42	3,186.141	0	637.228	955.842	1,593.071
B	New 132KV Line Bay	No	1	183.83	183.83	193.0215	0	38.604	57.906	96.511
C	New 132KV Tr.line	Km	238	82	19,516.00	20,491.8	0	4,098.360	6,147.540	10,245.900
D	New 66KV Line	Km	115.5		5,263.65	5,526.8325	0	1,105.367	1,658.050	2,763.416
E	New 132/33KV Sub-Station	MVA	40	75.86	3,034.41	3,186.1305	0	637.226	955.839	1,593.065



24X7 Power for All -Jammu and Kashmir



Parameters							Financial Phasing			
Sl.	Description	Unit	Qty	Unit Rate Rs in lacs	Total amount in Rs. Lacs	Scheme cost with 5% annual cost escalation	2015-16	2016-17	2017-18	2018-19
F	New 66KV Bay	No	4	34.92	139.68	146.664	0	29.333	43.999	73.332
G	New 33KV Line Bay	No	3	34.92	104.76	109.998	0	22.000	32.999	54.999
	Grand Total Rs In Lacs				31,276.75	32,840.5875	0	6,255.35	9,383.025	15,638.375



Annexure 2d: Proposed Substation Addition by FY19

Sl.	Capacity	New Substation		Augmentation of Existing Substation		Total Capacity Addition
		Name	MVA	Name	MVA	
1	220/132kV	Wahipora	160	Delina	160	480
				Budgam	160	
2	220/33kV	Wahipora	100			1,325
		Lassipora (GIS)	225			
		Tail (GIS)	160			
		Sheeri (GIS)	160			
		Mattan	160			
		Sallar	160			
		Tral	160			
		Pahalgam Battote (GIS)	50			
		Khan Saheb (Beerwah)	50			
		Gulmarg (GIS)	50			
		Qazi Gund	50			
3	132/33kV	Khanyar (GIS)	100	Chadoora	50	860
		Tengpora (GIS)	100	Mattan	50	



24X7 Power for All -Jammu and Kashmir



Sl.	Capacity	New Substation		Augmentation of Existing Substation		Total Capacity Addition
		Name	MVA	Name	MVA	
		Rafiabad	50	Amargarh	55	
		Hajan	50	Kulgam	60	
		Sonamarg (Gagangeer)	50	Kangan	30	
		Karnah	50	Zainakote	50	
		Gurez	50	Bemina	50	
				Rawalpura	30	
				Cheshmashahi	35	

13. List of Abbreviations

Abbreviation	Expansion
ARR	Aggregate Revenue Requirement
AT&C	Aggregate Technical & Commercial
BPL	Below Poverty Line
C&S	Commercial & Surveys
CAGR	Compound Annual Growth Rate
CGS	Central Generating Stations
CKM	Circuit Kilometers
CoD	Commercial Operation Date
CPSU	Central Public Sector Undertaking
DDG	Decentralized Distributed Generation
DDUGJY	Deendayal Upadhyaya Gram Jyoti Yojana
DELP	Domestic Efficient Light Program
DPR	Detailed Project Report
DSM	Demand Side Management
DT/ DTR	Distribution Transformer
EBIDTA	Earnings Before Interest Depreciation Taxes and Amortization
ECBC	Energy Conservation Building Code
EE	Energy Efficiency
EESL	Energy Efficiency Services Limited
EM&RE	Electric Maintenance and Rural Electrification
EPC	Engineering, Procurement and Construction
EPS	Electric Power Survey
ER	Eastern Region
ERP	Enterprise Resource Planning
FY	Financial Year
GoI	Government of India
GoJK	Government of Jammu & Kashmir
GSS	Grid Substation
GWp	Giga Watt Peak
HH	Household
IPDS	Integrated Power Development Scheme
IPP	Independent Power Producer
ISTS	Inter State Transmission System
JAKEDA	Jammu and Kashmir Energy Development Agency
JKPDD	Jammu & Kashmir Power Development Department
JKSERC	Jammu & Kashmir State Regulatory Commission
JKSPDCL	J&K State Power Development Corporation Limited
JKSPTCL	Jammu & Kashmir State Power Transmission Company Limited

Abbreviation	Expansion
JPDCL	Jammu Power Distribution Company Limited
KPDCL	Kashmir Power Distribution Company Limited
KREDA	Kargil Renewable Energy Development Agency
LED	Light-emitting Diode
LILO	Loop In Loop Out
LREDA	Ladakh Renewable Energy Development Agency
LT	Low Tension
MNRE	Ministry of New and Renewable Energy
MoC	Ministry of Coal
MoEF	Ministry of Environment & Forests, Government of India
MoP	Ministry of Power, Government of India
MU	Million Unit of Electricity (in kWh)
MVA	Mega Volt Ampere
MW	Mega Watt
NAD	Need Assessment Document
NCEF	National Clean Energy Fund
NESCL	NTPC Electric Supply Company Limited
NHPC	National Hydroelectric Power Corporation
NIC	National. Informatics Centre
NTPC	National Thermal Power Corporation
O&M	Operation & Maintenance
P&D	Planning & Design
P&MM	Procurement & Material Management
PAT	Profit After Taxes
PBT	Profit Before Taxes
PDC	Power Development Corporation
PFA	Power For All
PFC	Power Finance Corporation
PGCIL	Power Grid Corporation Of India Limited
PLF	Plant Load Factor
PMA	Project Monitoring Agency
PPA	Power Purchase Agreement
PPP	Public-private Partnership
R&M	Renovation & Modernization
RAPDRP	Restructured Accelerated Power Development and Reforms Programme
RE	Renewable Energy
REC	Rural Electrification Corporation
REMC	Renewable Energy Management Centres
RGVY	Rajiv Gandhi Grameen Vidyutikaran Yojana
ROW	Right of Way
RPO	Renewable Energy Purchase Obligation
S&O	System and Operation
SCADA	Supervisory Control and Data Acquisition
SECF	State Energy Conservation Fund
SHR	Station Heat Rate
SLDC	State Load Dispatch Center

Abbreviation	Expansion
SPV	Special Purpose Vehicle
T&D	Transmission & Distribution
TBCB	Tariff-based competitive bidding
UDAY	Ujjwal Discom Assurance Yojna



