Business Plan for MYT Control Period FY 2016-17 to FY 2020-21

Jharkhand Bijli Vitran Nigam Ltd (JBVNL)

Contents

List of Figures

List of Tables

1. Background & Introduction

1.1. Background

The JSERC (Terms and Conditions for Determination of Distribution Tariff) Regulations, 2015 mandate the submission of a business plan separately for the retail supply business as well as the wheeling business as below:

a) Business Plan for the Wheeling and the Retail Supply Business of the Licensees for the entire Control Period as submitted to the Commission for approval, prior to the start of the Control Period;
b) Licensees' forecast of expected wheeling tariff and retail supply tariff for each year of the Control Period, based on reasonable assumptions of the underlying financial and operational parameters, as submitted in the Business plan;
c) The Trajectory for specific parameters which shall be stipulated by the Commission for improvement of Licensee's performance through incentives and disincentives;
d) Annual review of performance which shall be conducted vis-à-vis the approved forecast and categorization of variations in performance into controllable and uncontrollable factors;
e) Development of mechanism for sharing approved gains or losses on account of controllable items; and
f) Development of pass through mechanism for approved gains or losses on account of uncontrollable items.

1.1.1 Business Plan:

As per JSERC (Terms and Conditions for Determination of Distribution Tariff) Regulations, 2015:

1. Each Licensee shall file for the Commission's approval a Business Plan approved by its authorized signatory, as per the timelines specified in Section 11 of the Regulations;
2. The Business Plan shall be filed separately for the Retail Supply and Wheeling Business. As specified in clause 5.5 of the regulations, in absence of segregated accounts for the two businesses, the Licensee shall prepare an allocation statement and submit the same with the business plan;
3. The business plan shall be for the entire Control Period and shall *inter-alia* contain;
    a. Capital Investment Plan for the entire Control Period commensurate with load growth, distribution loss reduction trajectory and quality improvement measures proposed in the Business Plan;

b. Sales/Demand Forecast for each customer category and sub-categories for each year of the Control Period;
c. Power Procurement Plan based on the sales forecast and distribution loss trajectory for each year of the Control Period. The power procurement plan should also include energy efficiency and demand side management measures;
d. A set of targets proposed for other controllable items such as distribution losses, collection efficiency, working capital requirement, quality of supply targets, etc. The targets shall be consistent with the capital investment plan proposed by the Licensee;
e. Business Plan shall also contain the requisite information for the preceding five years.

Provided that requisite information shall include year wise audited data on Scheme wise capital investment, distribution loss trajectory, quality improvement measures undertaken, category wise number of consumers, connected load and sales, source wise power procurement quantum and cost and any other information used for preparing projections of various components during the control period. In case of a new licensee such information is required to be submitted for the period of operations up to the start of the control period.

Accordingly, Jharkhand Bijli Vitran Nigam Limited (JBVNL) is hereby filing the Business Plan for the Control Period (FY 2016-17 to FY 2020-21) based on the available data for the FY 2015-16 and previous financial years.

Jharkhand Bijli Vitran Nigam Limited (JBVNL) has prepared the Business Plan taking into the consideration the various existing internal factors and external business environment affecting the business.

Jharkhand Bijli Vitran Nigam Limited (JBVNL) submits that the Business plan being a dynamic document may need to be updated at periodic intervals taking into account the changes in the internal and external environment and these changes would be intimated to the Hon'ble Commission from time to time

1.1. Introduction to business plan

In the current document we have separately dealt with the different aspects of the business plan for the distribution functions. The key objectives of this business plan are:

- **Providing a tool for strategic planning and management** - The primary objective of the Business Plan is to analyze and anticipate the future requirements and strategically plan for the requisite capital investments, means of financing the schemes and various associated costs and document them which would serve as an effective tool for monitoring and execution of future works. It is important to project the growth

in transmission and distribution network infrastructure commensurate with the energy demand required for fuelling the economic growth targets of the utility.

- Meeting the regulatory compliance of submission of a business plan as mandated by the JSERC, MYT Regulations, 2015
- **Support in decision making leading to better Operational Efficiency** - The Business Plan is prepared so as to be useful for the Management, associated stakeholders, the Hon'ble Commission and various government bodies. The future projections in the Plan would help the department in decision making and taking proactive actions, and thus improving the overall operational efficiency of the transmission and distribution network infrastructure

The above aspects are covered under this business plan, organized in different sections, with chapter 2 and chapter 3 of this business plan providing a brief overview of the present status of Jharkhand power sector followed by details of JBVNL and its existing business.

In line with the requirements under JSERC MYT Regulations, 2015, the chapter 4 of this document details out the capital expenditure plan of JBVNL, to be carried out under various schemes for infrastructure extension and improvement. The bases of identifying the works, implementation areas, capitalization schedule etc. have also been detailed out for the perusal of Hon'ble Commission.

The chapter 5 provides the projected operational performance of JBVNL followed by the projections of energy sales, detailed in chapter 6. Since, JBVNL has been recently unbundled as a separate entity with clean balance sheet, there is an immense potential that it can be transformed into a viable distribution utility with limited dependence on the State Government. This business plan also specifies some of the measures, provided in chapter 5, which the Hon'ble Commission may consider while approving the business plan and tariff for JBVNL. As it would be imperative to ensure the health and well-being of the sector and consumers at large.

As per the distribution tariff regulations, the distribution licensee is required to submit the sales and energy requirement for FY 2015-16. The chapter 6 and 7 deals with the projection of the sales, energy requirement and sources of power with whom PPAs have been signed by the JBVNL to meet the increasing power requirement.

The chapter 8 details out the basis of projecting the different cost heads mandated to be projected by the regulations. The cost heads include O&M expenses, depreciation, interest and finance charges, return on equity. In addition the non-tariff income is also projected in accordance with the requirements.

Since JBVNL does not maintain a separate account of the expenses incurred in the retail and wheeling business hence the total projected costs for distribution have been

segregated into wheeling and retail supply business based on certain assumptions detailed out in chapter 9.

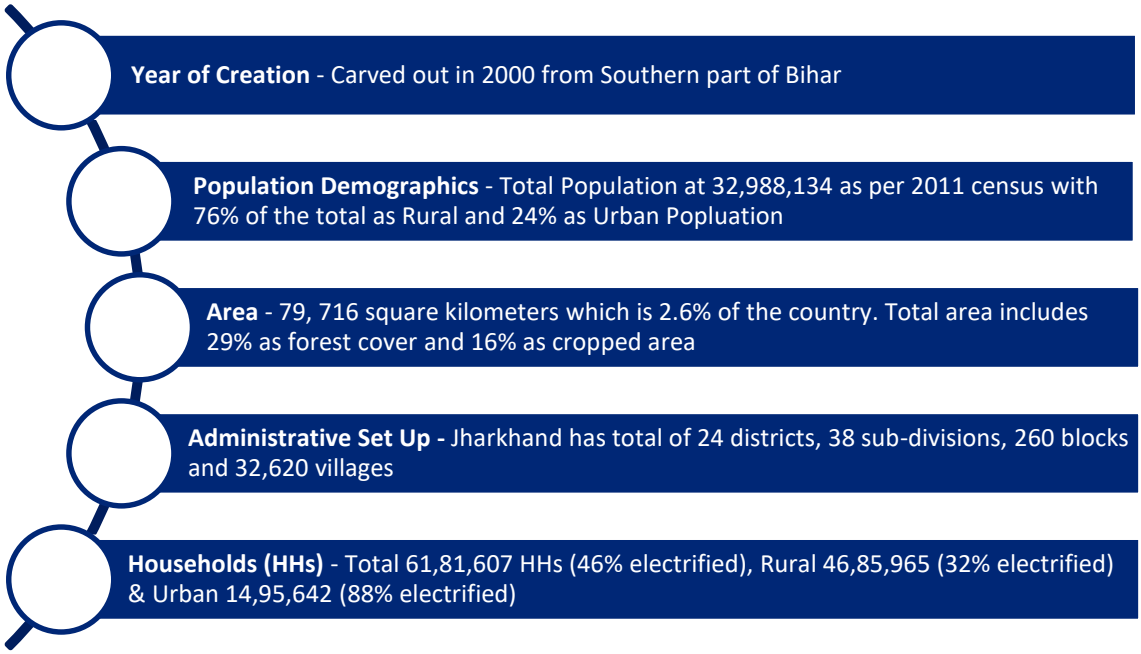
Finally, the business plan is concluded by the JBVNL's prayers to the Hon'ble Commission, as provided in chapter 10.

2. Jharkhand Power Sector: A Changing Landscape

2.1. The State of Jharkhand

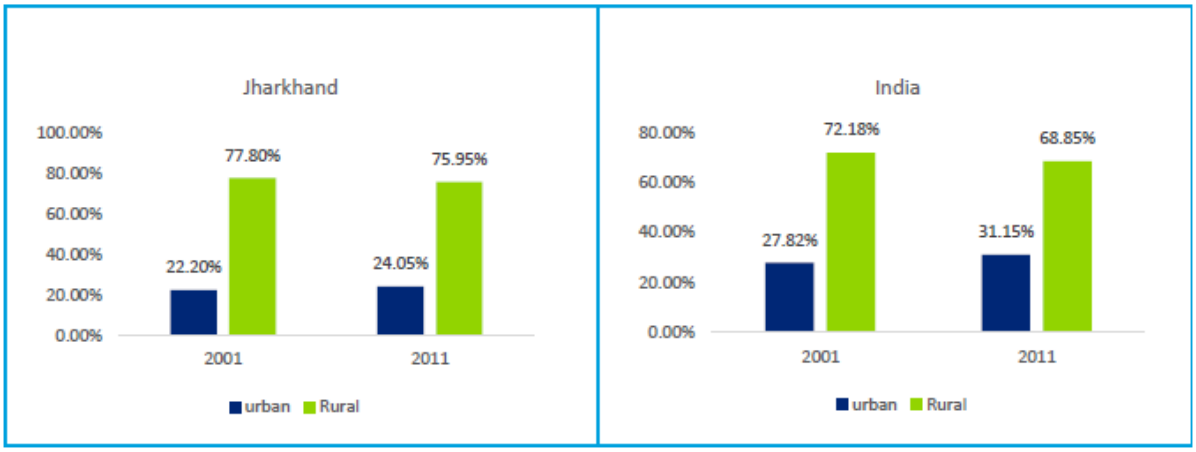
Jharkhand, being a mineral rich State, constituting nearly 40% of India's mineral wealth with significant coal and mineral reserves, holds immense potential for industrialization and becoming a power hub for the Nation. With large deposits of iron and coal, the pace of industrialization is important for the state's overall economic development and overcoming socio-economic issues including health, education and poverty. The Figure below brings about the few highlights of the state

Figure 1: Overview of the State of Jharkhand



In-spite of having large resources, the State has lagged behind in overall development as evident from various parameters including level of urbanization, which is still at 24.05% against the national average of 31.15%. The proportion of people living below poverty line has remained at 40.8% as against national average of 25.7%. A comparison between state and national demographics are shown in the chart below.

Figure 2: State Demographics



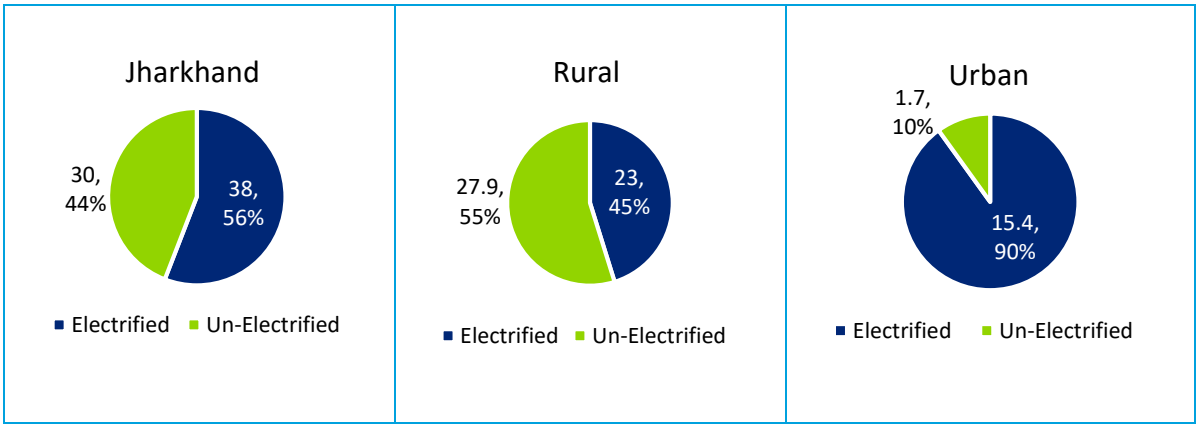
Power sector being one of the infrastructure foundation for a stronger economy, the state of the sector in Jharkhand will play a pivotal role in the overall upliftment of the state and drastically improve the standard of living and socio-economic parameters. The following sections provide details of the power sector in Jharkhand and the proposed way forward, which has been translated into actionable items and proposed investments as part of this business plan.

2.2. Jharkhand Power sector at a Glance

The State is home to nearly 68 Lac households, out of which ~38 Lac Households (56%) are already electrified. As it can be seen from the figure below, presently, out of total 50.9 Lac rural HHs, nearly 23 Lac rural HHs are electrified (~45%), while out of 17.1 Lac urban HHs, nearly 15.4 Lac urban HHs are electrified (90%) in the State.

The remaining 28.2 Lac rural HHs and ~1.8 lac Urban HHs are yet to be electrified. Considering the national HH electrification level of 72%, a significant emphasis on electricity access is required by the State.

Figure 3 Electrification Status of Jharkhand



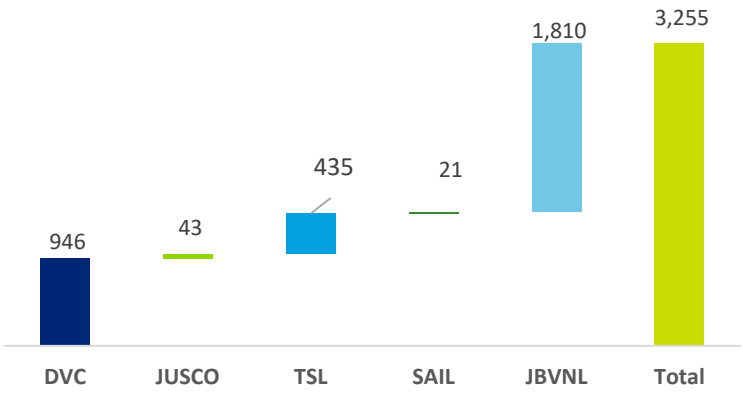
Source: 24X7 Power for All roadmap for Jharkhand

The State has successfully achieved 94% village electrification with providing electricity to 27,757[1] villages out of total 29,492 villages. The remaining 1,735 villages have been planned to be electrified by December 2016 under various central and state government schemes.

Owing to lower level of electrification and non-availability of adequate power, the per capita consumption in Jharkhand at 552kWh[2] is significantly lower than the national average of 1,010 kWh[3], which signifies that not only a massive electrification drive is required, but round the clock electricity to all connected consumers is to be ensured.

The State is presently being served by 5 different utilities, with JUSCO and DVC having overlapping areas with JBVNL. The share of each utility serving in Jharkhand in terms of demand met, is evident from the chart below.

Figure 4: Demand met by all utilities (FY14-15)



The erstwhile Jharkhand State Electricity Board (JSEB) was constituted on March 10, 2001 under the Electricity (Supply) Act, 1948 as a result of the bifurcation of the erstwhile State of Bihar. Jharkhand State Electricity Regulatory Commission (JSERC) was established on August 22, 2002 and became operational from April 24, 2003. JSERC carries out its functions and roles in accordance with applicable provisions of the Electricity Act, 2003.

In order to comply with the Electricity Act'2003, the state has recently restructured the erstwhile JSEB on 6th January 2014, into following companies:

- Jharkhand Urja Vikas Nigam Ltd (JUVNL) being the holding company;
- Jharkhand Urja Utpadan Nigam Ltd (JUUNL) undertaking the generation function of the erstwhile JSEB;
- Jharkhand Bijli Vitaran Nigam Ltd (JBVNL) undertaking the distribution function of the erstwhile JSEB;

[1] Status as on 29th February 2016
[2] Estimated based on actual consumption during FY 2014-15
[3] Source: CEA

- Jharkhand Urja Sancharan Nigam Ltd (JUSNL) undertaking the transmission function of the erstwhile JSEB.

The unbundling of erstwhile JSEB in January 2014, has been a step in the right direction, paving way for a robust and sustainable power sector and realizing the long-term vision of ensuring reliable and quality power for everyone.

2.3 Power Demand Supply

In terms of demand supply gap, the State has witnessed improvement over the last few years, the energy requirement and peak demand for JBVNL over the last few years is summarized in the table below –

Table 1: Peak Demand – Supply (MW) and Energy Requirement – Availability (MU) Position of JBVNL

Particulars	Jharkhand				
	FY11	FY12	FY13	FY14	FY15
Peak Power Demand and Supply					
Peak Demand (MW)	1,790	1,850	1,900	2,060	2,120
Peak Available (MW)	1,523	1,547	1,638	1,726	1,810
Peak Shortage (%)	***14.9%***	***16.4%***	***13.8%***	***16.2%***	***14.6%***
Energy Requirement and Availability					
Energy Requirement (MUs)	10,976	11,020	11,900	12,361	12,720
Energy Available (MUs)	10,103	9,988	10,912	11,631	11,954
Energy Shortage (%)	***8.0%***	***9.4%***	***8.3%***	***5.9%***	***6.0%***

The total peak demand met in the state (including all utilities) during FY15 is 3,255 MW, out of which 1,810MW is within JBVNL area. The peak demand for JBVNL area has been 2,120 MW during FY15 against availability of 1,810MW , while there was no demand supply gap in case of other utilities. The demand supply gap in JBVNL area is majorly on account of transmission constraints in Sahibganj (180MW), Garhwa (70MW) and Ranchi (50MW) regions.

The unbundling of erstwhile JSEB in January 2014, has been a step in the right direction, paving way for a robust and sustainable power sector and realizing the long-term vision of ensuring reliable and quality power for everyone. Going forward, JBVNL aims to focus on electrification of un-connected consumers, meet the demand supply gap and provide 24X7 power supply in the state, discussed in detail in the following section.

2.4 Key Targets for MYT Period

In accordance with the proposed capital investment, JBVNL expects to achieve various targets for operational and financial turnaround, as grouped below.

Figure 5: Key targets for MYT period

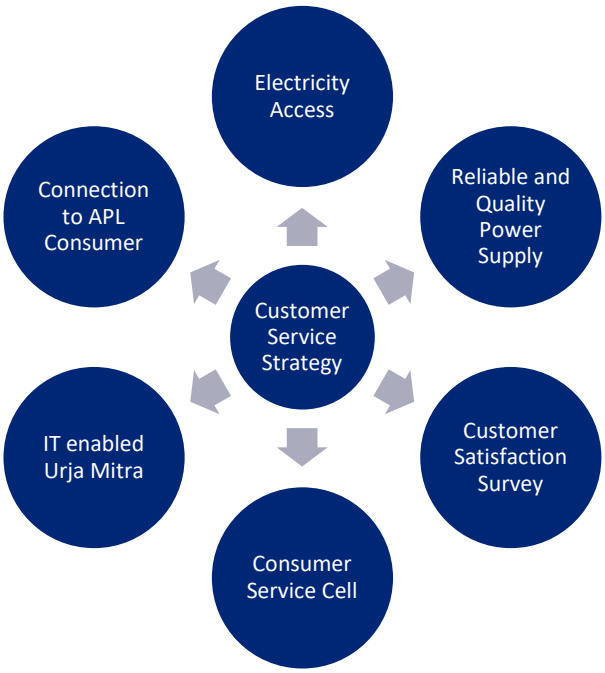
These targets are in line with the operational milestones as specified in DDUGJY & IPDS. JBVNL also plans to undertake and initiate several measures related to loss reduction, tariff measures, Demand side & energy efficiency, employee engagement and customer service strategy, discussed in details in the following sub-sections.

2.5 Key Initiatives

2.5.1 Customer Service Strategy

It is of paramount importance that the consumers being served by the distribution utility are satisfied with the services they receive, which enhances their willingness to pay. Furthermore, in the current regime of open access wherein all the authorities (State/Central Government, Commission etc.) are trying to bring in competition within the sector, the survival of the utilities itself is hinged on the satisfaction level of its consumers. The customer service strategy of a utility is dependent upon various tenets, which have been presented in the chart below and discussed in detail in the sub-sections below.

Figure 6: Customer Service Strategy



a) Electricity Access:

Access to electricity is the first and foremost concern for any consumer. Recognizing the same, JBVNL has set for itself the target of providing electricity to all households by 2019. The plan for significant capacity addition and network augmentation has been laid in this direction to ensure that each household has electricity by the stipulated timeline. In order to meet the objectives, the number of sub stations is expected to increase to 642 with nearly 7,188 MVA capacity from existing number of 320 sub-station with 3,687 MVA capacity thus ensuring electricity access for all.

b) Reliable and Quality Power Supply:

The successful implementation of Power for All hinges on providing quality and reliable supply. To provide quality 24x7 power supply to rural areas, there is an urgent need to augment/strengthen the electricity distribution infrastructure.

To improve the quality and reliability of supply, as discussed in previous sections, JBVNL is strengthening the existing Distribution Infrastructure, plan has been rolled out to augment the existing network and continuous maintenance of the system. Emphasis is laid on constant monitoring the Breakdown and Tripping on various feeders in order to improve the power supply quality and thus the Customer satisfaction.

Apart from this, Implementation of Outage Management System (OMS) after GIS mapping to be begin with in Urban Areas and then gradually extend to rural areas to proactively manage outages and supply restoration for increased Customer Satisfaction.

c) *Customer Satisfaction Survey:*

Survey or Regular interaction with the utility consumers is the most important tool to assess the level of satisfaction. JBVNL understand the importance of identification of key parameters for customer satisfaction assessment & surveys in key geographical areas through –

- Developing a survey plan and designing questions that will provide useful, actionable information.
- Determining the right approach for the survey: web, mail, or phone.
- Designing and administering surveys by hosting them on our secure survey website, subcontracting telephone surveys with trusted vendors, or distributing paper questionnaires.
- Receiving and tabulating the results, analysing the data, and reporting the findings (either in summary form or as raw data, depending on the client's preference).

Also, in order to increase customer engagement, JBVNL is planning to conduct workshops with various stakeholders such as consumer groups, MLAs etc. to deepen their knowledge on various aspects and enlighten them about the role each stakeholder can play in the turnaround plan of JBVNL. A host of consumer interaction programs are being prepared and already implemented on pilot basis to assess the factors which may help in improving the service standards and customer satisfaction.

d) *Consumer Service Cell:*

Centralized consumer service cell is planned to be established, these cells will be operational 24x7. The consumers can register their complaints for theft, no power, burning of meter or transformer, or any other technical issues including the safety issues also. Thus, the tasks planned to be undertaken under this are-

- Setting up of a centralized cell for HT consumers
- Dedicated officers for resolving disputes on priority
- Centralized online system for monitoring the status and time taken for outstanding and resolved complaints

e) *IT Enabled Urja Mitra in Rural and Urban Areas for Effective Meter Reading, Billing and Collection:*

In order to meet the AT&C loss targets, the utility is planning to implement a new program "Urja Mitra", in line with the Rural Revenue Franchisee model adopted in Bihar. Under the program,

Urja Mitras will be appointed for each panchayat (or cluster of 1,000-1,500 HHs). The Urja Mitra will be trained to use the basic IT tools, including Web and Mobile Applications, who will be incentivized suitably for collecting meter readings and making collection in his designated Panchayat (s)/area / cluster. An agency is being appointed for the purpose of development of such Web/ mobile App who shall be paid only for the services (rates per consumer basis) including processing and monitoring of bills, collections and performance of Urja Mitras. The proposed system shall replace the existing billing agencies which will result in the multiple benefits to JBVNL.

f) Connections to APL Consumers

As a foremost step towards providing 24X7 electricity access to all households, a new initiative has been proposed to avoid burden of one time connection charges that is charged from Above Poverty Line (APL) consumers at the time of new connection. Under the scheme, free connections will be provided at the time of installment, and service connection charges will be availed from consumers on installment basis.

It is estimated that nearly 8.8 lac APL consumers who are not being covered under any central or state government scheme gets benefited out of it.

g) Rooftop Solar PV Grid interactive systems and Net/Gross metering.

JSERC (rooftop solar PV) regulations dated 2015 provides an opportunity to his consumers of JBVNL to setup rooftop solar PV plants with project capacity ranging from minimum 1KWp upto 1MWp. Rooftop owner can also enter into an agreement for lease of rooftop system from third party solar developers and the developer in turn.

2.5.2 Employee Engagement

The Employee Engagement can be termed as the emotional and functional commitment of employees with his organization. JBVNL understands that that engaged employees are happier and hence in turn can be much more efficient. Thus, JBVNL has devised a three pronged approach to keep its employees engaged. The Figure below outlines the 3 step approach as developed by the organization:

Figure 7: Employee Engagement

a) Increased Employee Motivation

JBVNL realizes that in order to bring about a massive turnaround, motivation and involvement of employee is of utmost importance. Competent involvement of workforce safeguards deployment of optimum number of personnel in each department. Increased level of motivation of employees will ensure the higher level of productivity. Owing to the importance of such an initiative, JBVNL plans to undertake a comprehensive employee motivation program on continuous basis by conducting regular workshops and trainings.

b) Capacity Building of Employees

Maintaining a well-trained, well-qualified workforce is a critical function for any Discom and is a key determinant of an organization's success. JBVNL plan to undertake below mentioned activities for its employees:

- Classroom Training sessions for the Workforce.
- Clarify work responsibilities, provide the foundation for performance discussions, and facilitate effective hiring.
- Development and implementation of intervention strategies to improve employee and team performance.

c) Performance Management System for Improved Accountability

JBVNL is also planning to introduce the Performance Management System under which the Performance Appraisal Reports (PARs) will be prepared for each and every employee. . The performance of every employee is assessed annually through his/ her PAR. The work, conduct, character and capabilities of the officer are recorded in the PAR. The PAR system also provides data for judging the merits of employees when questions relating to confirmation, promotion and grade selection arise. The PAR(s), thus, provide the basic and vital inputs for various purposes. Therefore, all the employees should undertake the duty of filling out the PAR forms with a high sense of responsibility.

The JBVNL shall form Performance Appraisal Committee (PAC) which shall be responsible for Finalization of the Performance Appraisal Process, Resolution of Performance Appraisal Grievances raised by employee, Monitoring of entire performance appraisal system.

- Thus, the JBVNL will be able to attain the following targets through this - Magnitude of Satisfaction level and involvement of Employees in JBVNL initiatives.
- Emphasis on deriving the desired outputs – e.g., actual outcomes on AT&C loss reduction as compared to declared targets

JBVNL plans to roll-out the KPIs based performance management from FY 2016-17 onwards.

2.5.3 Demand Side Management (DSM)

Jharkhand is being supported by Shakti Foundation in adoption of DSM measures and implementing the various schemes in devising the DSM ecosystem for the state. Under the DSM program, a Jharkhand DSM Consultation Committee (JDCC) is being formed to monitor the progress of DSM programs and steer the DSM initiatives in the state. Since, DSM is an economical, viable and easy to implement option to overcome energy deficit and reduction in power procurement costs, various DSM programs are being devised for various consumer

segments including domestic, agriculture, street lighting etc. Some of these program have already been rolled out and some are being undertaken on pilot basis as discussed below.

a) JREDA/Energy Department Initiatives

JREDA/Energy Department of the state has taken following measures in the state-

- Lighting sector DSM for domestic projects under Bachat Lamp Yojna
- Energy Conservation Building Code (ECBC) and efficiency measures in government buildings
- Implementation of municipal DSM project, including LED based street lighting under PPP
- Agriculture DSM project.

b) Domestic Efficient Lighting Programme (DELP)

Domestic sector accounts for almost 50% of energy consumption and lighting is a key component of the same. In order to promote the use of LEDs in household sector and reduce the energy consumption, Energy Efficiency Services Limited (EESL) in consultation with Jharkhand Bijli Vitran Nigam Limited (JBVNL) and Government of Jharkhand, has proposed to implement the DELP (Demand Side Management based Efficient Lighting Programme) in Jharkhand. In line with the National Mandate for implementation of Domestic Efficient Electric Programme (DELP) through Energy Efficiency Services Limited (EESL). The board of directors discussed the matter in the Board meeting held on 02nd November 2015 and accorded post-facto approval to the initiation and implementation of Domestic Efficient Lighting Programme (DELP) through Energy Efficiency Services Limited (EESL) on Cost Recovery Model for all Domestic Consumers of Jharkhand Bijli Vitran Nigam Limited (JBVNL).

LED based household lights could reduce energy consumption by 91% (as compared to ordinary bulb) and 50% (as compared to CFLs). DELP promotes the usage of LEDs at a minimal cost and is designed to monetize the energy consumption reduction for the domestic consumers.

JBVNL launched LED lighting program on 15th November 2015, in order to encourage consumers to replace incandescent bulbs by LEDs which results in voltage stabilization and energy efficiency thereby helping in reduction of power purchase. Under this scheme the consumer is eligible to purchase up to 10 LED bulbs of 9W at an upfront cost of Rs. 10 each. The balance amount of Rs. 95 will be recovered from the electricity bill at Rs 10 per month for next 9 months & Rs. 5 in the 10th month. Alternately the consumer can also pay an upfront cost of Rs 100 per LED bulb. More than 33 lakh LEDs have been distributed by the Discom so far under this program

c) Street Lighting Programme

The State has also launched Energy Efficient Solar Street Lighting program under which all Towns with Municipal Corporation/ Municipality are covered.

d) Other DSM Initiatives/Projects

As a stepping stone towards promoting energy efficiency in the State, following initiatives/projects have been undertaken.

- State Energy Conservation Fund (SECF) has been created, with BEE's contribution of Rs. 2.0 Crore and State govt. has also provided matching grant of Rs. 2.0 Crore
- Tendering for 1,400 (1, 2 & 5 HP) efficient agricultural pumps is presently underway, which will be provided as new connections.

- Revamping of Ranchi Drinking Water System at Rukka, Ranchi.
- LED Village Campaign- replacement of GLS bulb with LED bulbs in Gagi village, Kanke, Ranchi.
- Replacement of Sodium Vapour Street Light of 250 watt with 90 watt LED Street Light from Rajbhawan to Booti More, Ranchi.
- LED Village Campaign: - replacement of GLS bulbs with LED bulbs and installation of LED Street Light in Childag village, Ranchi and Suryapura village, Hazaribagh.

2.5.4 ERP implementation

With the growing thrust towards m-governance and provision of public services on mobile phones in India, JBVNL has decided to implement organization wide ERP system. An agency has been appointed for evaluating and mapping the existing processes, organization structure and technological interventions required to successfully migrate towards and ERP ready entity. It is expected that the above task shall be completed within a period of 3 months and the tender documents shall be prepared and issued for the appointment of ERP implementation partner. Once the ERP implementation partner is selected, the ERP program shall be rolled out and various modules shall be implemented in phased manner. In this regard, JBVNL is focusing on being able to meet the targets, whereby implementation of ERP needs to be completed by March 2017.

Meanwhile, JBVNL is in the process of launching a Mobile Payment Platform to empower JBVNL Consumers to make bill payments and handling its entire payment process flow in a secure and convenient manner. The initiative was launched with the intention of to reduce the hassle of long queues, save time, provide accessibility and transparency to the consumers for electricity bill payments and take a small step taken towards cashless economy & Digital India.

2.5.5 Monitoring

a) Appointment of dedicated Agency for Monitoring

The agency shall continuously monitor and assist JBVNL in following ways

- Development of entity/ department wise targets and assistance in development of division wise micro level targets for implementation of targets specified under the schemes.
- Development and circulation of templates and format for data collection and follow-up and collection of information from various departments/ entities for regular monitoring.
- Aggregation, analysis and reporting of state/utility level progress monitoring reports and maintaining MIS on the schemes at the level of State/Utility

b) Development of Monitoring Portal

JBVNL along with the agency appointed for monitoring is developing a web based Tool for continuous monitoring of parameters against the targets specified. The online portal shall be instrumental in tracking the status of feeder metering, DTR metering, Consumer metering and AT&C losses on monthly basis. Some of the salient features are mentioned below-

- Real time monitoring of status of metering at circle and division level
- Target based evaluation through online monitoring tool.

- Timely filling of data from all circle officers. In this regard, workshops to be organized and training will be provided to circle officers.
- Monthly progress report with comparative analysis of achievement of targets to top management.

2.6 Way Forward

This section outlines the various results JBVNL is expected to draw out from the measures taken to turnaround itself into an operationally sound and financially viable utility. By ensuring implementation of these schemes in their letter and spirit, the existing JBVNL issues are likely to be overcome during the MYT period itself. Various scheme are aimed to assure that JBVNL comes out of its operational and financial distress condition and turn into a vibrant DISCOM through a permanent resolution of past as well as potential future issues of the sector. The various positive outcomes JBVNL is expected to draw out of adoption of various schemes are listed as below:

- With becoming a utility having 100% metering at all levels including rural consumers, installation of smart meters, utilization of technology and the energy accounting shall ensure that the reasons for T&D losses can identified and arrested.
- The up-gradation of existing distribution infrastructure with feeder improvement program coupled with infrastructure investments under various central government schemes such as DDUGJY, IPDS etc. shall ensure 24X7 reliable power to all consumers in the state.
- Initiatives related to energy efficiency, focus on optimization of power purchase cost along with reduction in overall cost of power generation due to coal swaps etc. shall definitely have an impact on creating the affordability of power for all consumers.
- The impact of measures to be taken by JBVNL for reduction of AT&C Losses, including feeder segregation, improving billing and collection efficiency through various means shall not only be instrumental in reducing the overall cost of supply but also result in optimal utilization of national resources at large.
- JBVNL is likely to attain a greater degree of financial discipline through alignment with State finances, as the impact of State taking over 75% debt and the looming CPSU dues shall directly be on its borrowing and investment capacity in future. The reduction in interest cost and linkage of profitability of utility with FRBM limits of the State in future years, shall ensure greater accountability thus resulting in enhanced focus on financial viability.
- As JBVNL endeavours to become a regulatory compliant entity with enhanced discipline in tariff filing and recovery of cost impact through Fuel and Power Purchase Cost Adjustment (FPPCA) mechanism, it can be ensured that the gap between the ACS and ARR gets timely addressed. JBVNL will also be able to recover its actual cost of supply and the tariff shocks can be avoided.

Thus, it is expected that a pace will be set for JBVNL, which will be characterized by robust infrastructure, monitoring of performance, motivation of employees and technological interventions. Effectively, it will reduce the dependence of JBVNL on State Government and pave foundations for a financially sustainable and a self-sufficient power sector in Jharkhand.

3. Company Profile and Business Overview

3.1. About JBVNL

Jharkhand Bijli Vitran Nigam Ltd. (JBVNL), is in the business of distribution and retail supply of electricity in the state of Jharkhand. JBVNL has been incorporated on 23rd October 2013 with the Registrar of Companies, Jharkhand, Ranchi and has obtained Certificate of Commencement of Business on 28th November 2013. This is a Company constituted under the provisions of Government of Jharkhand, General Resolution as notified by transfer scheme vide notification no. 8, dated 6th January 2014.

JBVNL holds the high consumer base of around 27 Lac consumers and the details of consumer mix as of April' 15 are as follows:

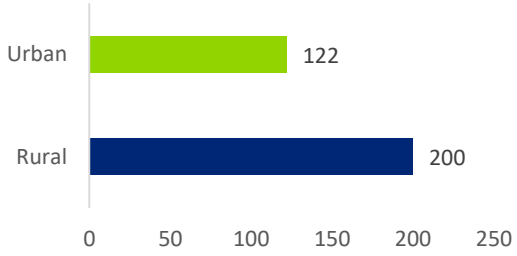
Table 2: Consumer Details under JBVNL

Type of consumer	Number of consumer (April' 2015)
High Tension	1,482
Low tension industrial services	13,035
Domestic services	24,59,989
Commercial services	1,54,021
Agricultural	37,322
Others	785
Total consumer	26,66,634

The consumers of Jharkhand are being served by 5 utilities, viz. Damodar Valley Corporation, JUSCO, TSL and SAIL Bokaro.

JBVNL's serves its ~27 lac consumers through 322 power substations with a capacity of 3,857.7 MVA. Out of these 322 substations, 122 are urban PSS and 200 are rural as depicted in the graph below.

Figure 8: No. of PSS – Urban & Rural



JBVNL's systems comprise of 33 KV sub-transmission systems which forms the distribution backbone at the district level and 11 KV and LT distribution systems which delivers electricity to the majority of the end consumers. The abstract of JBVNL's network in terms of installed

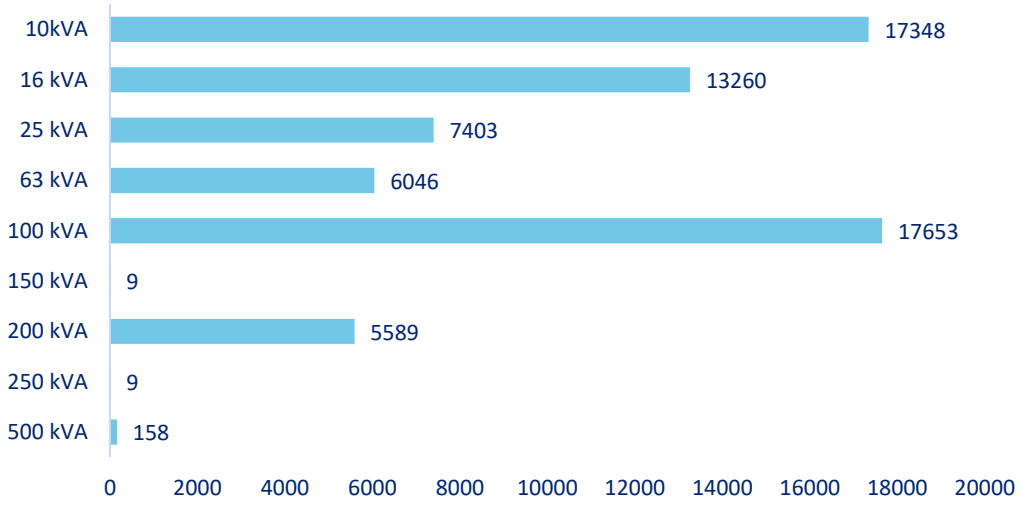
transformation capacity and line lengths of feeders at various voltage levels is provided in Table below -

Table 3: JBVNL's Power Distribution Network

Infrastructure Detail (As on 29th February 2016)			
No. of 33kV Substations (Nos.)	322	Urban	122
		Rural	200
Capacity of 33kV substations (MVA)	3,857.7	Urban	2,172.55
		Rural	1,685.15
No. of 33kV feeder (Nos.)			378
No. of 11kV feeders (Nos.)			1,138
33kV line length (kms)			7,429.46
11kV line length (kms)			53,014.3
LT line length (kms)			79,743.95

The total DTRs capacity under JBVNL is as shown in the Figure below-

Figure 9: Capacity wise DTRs distribution



The substantial increase in power demand in the state has led JBVNL to put emphasis on distribution network. JBVNL also endeavors to provide electricity access to all consumers in State, while ensuring operational efficiency and achieving long term financial viability.

3.2. JBVNL Business overview

Jharkhand Bijli Vitran Nigam Ltd. (JBVNL) is undertaking the distribution function of the erstwhile JSEB, with a consumer base of around 27 Lacs. The key duties being discharged by JBVNL are as follows:

- Laying and operating of such electric line, sub-station and electrical plant that is primarily maintained for the purpose of distributing electricity in the area of supply of JBVNL, notwithstanding that such line, sub-station or electrical plant are high pressure cables or overhead lines or associated with such high pressure cables or overhead lines; or used incidentally for the purpose of transmitting electricity for others, in accordance with Electricity Act. 2003 or the Rules framed there under.
- Operating and maintaining sub-stations and dedicated distribution network connected there with as per the provisions of the Act and the Rules framed there under.
- Arranging, in-coordination with the Generating Company(ies), for the supply of electricity required within the boundary of the supply area and for the distribution of the same in the most economical and efficient manner;
- Supplying electricity, as soon as practicable to any person requiring such supply, within its competency to do so under the said Act;
- Preparing and carrying out schemes for distribution and generally for promoting the use of electricity within the State.

Laying emphasis on the thrust areas for distribution, JBVNL endeavors to provide electricity access to all consumers in State, while ensuring operational efficiency by reducing the AT&C loss level to 15% by 2018-19 and achieving long term financial viability. There are several steps which have been envisaged to be covered during the MYT Control Period, including:

- Increasing the existing Power Sub Stations (PSS) capacity of 3,687 MVA (with 320 PSS) to 7,188 MVA (with 642 PSS) by FY2018-19,
- Significant addition in distribution infrastructure to increase the electricity reach by creating new 11kV/ LT lines and installation of distribution transformers.
- Strengthening and augmentation of existing distribution network to ensure reliable power supply to existing consumers
- Enhanced focus on customer service with provision of multiple consumer touch-points for various services, including complaint resolution, bill payment etc.

4. Capital Investment Plan

4.1. Approach for Capital Expenditure

As per the JSERC MYT Regulations 2015, the Distribution Licensee is required to file the Business Plan for Control Period of five financial years from April 1, 2016 to March 31, 2021, which shall comprise but not be limited to detailed category-wise sales and demand projections, power procurement plan, capital investment plan, financing plan and physical targets before the Hon'ble Commission as part of the Tariff Filing before the beginning of the Control Period. The submission of capital expenditure plan and its contents are provided under Regulations 5.9 to 5.14 of JSERC MYT Regulations 2015. In line with the relevant regulations, JBVNL has prepared the capital investment plan along with the details of required components such as purpose of investment, financing plan, capitalization schedule etc.

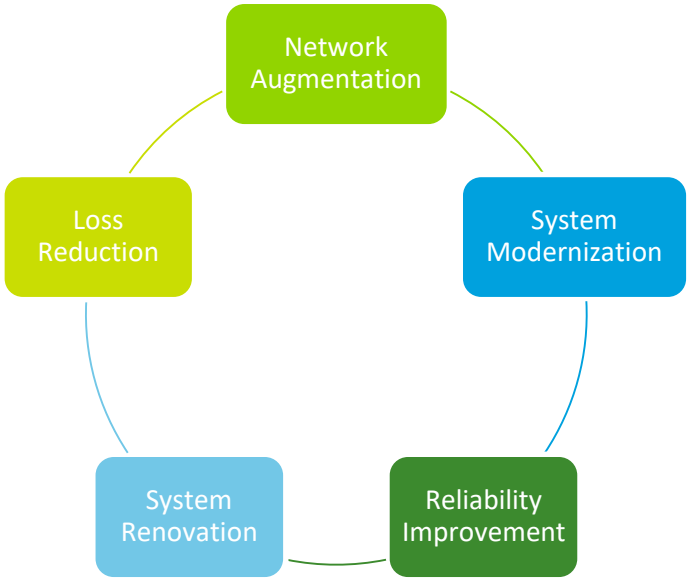
As discussed in the previous sections, JBVNL is aspiring to establish itself as a modern day utility in the State which is capable of providing reliable and affordable power to all consumers in the State, apart from realizing the vision of Hon'ble Prime minister of the nation to achieve 100% electrification in State. In order to achieve these larger objectives, JBVNL has prepared a comprehensive capital investment plan whereby nearly Rs.15,000 Cr. are planned to be invested to provide electricity access, build robust distribution infrastructure and achieve long term financial viability.

The capital investments of JBVNL can largely be categorized in following areas:

- Investments in new distribution infrastructure to provide electricity access and support the demand requirements.
- System augmentation and strengthening including renovation and modernization to maintain the performance of the existing system
- Feeder Segregation to ensure that rural and agricultural consumers can be segregated to improve the hours of supply to the rural consumers.
- Improve the Operational efficiency of the system and bring about cost benefit

The figure below provides a wider overview of the capital investment avenues planned by the JBVNL.

Figure 10: Capital Investment Avenues



The capital works of JBVNL are majorly carried out under following category of schemes:

1. Central Government Schemes such as DDUGJY, RGGVY, IPDS, etc.
2. State Government Schemes such as Tilka Manjhi, Atal Gram Jyoti Yojna etc.
3. Annual Development Plan prepared by JBVNL for departmental works

Under each of these schemes of Central and state government, the capital outlay is proposed by JBVNL in form of the DPRs prepared in line with the objectives of each schemes, based on which the capital outlay is sanctioned by the concerned government/ ministry/ department. It is important to mention that these schemes vary from each other in terms of funding structure, as the amount of funds provided as grants, debt and equity to be infused by utility/ state government are different.

Therefore, this capital expenditure plan discusses in details the key objectives under each of the capital investment schemes, the funds layout, proposed infrastructure and cost benefit analysis of the capital expenditure plan. The table below, summarizes the total capital expenditure proposed to be incurred by JBVNL over the MYT Control period, under various scheme heads, with the unapproved part of the schemes highlighted in different color.

Table 4: Capital Expenditure Plan (FY 17 - FY 21)

Scheme Name	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21	Approved	Total Proposed
DDUGJY	1,000.0	1,500.0	1,196.0			***3,696.0***	***3,696.0***
IPDS	109.7	315.5	353.0			***778.2***	***778.2***

Scheme Name	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21	Approved	Total Proposed
RAPDRP – A	132.4	40.3	15.1	15.5	16.5	***219.7***	***219.7***
RAPDRP – B	948.0	352.0				***1,300.0***	***1,300.0***
12th Plan RGGVY	540.0	720.9				***1,260.9***	***1,260.9***
ADP + Misc.	608.1	1,000.0	1,200.0	1,500.0	1,800.0	***608.1***	***6,108.1***
Tilka Manjhi & AGJY	100.0	100.0	57.4	-	-	***257.4***	***257.4***
RGGVY (10th & 11th Plan)	394.0	-	-	-	-	***394.0***	***394.0***
Total	***3,832.2***	***4,028.6***	***2,821.5***	***1,515.5***	***1,816.5***	***8,514.4***	***14,014.4***

It has been experienced that the capital investment outlay approved in some of the central government schemes, especially DDUGJY, IPDS etc. is lower than that of proposed by JBVNL. In such a scenario the unapproved part of the investment is required to be funded by JBVNL on its own, by way of debt and equity. Such expenditure proposed for different years is planned to be covered by JBVNL by way of debt and equity, as it would be important for realizing the overall objectives of the schemes and the overall objectives of JBVNL. The following sub-section the key objectives of each of the schemes and the details of proposed infrastructure to be created under each of these schemes.

4.2 Capital Expenditure Objectives and Details of Infratructure

The key objectives envisaged and the details of infrastructure planned to be created under each of the schemes are detailed in the following sub-sections.

4.2.1 Deen Dayal Upadhyaya Gram Jyoti Yojna (DDUGJY)

Govt. of India has launched Deendayal Upadhyay Gram Jyoti Yojna (DDUGJY) for Rural Areas to provide regulated supply to agricultural consumers and 24X7 power supply to non-agricultural consumers of rural areas.

Key objectives:

- The key objectives of DDUGJY are listed as below –To separate agriculture and non-agriculture feeders in rural areas;
- To facilitate Discoms in the judicious roistering of supply to agricultural and non-agricultural consumers in rural areas;
- Strengthening and Augmentation of Sub Transmission & Distribution infrastructure in rural areas.

Proposed coverage:

JBVNL has proposed to cover 259 villages under DDUGJY and the DPR of total Rs. 5,816 Cr. was prepared for various components of the scheme. However, while approving the investment outlay the central government has approved only Rs.3,696 Cr. and deductions have been made majorly on account of system strengthening and rural household access. The table below provides the details of work to be undertaken under DDUGJY for the control period

Table 5: Capital Expenditure under DDUGJY

Sl.	Item	Present Scenario	Covered Under DPR	Cost Proposed in DPR	Cost approved
1	Electrification for Un-electrified villages	• Total UE – 736 • Through Off grid – 477 • Balance UE Villages-259	259 UE Villages	90.1	90.1
2	System Strengthening and Access to Rural Households	System Strengthening & Access to 24.87 Lakh RHH	Access to all RHH & Erection and augmentation of Lines, Sub-station, DTs	3,205.63	1,067.55
3	Metering	Unmetered and Defective metering	100% Feeder Metering only	317.57	317.56
4	SAGY		19 villages	3.12	3.12
5	Feeder Separation	No Feeder segregation	New substation, 11 KV Bays, 11 KV Lines	2,199.5	2,199.5
Total				**5,815.92**	**3,677.83**
	PMC Charges @ 0.5%				18.39
Grand total (including PMC charge)				**5,815.92**	**3,696.22**

Presently, the preparation of NIT for metering component is underway & will be published very soon. The detailed material budget has been prepared and the details of infrastructure proposed to be created over a period of three years ending FY 18-19 are provided below:

4.2.2 Integrated Power Development Scheme (IPDS)

The scheme was launched by Govt. of India with the aim to help in reduction in AT&C losses, establishment of IT enabled energy accounting / auditing system, improvement in billed energy based on metered consumption and improvement in collection efficiency.

Key objectives of IPDS are listed as below:

- Strengthening of Distribution network including provisioning of solar panels on P/S/S including Net-metering
- Metering of feeders / distribution transformers / consumers
- IT enablement of distribution sector

Proposed coverage:

Under this scheme, 40 nos. of Statutory Towns of Jharkhand have been eligible with JBVNL proposing for a total DPR of Rs. 1,127 Cr. for various works to be covered. However, the central government has approved the capital outlay to the tune of only Rs. 778.2 Cr. The year on year capital expenditure phasing along with the proposed infrastructure is provided in the table below:

Table 6: Capital Expenditure under IPDS

Division/ Circle/ Particulars	FY 16-17		FY 17-18		FY 18-19	
	Planned		Planned		Planned	
	Physical	Amount (Rs. Cr.)	Physical	Amount (Rs. Cr.)	Physical	Amount (Rs. Cr.)
No. of New PSS (Nos)	3	6	12	38	13	41
PSS Capacity Addition (MVA)(excluding New PSS)	47	8	137	23	152	26
No. of bays (Nos)	0	0	0	0	0	0
PSS renovation	3	1	8	2	9	3
Replacement of Existing defective 33kV VCB/OCB with 33kV Motorized VCB	8	1	23	2	25	2
Replacement of Existing defective 11kV VCB/OCB with 11kV Motorized VCB	13	1	36	2	40	2
New 33 KV newlines (cKm)	59	10	156	28	176	31
33 KV feeders Reconductoring/Augmentation	44	3	118	9	133	10

Division/ Circle/ Particulars	FY 16-17		FY 17-18		FY 18-19	
	Planned		Planned		Planned	
	Physical	Amount (Rs. Cr.)	Physical	Amount (Rs. Cr.)	Physical	Amount (Rs. Cr.)
11kV Feeders (Nos)	20	14	54	37	59	42
11kV Feeders (cKm)	105		280		315	
11 kV Line : Augmentation/Reconductoring	77	4	205	10	230	11
UG Cable	9	4	24	10	27	12
DT Nos.	257	11	686	30	771	34
DT Capacity Addition (kVA)(excluding New DTR)	17,216	6	45,910	16	51,649	18
Distribution Transformer-R&M	90	1	241	2	271	3
LT lines (cKm)	84	3	223	8	251	9
LT Line : Augmentation / Re-conductoring	391	21	1,044	55	1,174	62
Capacitor Bank	29	2	76	6	86	7
Provisioning of solar panel	62	5	167	12	188	14
Additional Poles (Nos)	382	1	1,018	3	1,145	4
No. of meters (Nos)	20,807	7	55,521	19	62,450	21
Installation of Pillar Box for relocation of meters outside the premises of consumers including associated cables and accessories	1,606	1	4,282	3	4,818	3
		109.73		**315.49**		**353**

4.2.3 R-APDRP Part A

Another major investment planned by the Board is in system improvement and strengthening under R-APDRP. The expenditure under R-APDRP is to undertaken in two phases namely Part-A and Part-B.

Key objectives:

- Establishment of baseline data and IT applications for energy accounting/auditing & IT based consumer service centers
- Preparation of Base-line data for the project area covering Consumer Indexing, GIS Mapping, Metering of Distribution Transformers and Feeders, and Automatic Data Logging for all Distribution Transformers and Feeders and SCADA / DMS system.
- Asset mapping of the entire distribution network at and below the 11Kv transformers and include the Distribution Transformers and Feeders, Low Tension lines, poles and other distribution network equipment.
- Adoption of IT applications for meter reading, billing & collection; energy accounting & auditing; MIS; redressal of consumer grievances; establishment of IT enabled consumer service centers etc.

Proposed Coverage:

The table below provides the breakup of the expenses planned to be incurred under R-APDRP Part – A. For SCADA Part – A, DPR was submitted to PFC amounting Rs.105.24 Cr out of which, DPR sanctioned by PFC: Rs. 70.23 Cr and by GoJ : Rs 2.76 Cr.

Table 7: Capital Expenditure under RAPDRP - Part A & SCADA Part A

Sl. No	Name of the work	Proposed Capital expenditure for next 5 year for R-APDRP Part-A and SCADA Part-A (Amount in Crore Rs.)										Total
		FY 16-17		FY 17-18		FY 18-19		FY 19 -20		FY 20-21		
		PFC	GoJ	PFC	GoJ	PFC	GoJ	PFC	GoJ	PFC	GoJ	
1	**Facility Management Services**	10.46			10.46		10.46		10.46		10.47	52.31
2	**Payment for ITIA**	70.00										70.00
3	**Payment for NBSP**	3.39		3.39		3.39		3.40			4.42	17.99

Sl. No	Name of the work	Proposed Capital expenditure for next 5 year for R-APDRP Part-A and SCADA Part-A (Amount in Crore Rs.)										Total
		FY 16-17		FY 17-18		FY 18-19		FY 19 -20		FY 20-21		
		PFC	GoJ	PFC	GoJ	PFC	GoJ	PFC	GoJ	PFC	GoJ	
4	**AMC for DC, Ranchi and DRC, JSR**		0.75		0.75		0.75		1.00		1.00	4.25
5	**Call Centre**		0.36		0.42		0.50		0.60		0.65	2.53
6	**SCADA Part-A**	45.00	2.76	25.23								72.99
Total		128.85	3.87	28.62	11.63	3.39	11.71	3.40	12.06	0.00	16.54	220.07

4.2.4 R-APDRP Part B

RAPDRP program has been prepared and finalized for 30 towns in the State. The DPRs have already been prepared and approved for R-APRDRP part A and part B both. The expenditure has been partly incurred.

Key objectives:

- Renovation, modernization and strengthening of 11 kV level Substations, Transformers/Transformer Centers, Bring about commercial viability
- Reduce outages & interruptions
- Increase consumer satisfaction.

A significant work is proposed to be carried out such as New 33/11 kV PSS, renovation of existing PSS, Feeder Segregation, Bay Extension and Re-conductoring both at 33 and 11 KV level, installation of RMUs, R&M work of PSS, installing capacitor bank, areal bunch cable, meter installation and under-grounding both at 33 & 11 KV level. The list of works planned to be undertaken under R-APDRP Part B are as below-

Table 8: Capital Expenditure under RAPDRP - Part B

Particulars		Quantity
New 33/ 11 KV PSS		23
Renovation in PSS		62
33 KV	Feeder bifurcation in Km	261.84
	Re-conductoring in Km	469.88

Particulars		Quantity
	Bay Extension	18
New 11 KV	Feeder bifurcation in Km	1,513.21
	Re-conductoring in Km	1,889.68
	Bay Extension	122
Installation	RMU in Nos.	823
	Sectionalizers	816
R & M of 33/ 11 KV PSS		103
Installation of New DT		7,268
Capacity enhancement of LT Sub Station		450
Capacitor Bank		287
Areal Bunch Cable		3,032.30
Meter		1,71,391
Under-ground Cabling 33 KV		34
Under-ground Cabling 11 KV		114.73

4.2.5 RGGVY (10th & 11th Plan)

Government of India in April, 2005 conceived Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) to electrify all un-electrified villages / habitations and to provide access to electricity to all rural households in un-electrified and partially electrified villages in the entire country.

Key objectives:

- To electrify all villages and habitations, provide access to electricity to all households and give electricity connection to Below Poverty Line (BPL) families free of charge.
- Creation of Rural Electricity Distribution Backbone with at least one 33/11 KV or 66/11 KV sub-station in each block, Village Electrification Infrastructure with at least one distribution transformer in each village/habitation or Decentralized Distribution Generation Systems where grid supply is not feasible or cost-effective was envisaged.

JBVNL is also undertaking electrification of several villages under the RGGVY scheme. It is to be noted here that considering the quantum of work involved, the work was allocated to different implementing agencies like RITES, DVC and NTPC etc. However the work in a few villages was not carried out by these agencies and hence JBVNL has undertaken to complete the same. In addition, several un-electrified villages are also to be covered under the electrification scheme which is being carried out by JBVNL on its own. The Particulars of work to be carried out under this are:

Table 9: Infrastructure Addition under RGGVY (10th & 11th Plan)

Particulars	Numbers	Capacity
Transformation Capacity (in MVA)		
33 KV/11 KV Substations	14	82
Augmentation of Substation	26	130
11KV/ LT Distribution Transformers	3,045	75
Augmented Distribution Transformers	797	26
Lines (in ckm)		
33 KV Feeders	-	414.5
11 KV Feeders	-	3,569
LT Feeders	-	2,929

4.2.6 RGGVY (12th Plan)

Government of India in February 2008, sanctioned is conveyed for continuation of "Rajiv Gandhi Grameen Yojana (RGGVY) – Scheme of Rural Electrification in the 12th Plan with the following key objectives

Key objectives:

- Completing spillover works of projects sanctioned in the 10th and 11th Plan.
- Continuing the scheme for covering all remaining census villages and habitations with population of above 100.
- Providing free electricity connections to BPL households at the rate of Rs 3000 per connection in villages and habitations with population of above 100
- Extending DDG to the grid connected areas to supplement the availability of power in areas where power supply is less than six hours a day.

State has been allocated Rs. 1,261 Crs. under the 12th Plan which primarily focusses on rural electrification of 308 un-electrified villages and 18,308 partially electrified villages. The proposed project will be executed over a period of four years and the funds will be released simultaneously.

Table 10: Infrastructure Addition under RGGVY (12th Plan)

Particulars	Numbers
Villages to be covered in RGGVY 12th Plan	308
Electrification of rural HHs under proposed 12th Plan /RGGVY	11,79,476

33 KV / 11 KV Substations	51
11 KV/ LT Distribution Transformers	22,473
33 KV Feeders	34cKm
11 KV Feeders	5,685
LT Feeders	8,046

4.2.7 Other State Plan Schemes

Apart from the Central Govt. schemes, the State Government has also allocated funds towards the strengthening of distribution infrastructure focusing on 7 cities including the capital Ranchi. The details of these schemes are as below:-

4.2.7.1 Annual Development Plan (ADP) and Miscellaneous Capital Work

With the load growth for the year 2016–17 is estimated to be around 850 MW and 3.25 Lac new consumers are to be added in the system during the year, the state has kept aside budget apart from centrally sponsored scheme in the form of ADP budget.

Key objectives:

- To maintain the load growth and increased system demand as well as strengthening the existing system for more reliable power supply,
- Strengthening and Augmentation of existing Electrical infrastructure in Urban and Rural Areas of Jharkhand State.
- Electricity Access – Erecting new 33/11 KV PSS along with new 33KV, 11KV and LT Lines and providing service connection to new consumers including Govt. Schools, Gram Panchayat bhawan and primary health centers.
- System Strengthening & Capacity Augmentation – Adding additional capacity and augmentation of distribution system and facilitate existing consumers by augmenting the capacity of Power Transformers
- Operational Efficiency – Maintenance of Power Sub-Stations, 33 KV, 11KV, LT Distribution line and Distribution Transformer
- Capacity Building and institutional strengthening – Training programs, workshops to enhance the internal capacity of employees. Provision for consultancy services.

- IT and Technology Interventions - IT services dependent new work like ERP, Video Conferencing, and Ease of Doing Services etc.

The allocated amount under ADP was distributed among OSP (62%), TSP (26%) and SCSP (12%). The details of various works to be covered to achieve the targets under various thrust areas, are tabulated below:

Table 11: Capital Expenditure under ADP

Sl.	Name of Work	Amount (in Crs.)
1	Balance works for construction of New P/S/S, 33KV, 11KV, LT Lines, Installation of DTR & Other works as per approved supplementary ADP Budget 2015-16 amounting to Rs. 521.52 Cr.	421.52
2	Balance works for construction of 33KV LIne, 33/11 KV P/S/S & Other works as per approval work programme in DVC Command Area amounting to Rs. 139.00	88.92
3	Installation of Distribution Transformer - 500KVA	0.00
	Installation of Distribution Transformer - 200KVA	3.93
	Installation of Distribution Transformer - 100KVA	7.79
	Installation of Distribution Transformer - 63KVA	3.91
4	Renovation & Maintenance of existing 33/11 KV P/S/S	6.76
5	DPC Al. wire and Al. Strip	2.28
6	Transformer Oil	2.88
7	Renovation & Strengthening of MRT	3.50
8	Renovation & Strengthening of TRW	8.52
9	Consultancy service for different work programme i.e. Uday Scheme, 24x7 PFA, Tariff Fixation etc.	3.00
10	Training programme and work shop organization	1.00
11	Technology Intervention including IT implementation, ERP, Video Conferencing, enhancement of hardware & software etc. at Nigam Headquarter level	16.00
Total Rs. (In Crs.)		570.00

Apart from the capex work under various State and centrally sponsored scheme, there are some miscellaneous work such as furniture, vehicle, office equipment, building and other civil work expense which forms part of the JBVNL Capital Expenditure. The details of the Miscellaneous Capex work expenditure for FY16-17 is listed in the table below. Similar amount can be earmarked for period from FY 17-18 to FY 20-21 –

Table 12: Capital Expenditure under Miscellaneous Capital Works FY 16-17

Name of Unit (Figures in Rs. Lacs for FY 16-17)		Furniture & Fixture	Vehicle	Office Equipment	Building	Others Civil Works	Total FY 16-17
1	JBVNL Nigam Hqr (A)	50	50	25	200	50	**375**
2	Singhbhum Supply Area	3.5	-	2.5	665	260	**931**
3	Jamshedpur	1.5	-	2.5	265	125	**394**
4	Chaibasa	3	-	3	30	55	**91**
5	Ranchi Supply Area	3	-	42	-	-	**45**
6	Ranchi	6	-	3	140	49	**198**
7	Gumla	0.18	-	0.18	11	5	**16.36**
8	Medininagar Supply Area	5	20	1.5	295	24	**345.5**
9	Daltonganj		-	-	-	-	**0**
10	Garhwa	2.5	40	2.5	90	19	**154**
11	Dhanbad Supply Area	11.45	-	-	-	-	**11.45**
12	Dhanbad	6	-	6	360	130	**502**
13	Chas		-	-			**0**
14	Hazaribagh Supply Area	11.45	-	5.62	17.75	8.95	**43.77**
15	Hazaribagh		-	-	-	-	**0**
16	Ramgarh	34.85	-	13.06	87.12	60.98	**196.01**
17	Giridih Supply Area		-	-	-	-	**0**
18	Giridih		-	-	-	-	**0**
19	Koderma	12	-	25	60	20	**117**
20	Dumka Supply Area	2.5	8.5	5.5	270	39	**325.5**
21	Dumka		-	-	-	-	**0**
22	Deoghar		-	-	-	-	**0**
23	Sahebganj	2	-	3	40	20	**65**
	Total Exp.Under Sub Head	154.93	118.5	140.36	2530.87	865.93	**3810.59**

The planned outlay in Miscellaneous work for the period from FY 16-17 to FY 20-21 is tabulated as below:

Table 13: YoY Capex on Miscellaneous Works

Name of Capital Expenditure	FY 16-17 (in Cr.)	FY 17-18 (in Cr.)	FY 18-19 (in Cr.)	FY 19-20 (in Cr.)	FY 20-21 (in Cr.)
Miscellaneous Work	38.1	50	50	50	50

4.2.7.2 Atal Gram Jyoti

Government of Jharkhand has launched a scheme namely Atal Gram Jyoti Yojana which is associated with centrally sponsored scheme DDUGJY in which lower capacity of single phase DTRs of 10 and 16 KVA capacity shall be replaced with higher capacity of multiple 25 kVA DTR to cater the load of free electric connection in selected villages. Under the scheme, all left over un-electrified households will be provided free electrical connection as well as meters, whereby a total of 2.5 Lac households are expected to be covered.

4.2.7.3 Tilka Manjhi Krishi Pump Yojana

In this scheme Government of Jharkhand has planned to provide free electric connection to rural agricultural pumps. Under centrally sponsored DDUGJY scheme in which feeder separation work is to be done on basis of agriculture & non-agriculture consumers. In this scheme 11 KV line shall be extended and DTRs shall be erected to cater free agricultural pump connection load in rural areas. All small and marginal agriculturist who have pumps and potential farmers who do not have agricultural pump-set will be covered under the scheme, whereby a total of nearly 2 Lac farmers will be benefitted.

Table 14: Capital Expenditure under Atal Gram Jyoti Yojana and Tilka Manjhi Scheme

Name of Scheme	FY 16-17 (in Cr.)	FY 17-18 (in Cr.)	FY 18-19 (in Cr.)	FY 19-20 (in Cr.)	FY 20-21 (in Cr.)
Atal Gram Jyoti Yojana and Tilka Manjhi Yojna	100	100	57.4	-	-

4.3 Capital Structure & Financing Plan

Various state and central government schemes are financed either through Grants, Debt Infusion or equity infusion. While some of the State schemes are 100% grant on the other hand central schemes require necessary contribution of States in form of equity along with the tied up debt. As part of capital investment plan, JBVNL aims to utilize the tied up funds in form of grant, debt and equity for the approved part of the schemes, while the unapproved part of these schemes has been proposed to be funded in the debt equity ratio of 70:30.

In the following sub-section the details of approved part, tied up funding, unapproved part and the funding structure of entire scheme has been discussed in details for each of the schemes.

4.3.1 DDUGJY

Under the DDUGJY scheme, Rs. 3,696 Cr has been approved out of the total proposed amount of Rs 5,813 Cr. by JBVNL. The central government scheme has been planned whereby up to 75% of the funds approved under the scheme can be availed as grants, with 60% of the approved part is available as upfront grant while remaining 15% shall be provided after a period of 2 years. The scheme document also provides for 10% State's contribution while remaining amount needs to be funded through debt.

In line with above, the capital expenditure of Rs.3,696 Cr. has been proposed to be incurred over a period of three years ending FY 19, as per the financing structure envisaged in the scheme. Considering the importance of the infrastructure proposed, the remaining unapproved part of Rs. 2,117 Cr. has been proposed to be incurred in the remaining two years of the MYT control period, i.e. FY20 and FY 21, by way of debt and equity in the ratio of 70:30. The additional grant to the tune of 15% of approved part available after a period of 2 years has been assumed to be utilized towards repayment of the debt in the years when it is obtained. The detailed financing structure is provided in the table below:

Table 15: Financing Structure under DDUGJY

Particulars (Rs. Cr.)	FY 16-17	FY 17-18	FY 18-19	FY 19 -20	FY 20-21	Total
Scheme proposed	1,000.0	1,500.0	1,196.0	-	-	3,696.0
Scheme approved	1,000.0	1,500.0	1,196.0	-	-	3,696.0
Upfront Grant available	600.0	900.0	717.6	-	-	2,217.6
Debt	300.0	450.0	358.8	-	-	1,108.8
Additional grant	-	-	150.0	225.0	179.4	554.4
Debt repayment (out of additional grant)	-	-	150.0	225.0	179.4	-
Resultant debt	300.0	450.0	208.8	(225.0)	(179.4)	554.4
Equity infusion	100.0	150.0	119.6	-	-	369.6
Debt infusion (Unapproved Part)	-	-	-	-	-	-
Equity infusion (Unapproved Part)	-	-	-	-	-	-

The overall grant, debt and equity based on the above financing plan for the MYT period is provided in the table below.

Table 16: Grant, Debt and Equity details for DDUGJY

Particulars (Rs. Cr.)	FY 16-17	FY 17-18	FY 18-19	FY 19 -20	FY 20-21	Total
Total capital expenditure	1,000.0	1,500.0	1,196.0	-	-	3,696.0
Grant	600.0	900.0	867.6	225.0	179.4	2,772.0
Debt	300.0	450.0	208.8	(225.0)	(179.4)	554.4
Equity	100.0	150.0	119.6	-	-	369.6

4.3.2 IPDS

Under the IPDS scheme, a sum of Rs. 952.4 Cr has been approved out of the total amount of Rs 1,126.7 Cr. proposed by JBVNL. In line with the DDUGJY scheme, the funding structure of IPDS also provides for 60% upfront grant, 30% debt and 10% equity infusion by State. An additional grant of 15% is available after a period of 2 years, which can be utilized towards retirement of debt.

The capital expenditure of Rs.778.2. has been proposed to be incurred over a period of three years ending FY19, as per the financing structure envisaged in the scheme. Considering the requirement of the proposed infrastructure, the remaining unapproved part. The detailed financing structure is provided in the table below:

Table 17: Financing Structure under IPDS

Particulars (Rs. Cr.)	FY 16-17	FY 17-18	FY 18-19	FY 19 - 20	FY 20-21	Total
Scheme proposed	109.7	315.5	353.0	-	-	778.2
Scheme approved	109.7	315.5	353.0	-	-	778.2
Upfront Grant available	65.8	189.3	211.8	-	-	466.9
Debt	32.9	94.6	105.9	-	-	233.5
Additional grant	-	-	16.5	47.3	53.0	116.7
Debt repayment (out of additional grant)	-	-	16.5	47.3	53.0	-
Resultant debt	32.9	94.6	89.4	(47.3)	(53.0)	116.7
Equity infusion	11.0	31.5	35.3	-	-	77.8
Debt infusion (Unapproved Part)	-	-	-	-	-	-
Equity infusion (Unapproved Part)	-	-	-	-	-	-

The overall grant, debt and equity based on the above financing plan for the MYT period is provided in the table below.

Table 18: Grant, Debt and Equity details for IPDS

Particulars (Rs. Cr.)	FY 16-17	FY 17-18	FY 18-19	FY 19 -20	FY 20-21	Total
Total capital expenditure	109.7	315.5	353.0	-	-	778.2
Grant	65.8	189.3	228.3	47.3	53.0	583.7
Debt	32.9	94.6	89.4	(47.3)	(53.0)	116.7
Equity	11.0	31.5	35.3	-	-	77.8

4.3.3 RAPDRP – Part A

Although a significant part of the R-APDRP Part- A scheme has already been covered over the last few years, some of the parts have seen a spill over and yet to be covered, especially in FY16-17. A sum of Rs. 219.7 Cr. are expected to be invested under R-APDRP part A with nearly Rs. 164.3 Cr. to be available in form of grant while remaining amount of Rs. 55.5 Cr. has been planned to be funded by way of equity from the State Government. The overall year on year capital expenditure and funding structure is provided in the table below:

Table 19: Funding Structure - RAPDRP Part A

Particulars (Rs. Cr.)	FY 16-17	FY 17-18	FY 18-19	FY 19 - 20	FY 20-21	Total
Total capital expenditure	132.4	40.3	15.1	15.5	16.5	219.7
Grant	128.9	28.6	3.4	3.4	-	164.3
Debt	-	-	-	-	-	-
Equity	3.5	11.6	11.7	12.1	16.5	55.5

4.3.4 RAPDRP – Part B

JBVNL has made significant progress under Part B of the R-APDRP scheme, however, some of the components of R-APDRP Part B are remaining, which JBVNL has planned to cover over the next 2 years. A sum of Rs. 1,315.5 Cr. are is planned to be invested under R-APDRP part B. As per the scheme the financing is provided by way of debt to the extent of 90% of the approved cost, while remaining 10% amount is required to be infused by the State Government by way of equity. It is important to note that as per the scheme, upon achieving the loss reduction targets in the areas, 50% of the debt so provided gets converted into grants.

Based on the above financing plan, the year on year capital expenditure and funding structure is provided in the table below:

Table 20: Funding Structure - RAPDRP Part B

Particulars (Rs. Cr.)	FY 16-17	FY 17-18	FY 18-19	FY 19 - 20	FY 20-21	Total
Total capital expenditure	948.0	352.0	-	-	-	1,300.0
Grant	-	-	426.6	158.4	-	585.0
Debt (repayment)	853.2	316.8	(426.6)	(158.4)	-	585.0
Equity	94.8	35.2	-	-	-	130.0

4.3.5 12th Pan – RGGVY

Under the RGGVY 12th Plan, a total of Rs.1,261 Cr. is proposed to be undertaken over the next 2 years. However, going forward, the unapproved part of the scheme to the tune of Rs.2,029 Cr. is proposed to be undertaken by JBVNL over the rest of the 3 years of the MYT period from FY18-19 to FY20-21. In line with the financing plan of the scheme, out of

approved expenditure, 90% shall be available to JBVNL by way of grant while remaining 10% is to be arranged by the utility by way of debt, which is tied up with REC. The unapproved part is likely to be financed by a mix of debt and equity in the ratio of 70:30. Based on the above financing plan, the year on year capital expenditure and funding structure is provided in the table below:

Table 21: Funding Structure – RGGVY – 12th Plan

Particulars (Rs. Cr.)	FY 16-17	FY 17-18	FY 18-19	FY 19 - 20	FY 20-21	Total
Total capital expenditure	540.0	720.9	-	-	-	1,260.9
Grant	486.0	648.8	-	-	-	1,134.8
Debt	54.0	72.1	-	-	-	126.1
Equity	-	-	-	-	-	-

4.3.6 RGGVY (10th & 11th Plan)

Under the erstwhile RGGVY scheme, an amount of nearly Rs.254 Crore is remaining as the spill-over of the works proposed under the scheme, which JBVNL plans to invest during the current financial year itself. A part of the spill over amount is also related to the works which are ongoing and the payment to the vendors has not been made. Upon commissioning of the works, the final payment shall be made and the total outlay is planned to be covered. In line with the financing structure of RGGVY, an amount of 90% shall be available to JBVNL as grant while remaining 10% shall be raised as debt, which has been tied up with REC. the year on year capital expenditure and funding structure is provided in the table below:

Table 22: Funding Structure - RGGVY 10th & 11th Plan

Particulars (Rs. Cr.)	FY 16-17	Total
Scheme proposed	394	394
Scheme approved	394	394
Upfront Grant available	354.6	354.6
Resultant debt	39.4	39.4
Total	394	394

4.3.7 State Schemes

In addition to the capital expenditure planned under the central government schemes a significant amount has been planned to be invested under various State schemes with funds to be provided to JBVNL in form of grant, debt and equity. The details of capital structure and financing plan for these schemes is discussed in the following sub-sections:

4.3.7.1 Annual Development Plan and Miscelleneous Capital Works

Presently, the funds for ADP and miscellaneous capital works are provided by the State government under its budget or supplementary budget. These funds are provided to JBVNL by way of debt, with an interest rate of around 13% and the in-principal approval for the FY16-17 have already been obtained. However, going forward, JBVNL proposes to obtain these funds by way of debt and equity

Amount of Rs 6,412.1 Cr. is financed through debt and equity financing scheme in the debt to equity ratio of 70% and 30% respectively. For works other than covered under various schemes, mainly towards regular increase in load, conductor replacement, system improvement etc.

Table 23: Funding Structure - ADP and Miscellaneous Works

Particulars (Rs. Cr.)	FY 16-17	FY 17-18	FY 18-19	FY 19 -20	FY 20-21	Total
Total capital expenditure	608.1	1,000.0	1,200.0	1,500.0	1,800.0	6,412.1
Grant	-	-	-	-	-	-
Debt	608.1	700.0	840.0	1,050.0	1,260.0	4,762.1
Equity	-	300.0	360.0	450.0	540.0	1,650.0

4.3.7.2 Tilka Manjhi and Atal Gram Jyoti Yojna (AGJY)

The Tilka Manjhi and AGJY are the State welfare schemes aimed towards providing free connections to rural households and agriculture consumers. The funds are made available under these 2 schemes by the State Government by way of grants. The year on year proposed funds requirement and funding structure is presented in the table below:

Table 24: Funding Structure - Atal Gram Jyoti and Tilka Manjhi Krishi Pump Yojana

Particulars (Rs. Cr.)	FY16-17	FY17-18	FY18-19	FY19-20	FY20-21	Total
Total capital expenditure	100.0	100.0	57.4	-	-	257.4
Grant	100.0	100.0	57.4	-	-	257.4

4.4 Total Capital Investment and Capitalization Schedule

The overall Fund Layout for the schemes are detailed out in the table below:

Table 25: Overall Fund Layout for all Schemes

Capex	FY 16-17	FY 17-18	FY 18-19	FY 19 -20	FY 20-21	Total
DDUGJY	1,000.0	1,500.0	1,196.0			***3,696.0***
IPDS	109.7	315.5	353.0			***778.2***
RAPDRP - A	132.4	40.3	15.1	15.5	16.5	***219.7***
RAPDRP - B	948.0	352.0				***1,300.0***
12th Plan RGGVY	540.0	720.9				***1,260.9***

Capex	FY 16-17	FY 17-18	FY 18-19	FY 19 -20	FY 20-21	Total
ADP + Miscellaneous	608.1	1,000.0	1,200.0	1,500.0	1,800.0	***6,108.1***
Tilka Manjhi + AGJY	100.0	100.0	57.4	-	-	***257.4***
RGGVY 10th & 11th Plan	394.0	-	-	-	-	***394.0***
Total	***3,832.2***	***4,028.6***	***2,821.5***	***1,515.5***	***1,816.5***	***14,014.4***

Based on the funding structure under each of the schemes the overall availability of grant, debt to be raised and equity to be infused by the State over the MYT control period is provided in the table below:

Table 26: Overall Funding Structure

Particulars (Rs. Cr.)	FY 16-17	FY 17-18	FY 18-19	FY 19 -20	FY 20-21	Total
Total capital expenditure	3,832	4,029	2,821	1,515	1,817	14,014
Grant	1,735	1,867	1,583	434	232	5,852
Equity	209	528	527	462	557	2,283
Debt	1,888	1,634	712	619	1,028	5,880

4.4.1 Capitalization Schedule

Capital expenditure is essential for meeting demand growth and prompt upkeep of the network on sustained basis. The erstwhile JSEB has faced severe issues related to the mounting capital works in progress due to slow capitalization and fixed asset transfer of the capital expenditure incurred. This has led to considerable regulatory disallowances in past on account of interest, depreciation and equity returns. It has been observed that one of the key reason behind the slower capitalization is the internal issues related to vendor payment, certificate from electrical inspector, even when the asset has been put to use.

Going forward, JBVNL has planned to undertake stricter control of the capitalization issues and ensure that the internal processes are streamlined in a manner that once the works get completed, it gets transferred to GFA. Therefore, JBVNL has proposed a capitalization period of 2 years for all the proposed works with 60% capitalization of the amount proposed in the concerned year and 40% in the next year for all schemes. The year on year capitalization schedule for the Control Period is summarized in Table below:

Table 27: Capitalization Schedule

Particulars (Rs. Cr.)	FY 16-17	FY 17-18	FY 18-19	FY 19 -20	FY 20-21
Capex Incurred	3,832.23	4,028.64	2,821.48	1,515.46	1,816.54
Capitalization: Year 1	2,299.34	2,417.18	1,692.89	909.28	1,089.92
Capitalization: Year 2	565.32	1,532.89	1,611.46	1,128.59	606.18
Asset Capitalized	**2,864.66**	**3,950.08**	**3,304.34**	**2,037.87**	**1,696.11**

The year on year Capital Work in Progress (CWIP) Schedule is as below:

Table 28: YoY Capital Work in Progress

Particulars (Rs. Cr.)	FY 16-17	FY 17-18	FY 18-19	FY 19 -20	FY 20-21
Opening CWIP	565.32	1,532.89	1,611.46	1,128.59	606.18
Capex during the year	3,832.23	4,028.64	2,821.48	1,515.46	1,816.54
Capitalization	2,864.66	3,950.08	3,304.34	2,037.87	1,696.11
Closing CWIP	1,532.89	1,611.46	1,128.59	606.18	726.62

4.5 Cost Benefit Analysis

JBVNL has proposed the above discussed capital expenditure, over the MYT period with a single focus of ensuring 100% electrification and reliable electricity supply to all consumers. Although, the broader objectives of the planned expenditure may not be easily quantifiable in terms of benefit, but the likely electrification and availability of reliable power supply may directly impact the overall socio-economic status of Jharkhand. It may be important to mention that, as JBVNL has committed to turnaround itself into an operationally sound and financially viable utility, such capital expenditure is of paramount importance. Various Cost benefit which JBVNL is looking to attain are categorized as below:

4.5.1 Reduction in AT&C Losses

A significant part of the capital expenditure is also aimed towards reducing the AT&C losses, which shall directly impact the financial viability of JBVNL in long run and reduce the burden on State Government in future. The efforts undertaken to bring about the cost benefit to the utility and consumer will lead to achievement of operational performance targets such as T&D, Loss reduction, enhancing collection efficiency and reduction in AT& C Losses, the trajectory for which can be as below. JBVNL has proposed to reduce the AT&C Losses to 15% by FY19 as per UDAY Targets. However, considering the practical limitations in reducing the T&D Losses from current level of 28% to 15% and improving the collection efficiency from 89% to 100% by FY19, JBVNL is in process of proposing a realistic trajectory with at least two (2) years of relaxation to the Government of India. The final AT&C loss trajectory is being discussed with GoI, since UDAY Scheme proposes a highly ambitious trajectory. Hence, it is submitted that the final AT&C loss trajectory as approved by the Government of India shall be submitted subsequently for consideration and approval of the Hon'ble Commission.

Table 29: AT&C, T&D Loss, Collection Efficiency Trajectory

Particulars	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Distribution Loss Target	24.20%	20.40%	15.00%	15.00%	15.00%
Collection Efficiency Target	95.00%	98.00%	100.00%	100.00%	100.00%

AT&C Loss Target	27.99%	21.99%	15.00%	15.00%	15.00%

It is pertinent to mention here that the Hon'ble Commission in its Regulations has fixed the collection efficiency to be 100% for the entire duration of MYT Control period. Presently, JBVNL has a collection efficiency of 89.1% during FY15-16, which has become one of the key focus under the unbundled utility regime. Several steps are being undertaken to ensure improvement in the collection efficiency, however, it wouldn't be appropriate that such steps will result in 100% collection efficiency overnight. Although, JBVNL appreciates the importance of 100% collection efficiency in its financial turn-around, but keeping the target to be 100% from first year of MYT control period is not realistic. The topographical and socio-economic conditions also need to be considered while keeping a targets of collection efficiency for Jharkhand, apart from the historical averages. Nevertheless, considering the need to achieve 100% collections, JBVNL plans to achieve the target of 100% by the end of current MYT period. Therefore, it is prayed to the Hon'ble Commission that the proposed trajectory of improvement in collection efficiency may kindly be accepted and approved.

4.5.2 System strengthening

The various positive outcomes JBVNL is expected to draw out of the capital expenditure which is planned to be infused over the control period are listed as below:

System Strengthening – The capital expenditure planned under various financing schemes will help in strengthening the existing distribution infrastructure, the system will be augmented and hence will be able to support increase in demand arising due to electrification of un-electrified households. This will include increasing the current transformation capacity, augmentation of substations, and DTR capacity and increase in feeder line length. The up-gradation of existing distribution infrastructure with feeder improvement program coupled with infrastructure investments under various central government schemes such as DDUGJY, IPDS etc. shall ensure 24X7 reliable power to all consumers in the state.

Metering - With becoming a utility having 100% metering at all levels including rural consumers, installation of smart meters, utilization of technology and the energy accounting shall ensure that the reasons for T&D losses can identified and arrested.

Feeder Separation - The feeder improvement program shall also be instrumental in physical segregation of domestic and agriculture supply. Moreover, DDUGJY Scheme focuses on Feeder separation (rural households and agricultural) and strengthening of sub-transmission and distribution infrastructure. This will help in providing round the clock supply to rural households and adequate power to agricultural consumers.

- The impact of measures to be taken by JBVNL for reduction of AT&C Losses, including feeder segregation, improving billing and collection efficiency through various means

shall not only be instrumental in reducing the overall cost of supply but also result in optimal utilization of national resources at large.

- As JBVNL endeavours to become a regulatory compliant entity with enhanced discipline in tariff filing and recovery of cost impact through Fuel and Power Purchase Cost Adjustment (FPPCA) mechanism, it can be ensured that the gap between the ACS and ARR gets timely addressed. JBVNL will also be able to recover its actual cost of supply and the tariff shocks can be avoided.

4.5.3 Improvement in Consumer Services

It is of paramount importance that the consumers being served by the distribution utility are satisfied of the services they receive, which enhances their willingness to pay. Furthermore, in the current regime of open access wherein all the authorities (State/Central Government, Commission etc.) are trying to bring in competition within the sector, the survival of the utilities itself is hinged on the satisfaction level of its consumers. JBVNL has taken various steps in the direction of improved consumer services which are as below:

Electricity Access - JBVNL has set for itself the target of providing electricity to all households by 2019, the number of sub stations is expected to increase to 642 with nearly 7,188 MVA capacity from existing number of 320 sub-station with 3,687 MVA capacity thus ensuring electricity access for all.

- **Customer Satisfaction Survey** - Survey or Regular interaction with the utility consumers is the most important tool to assess the level of satisfaction. JBVNL understand the importance of identification of key parameters for customer satisfaction assessment & surveys in key geographical areas. JBVNL is planning to conduct workshops with various stakeholders such as consumer groups, MLAs etc. to deepen their knowledge on various aspects and enlighten them about the role each stakeholder can play in the turnaround plan of JBVNL.
- Consumer Service Cell - Centralized consumer service cell is planned to be established, these cells will be operational 24x7. The consumers can register their complaints for theft, no power, burning of meter or transformer, or any other technical issues including the safety issues also.
- IT Enabled Urja Mitra - Under the program, Urja Mitras will be appointed for each panchayat (or cluster of 1,000-1,500 HHs). The Urja Mitra will be trained to use the basic IT tools, including Web and Mobile Applications, who will be incentivized suitably for collecting meter readings and making collection in his designated Panchayat (s)/area / cluster, thus ensuring to meet the AT&C Loss targets.

4.5.4 Employee Motivation

- The Employee Engagement can be termed as the emotional and functional commitment of employees with his organization. JBVNL understands that engaged employees are

happier and hence in turn can be much more efficient. Thus, JBVNL has taken few steps in this direction to ensure the motivation of its employee –

- Capacity building of employees – JBVNL understands that maintaining a well-trained and well-qualified workforce is of utmost importance and thus initiatives in this direction such as classroom training sessions, clarifying work responsibilities, and development of intervention strategies to improve the employee and team performance
- Increased Employee Motivation - JBVNL plans to undertake a comprehensive employee motivation program on continuous basis by conducting regular workshops and trainings.

Thus, it is expected that a pace will be set for JBVNL, which will be characterized by robust infrastructure, monitoring of performance, motivation of employees and technological interventions. Effectively, it will reduce the dependence of JBVNL on State Government and pave foundations for a financially sustainable and a self-sufficient power sector in Jharkhand.

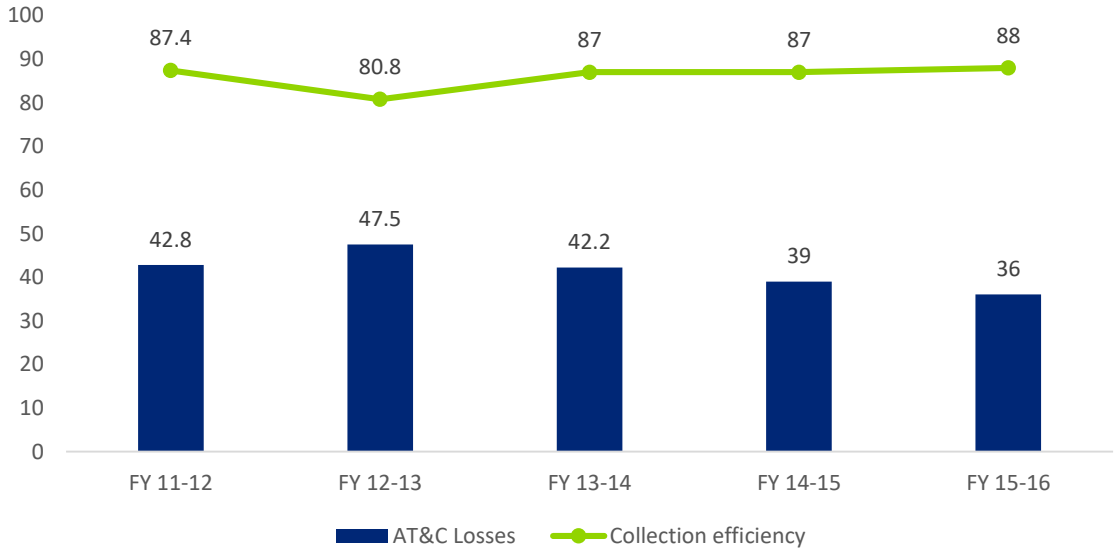
5. Operational Performance Targets and Mitigation Mechanism

5.1 Distribution Loss, Collection Efficiency and Targets

AT&C losses are considered to be the major threat to the operational and financial performance of any Discom and high level of AT&C losses plunges the financial health of the utility. Historically, AT&C losses of JBVNL have been high to the extent of 54.16% in FY 08-09 (erstwhile JSEB), however significant improvement has been witnessed during the last 7 years as the losses have been brought down to 39% in FY 14-15 and 38.00 % during FY 15-16 as seen in the figure below. It is still alarmingly high considering the national average of 23% during FY 14-15.

The AT&C losses vis-à-vis collection efficiency over the period of FY 11-12 to FY 15-16 are provided in the figure below.

Figure 11: AT&C Losses and Collection Efficiency

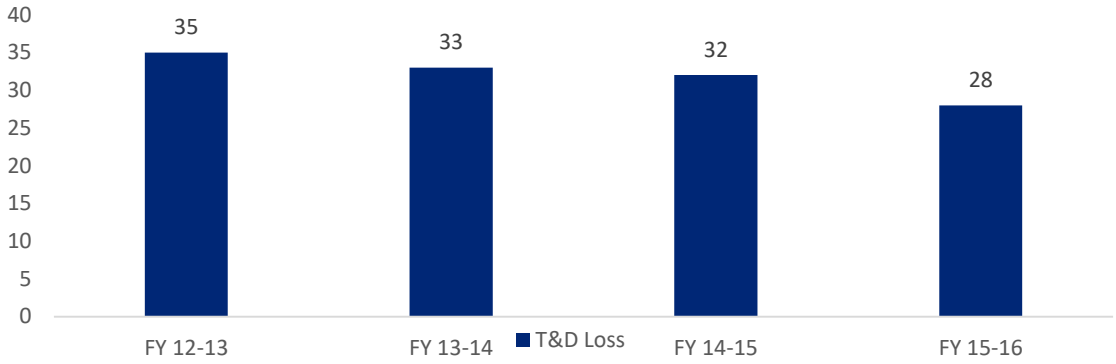


It would have to be clearly recognized that Power Sector will remain unviable until AT&C and Distribution Losses are brought down significantly and rapidly. By any standards, these are unsustainable and imply a steady decline of power sector operations. Continuation of

the present level of losses would not only pose a threat to the power sector operations but also jeopardize the growth prospects of the economy as a whole.

Currently JBVNL has high Distribution Losses upto the level of 28% causing a huge operational and financial loss to the utility. The major effect of Distribution Losses on utility is to purchase excess energy to make required energy available. The Distribution Losses over the period of FY 12-13 to FY 15-16 are provided in the figure below.

Figure 12: Past Distribution Losses (in %)



The excess energy is not being considered by Hon'ble commission and several regulatory disallowances have been done on inefficiencies. As projected in the next chapter, the energy requirement at the State periphery is likely to increase from 12,227 MU in FY 15-16 to nearly 21,056 MU in FY 20-21 and the Distribution Losses are expected to reduce from 28% in FY16 to around 15% in FY 18-19, owing to the numerous measures proposed by the State utility as discussed in the section below.

As discussed in Section 4.5.1, the loss trajectory is indicative and as per UDAY targets. However, the final trajectory to be approved by Govt. of India, considering the practical difficulties, shall be submitted to the Hon'ble commission. The year on year targets for reducing AT&C losses, Distribution Losses and increasing collection efficiency are provided in the table below:

Table 30: Targets AT&C Losses, Collection Efficiency and Billing Efficiency

Parameters	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Distribution Losses	24.20%	20.40%	15.00%	15.00%	15.00%
Collection Efficiency	95.00%	98.00%	100.00%	100.00%	100.00%
AT&C Losses	27.99%	21.99%	15.00%	15.00%	15.00%

5.2 Mitigation Mechanism

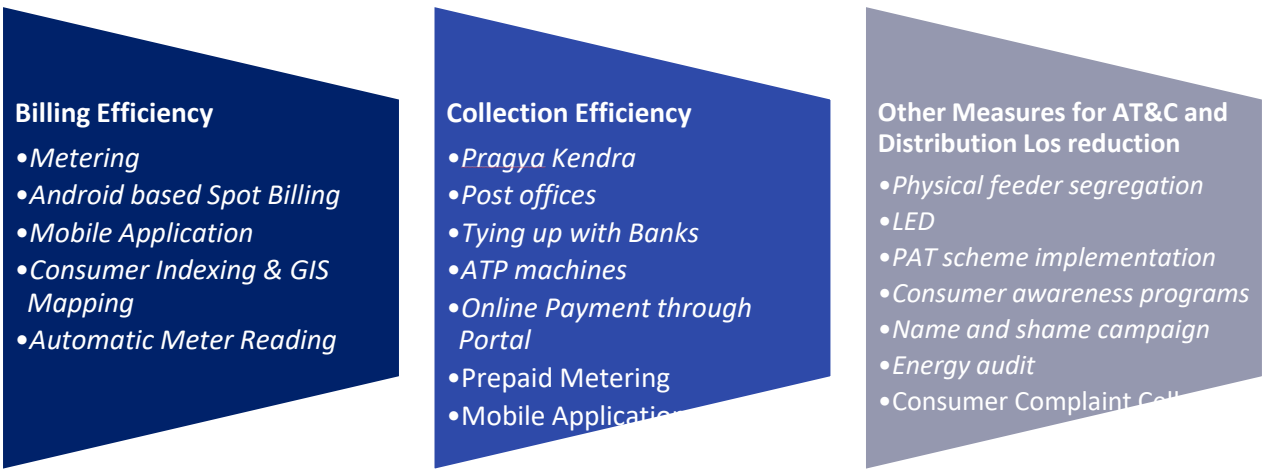
In order to facilitate the reduction of AT&C losses and improve the power distribution system, the Government of India has already launched various schemes, which have been instrumental in facilitating reduction of AT&C losses in JBVNL areas as well. Some of these schemes including:

- R-APDRP – for strengthening of sub-transmission and distribution systems,
- DDUGJY – for separation of agriculture and non-agriculture feeders in rural areas and strengthening & augmentation of sub-transmission and distribution infrastructure
- IPDS - which covers strengthening & augmentation of sub-transmission and distribution infrastructure including metering at consumers, feeders and distribution transformer levels in the urban areas.

Additionally, various state level initiatives and best practices being adopted by JBVNL are likely to help in reducing AT&C losses and improve operational efficiency. These initiatives include use of modern technology, meticulous planning, maintenance and up gradation of distribution infrastructure such as use of Aerial Bunched Cabling (ABC) in high theft areas, Geographical Information System (GIS) and consumer indexing for energy audit and identify loss pockets, High voltage Distribution System (HVDS) to reduce line losses, and other measures including analytics software, pre-paid metering, AMR, unmanned sub-stations, business process re-engineering, deployment of SCADA/ DMS and real-time energy auditing and accounting.

The major steps taken/ planned to be taken by JBVNL to reduce the AT&C and Distribution Losses can be categorized in following segments, with specific measures discussed under each segment, as presented in the figure below:

Figure 13: Action Plan for AT&C and T&D Loss Reduction



5.2.1 Improving Billing Efficiency

Following measures are being taken to improve the billing efficiency in the state. Although, metering at all levels is the foremost measure which will result in drastically improved billing efficiency, there are several other steps being undertaken, as discussed below:

I. Metering

Compulsory feeder and Distribution Transformer (DT) metering shall be done by the States within the stipulated timelines of UDAY scheme signed on 5th Jan 2016. Through complete metering and energy accounting, JBVNL will be able to track the losses at the feeder and DT level for identification of loss making pockets of consumers and take necessary corrective action. Metering will help utility in controlling theft and pilferages and control the losses. A comprehensive study has already been done and targets related to metering have been set and discussed in the earlier sections of metering.
Moreover, JBVNL is also focusing on the type of meter being installed and as a part of this, it has already started changing all the electro-mechanical meter into electronic meters to reduce the theft and the defective meters are being replaced on regular basis.

II. Android based Spot Billing

JBVNL is in the process of appointing an agency, which shall employ meter readers to be named as “Urja Mitras” who will responsible for meter reading, bill generation, bill distribution and collection, thus becoming a touch point for consumers. In order to serve the consumers in a focused manner, one Urja Mitra shall be appointed for a batch of each 1,000-1,500 consumers or batch of DTRs in urban areas or Panchayats.

The entire activities enumerated above shall be carried out on a centralized android based mobile application platform, with all hardware related to field activities such as mobile and Bluetooth printer etc. to be provided by the Agency selected for appointing Urja Mitras.

III. Mobile Application

In order to achieve the above objectives, JBVNL is in the process of appointing a Software Service Agency (SSA), who will develop a centralized platform for android based mobile meter photo reading, billing, collection and managing Urja Mitras along with all necessary software and hardware. The software and mobile application to be developed by SSA must ensure that the existing billing software for the R-APDRP areas, already existing with JBVNL, gets integrated to the software and mobile application to be developed.

IV. Consumer Indexing & GIS Mapping

Consumer indexing by the use of GIS can effectively help utility in managing information related to the distribution of electricity to consumers and information describing the attributes of each consumer. Consumer Indexing (CI) can also help utility in finding out the exact location of the consumer through which feeder, or transformer, or circuit

number and or pole consumer is being supplied. Identification of these data can help in identifying the loss making areas for corrective actions.

To achieve the above the above loss reductions, Utility has already taken significant steps in consumer indexing and GIS mapping. Under the R-APDRP program, out of 30 RAPDRP towns, 22 towns have already gone-live with complete consumer indexing and GIS mapping. The remaining 8 towns are scheduled to go-live by March 2016.

V. Automatic Meter Reading

JBVNL is focusing on Automatic meter reading (AMR) which assist in collection of data from consumption meters located at customers premises via telecommunication links. AMR has been installed by JBVNL for all HT consumers and a dedicated AMR cell has been formed for the monitoring of HT consumers.

AMR is essential in order to tap the significant revenue realisation from the HT consumers. Moreover, AMR brings other significant benefits to the consumers and utility by providing-

- increased meter-reading accuracy,
- fewer estimated bills,
- rapid response to read requests,
- automatic leak detection and billing options and
- Provides detailed usage information about individual sites, which allows the utility to offer variable rates and encourage price-responsive behavior among customers.

VI. Theft reduction by installing A.B Cables

JBVNL has installed 773 Km single phase and 1,174 km 3-phase A.B cables to stop the theft being done by Hooking. Also, procurement of 1,860 km single phase and 990 km A.B cables are underway.

5.2.2 Collection efficiency Improvement

To enhance the collection, JBVNL has launched one time settlement scheme, under which several discounts are being provided on payment of old electricity bills. JBVNL is also focusing on enhancing its collection efficiency by providing several payment avenues to consumers as discussed below:

I. Pragya Kendra

In order to facilitate the consumers, JBVNL has entered into an agreement with CSC Pragya Kendra for “online electricity bill payment collection of energy bills.” Here, CSC SPV shall provide the electricity bill collection facilities at the first instance in rural and urban areas in respect of all consumers of JBVNL through the CSC (common service centres) on behalf of first party and allowing consumers of the specified areas of JBVNL to avail the benefits.

Also, JBVNL portal is integrated with CSC E-Wallet payment mechanism for allowing CSC to pay electricity bill with complete assistance with CSC operator. CSC shall issue system generated receipts having proper receipt number provided by JBVNL through web service.

II. Mobile Application

Payment through Mobile Application is planned to be introduced under the JBVNL Bill Collection System to improve the overall efficiency of the system. Mobile App can also be a source for providing Billing Information, Billing History, Payment Options and Complaint Management (Billing and Supply) etc. to the consumers.

III. Post offices

To enhance the collection centers, JBVNL has entered into an agreement with the state post offices. Here, the post office shall receive cash within the jurisdiction of respective supply circles office. While accepting the payment from the consumers, the post office shall issue computer generated receipts against the amount of bill so paid by the consumers.

IV. Tying up with Banks

Considering the convenience and ease of the consumers and in order to facilitate more collection points in the state, JBVNL has tied-up with few banks. The role of the bank is to facilitate consumers to deposit their electricity bill and to issue receipt against the bill deposition of the consumers. Here the bill van be paid through cash, cheque and draft.

V. ATP machines

JBVNL in its endeavor to enhance its customer service base has launched Any Time Payment (ATP) Machine for the convenience of its consumers, who can pay their electricity bills round the clock- 365 days, either by cash or cheque and get a receipt of the amount paid on the service number of the consumer. In order to provide high benefits to the consumer in payment of electricity bills, 69 ATP machines are under installation. The ATP Machine has a touch screen, through which the consumers can enter their Service Number and pay the amount and get a receipt/statement of the amount paid. The machine has the provision to take currency notes. A separate slot will accept cheques in the same manner.

VI. Prepaid Metering

In order to achieve its objective of 100% Collection Efficiency, JBVNL is planning to introduce a concept of Prepaid Metering for all its consumers. The reasons for poor collection efficiency can be manifold. Pre-paid metering, which operates on the concept of ‘pay before you use’, just like the pre-paid telecom connections, offers a rewarding alternative to the conventional post-paid metering system which would inherently address the issue of low collection efficiency by eliminating the need for

collection itself. The fact that payment is made prior to consumption implies both a significant improvement in the collection of revenues and a reduction in working capital requirement.

VII. Online Payment through Portal

JBVNL has initiated the payment of electricity bill through its online portal (https://www.jbvnl.co.in/apply/viewbill.php) to provide more ease and convenience to its consumers. Here the consumer can check the status of their bill and can make payment of bills through internet.

5.2.3 Other Measures for AT&C and Distribution loss reduction

As discussed above, JBVNL has planned/taken various measures for improvement of billing and collection efficiency. Mentioned below are few measures for bringing down the AT&C losses in the state.

I. Physical feeder segregation – March 2018

JBVNL realizes that separating the feeder can lead to better load management and increased power supply for rural households and industries. In view of this 259 villages of Jharkhand shall be covered under DDUGJY, a central scheme of Govt. of India, which aims to provide regulated supply to agricultural consumers and 24X7 power supply to non-agricultural consumers of rural areas.

In this regard, the total project cost of Rs. 3,696.22 Cr. is sanctioned by REC/MoP. The state owned scheme namely Atal Gram Jyoti Yojna and Tilka Manjhi Krishi Pump Yojna is linked with DDUGJY where the process for recasting of infrastructure is under process and tendering will be taken up at earliest.

Data in this respect has been collected and analysis based segregation plan shall be rolled out to ensure that feeders are not overloaded. It is also noteworthy that Feeder segregation program can improve the low voltage, frequent power outages issues.

II. Revenue Intelligence Cell

JBVNL intends to set up a Revenue Intelligence Cell which will monitor revenue collection of both the LT and HT consumers, the task of cell will Includes both recovery of revenue (e.g. back-billing) and prevention of future potential revenue loss (e.g. reduced theft); monitor the activities which resulting in Loss of Revenue and hence the decrease in efficiencies of scale.

III. Consumer Indexing

JBVNL has already taken up the activity under which GIS-based asset mapping and consumer indexing service identifies and registers the electrical connectivity and

geographical position of every electrical asset and identifies all consumer connections within the power distribution network. GIS Asset Mapping and

Consumer Indexing is nearly completion in most of towns in all urban offices of Jharkhand

IV. LED for domestic and other category consumers under DELP

The total energy consumption of Domestic Consumers in Jharkhand is around 3,065 MU for FY15. A large numbers of incandescent lamps are still used in households to serve the lighting needs. Incandescent lamps are highly inefficient as 95% of electricity used by them is converted to heat. They can be replaced by LED lamps, which are 90% more energy efficient. The penetration of LED bulbs can reduce the Input Energy for JBVNL and thus enabling the Utility to save a substantiate amount on energy procurement. However, this is constrained by the initial high cost barrier. The incandescent lamps are available at Rs. 10-15 while LED lamps sell at Rs. 400-500, as a result the penetration of LED bulbs in household sector is less than 1%.

JBVNL has adopted the scheme called Domestic Efficient Lighting Scheme (DELP) developed by EESL to provide energy efficient LED lighting to grid-connected consumers in the domestic sector where high quality LED bulbs are given to households at an affordable price to encourage them to invest in energy efficiency. The large-scale replacement of incandescent lamps and CFL's with LEDs leads to savings in peak power for JBVNL and lower power consumption of households. The relevance of DELP program is significant in case of JBVNL, as it targets to electrify ~30 Lac households over next 3 years. The prevailing tariff for domestic consumers in state is highly subsidized, thus reducing their energy consumption by use of LEDs will help in reducing the cross subsidization requirement, leading to avoidance of AT&C losses. An independent mechanism for monitoring and verification of savings shall be established. As on March 08, 2016, more than 54 Lac LEDs have already been distributed in the state under this program.

V. Energy Efficiency Equipment Scheme

In line with the MoP scheme of Standard and Labelling programme for equipment and appliances, State is looking forward to introduce the same to provide the consumer an informed choice about the energy saving and thereby the cost saving potential of the relevant marketed product such as Room Air Conditioners, Fluorescent Tube Lights, Frost Free Refrigerators, Distribution Transformers, which have been notified under mandatory labelling from 7th January, 2010

VI. PAT scheme implementation

Industrial consumers accounted for nearly 45% of energy sales of JBVNL in FY 15 and the sales to Industrial consumers has been growing at CAGR 7.1% YoY for past 5 Years. Under Perform Achieve and Trade (PAT) Mechanism, specific energy consumption targets are established plant wise rather than a sectorial target.

Jharkhand understands the importance of adoption of PAT scheme and steps have been taken for successful implementation of this program. JREDA has floated a tender in this regard for hiring an agency who are experienced in the field of energy efficiency. Implementing perform, Achieve and Trade (PAT) and other BEE scheme to provide manpower support to enable the State Designated Agencies (SDA), JREDA, to coordinate, regulate and enforce various provisions of the EC Act 2001.

The manpower engaged are expected to work in tandem with other SDA officials and facilitate SDA, JREDA, Jharkhand in achieving the target energy saving along with smooth and timely completion of other SDA activities pertaining to promotion of efficient use of energy and its conservation. This shift in focus is necessitated due to the fact that energy efficiency implementation in industries (PAT) and four major categories of appliances under Standard & Labelling (S&L) scheme is in mandatory phase. Vision document of the 12th five year plan envisages 75% new construction of all commercial buildings in the 12th plan period to be ECBC compliant

VII. Consumer awareness programs

In view of lack of consumer awareness, JBVNL has taken an initiative to increase consumer awareness about the need for Energy Efficiency (EE) and Energy Conservation (EC) and the manner in which EE/EC can be brought about by undertaking extensive consumer awareness campaigns. The emphasis has been laid down on increasing interaction with the consumers by making them aware of the various initiatives which can be devised from there end to ensure a significant Energy Conservation. Moreover, the new initiative of Urja Mitra will further help in consumer awareness by becoming a utility's touch-point for the consumers, at their door-step.

VIII. Name and shame campaign to control power theft

The MoU signed by state government and JBVNL clearly outlines the commitment made by Discom to achieve 100% Collection Efficiency, the MoU suggests using "Name and Shame campaign" for this purpose. JBVNL understands that there can significant change in collections through such campaigns. JBVNL is planning to roll out various plan in this respect with the help of print and internet media, whereby the names of dishonest consumers shall be published on the website. Also, JBVNL is also planning to stick posters in each division / sub-division office highlighting names of dishonest consumers.

IX. Energy Audit up-to 11kV level in rural areas

Energy audit, also termed as energy assessment, as a step to assess how much energy it's consumes requires and to evaluate what measures can be taken to make

it more energy efficient. JBVNL is in the advanced stages of getting an energy audit done upto 11kV level. JBVNL understands that an assessment will show the problems that may, when corrected, save significant amount of money over time.

6. Energy Sales Projections

6.1. Introduction

This Chapter summarizes the year on year increase in number of consumers vis-à-vis increase in sales in the JBVNL served area. The projections for the control period have been made considering the past figures of FY 11-12 to FY 14-15, provisional figures of FY 15-16 and the targets envisaged under PFA as the base.

Jharkhand is amongst the first state to enter into the 24X7 Power for All (PFA) Program. The Power for All program is a joint initiative of Government of India (GoI) and State Governments, aiming to achieve 24X7 availability of reliable power to all households, industrial, commercial establishments and all other electricity consuming entities by the end of FY 18-19. In addition to achieving 100% electrification, the State has also planned to ensure 24 hours supply to all consumers, leading to significant increase in consumer base and sales in the coming years. Keeping these aspects in view, the projections for consumer numbers and energy sales have been done.

6.2. Consumers- Historical and Projections

JBVNL holds a large consumer base of around 28.5 Lac consumers as on February 2016. The details of consumer mix and increase in consumer base over the FY 11-12 to FY 15-16 can be depicted from the table below. It can be noted that in FY 2015-16, the domestic consumers contributes nearly about 91% in the total consumer mix, while commercial consumers stands at 6% and rest 3% are contributed by Industrial and others consumers.

Table 31: Consumers- Historical

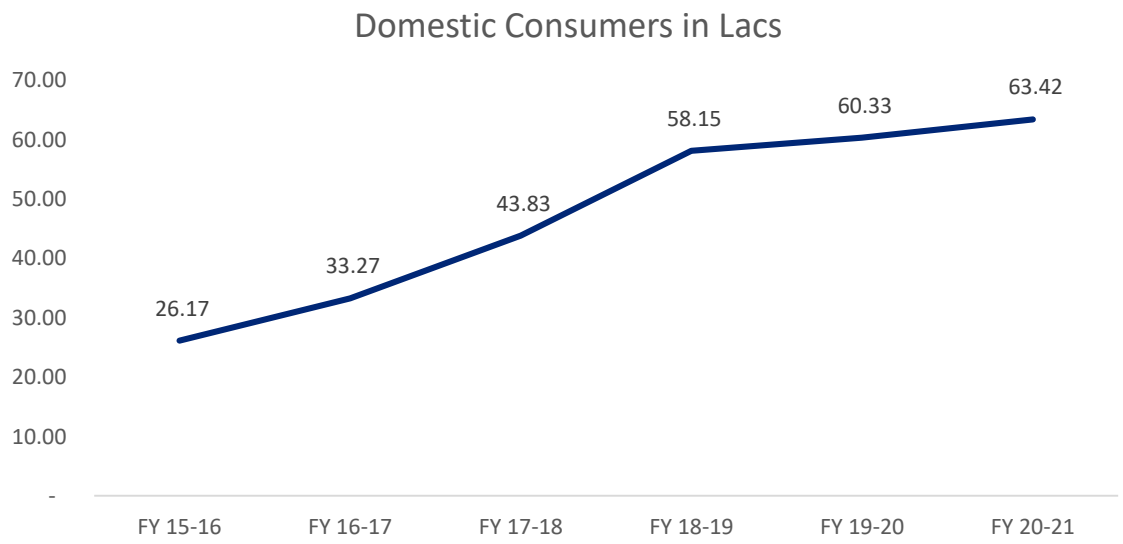
JBVNL	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16
Domestic	1,814,903	2,094,834	2,264,392	2,473,327	2,616,621
Commercial/Non Domestic	121,393	132,746	145,835	159,099	174,111
Public Lighting / SS	532	566	570	539	541
Irrigation / IAS	25,943	28,243	32,651	38,896	44,518
MES	7	7	7	7	7
Industrial LT / LTIS	12,976	12,779	14,787	13,596	13,809
Industrial HT / HTS / S	1,470	1,544	1,558	1,593	1,636
Railway / RTS	13	13	13	13	13
Bulk Supply			-	-	
Inter State Sales			-	-	
Total	1,977,237	2,270,732	2,459,813	2,687,070	2,851,256

I. Projection of Domestic Consumers

This category includes all residential premises for domestic use for household electric appliances such as Radios, Fans, Televisions, Desert Coolers, Air Conditioner, etc. and including Motors pumps for lifting water for domestic purposes and other household electrical appliances not covered under any other schedule. This rate is also applicable for supply to religious institutions such as Temples, Gurudwaras, Mosques, Church and Burial/Crematorium grounds and other recognized charitable institutions, where no rental or fees are charged whatsoever.

It can be noted from the table above that domestic consumers have grown at a CAGR of 11% over the FY 11-12 to FY 15-16. Under the vision of Hon'ble Prime minister of electrifying all households (HHs) by FY 18-19 in the state, JBVNL has put special focus on electrifying all the unconnected HHs. Considering the large scale electrification planned under the PFA Program, the projections of domestic consumers based on past CAGR of 11% may not be realistic. Therefore, projections of domestic consumer is done in keeping the targets of PFA of electrifying 30 Lacs unconnected domestic consumers and expected additional new HHs to be constructed during the MYT period. Although JBVNL targets to achieve the electrification by FY 18-19, certain level of spill over may be unavoidable. Hence, in the first 3 years, a total of 30 Lacs HHs are projected to be added to the JBVNL network, while for FY 19-20 and FY 20-21, 0.68 Lacs HHs are projected to be added. The year on year electrification of urban and rural households are provided in the figure below.

Figure 14: Projection of Domestic Consumers (In Lacs)

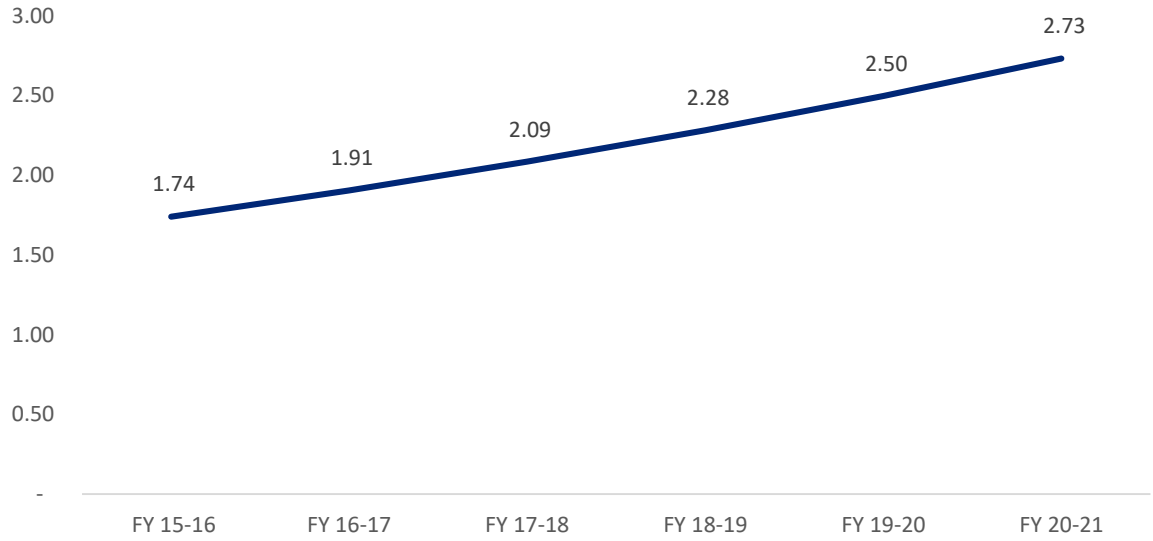


II. Projection of Commercial Consumers

Commercial Consumers are all those consumers using electrical energy for light, fan and power loads for non-domestic purposes like shops, hospitals (govt. or private), nursing homes, clinics, dispensaries, restaurants, hotels, clubs, guest houses, marriage houses, public halls, show rooms, workshops, etc.

For projecting the Commercial consumers for FY 16-17 to FY 20-21, 4 year CAGR has been computed based on the historical data of FY 11-12 to FY 15-16 i.e. 9.5%, which has been applied on the actual number of consumers during FY 15-16. Based on above, the projected number of commercial consumers for the MYT period are shown in the figure below.

Figure 15: Projection of Commercial Consumers (In Lacs)



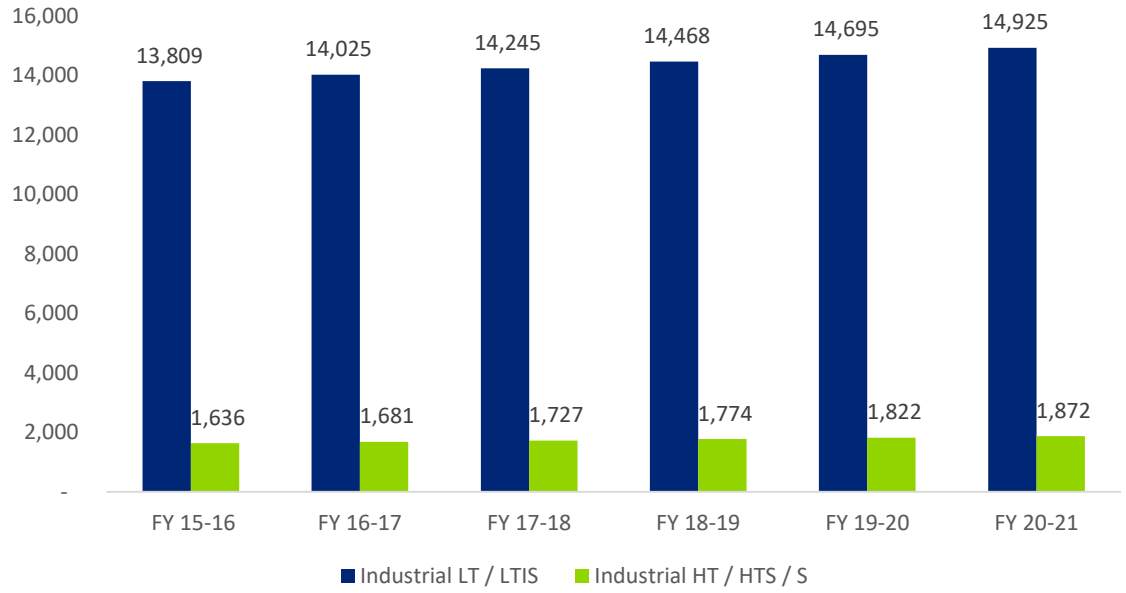
III. *Projection of Industrial Consumers*

Industrial Consumers are comprised of mainly two following sub categories-

- **LT consumers-** This category applied on all industrial units applying for a load of less than or equal to 100 kVA (or equivalent in terms of HP or kW).
- **HT Consumers-** The category applied on all consumers having contract demand above 100 kVA.

For projecting the industrial consumers for FY 16-17 to FY 20-21, 4 year CAGR has been computed for LT and HT consumers based on the historical data of FY 11-12 to FY 15-16 i.e. 1.57% and 2.72% respectively. The 4 years CAGR has been applied on the actual consumers during FY 15-16. Projections for the LT and HT consumers for FY 16-17 to FY 20-21 as shown in the figure below.

Figure 16: Projection of Industrial Consumers

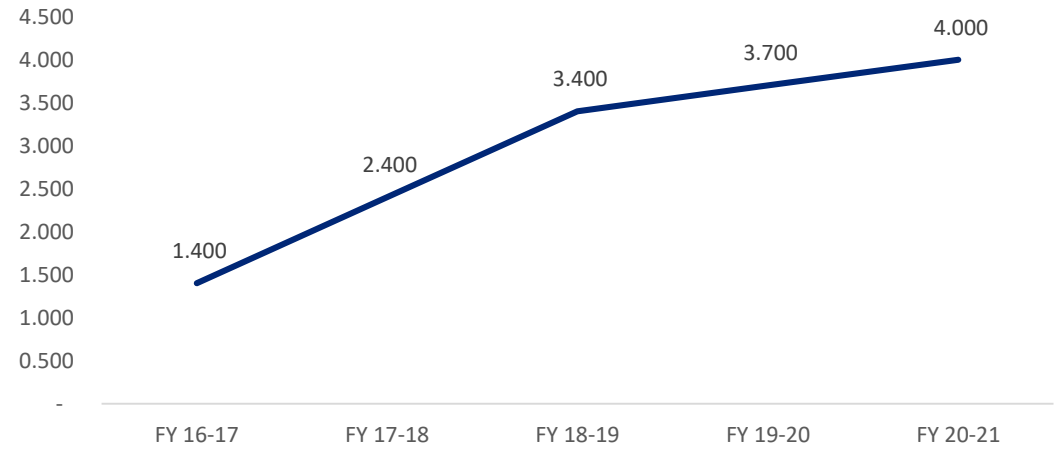


IV. *Projection of Irrigation & Agriculture Service Consumers*

This category shall apply to all consumers for use of electrical energy for Agriculture purposes including tube wells and processing of the agricultural produce, confined to Chaff-Cutter, Thresher, Cane crusher and Rice-Hauler, when operated by the agriculturist in the field or farm and does not include Rice mills, Flour mills, Oil mills, Dal mills, Rice-Hauler or expellers.

JBVNL has planned to provide free electricity connections to 100,000 agriculture consumers every year in the State, over the next 3 years period under the "Tilka Manji" scheme. The impact of addition of such consumers must be considered while projecting the number of agriculture consumers. The number of projected agriculture consumer for the Irrigation & Agriculture consumers for FY 16-17 to FY 20-21 as shown in the figure below.

Figure 17: Projection of Irrigation & Agriculture Service Consumers (In Lacs)



V. *Projection of Other Consumers*

Other Consumers are characterized into following three categories.

- **Public Lightning-** This category shall be applied for use of Street Lighting system, including single system in corporation, municipality, notified area committee, panchayats etc. and also in areas not covered by municipalities and Notified Area Committee provided the number of lamps served from a point of supply is not less than 5.
- **MES-** This includes Military Engineering Services (MES) for a mixed load in defense cantonment and related area.
- **Railways-** It is to pertinent to mention that railway traction consumers has been considered to be 3 for the control period as the railway traction has been shifted from JBVNL's network and opted for purchase of power through open access only.

To summarize, the projection of other consumers for MYT period, last 4 year CAGR has been considered for Public Lightning and MES consumers based on their historical data of FY 11-12 to FY 15-16 i.e. 0.5% and 0.75% respectively. The 4 year's CAGR has been applied on the actual consumers during FY 15-16.

The category wise Projection of consumers all categories for FY 16-17 to FY 20-21 are detailed below.

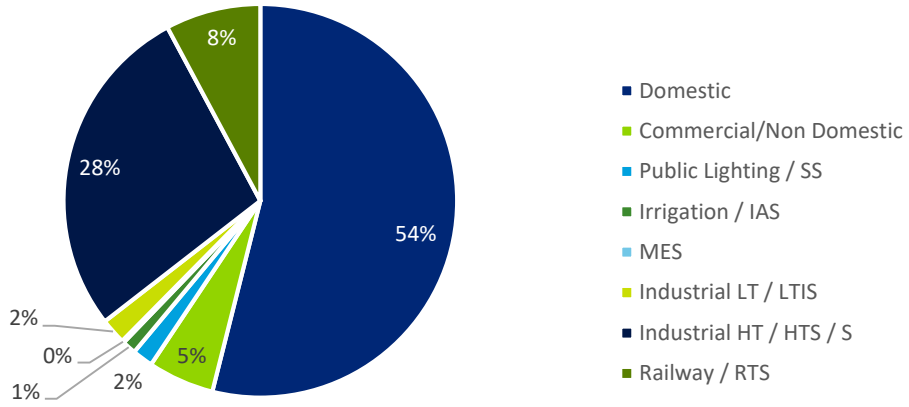
Table 32: Consumers- Projections

JBVNL	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Domestic	3,326,629	4,383,146	5,814,595	6,033,229	6,342,295
Commercial/Non Domestic	190,539	208,517	228,191	249,722	273,285
Public Lighting / SS	544	546	548	551	553
Irrigation / IAS	140,000	240,000	340,000	370,000	400,000
MES	8	8	8	8	8
Industrial LT / LTIS	14,025	14,245	14,468	14,695	14,925
Industrial HT / HTS / S	1,681	1,727	1,774	1,822	1,872
Railway / RTS	3	3	3	3	3
Bulk Supply					
Inter State Sales					
Total	3,673,429	4,848,192	6,399,588	6,670,030	7,032,941

6.3. Energy Sales: Past Trend and Projections

JBVNL holds the high consumer base of around 28.51 Lacs consumers with total energy sales of around 8,450 MUs in FY16. As shown in the figure below, it can be noted that during FY 15-16, the domestic consumers contributes nearly about 54% in the total energy mix, while HT consumers holds 27% and remaining energy consumption is done by LT, Commercial, IAS and other consumer categories.

Figure 18: Sales Mix (2015-16)



The details of sales mix and increase in energy sales over the FY 11-12 to FY 15-16 can be depicted from the table below.

Table 33: Sales in MUs- Historical

JBVNL	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16
Domestic	2,483.32	2,888.55	3,318.50	3,735.40	4,557.19
Commercial/Non Domestic	339.84	339.21	392.42	426.65	460.26
Public Lighting / SS	131.69	127.18	176.59	140.50	143.57
Irrigation / IAS	64.78	67.71	79.96	87.00	95.99
MES	15.00	15.00	15.05	15.31	15.57
Industrial LT / LTIS	165.05	157.27	181.81	174.98	178.42
Industrial HT / HTS / S	2,221.90	2,532.67	2,359.40	2,308.45	2,338.04
Railway / RTS	641.20	658.73	653.61	656.50	661.68
Bulk Supply			-	-	-
Inter State Sales	435.41	473.79	-	-	
Total	6,498.19	7,260.11	7,177.34	7,544.79	8,450.72

JBVNL has witnessed a significant growth in the total Sales across all categories in the last five years, as can be seen in the table above. It is pertinent to note that since 2011, JBVNL has been able to considerably increase the availability of power, because of which the sales of JBVNL have been able to grow at a rapid rate. This is primarily due to the reduced load shedding and additional supply availability. Additional availability of power to the consumers resulted in uninterrupted supply of power to majority of consumers and hence resulted in considerable increase in the consumption and in turn the Sales of JBVNL. The additional power has boosted the State's industrial growth and helped it maintain the momentum in the service sector. Considering that JBVNL aims to provide 24X7 power to all consumers in the State, the energy sales in the MYT control period are expected to witness a significant increase. The category wise projection of energy sales for FY 16-17 to FY 20-21 are discussed below.

I. Projection of Energy Sales to Domestic Consumers

JBVNL has witnessed an annual growth of 14.5% in the energy sales to domestic consumers in the last four years. However, it is pertinent to note that in line with the year on year addition of domestic consumers as discussed above, a higher consumption growth must be assumed for the projections of energy sales. Considering the objectives of electrification and providing 24X7 electricity supply to all household consumers, due care has to be taken for projections of energy sales.

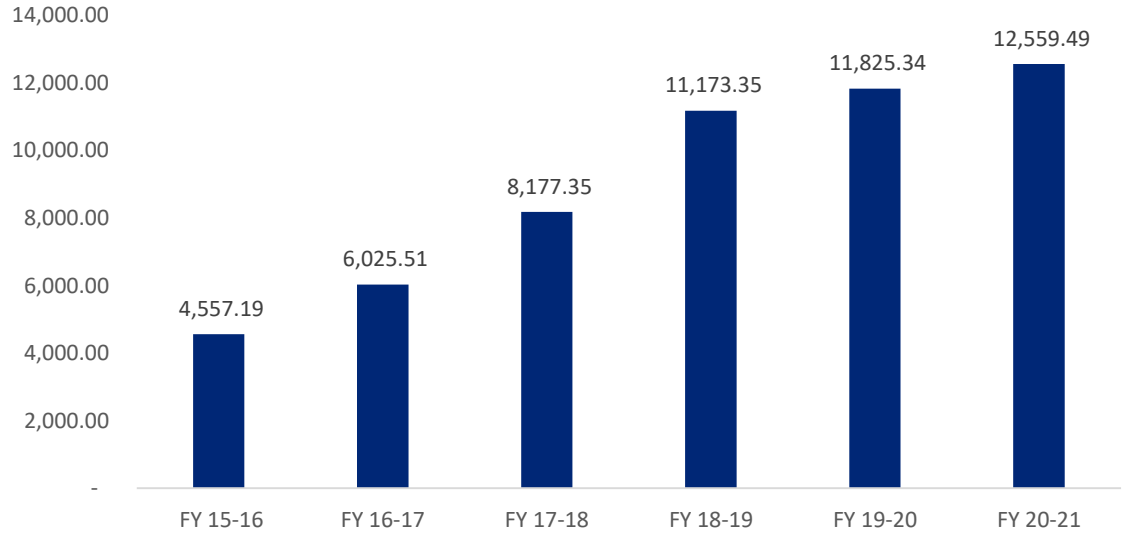
In order to estimate the energy sales for domestic consumers, the existing energy consumption for each domestic consumer is estimated, which has been observed to have grown at a CAGR of nearly 6.22% during the last 5 years period. This is mainly on account of increase in number of hours of supply during the last few years, which presently stand at around 20-22 hours in urban areas and 16-18 hours in rural areas. Going forward, as JBVNL proposes to provide 24X7 electricity supply, the demand from domestic consumers is expected to increase, however at a slightly lower rate.

Table 34: Demand projection of Domestic consumers (In KWh)

Particulars	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Demand of domestic consumers (In KWh)	1,741.63	1,844.57	1,930.20	2,033.43	2,033.43	2,033.43
Increase in demand	6.22%	5.91%	4.64%	5.35%	0.00%	0.00%

The year on year demand of domestic consumers calculated above, is then multiplied by the total consumers forecasted for the respective year to arrive on the total sales of domestic consumers. Figure below represents the year on year increase in consumption of electricity of domestic category.

Figure 19: Projection of Domestic Sales (MUs)



II. *Projection of Energy Sales to Commercial Consumers*

For projecting the sales of commercial consumers for FY 16-17 to FY 20-21, 4 year CAGR has been computed based on the historical data of FY 11-12 to FY 15-16. The CAGR of last 4 years i.e. 7.88% has been applied on the actual sales on FY 15-16 to project the consumers for FY 16-17 to FY 20-21.

III. *Projection of Energy Sales to Industrial Consumers*

The Sales growth rate for LT Industrial and HT Industrial consumers between FY 11-12 and FY 15-16 was 2.0% and 1.28% respectively. It is pertinent to note that since FY 11-12, JBVNL has been able to considerably increase the availability of power and has substantially reduced the load shedding. Hence, This category wise CAGR has been then applied on the actual sales on FY 15-16 to project the consumers for FY 16-17 to FY 20-21.

IV. *Projection of Energy Sales to Irrigation & Agriculture Service Consumers*

For projecting the sales of Irrigation & Agriculture Service Consumers for FY17 to FY21, the existing sales per consumer has been considered, which is estimated to be around 2,165 kWh per annum. As discussed earlier, the existing Tilka Manjhi scheme is being proposed to be extended to provide free energy efficient pumps to all agriculture consumers along with the electricity connections. The installation of energy efficient pump-sets is expected to reduce the average consumption by around 30%, thus the energy consumption of the new agriculture consumers is considered to be 1,515 kWh per annum. Based on the consumption per consumer, the energy sales for the agriculture consumers has been projected.

V. *Projection of sales to Other Consumers*

For projecting the sales of other consumers for MYT Period from FY 16-17 to FY 20-21, 4 year CAGR has been computed based on the historical data of FY12 to FY16. This category wise CAGR has been then applied on the estimated sales on FY 2015-16 to project the consumers for FY 16-17 to FY 20-21 as shown in the table below. The CAGR taken for projecting the sales for Public Lightning and MES consumers is 2.18% and 1% respectively.

It is to pertinent to mention that sales to railway traction has been considered to be reduced to only 3 consumers as the railway traction has been shifted from JBVNL's network and opted for purchase of power through open access only.

It can be observed that for some categories there are slight deviations in CAGR of energy sales and growth rate of number of consumers which can be possible due to various energy efficiency measures taken by the utility across all the categories and increased hours of supply. However, it has been observed from the past experience that the historical trend method has proved to be a reasonably accurate and well accepted method for estimating the load, number of consumers and energy consumption. In light of the above, JBVNL has estimated energy consumption for various customer

categories primarily based on the CAGR trends during past years. Wherever it is observed that the trend is unreasonable or unsustainable, the growth factors have been corrected to arrive at more realistic projections.

Table 35: Projection of Sales in MUs

JBVNL	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Domestic	6,025.51	8,177.35	11,173.35	11,825.34	12,559.49
Commercial/Non Domestic	497.08	536.85	563.69	591.88	621.47
Public Lighting/ SS	146.70	149.90	153.17	156.51	159.93
Irrigation/ IAS	303.00	519.00	736.10	800.79	865.48
MES	15.73	15.88	16.04	16.20	16.36
Industrial LT/ LTIS	181.93	185.51	189.16	192.88	196.68
Industrial HT / HTS/ S	2,368.01	2,398.36	2,429.10	2,460.24	2,491.78
Railway/ RTS	222.00	222.00	222.00	222.00	222.00
Bulk Supply					
Inter State Sales					
Total	9,759.95	12,204.85	15,482.61	16,265.85	17,133.19

6.4. Connected Load Projections

Based on the year on year growth of consumers and their energy sales, connected load is forecasted for FY 16-17 to FY 20-21 as detailed in the table below.

Table 36: Connected Load Projections (KWh)

JBVNL	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Domestic	3,792,357	4,952,955	6,512,346	6,696,884	6,976,525
Commercial/Non Domestic	505,670	553,383	605,597	662,737	725,269
Public Lighting / SS	15,645	15,713	15,782	15,851	15,920
Irrigation / IAS	220,269	377,604	534,939	582,140	629,340
PWW	5,680	5,680	5,680	5,680	5,680
Industrial LT / LTIS	285,285	289,756	294,297	298,909	303,594
Industrial HT / HTS/ S	943,038	966,976	984,424	1,009,394	1,034,994
Railway / RTS	1,142	1,142	1,142	1,142	1,142
Bulk Supply					
Inter State Sales					
Total	5,769,086	7,163,210	8,954,207	9,272,737	9,692,464

The projection of connected load of different consumer categories has been done based on the existing load per consumer, which has been assumed to increase in the existing proportion.

7. Power Availability and Energy Balance

The requirement of electricity, for JBVNL, both in terms of energy requirement and peak demand are expected to increase significantly from the present level of 12,227 MU & 2,147 MW in FY 15-16 to 21,056 MU and 3,963 MW in FY 20-21. In order to meet the burgeoning power demand and considering the existing tied up capacity, the State needs to carefully plan for either developing its own generation capacity or tie up with Central generating stations/ IPPs.

This Chapter summarizes the overall power allocation of JBVNL through different sources like central generating plants, state generating plants, IPPs and renewables forecasted in the coming years. The year on year projected power purchase quantum vis-à-vis their power purchase cost and rate of power purchase is provided in this section. Also the energy balance between the energy required and energy available is presented in the section.

7.1. Present status and key assumptions

The total allocated capacity, including central allocation, in Jharkhand as on March 31, 2016 is 2,820 MW. In which, 765 MW is available from DVC to JBVNL for the DVC command area. Owing to the proximity to large coal reserves, the fuel mix of the allocated generation capacity is largely skewed towards thermal, with more than 91% of the installed (and allocated) capacity available is from coal based generation plants only.

A detailed breakup of present allocation capacity of JBVNL can be tracked from the exhibit below.

Table 37: Current Power Purchase Allocation in MUs

Particulars	Power Allocation (MW) FY 15-16
NTPC	
Farrakka	139.06
Farrakka III	34.74
Khalagaon I	27.66
Talcher	89.38
Khalagaon II	45.72
Barh	40
NHPC	
Rangit	8
Teesta	62.83
PTC	

Particulars	Power Allocation (MW) FY 15-16
Chukha	38.66
Tala	116.9
Others (outside Boundaries)	
DVC	765
WBSEB	8
State Sector	
PTPS	770
SHPS	130
TVNL	340
Private	
Inland Power	55
APNRL 12%	122.85
APNRL 13%	
Other RE	
Solar IPPs	16
Solar REC	10
Grand Total	**2820**

It is important to mention that a large number of generation capacities are presently under various stages of development in the State as TVNL has planned to undertake development of 1,320 MW Stage 2 and the State utility has also entered into a JV with NTPC to revive the existing units of PTPS and develop subsequent phases with total capacity of 4,000 MW. Apart from above, the Utility has also entered into PPAs with various Central sector projects. The list of upcoming projects along with their expected COD and allocation capacity is provided in the table below.

Table 38: Upcoming Allocations in MUs

SL	Name of company	Fuel	Allocated/ Requisition (MW)	Exp. CoD
1.	NTPC Darlipalli STPS	Thermal	125	Aug/18
2.	NTPC Nabinagar	Thermal	60.00	Apr/17
3.	NTPC North Karanpura	Thermal	434.00	Oct/18
4.	KBUNL Kanti TPS	Thermal	12.00	Sep/16
5.	Punatsangchhu-II HEP	Hydro	121.79	May/17
6.	PTPS-NTPC Unit 1, 2 & 3	Thermal	2,400.00	Oct/20
7.	JREDA	Solar	1,200	Jan/17
8.	Other RE	Hydro	10	Sep/17
Total			4,362.79	

7.2. Power Purchase Quantum

For making power purchase quantum projection for FY 16-17 to FY 20-21, the existing energy availability based on provisional power purchase of FY 15-16 has been considered, with certain adjustments based on the relevant information about availability of source of generation. The provisional figures of power purchase quantum for FY 15-16 used for projection are provided in the table below.

Table 39: Power Purchase Quantum in MUs for FY 15-16

Particulars	Power Purchase Quantum FY 15-16
NTPC	
Farrakka	825.38
Farrakka III	188.88
Khalagaon I	184.93
Talcher	498.19
Khalagaon II	190.08
Barh	237.10
Total	2,124.56
NHPC	
Rangit	45.79
Teesta	329.69
Total	375.48
PTC	
Chukha	203.79
Tala	405.61
Total	609.40
Total Central Sector	3,109.44
Others	
DVC	4,764.93
STOA	15.11
ERLDC(APNRL)	
DVC STOA	109.79
STOA	15.11
Total Others	4,913.35
State Sector	
PTPS	460.37
PTPS-NTPC Phase-1	-
PTPS-NTPC Phase-2	-
SHPS	55.19
TVNL	2,266.75
Total State Sector	2,782.31
Private	
Inland Power	422.94
APNRL 12%	458.00
APNRL 13%	496.00
APNRL STOA	-
Total Private Sector	1,376.94
Other RE	

Particulars	Power Purchase Quantum FY 15-16
Solar IPPs	16.87
Solar REC	7.60
JREDA	-
RE Others	-
Total RE	24.47
PGCIL	-
Posoco (ERLDC)	-
UI Payable	20.45
UI Receivable	153.00
Grand Total	**12,226.97**

However, there are several factors which have also been considered while projecting the power purchase quantum for different sources, as discussed in detail below.

7.2.1. Optimisation of power purchase cost

Jharkhand is focusing on generating Self-sufficiency in power by means of enhancing its own generation Capacity as well tie-ups from IPPs leading to low cost of power procurement. Keeping the objective in mind, a JV has been formed between Jharkhand Urja Vikas Nigam Ltd (JUVNL) with NTPC, to revive Patratu Thermal Power Station (PTPS) generating units in the medium term and develop subsequent phases of 3X800 MW by FY 19-20 and 2X800 MW by FY 21-22. A part (unit) of PTPS phase-1 is expected to come in last quarter of FY18, reducing the reliance on central and other allocations. In this regard, a slight reduction is planned in the power purchase from central generating plants like Farrakka, Farrakka III, Barh and DVC.

7.2.2. Renewables

Jharkhand has put special focus on power purchase through renewable sources with a vision to move on the path of sustainable development as well as to fulfill the Renewable Purchase Obligations (RPO). The RPO targets are segregated into two major parts i.e. RPO through solar sources and RPO through Non-solar sources.

To meet the Solar RPO targets, JBVNL has planned to procure the solar power from present allocations as well as power available through different IPPs recently selected under the recently floated tender for development of 1200 MW solar capacity. Projects under this tender are expected to be allocated under two categories: 200 MW for projects smaller than 25 MW (minimum size is 1 MW) and 1,000 MW for projects ranging between 26 MW and 500 MW. Around 23 small and big players of solar industry are selected to install solar power plants in Jharkhand totaling up to 1200 MW capacity. JBVNL has already planned to procure power from these sources based the expected CODs of the solar plants in a phased manner.

This will not only fulfill the below described targets, but will allow utility to meet its demand and serve its consumers with 24X7 reliable power.

Also, JBVNL has to meet the Non-solar targets as provided in the table below. To meet these targets JBVNL has planned to enter into the PPAs with different generators having different sources of power generation like wind, small hydro and biomass. The process of allocation from these sources are underway and will be done at earliest. Once after the finalization of allocation through non solar renewable sources, a notification in this regard along with detailed allocation list will be provided to Hon'ble commission.

In the absence of above mentioned power availability, JBVNL has also planned to purchase REC's to meet the shortfall in achieving the RPO targets. The RPO targets to be followed by JBVNL and expected quantum to be purchase to fulfill it based on the total energy availability are provided in the table below.

Table 40: Renewable Purchase Obligations (RPO)

RPO	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Non-solar (%)	5.00%	6.50%	8.50%	11.00%	11%
Solar (%)	1.50%	2.25%	3.25%	4.50%	5.00%
Non-solar (MUs)	643.80	996.63	1,548.26	2,104.99	2,216.58
Solar (MUs)	193.14	344.99	591.98	861.13	1,007.53
Total (MUs)	836.94	1,341.61	2,140.24	2,966.12	3,224.11

7.2.3. Short Term Open Access (STOA) -

In the absence of Power availability through current allocation and to move with the commitment to provide 24X7 reliable power to all consumer, JBVNL has planned to purchase power from short term open access. To meet the shortfall of power, JBVNL has planned to procure power from APNRL STOA, IEX and PTC depending upon the suitability and cost of power purchased.

Accordingly, the Power Purchase Quantum (MUs) for FY 16-17 to FY 20-21 is showcased in the table below.

Table 41: Power Purchase Quantum in MUs

Particulars	Power Purchase				
	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
NTPC					
Farrakka	900.00	900.00	900.00	700.00	700.00
Farrakka III	200.00	200.00	200.00	100.00	100.00
Khalagaon I	184.93	184.93	184.93	184.93	184.93
Talcher	498.19	498.19	498.19	498.19	498.19
Khalagaon II	190.08	190.08	190.08	190.08	190.08
Barh	250.00	250.00	250.00	100.00	100.00
NTPC Darlipalli STPS	-	-	585.00	742.50	742.50
NTPC Nabinagar	-	367.20	367.20	367.20	367.20

Particulars	Power Purchase				
	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
NTPC North Karanpura	-	-	867.13	2,585.77	2,585.77
KBUNL Kanti TPS	32.00	73.44	73.44	73.44	73.44
Total	2,255.20	2,663.84	4,115.97	5,542.11	5,542.11
NHPC					
Rangit	45.79	45.79	45.79	45.79	45.79
Teesta	329.69	329.69	329.69	329.69	329.69
Total	375.48	375.48	375.48	375.48	375.48
PTC					
Chukha	210.00	210.00	210.00	210.00	210.00
Punatsangchhu-II HEP	-	488.13	533.44	534.90	533.44
Tala	405.61	405.61	405.61	405.61	405.61
Total	615.61	1,103.75	1,149.05	1,150.51	1,149.05
Total Central Sector	3,246.29	4,143.07	5,640.51	7,068.11	7,066.65
Others					
DVC	5,100.00	5,300.00	5,300.00	4,100.00	4,000.00
STOA	-	618.00	-	-	-
Total Others	5,100.00	5,918.00	5,300.00	4,100.00	4,000.00
State Sector					
PTPS	460.37	460.37	460.37	460.37	460.37
PTPS-NTPC Phase-1	-	478.00	1,782.00	1,782.00	2,606.00
SHPS	55.19	55.19	55.19	55.19	55.19
TVNL	2,266.75	2,266.75	2,266.75	2,266.75	2,266.75
Total State Sector	2,782.31	3,260.31	4,564.31	4,564.31	5,388.31
Private					
Inland Power	422.94	422.94	422.94	422.94	422.94
APNRL 12%	458.00	458.00	458.00	458.00	458.00
APNRL 13%	496.00	496.00	496.00	496.00	496.00
APNRL STOA	85.00	-	-	-	-
Total Private Sector	1,461.94	1,376.94	1,376.94	1,376.94	1,376.94
Other RE					
Solar IPPs	16.87	16.87	16.87	16.87	16.87
Solar REC	13.14	13.14	13.14	13.18	13.14
JREDA	163.13	314.98	561.97	831.09	977.52
RE Others	643.80	996.63	1,548.26	2,104.99	2,216.58
Total RE	836.94	1,341.61	2,140.24	2,966.12	3,224.11
PGCIL	-	-	-	-	-
Posoco (ERLDC)	-	-	-	-	-
Grand Total	**13,427**	**16,040**	**19,022**	**20,075**	**21,057**

7.3. Power Purchase Rate and Power Purchase Cost

In order to compute the power purchase expenses for FY 16-17 to 20-21, the per unit rate of power purchase for FY 15-16 has been escalated by 5% based on the inflation factor and past few year trends of power purchase cost escalation.

It is further submitted that the growth trend of increase in per unit cost from different power purchase sources has been considered as it signifies the best possible projections as per the experience of the petitioner and latest per unit cost of various power purchase sources. Also, wherever the trend has seemed unreasonable or unsustainable, the growth factors have been appropriately modified by JBVNL, to arrive at more realistic projections. Further it is also taken care of that the fuel mix of the petitioner is skewed towards the coal based sources.

The transmission charges for PGCIL and ERLDC for control period have been computed by applying 10% escalation over actual transmission charges of FY 15-16. As power purchase cost of STOA is concerned, average of last 5 year trend of IEX (India Energy Exchange) prices has been taken for the consideration of power purchase cost. Last 5 years prices in Rs/KWh along with the 5 year average i.e. Rs 3.21/KWh is provided in the table below.

Table 42: IEX price Index in Rs/KWh

IEX Price Index	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16	5 year Average
Price in Rs/KWh	3.56	3.48	2.80	3.51	2.73	3.21

* *source-IEX*

For the power purchase rate of renewable sources, JBVNL has taken an average bidding rate quoted by all 23 bidders in the recent bidding held through JREDA for 1,200 MW solar IPPs and an average price of Rs.6.0/KWh is considered for power purchase rate through non-solar renewable sources as taken through MNRE. Following table provides the detailed power purchase rate forecasted for the FY 16-17 to FY 20-21 for all sources are provided in the table below.

Table 43: Power Purchase rate in Rs/KWh

Particulars	Power Purchase Rate				
	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
NTPC					
Farrakka	3.87	4.07	4.27	4.49	4.71
Farrakka III	5.09	5.35	5.61	5.90	6.19
Khalagaon I	3.65	3.84	4.03	4.23	4.44
Talcher	2.30	2.41	2.54	2.66	2.80
Khalagaon II	3.44	3.62	3.80	3.99	4.19
Barh	6.25	6.56	6.89	7.23	7.59
NTPC Darlipalli STPS			4.63	4.86	5.11

Particulars	Power Purchase Rate				
	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
NTPC Nabinagar		4.63	4.86	5.11	5.36
NTPC North Karanpura			4.63	4.86	5.11
KBUNL Kanti TPS	4.73	4.96	5.21	5.47	5.74
Total					
NHPC					
Rangit	3.16	3.32	3.48	3.66	3.84
Teesta	2.48	2.60	2.73	2.87	3.01
Total					
PTC					
Chukha	2.09	2.29	2.29	2.29	2.29
Punatsangchhu-II HEP		3.31	3.47	3.65	3.83
Tala	2.22	2.22	2.22	2.22	2.22
Total					
Total Central Sector					
Others (outside Boundaries)					
DVC	5.12	5.38	5.65	5.93	6.23
STOA	3.37	3.54	3.72	3.90	4.10
Total Others					
State Sector					
PTPS	4.73	4.96	5.21	5.47	5.74
PTPS-NTPC Phase-1		4.50	4.50	4.50	4.50
SHPS	4.20	4.41	4.63	4.86	5.11
TVNL	3.69	3.88	4.07	4.27	4.49
Total State Sector					
Private					
Inland Power	4.36	4.58	4.81	5.05	5.30
APNRL 12%	2.40	2.52	2.65	2.78	2.92
APNRL 13%	5.05	5.30	5.57	5.85	6.14
APNRL STOA	5.00				
Total Private Sector					
Other RE					
Solar IPPs	17.96	17.96	17.96	17.96	17.96
Solar REC	5.50	5.50	5.50	5.50	5.50
JREDA	6.36	6.36	6.36	6.36	6.36
RE Others	6.00	6.00	6.00	6.00	6.00
Total RE					
PGCIL	-	-	-	-	-
Posoco (ERLDC)	-	-	-	-	-
Average Rate	**4.40**	**4.57**	**4.82**	**4.96**	**5.12**

Considering the power purchase quantum and rate from different sources, a detailed power purchase cost of all sources for FY 16-17 to FY 20-21 is provided in the table below. It can be noted from the table below that power purchase cost is expected to increase form Rs. 5,905.30 Crs in FY 16-17 to Rs. 10,791 in FY 20-21.

Table 44: Power Purchase cost in Crores

Particulars	Power Purchase Cost				
	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
NTPC					
Farrakka	348.71	366.14	384.45	313.97	329.66
Farrakka III	101.85	106.94	112.29	58.95	61.90
Khalagaon I	67.57	70.95	74.50	78.22	82.13
Talcher	114.56	120.29	126.30	132.62	139.25
Khalagaon II	65.46	68.74	72.17	75.78	79.57
Barh	156.19	164.00	172.20	72.32	75.94
NTPC Darlipalli STPS	-	-	270.88	361.01	379.06
NTPC Nabinagar	-	170.03	178.53	187.46	196.83
NTPC North Karanpura	-	-	401.53	1,257.21	1,320.07
KBUNL Kanti TPS	15.12	36.44	38.26	40.17	42.18
Total	869.46	1,103.52	1,831.11	2,577.71	2,706.59
NHPC					
Rangit	14.47	15.20	15.96	16.75	17.59
Teesta	81.70	85.78	90.07	94.57	99.30
Total	96.17	100.98	106.03	111.33	116.90
PTC					
Chukha	43.89	48.09	48.09	48.09	48.09
Punatsangchhu-II HEP	-	161.45	185.26	195.05	204.25
Tala	89.96	89.96	89.96	89.96	89.96
Total	133.85	299.50	323.31	333.11	342.30
Total Central Sector	1,099.48	1,504.01	2,260.45	3,022.14	3,165.79
Others (outside Boundaries)					
DVC	2,613.43	2,851.71	2,994.30	2,432.16	2,491.48
STOA	-	218.71	-	-	-
Total Others	2,613.43	3,070.42	2,994.30	2,432.16	2,491.48
State Sector					
PTPS	217.53	228.40	239.82	251.81	264.40
PTPS-NTPC Phase-1	-	215.10	801.90	801.90	1,172.70
SHPS	23.18	24.34	25.56	26.83	28.18
TVNL	836.59	878.42	922.34	968.46	1,016.88
Total State Sector	1,077.30	1,346.26	1,989.62	2,049.00	2,482.16
Private					
Inland Power	184.40	193.62	203.31	213.47	224.14

Particulars	Power Purchase Cost				
	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
APNRL 12%	110.13	115.63	121.41	127.48	133.86
APNRL 13%	250.50	263.03	276.18	289.99	304.49
APNRL STOA	42.50	-	-	-	-
Total Private Sector	587.53	572.29	600.90	630.95	662.49
Other RE					
Solar IPPs	30.30	30.30	30.30	30.30	30.30
Solar REC	7.23	7.23	7.23	7.25	7.23
JREDA	103.75	200.32	357.41	528.57	621.71
RE Others	386.28	597.98	928.96	1,262.99	1,329.95
Total RE	527.55	835.83	1,323.90	1,829.11	1,989.18
PGCIL	124.53	136.98	150.68	165.75	182.32
Posoco (ERLDC)	1.54	1.69	1.86	2.05	2.25
Grand Total	**5,905.30**	**7,328.80**	**9,169.16**	**9,963.37**	**10,791.10**

7.4. Energy Balance

Considering the energy available, energy sales and T&D loss projections discussed in previous sections, JBVNL has worked out the Energy Balance for the Control Period. For the purpose of power purchase, the above available allocated capacity of various central generating stations and own generating stations has been considered.

JBVNL would like to submit that power purchase from various sources are segregated into different heads, while calculating the energy balance for the control period. Power Purchase from Outside JBVNL boundary comprises of all power purchased through central allocations, APNRL, STOA and a portion of TVNL while a major portion of around 67% on an average falls into the energy Input directly to state transmission system. Subsequent transmission loss are applied on energy Input directly to state transmission system, State-owned generation and major part of renewables (above 50 MW), which are connected to 132 kV or above. While no transmission charges are applied on direct input of energy to distribution system which comprise power available from DVC and a small portion of renewables (less than 50 MW).

The energy requirement for Company will be met by supply from various sources as discussed above in the power purchase section. Based on the information provided above, Energy Balance of JBVNL for the period FY 16-17 and FY 20-21 is shown in the following table.

Table 45: Energy balance

Particulars	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Power Purchase from Outside JSEB Boundary	5,123.99	6,553.76	7,433.20	8,860.80	8,859.34

Particulars	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Loss in External System (%)	3%	3%	3%	3%	3%
Loss in External System	153.72	196.61	223.00	265.82	265.78
Net Outside Power Available	4,970.27	6,357.15	7,210.21	8,594.98	8,593.56
Energy Input Directly to State Transmission System	1,428.05	1,428.05	1,428.05	1,428.05	1,428.05
State Generation	938.51	1,416.51	2,720.51	2,720.51	3,544.51
Energy Input through Renewables sources	627.70	1,006.21	1,605.18	2,224.59	2,418.08
UI Sale / Receivable	-	-	-	-	-
Energy Available for Onward Transmission	7,964.53	10,207.92	12,963.94	14,968.13	15,984.20
Transmission Loss (%)	5.00%	5.00%	4.50%	4.50%	4.00%
Transmission Loss	398.23	510.40	583.38	673.57	639.37
Net Energy Sent to Distribution System	7,566.30	9,697.52	12,380.57	14,294.56	15,344.83
Direct Input of Energy to Distribution System	5,309.23	5,635.40	5,835.06	4,841.53	4,806.03
Total Energy Available for Sales	12,875.54	15,332.93	18,215.63	19,136.09	20,151.79
Projected Sales	9,759.95	12,204.85	15,482.61	16,265.85	17,133.19
Distribution loss Trajectory	24.20%	20.40%	15.00%	15.00%	15.00%
Total energy requirement considering Distribution Losses	12,875.93	15,332.73	18,214.84	19,136.29	20,150.69

8. Estimation of ARR for MYT Period

This chapter summarizes the Aggregate Revenue Requirement (ARR) for the control period FY 16-17 to FY 20-21. The projections for the control period have been made considering the provisional accounts of FY 14-15 and estimated financial projections for FY 15-16, as the base. While estimating the various components of ARR, the JSERC MYT Regulations 2015 have been considered along with certain underlying assumptions.

It would be important to mention here that presently JBVNL is in the process of auditing its annual accounts for the period of FY 13-14, which have been approved by the Board of Directors and the statutory audit is presently underway. The annual accounts for FY 14-15 have been compiled and are in the process of getting the Board of Director's approval, following which the statutory audit will be completed. Therefore, the projections for the purpose of business plan has been don't based on the under-audit accounts of FY 13-14 and provisional accounts of FY14-15. The details of projections of various sub-components of ARR are provided in the following sub-sections.

8.1 Power Purchase Cost

The power purchase cost has been estimated based on expected power availability from various sources and the projected power purchase cost, considering the existing power purchase cost of JBVNL appropriately escalated. The details of power purchase cost projections are provided in Chapter 7 of this business plan.

8.2 Transmission charges – State Transmission Utility

In addition to the power purchase cost, JBVNL also has to incur the transmission charges payable to the State Transmission Utility, Jharkhand Urja Sancharan Nigam Ltd. (JUSNL). Although the power purchase cost estimated in chapter 7 above consider the central transmission utility and RLDC charges, the state transmission charges are estimated as a separate component of the ARR. The transmission charges are estimated based on the rate of transmission charge approved by the Hon'ble Commission in its tariff order for FY 15-16, which has been escalated by 5% YoY to account for the increase in ARR of transmission utility during the MYT control period. The estimated transmission charges are presented in the table below.

Table 46: Transmission Charges - State Transmission Utility

Particulars (Rs. Cr.)	Unit	FY 15-16 (Est.)	FY 16-17 (Proj.)	FY 17-18 (Proj.)	FY 18-19 (Proj.)	FY 19-20 (Proj.)	FY 20-21 (Proj.)
Transmission charges	Rs./kWh	0.19	0.20	0.21	0.22	0.23	0.24
Units wheeled	MUs	12,227	13,427	16,040	19,022	20,075	21,057
Transmission charges	Rs.Cr.	232.3	267.9	336.0	418.4	463.6	510.6

8.3 Operation and Maintenace Cost

In line with the Regulation 6.3 of JSERC MYT Regulations 2015, the operation and maintenance cost of JBVNL can be segregated into following 3 sub-components:

a) Salaries, wages, pension contribution and other employee costs;
b) Administrative and General expenses;
c) Repairs and Maintenance;

The basis of projection of each of the above sub-component of O&M cost is discussed in the following sub-sections.

8.3.1 Employees cost

The employee cost for the MYT control period is estimated based on the employee cost provided in the provisional accounts for FY 14-15 and estimated employee cost for FY 15-16, as detailed in the table below.

Table 47: Employee Cost & Terminal Benefit

Particulars (Rs. Cr.)	FY 14-15 (Prov.)	FY 15-16 (Est.)	FY 16-17 (Proj.)	FY 17-18 (Proj.)	FY 18-19 (Proj.)	FY 19-20 (Proj.)	FY 20-21 (Proj.)
Employee Cost	151.9	173.9	212.2	228.3	245.7	264.4	284.4
Terminal benefits	102.0	111.0	135.4	145.6	156.7	168.6	181.4
Total Cost	253.9	284.9	347.6	374.0	402.4	433.0	465.9

The projections of employee cost for the MYT period from FY 16-17 to FY 20-21 considers an annual escalation of 7.6%, however, owing to the expected impact of 7th Pay Commission the escalation rate for FY16-17 period has been considered as 22%.
The escalation factor has been estimated in line with the Regulation 6.6 (c) whereby the Wholesale Price Index (WPI) and Consumer Price Index (CPI) for a period of 5 years has been estimated and a weighted average rate has been arrived at by giving 45% weightage to WPI and 55% weightage to CPI. It would be important to mention here that the CPI and WPI for a period of 5 years has been considered as it would reflect long term trend and considers the impact of economic cycle.

In addition to employee cost, the terminal benefits liability of JBVNL employees has been estimated keeping in view the actual terminal benefit liability during FY14-15, based on the provisional annual accounts. The terminal benefit liability also considers an escalation of 22% over the base year for FY16-17 while for remaining period the escalation of 7.6% YoY has been considered.

It is pertinent to mention here that in line with the Regulations, JBVNL shall submit the actuarial valuation of terminal benefits liability subsequently. The further breakup/ details of employee cost can be seen in the provisional annual accounts annexed with the MYT business plan.

8.3.2 Administrative and General (A&G) Expenses

In line with the Regulation 6.6 (b) and (c) the A&G expenses have been projected, with provisional figures of FY 14-15 being the base for arriving A&G expenses for FY 15-16 and for the MYT control period. The estimation of A&G expense for FY 16-17 assumes an additional 5% increase owing to the various steps being undertaken by the utility in terms of outsourcing the tasks and utilizing consultancy services for capacity building of the entity. The details of A&G expenses are provided in the table below.

Table 48: A&G Expenses

Particulars (Rs. Cr.)	FY 14-15 (Prov.)	FY 15-16 (Est.)	FY 16-17 (Proj.)	FY 17-18 (Proj.)	FY 18-19 (Proj.)	FY 19-20 (Proj.)	FY 20-21 (Proj.)
Administration and General Expenses	42.50	46.75	52.64	56.64	60.94	65.57	70.56

8.3.3 Repair and Maintenace Cost

In line with the Regulation 6.6 (a) of JSERC MYT Regulation 2015, the R&M cost has been projected whereby the projected GFA has been considered.

Table 49: R&M Expenses

Particulars (Rs. Cr.)	FY 14-15 (Prov.)	FY 15-16 (Est.)	FY 16-17 (Proj.)	FY 17-18 (Proj.)	FY 18-19 (Proj.)	FY 19-20 (Proj.)	FY 20-21 (Proj.)
Gross Fixed Assets	2,369.5	4,065.4	6,930.1	10,880.2	14,184.5	16,222.4	17,918.5
Repair and Maintenance cost	30.7	124.2	111.2	115.3	162.2	196.8	221.0

It can be observed that during FY 15-16 a significant increase in R&M cost is expected as during FY 14-15 the agency of rural franchisees had not raised the bills and the pending bills of RF were admitted in FY 15-16 and no provision was made during FY 14-15. The bills amounting to Rs. 54 Cr. were estimated to be paid to rural franchisee during FY 15-16.

8.4 Gross Fixed Assets and Depreication

The projections of depreciation considers the Gross Fixed Assets as per the opening balance provided in the provisional financial statement for FY 14-15 based on which the

GFA for FY 15-16 has been estimated. Based on the closing GFA of FY15-16, the additions in GFA for the MYT control period have been added to arrive at the closing GFA figures for the MYT control period. The details of capitalization / amount of capital expenditure transferred to GFA in each of the financial year has been detailed out in Chapter 4 of this business plan.

The depreciation for the existing assets has been considered as to be the same rate as provided in the provisional financial statements of FY 14-15. While for asset additions during FY 15-16 and for MYT period, the depreciation rate has been considered as per the depreciation rates provided in the Appendix 1 of the JSERC MYT Regulations, 2015. It is expected that majority of the capital expenditure shall be towards transformers, switchgears, lightening arresters, cables, etc., thus an average rate applicable to these components has been arrived , based on which the depreciation rate applicable has been estimated.
It is important to mention, as provided in Regulation 6.32 of the JSERC MYT Regulations 2015, the depreciation attributable to grants has been reduced from the total depreciation to arrive at the depreciation forming part of the ARR. The details of total depreciation, depreciation attributable to grants and depreciation forming part of ARR are provided in the table below:

Table 50: Gross Fixed Assets and Depreciation

Particulars (Rs. Cr.)	FY 14-15 (Prov.)	FY 15-16 (Est.)	FY 16-17 (Proj.)	FY 17-18 (Proj.)	FY 18-19 (Proj.)	FY 19-20 (Proj.)	FY 20-21 (Proj.)
Opening GFA	2,293.9	2,369.5	4,065.4	6,930.1	10,880.2	14,184.5	16,222.4
Additions	75.6	1,696.0	2,864.7	3,950.1	3,304.3	2,037.9	1,696.1
Closing GFA	2,369.5	4,065.4	6,930.1	10,880.2	14,184.5	16,222.4	17,918.5
Depreciation - Existing Assets	54.2	54.2	54.2	54.2	54.2	54.2	54.2
Depreciation - New Assets		22.4	120.4	300.3	491.8	632.9	731.4
Depreciation - Total	54.2	76.6	174.6	354.5	546.0	687.1	785.6
Less: Depreciation attributable to Grants etc.	-	9.6	49.9	128.5	221.2	282.7	299.4
Depreciation forming part of ARR	54.2	67.0	124.7	226.0	324.9	404.4	486.2

8.5 Debt Schedule and Interest on Debt

JBVNL intends to invest nearly Rs.14,014 Cr. in the distribution infrastructure, as detailed in chapter 4 of this business plan. Although there are several central government and state government schemes under which these investments are tied up with a significant part to be available for JBVNL in form of grants. However, for the part under approved schemes, which are to be funded by JBVNL on its own and the additional capital expenditure up to FY

20-21, the debt equity ratio of 70:30 has been considered based on which the debt requirement has been estimated.

The debt schedule has been prepared considering the figure of closing debt as per the provisional financial statement of FY 14-15. The impact of debt taken over by the State Government under UDAY scheme during FY15-16 has been considered to arrive at the estimated closing debt of FY 15-16 based on which the debt schedule for MYT Control period has been prepared. However, it is important to mention here that the outstanding amount of CPSUs and outstanding bank debt taken over by the State Govt. has been transferred back to JBVNL in form of loan. A total amount of Rs. 6,136 Cr has been considered to be transferred to JBVNL as loan, with interest payable at the rate of 13%. The above transfer mechanism is in line with the clause of UDAY MoU, whereby it is mentioned that the amount taken over by State Govt. may be transferred backed to Utility in form of debt or grant or equity. The State Govt. has notified vide letter no. 201, dated 31/03/2016, that such amount has been transferred as debt. Therefore, the amount has been considered as debt for the purpose of estimation of ARR.

In order to estimate the interest on debt for the MYT control period, the debt repayment tenor of 10 years and interest rate of 13.0% p.a. has been considered. The detailed debt schedule and interest on debt has been provided in the table below:

Table 51: Debt Structure

Particulars (Rs. Cr.)	FY 15-16 (Est.)	FY 16-17 (Proj.)	FY 17-18 (Proj.)	FY 18-19 (Proj.)	FY 19-20 (Proj.)	FY 20-21 (Proj.)
Opening Debt	582.5	7,025.5	8,210.6	8,952.8	8,609.8	8,103.2
Debt drawdown	6,443.0	1,887.6	1,633.5	711.6	619.3	1,027.7
Debt repayment	-	702.5	891.3	1,054.7	1,125.8	1,187.8
Closing debt	7,025.5	8,210.6	8,952.8	8,609.8	8,103.2	7,943.1
Interest of Debt	494.5	990.3	1,115.6	1,141.6	1,086.3	1,043.0

8.6 Equity Schedule and Return on Equity

As discussed in chapter 4 and sub-section 8.4 above, the capital investments of JBVNL shall be funded through a mix of grant, debt and equity, the envisaged equity contribution of State Government under various approved schemes and equity portion to the extent of 30% of remaining capital investment schemes has been considered.

The rate of return on equity has been considered in line with the Regulation 6.17 of the JSERC MYT Regulation 2015, considering the projects to be completed on time. The details of projected equity capital to be employed and the estimated return on equity are provided in the table below:

Table 52: Equity Schedule & RoE

Particulars (Rs. Cr.)	FY 14-15 (Prov.)	FY 15-16 (Est.)	FY 16-17 (Proj.)	FY 17-18 (Proj.)	FY 18-19 (Proj.)	FY 19-20 (Proj.)	FY 20-21 (Proj.)
Opening Equity	-	3,028.4	3,029.7	3,239.0	3,767.4	4,294.0	4,756.0
Equity Additions	-	1.3	209.3	528.4	526.6	462.1	556.5
Closing Equity	3,028.4	3,029.7	3,239.0	3,767.4	4,294.0	4,756.0	5,312.6
Return on Equity	484.5	484.6	501.5	560.5	644.9	724.0	805.5

8.7 Interest on Working Capital

The Regulation 6.29 and 6.30 of JSERC MYT Regulation 2015 provide for estimation of working capital requirement and interest thereof. In line with the above Regulation, the working capital requirement of JBVNL has been estimated for the MYT control period, with the following components:

a) One-twelfth of the amount of Operation and Maintenance expenses for wheeling business for such financial year; plus
b) Maintenance spares at 1% of Opening GFA of wheeling business; plus
c) Two months equivalent of the expected revenue from wheeling charges at the prevailing tariffs; minus
d) Amount held as security deposits under clause (a) and clause (b) of subsection (1) of Section 47 of the Act from consumers and Distribution System Users net of any security held for wheeling business; minus
e) One month equivalent of cost of power purchased, based on the annual power procurement plan.

Based on the above, the working capital requirement has been estimated and the interest rate of 13.5% has been applied to arrive at the interest on working capital. The Regulation 6.31 provides for rate of interest on working capital to be equal to SBI base rate, which is prevailing at 10% plus 350 basis points, thus totaling to 13.5%. The details of working capital and interest is provided in the table below:

Table 53: Interest on Working Capital

Particulars (Rs. Cr.)	FY 16-17 (Proj.)	FY 17-18 (Proj.)	FY 18-19 (Proj.)	FY 19-20 (Proj.)	FY 20-21 (Proj.)
Receivables	1,471.2	1,738.3	2,077.3	2,200.3	2,377.0
Maintenance spares	40.7	69.3	108.8	141.8	162.2
O&M Cost	42.6	45.5	52.1	57.9	63.1
Less: Power purchase cost	492.1	610.7	764.1	806.1	873.9
Less: Security deposits held	335.7	335.7	335.7	335.7	335.7
Total Working capital requirements	726.7	906.7	1,138.4	1,258.3	1,392.7
Interest on working capital	98.1	122.4	153.7	169.9	188.0

8.8 Provision for Bad Debts due to collection efficiency

The Regulation 5.24 of JSERC MYT Regulation 2015 provides for the collection efficiency target of JBVNL to be 100% for the entire control period. It is humbly submitted to Hon'ble Commission that JBVNL's present collection efficiency level is about 89.1%, which JBVNL is committed to improve over significantly over the MYT control period. There have been numerous initiatives undertaken by JBVNL to improve its collection efficiency, including introduction of Urja Mitra, spot billing, mobile base bill application, increasing number of bill collection points, taking actions against defaulters to recover arrear, which are discussed in detail in chapters of this business plan. However, it would be highly unlikely and impractical to say that any amount of measures to improve the collection efficiency will overnight result in 100% achievement.

It is imperative to mention that it is not only the JBVNL's prerogative to undertake initiatives to improve collections but it significantly depends upon the socio-political environment of the State, which affects the consumers capacity and intention to pay for the usage of electricity. For the people of the State who have been used to consuming electricity without paying over the years, bringing a sudden change and creating awareness regarding importance of electricity bill payment may take some time. Therefore, JBVNL humbly requests the Hon'ble commission to kindly provide a modified trajectory as proposed by JBVNL below, which JBVNL is aspiring to achieve over the next five years and emerge as a self-sustained utility of Jharkhand.

Table 54: Bad Debts due to collection efficiency

Particulars (Rs. Cr.)	FY 15-16 (Est.)	FY 16-17 (Proj.)	FY 17-18 (Proj.)	FY 18-19 (Proj.)	FY 19-20 (Proj.)	FY 20-21 (Proj.)
Receivables	7,717.9	8,827.4	10,430.1	12,463.6	13,201.7	14,262.0
Collection efficiency	89.0%	95.0%	98.0%	100.0%	100.0%	100.0%
Bad debts provision	849.0	441.4	208.6	-	-	-

It is submitted that till such time JBVNL is not able to achieve 100% collection efficiency, the disallowance of such amount in the ARR may kindly be avoided and the difference in such collection efficiency may kindly be passed on as part of ARR in form of provision for bad debts. Also, as can be seen in table above, JBVNL is committed to reduce the gap of actual and approved collection efficiency to zero by FY 20-21, which shall be in the benefit of consumers and State at large.

8.9 Non- tariff Income

In order to project the non-tariff income, the historical figures of other income, excluding DPS has been utilized. It is important to mention that JBVNL is in the process of

The DPS has not been considered as part of other income as JBVNL is able to recover only a minimal amount against the actual DPS booked.

Table 55: Non-Tariff Income

Particulars (Rs. Cr.)	FY 15-16 (Est.)	FY 16-17 (Proj.)	FY 17-18 (Proj.)	FY 18-19 (Proj.)	FY 19-20 (Proj.)	FY 20-21 (Proj.)
Other income	(12.5)	(13.1)	(13.8)	(14.5)	(15.2)	(16.0)

8.10 Projected Aggregate Revenue for MYT Control Period

Based on the components of the ARR discussed in the above sub-sections, the projected ARR for the MYT control period has been provided in the table below:

Table 56: Projected Aggregate Revenue for MYT Control Period

Particulars (Rs. Cr.)	FY 16-17 (Proj.)	FY 17-18 (Proj.)	FY 18-19 (Proj.)	FY 19-20 (Proj.)	FY 20-21 (Proj.)
O&M Cost	511.4	545.9	625.6	695.3	757.4
Employee cost	*347.6*	*374.0*	*402.4*	*433.0*	*465.9*
A&G Expense	*52.6*	*56.6*	*60.9*	*65.6*	*70.6*
R&M Cost	*111.2*	*115.3*	*162.2*	*196.8*	*221.0*
Power purchase (Inc. PGCIL & RLDC)	5,905.3	7,328.8	9,169.2	9,673.4	10,487.2
Transmission cost – JUSNL	267.9	336.0	418.4	463.6	510.6
Interest Cost	990.3	1,115.6	1,141.6	1,086.3	1,043.0
Interest on working capital	98.1	122.4	153.7	169.9	188.0
Depreciation	124.7	226.0	324.9	404.4	486.2
Return on Equity	501.5	560.5	644.9	724.0	805.5
Provision for bad debts	441.4	208.6	-	-	-
Less: Other income	(13.1)	(13.8)	(14.5)	(15.2)	(16.0)
Total ARR required	8,827.4	10,430.1	12,463.6	13,201.7	14,262.0

9. Segregation of ARR between Retail Supply and Wheeling Business

The Regulation 5.4 of JSERC MYT Regulation 2015, provide for segregation of ARR in to retail supply and wheeling business, as reproduced hereunder:

Regulation 5.4:

"The Licensee shall segregate the accounts of the Licensed Business into Wheeling Business and Retail Supply Business. The ARR for Wheeling Business shall be used to determine Wheeling Tariff and the ARR for Retail Supply Business to determine Retail Supply Tariff;"

It is important to mention here that JBVNL is a newly carved out entity and has taken significant initiatives to improve its efficiency and compliance on all front including regulatory compliance. At present the annual accounts of JBVNL are under the process of audit or being compiled for different years. However, the segregation of accounts under retail and wheeling business has not been done so far and it would be difficult to undertake such segregation given the practical difficulties being faced in finalization of annual accounts of consolidated entity.

It is pertinent to note that Regulation 5.5 of the said Regulations also provide for allocation statement in case the segregated accounts are not prepared. Although JBVNL is committed to prepare segregated accounts for retail and wheeling business but until such time the allocation statement has been provided for segregation of ARR. The relevant Regulation is provided hereunder:

Regulation 5.5

"For such period until accounts are segregated, the Licensees shall prepare an Allocation Statement to apportion costs and revenues to respective business. The Allocation Statement, approved by the Board of Directors of the Licensee, shall be accompanied with an explanation of the basis and methodology used for segregation which should be consistent over the Control Period."

9.1 Segregation of Retail Supply and Wheeling Business

In line with above, the details of allocation and basis thereof for various components of ARR is discussed in the following sub-sections.

9.2.1 Power purchase expenses including transmissoin charges

JBVNL has contracted the sufficient power to achieve 24X7 supply to the consumers in the State during the MYT period. Also, JBVNL aims to go for short term power purchase from bilateral sources or trading to ensure sufficient supply for the State. On the basis of its power procurement plan, it is further expected that the consumers in the State would be availing 24X7 supply. The entire cost of power purchase, transmission charges including central transmission utility and RLDC charges have been allocated to the retail supply business since procurement of electricity from wholesaler or bulk supplier for sale to end consumer is the main activity of retail supply business. Further, entire transmission charges to be paid to Transmission Licensee, central transmission utility and load dispatch centers is allocated to the retail supply business.

9.2.2 Allocation of Capital Cost

The major components that form retail supply asset are meters and billing equipment (computer etc). Similarly, majority of the plant and Machinery and lines and cables form Distribution Assets. Other fixed assets like buildings, office equipment, furniture and fixtures, vehicles etc. may be apportioned considering predominant usage concept. Considering the general principles of segregation of capital cost into wheeling and retail supply business, JBVNL has considered a ratio of 90% to Wheeling Business and 10% to retail supply business.

9.2.3 Allocation of Employee Expense

The employee expenses are allocated equally in both wheeling and retail supply business, as at present it would be difficult to find the actual breakup of employees working for both the businesses.

9.2.4 Allocation of Administrative and general Expenses

A&G expenses related to power purchase, metering, billing and collection, financing expenses on loan related to retail supply business can be allocated to retail supply business. Office expenses like telephone, stationery, electricity, lease rent etc. can be apportioned between wheeling and retail supply business on the basis of predominant usage concept.

Entire expenses towards outsourcing of metering and billing system are allocated to retail supply business. Remaining heads of A&G expenses are allocated in the ratio of 15% to retail supply and 85% to wheeling business considering the fact that majority of expenses towards rent rates & taxes, telephone & postage, professional & consultancy fee, conveyance & travel charges, electricity charges, security arrangements, stationery and bank Charges can be attributed to wheeling business. Considering this, A&G expenses are allocated as 75% to wheeling business and 25% to retail supply business.

9.2.5 Allocation of Repair and Maintenance Expense

As discussed earlier, the distribution network up to consumer meter is part of the wires business and the infrastructure beyond meter is part of the retail supply business. Therefore, majority of R&M is required for the portion up to consumer meter and infrastructure beyond consumer meter or other supply related equipment don't require that much R&M. Considering this fact, R&M expenses are allocated as 95% to wheeling business and 5% to retail supply business.

9.2.6 Allocation of Depreciation

Depreciation expenses are allocated on the proposed ratio of fixed assets between wires and retail supply business. i.e. 90% to wheeling business and 10% to retail supply business.

9.2.7 Allocation of Interest Cost

Majority of the long term loans are taken for capital works. Therefore interest expenses on long term loans are allocated on the proposed ratio of fixed assets between wheeling and retail supply business. i.e. 90% to wheeling business and 10% to retail supply business.

9.2.8 Allocation of Interest on Working Capital

The majority of components of working capital requirement estimation pertain to wheeling business, with power purchase cost being 100% allocable to wheeling business, 90% of O&M cost allocable to wheeling business and 90% of maintenance spares allocable to wheeling business. Therefore, 98% of the working capital requirement and interest thereof has been allocated to wheeling business while remaining is allocated to retail supply business.

9.2.9 Allocation of Provision for Bad Debts

Bad debts are inseparable incidents of the retail supply business of electricity distribution. Provision for Bad Debts is associated with the business risk and both wheeling and supply business will have certain business risk. Considering this fact provision for bad debts is allocated as 10% to wheeling business and 90% to retail supply business.

9.2.10 Allocation of Return on Equity

Return on equity capital is allowed on the equity infused for capital works. Therefore return on equity capital is allocated on the proposed ratio of fixed assets between wheeling and retail supply business. i.e. 90% to wheeling business and 10% to retail supply business.

9.2.11 Allocation of Non-Tariff Income

JBVNL has certain sources of non-tariff income viz. interest on arrears of consumers, Rebate on power purchase etc. Almost all the non-tariff income comes from supply related activities. Hence, entire non-tariff income is allocated to Supply Business.

The summary of segregation of various components of ARR into wheeling and retail business is provided in the table below.

Table 57: ARR Components into Wheeling and retail business

Particulars (Rs. Cr.)	Share of Retail Supply %age	Share of Wheeling Business %age
O&M Cost		
Employee cost	50%	50%
A&G Expense	25%	75%
R&M Cost	5%	95%
Power purchase (Inc. PGCIL & RLDC)	100%	0%
Interest Cost	100%	0%
Interest on working capital	10%	90%
Depreciation	2%	98%
Return on Equity	10%	90%
Provision for bad debts	10%	90%
Less: Other income	10%	90%

9.2 Segregated ARR of Retail Supply and Wheeling Business

Based on above, the segregated ARR of Retail supply business and wheeling business has been provided below:

Table 58: ARR of Retail Supply Business (Rs. Cr.)

Particulars (Rs. Cr.)	FY 16-17 (Proj.)	FY 17-18 (Proj.)	FY 18-19 (Proj.)	FY 19-20 (Proj.)	FY 20-21 (Proj.)
O&M Cost	192.5	206.9	224.5	242.7	261.6
Employee cost	173.8	187.0	201.2	216.5	232.9
A&G Expense	13.2	14.2	15.2	16.4	17.6
R&M Cost	5.6	5.8	8.1	9.8	11.0
Power purchase (Inc. PGCIL & RLDC)	5,905.3	7,328.8	9,169.2	9,673.4	10,487.2
Transmission charges – JUSNL	267.9	336.0	418.4	463.6	510.6
Interest Cost	99.0	111.6	114.2	108.6	104.3
Interest on working capital	2.0	2.4	3.1	3.4	3.8
Depreciation	12.5	22.6	32.5	40.4	48.6
Return on Equity	50.1	56.1	64.5	72.4	80.5
Provision for bad debts	44.1	20.9	-	-	-
Less: Other income	(13.1)	(13.8)	(14.5)	(15.2)	(16.0)
Total ARR required	6,560.3	8,071.4	10,011.8	10,589.4	11,480.7

Table 59: ARR of Wheeling Business (Rs. Cr.)

Particulars (Rs. Cr.)	FY 16-17 (Proj.)	FY 17-18 (Proj.)	FY 18-19 (Proj.)	FY 19-20 (Proj.)	FY 20-21 (Proj.)
O&M Cost	318.9	339.0	401.0	452.6	495.8
Employee cost	173.8	187.0	201.2	216.5	232.9
A&G Expense	39.5	42.5	45.7	49.2	52.9
R&M Cost	105.6	109.5	154.1	187.0	209.9
Power purchase (Inc. PGCIL & RLDC)	-	-	-	-	-
Transmission charges – JUSNL	-	-	-	-	-
Interest Cost	891.3	1,004.1	1,027.4	977.7	938.7
Interest on working capital	96.1	120.0	150.6	166.5	184.3
Depreciation	112.2	203.4	292.4	364.0	437.6
Return on Equity	451.3	504.5	580.4	651.6	724.9
Provision for bad debts	397.2	187.7	-	-	-
Less: Other income	-	-	-	-	-
Total ARR required	2,267.1	2,358.6	2,451.8	2,612.4	2,781.3

10.Prayers to Hon'ble Commission

The Petitioner JBVNL respectfully prays to the Hon'ble Commission:

1) To admit the Business Plan of JBVNL for the Control Period (FY 2016-17 to FY 2020-21) in accordance with Regulation 5 of the Jharkhand State Electricity Regulatory Commission (Multi Year Tariff) Regulations, 2015.
2) To approve the Business Plan JBVNL for the Control Period (FY 2016-17 to FY 2020-21) in accordance with Regulation 5 of the Jharkhand State Electricity Regulatory Commission (Multi Year Tariff) Regulations, 2015.
3) To approve the principles and methodology proposed by JBVNL for projection of ARR.
4) To allow the collection efficiency trajectory as proposed by JBVNL and its impact on the ARR.
5) To approve the deviation from the norms for certain parameters prescribed in JSERC (MYT) Regulations 2015, provisions thereof, as sought in this Business Plan during the period FY 2016-17 to FY 2020-21.
6) To pass any other order as the Hon'ble Commission may deem fit and appropriate under the circumstances of the case and in the interest of justice.
7) To condone any error/omission and to give opportunity to rectify the same.
8) To permit JBVNL to make further submissions, addition and alteration to this Business Plan as may be necessary from time to time.