



Business Plan for MYT Control Period FY 2021-22 to FY 2025-26

**Jharkhand Bijli Vitran Nigam Ltd
(JBVNL)**



Contents

List of Figures	1
List of Tables	1
1. Background & Introduction	2
2. Jharkhand Power Sector: A Changing Landscape	5
3 Company Profile and Business Overview	16
4 Capital Investment Plan	19
5 Operational Performance Targets and Mitigation Mechanism	28
6 Energy Sales Projections	39
7 Power Availability and Energy Balance.....	46
8. Prayers to Hon'ble Commission	60

List of Figures

Figure 1: Overview of the State of Jharkhand 5

Figure 2: State Demographics..... 6

Figure 3: Key targets for MYT period..... 8

Figure 4: Customer Service Strategy..... 9

Figure 5: Employee Engagement..... 12

Figure 6: Capacity wise DTRs distribution 17

Figure 7: Capital Investment Avenues 20

Figure 8: AT&C Losses and Collection Efficiency 28

Figure 9: Past Distribution Losses (in %) 28

Figure 10: Action Plan for AT&C and T&D Loss Reduction 31

Figure 11: Sales Mix 42

Figure 12: Projection of Domestic Sales (MUs) 43

List of Tables

Table 1: Peak Demand – Supply (MW) and Energy Requirement – Availability (MU) Position of JBVNL.....	7
Table 2: Consumer Details under JBVNL.....	16
Table 3: JBVNL's Power Distribution Network.....	16
Table 4: Capital Expenditure Plan (FY 22 - FY 26)	21
Table 5: Capitalization Schedule.....	27
Table 6: Capitalization Schedule (Rs. Crore)	27
Table 7: Targets AT&C Losses, Collection Efficiency and Billing Efficiency.....	29
Table 8: Consumers- Historical	39
Table 9: Consumers- Projections.....	41
Table 10: Sales in MUs- Historical.....	42
Table 11: Projection of Sales in MUs.....	44
Table 12: Connected Load Projections (KVA)	45
Table 13: Current Power Purchase Allocation in MUs.....	46
Table 14: Upcoming Allocations in MWs.....	47
Table 15: Power Purchase Quantum in MUs for FY 20-21.....	48
Table 16 Reduction in Power purchase from Plants lower in Merit Order in next Control Period	51
Table 17 Reduction in Power purchase from KTPS in next Control Period	51
Table 18 Power Plants to be considered for De-allocation	51
Table 19: Power Purchase Quantum in MUs.....	53
Table 20: Power Purchase rate in Rs/KWh	55
Table 21: Power Purchase cost in Crores.....	56
Table 22: Energy balance.....	58
Table 23 Revenue from Sale of Excess Power	59



1. Background & Introduction

Background

- 1.1 The Hon'ble Commission, in exercise of the powers conferred by the Electricity Act 2003, notified the Jharkhand State Electricity Regulatory Commission (Terms and Conditions for Determination of Distribution Tariff) Regulations, 2020.
- 1.2 Regulation 6.9 of JSERC (Terms & Conditions for Determination of Distribution Tariff) Regulations, 2020 (hereafter referred as JSERC Distribution Tariff Regulations, 2020) states that: "Each licensee shall file for the Commission approval a Business Plan approved by its authorized signatory, as per the timelines specified in Section 11 of these Regulations; "
- 1.3 Further Regulations 6.10 and 6.11 of JSERC Distribution Tariff Regulations, 2020 states that:

"...6.10 The Business Plan shall be filed separately for the Retail Supply and Wheeling Business. As specified in Clause 6.7 of these Regulations, in the absence of segregated accounts for the two Businesses, the Licensee shall prepare an allocation statement and submit the same with the Business Plan."

"..6.11 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 (viz., SAIFI, SAIDI and MAIFI as per the JSERC (Distribution Licensees" Standards of Performance) Regulations, 2015, and subsequent amendments), etc. The targets shall be consistent with the capital investment plan proposed by the Licensee;
- e) **Human Resource Plan** with manpower planning including details of the estimated year wise manpower addition and retirements for the Control Period to meet the growth in demand/consumers;
- f) Business Plan shall also contain the requisite information for the Control Period:



Provided that requisite information for the preceding Control Period 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, Employee, R&M and A&G Expenses along with detailed break up and any other information used for preparing projections of various performance parameters and other 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.”

- 1.4 Accordingly, Jharkhand Bijli Vitran Nigam Limited (JBVNL) is hereby filing the Business Plan for the Control Period (FY 2021-22 to FY 2025-26) based on the available data for the FY 2019-20 and previous financial years.
- 1.5 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.
- 1.6 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.

Introduction to business plan

- 1.7 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, Distribution Regulations, 2020.
 - **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
- 1.8 The above aspects are covered in this business plan, organized in different



sections, with chapters 2 and 3 providing a brief overview of the present status of power sector in Jharkhand followed by the details of JBVNL and its existing business.

- 1.9 In line with the requirements under JSERC Distribution Regulations, 2020, chapter 4 of this document details out the capital expenditure plan of JBVNL to be carried out under various schemes for infrastructure augmentation and modernization. The bases for identifying the works, implementation areas, capitalization schedule etc. have also been detailed out for the perusal of the Hon'ble Commission.
- 1.10 Chapter 5 provides the projected operational performance of JBVNL followed by the projections of energy sales, detailed in chapter 6. Since JBVNL has been unbundled in 2014 as a separate entity with a clean balance sheet, there is immense potential for it to 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 which would be imperative to ensure the health and well-being of the sector and the consumers at large.
- 1.11 As per the distribution tariff regulations, the distribution licensee is required to submit the sales and energy requirement for FY 2020-21. Chapters 6 and 7 deal with the projection of sales, energy requirement and sources of power with whom PPAs have been signed by JBVNL to meet the increasing power requirement.
- 1.12 Finally, the business plan is concluded with the JBVNL's prayers to the Hon'ble Commission, as provided in chapter 8.

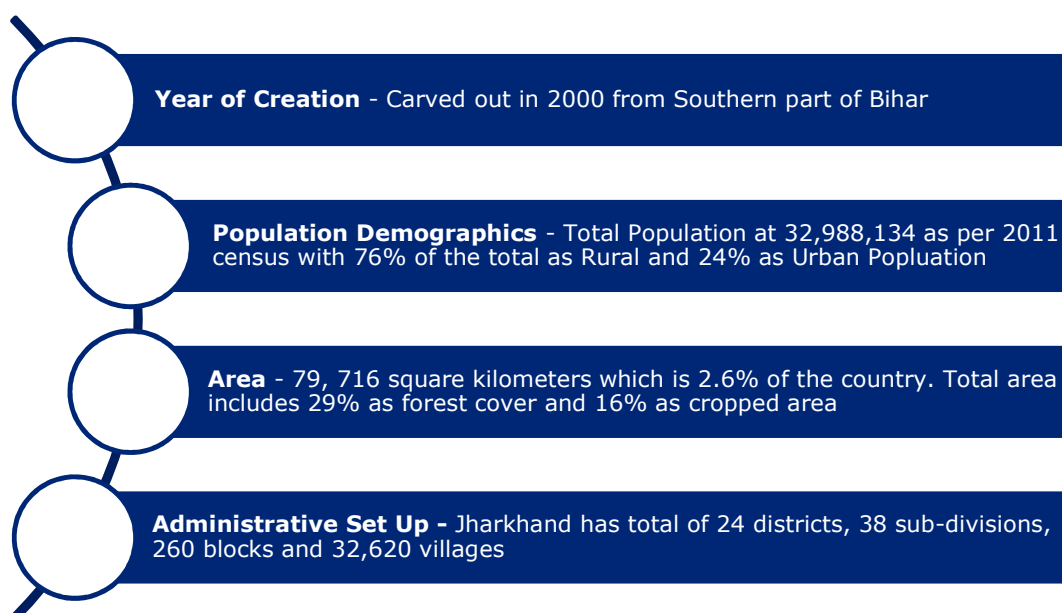


2. Jharkhand Power Sector: A Changing Landscape

The State of Jharkhand

- 2.1 Jharkhand being a mineral rich state and 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



- 2.2 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

- 2.3 Power sector being one of the foundational pillars for a stronger infrastructure and a stronger economy, the status of the sector in Jharkhand plays a pivotal role in the overall upliftment of the state and improvement in the standard of living and socio-economic parameters. The following sections provide details about the power sector in Jharkhand and the planned way forward, which has been translated into actionable items and proposed investments as part of this business plan.

Jharkhand Power sector at a Glance

- 2.4 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.
- 2.5 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 Vitran Nigam Ltd (JBVNL) undertaking the distribution function of the erstwhile JSEB;
 - Jharkhand Urja Sancharan Nigam Ltd (JUSNL) undertaking the transmission function of the erstwhile JSEB.
- 2.6 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.
- 2.7 The State is home to nearly 69 lakh households, which have been completely electrified (100%) [As on 31st March, 2019].
- 2.8 The State has successfully achieved 100% village electrification providing electricity



to out of total 32,492 villages. Owing to non-availability of adequate power, the per capita consumption in Jharkhand at 938 kWh¹ is lower than the national average of 1,181 kWh², which signifies that 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 energy sales, is mentioned in the table below.

Name of Utility	Energy Sales (FY2019-20) (in MUs)[Provisional]
JBVNL	9529.50
JUSCO	637.78
DVC*	6953.94
TSL	2717.10
SAIL-Bokaro**	643.65

*Sale of DVC also includes sales to other distribution licensees; **Energy sales of SAIL-Bokaro is as approved in true-up of FY 2015-16.

Power Demand Supply

2.9 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	FY16	FY17	FY18	FY19	FY20
Peak Demand (MW)	1,153	1,498	1,332	1,339	1,396
Peak Available (MW)	1,153	1,498	1,260	1,291	1,389
Peak Shortage (%)	0.00%	0.00%	5.41%	3.58%	0.50%
Energy Requirement and Availability					
Energy Requirement (MUs)	7,735	7,960	7,906	8,737	8,941
Energy Available (MUs)	7,560	7,906	7,753	8,490	8,872
Energy Shortage (%)	2.26%	0.68%	1.94%	2.83%	0.77%

\$ Except DVC area

2.10 The total peak demand met by JBVNL in FY20 is 1,389 MW. The peak demand for JBVNL area has been 1,396 MW during FY20 against availability of 1,389 MW. 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 meet the demand supply gap and provide 24X7 power supply in the state, discussed in detail in the following section.

¹ Estimated based on actual consumption during FY 2018-19

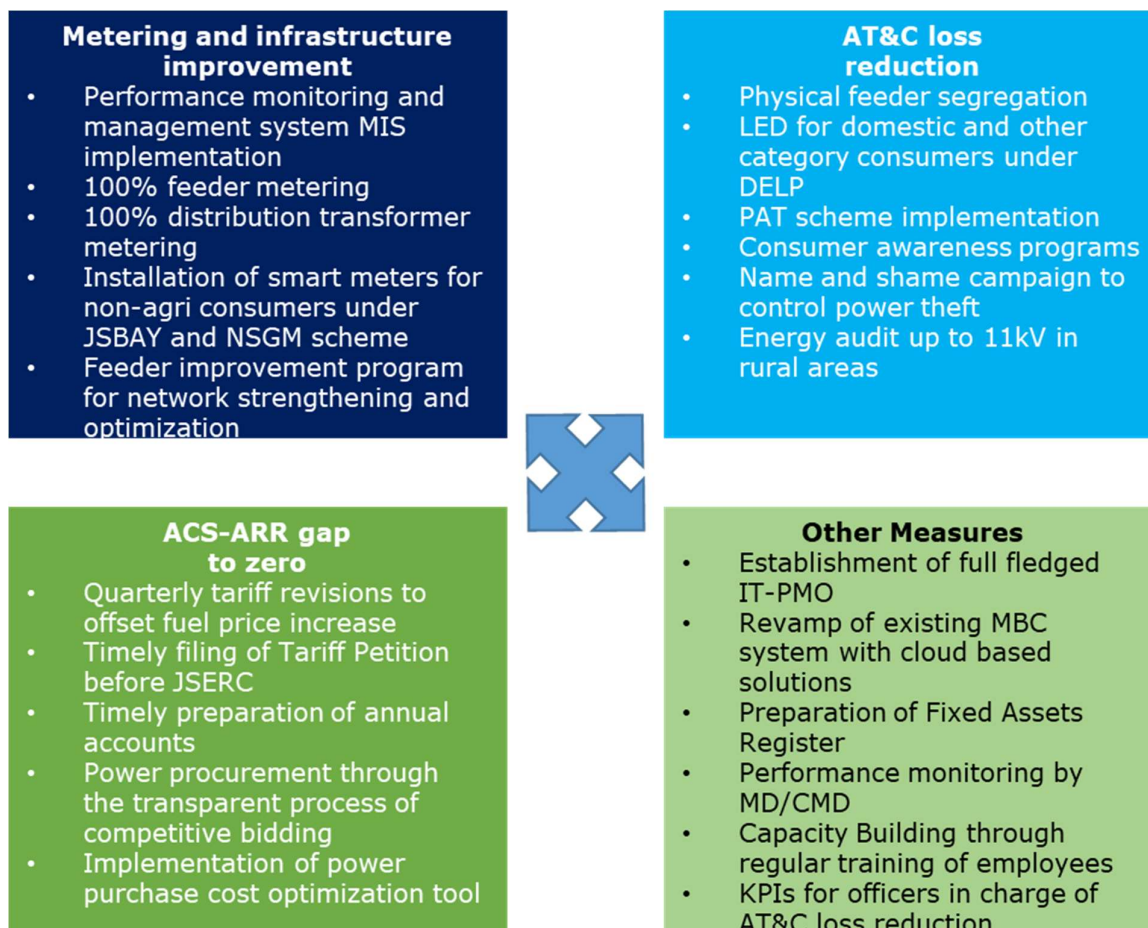
² Source: CEA



Key Targets for MYT Period

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

Figure 3: Key targets for MYT period



2.12 These targets are in line with the operational milestones as specified in DDUGJY New, DDUGJY 12th Plan, IPDS, R-APDRP (Part-B) and JSBAY. 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.

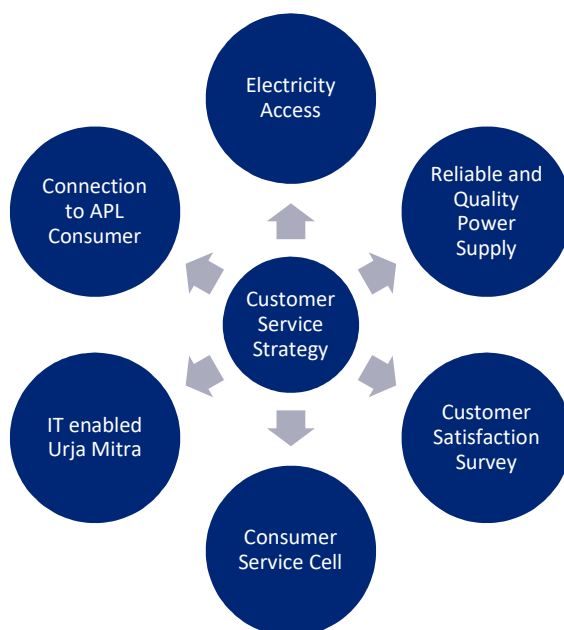


Key Initiatives

Customer Service Strategy

2.13 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 4: Customer Service Strategy



a) Electricity Access:

2.14 Access to electricity is the first and foremost concern for any consumer. Recognizing the same, JBVNL completed electrification works for all households in 2019. The plan for significant capacity addition and network augmentation has been laid in direction to ensure that each household has reliable electricity supply. In order to meet the objectives, the infrastructure augmentation and strengthening for Central Government Schemes is expected to be completed by March 2021 and for JSBAY by March 2024.

b) Reliable and Quality Power Supply:

2.15 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.

- 2.16 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.
- 2.17 Apart from this, Implementation of Outage Management System (OMS) after GIS mapping to 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:

- 2.18 Survey or Regular interaction with the utility consumers is the most important tool to assess the level of satisfaction. JBVNL understands 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).
- 2.19 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:

- 2.20 JBVNL has set up a centralized consumer service cell (SASHAKT) to enhance consumer's approachability towards complaints redressal. This cell monitors complaints registered through a dedicated call centre set up at Kusai Colony, Doranda for complaints received through phone and through a dedicated team set up at JBVNL HQ to monitor complaints received through social media, website and other digital platforms. 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 undertaken under this are-



- Setting up of a centralized cell for consumer complaints
- 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:

- 2.21 In order to meet the AT&C loss targets, the utility has implemented a new program "Urja Mitra", in line with the Rural Revenue Franchisee model adopted in Bihar. Some of the ongoing/future initiatives undertaken by JBVNL are as follows:
- Close monitoring to ensure 100% billing of all the consumers and high value consumers
 - Launch of "**Vipatra Sahayak**" to reduce the number of never billed consumers
 - "**Centralized HT billing**" system has been developed and streamlined
 - "**Self Billing system**" for consumers is being deployed
 - Inclusion of **Self-Help Groups** to improve Billing and collection in Rural Areas
- 2.22 Under the World Bank Program, JBVNL is migrating to State of the art ERP Billing System, integrating with ongoing SAP system and upcoming Smart Metering. JBVNL is in process of floating a tender for upgradation of the existing Metering, Billing & Collection (MBC) System, Customer Information System (CIS) and Meter Data Management System (MDMS) to a robust cloud based system thus increasing the scalability and flexibility for integration across the revenue management function.
- 2.23 JBVNL intends to implement smart metering across urban and rural centres thereby plugging the leaks in revenue collection. Smart metering is to be initiated with Ranchi city as a project jointly funded by Government of Jharkhand, Government of India and National Smart Grid Mission (NSGM) for 3,50,000 smart meters.
- 2.24 Further, JBVNL intends to expand the scope covering other urban centres, high value consumers and rural consumer segment as well.
- 2.25 JBVNL is planning for rooftop solar integration to the grid thereby making such customers ("Prosumers"- Producers as well as Consumers) resulting in enhanced energy savings through reduced off take from the grid during non-peak hours. As such, a plan to implement net metering for such consumers is underway.

Employee Engagement

- 2.26 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 5: Employee Engagement



a) Increased Employee Motivation

2.27 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

2.28 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 plans 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

2.29 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.

2.30 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 2020-21 onwards.

Demand Side Management (DSM)

a) JREDA/Energy Department Initiatives

2.31 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) UJALA Scheme

2.32 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 successfully implemented the DELP (Demand Side Management based Efficient Lighting Programme) in Jharkhand which has now been renamed as UJALA through Energy Efficiency Services Limited (EESL).

2.33 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.

2.34 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 was to 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 1,36,45,874 LEDs have been distributed by the Discom so far under this program which has led to 17,72148 MWh energy saved per year, cost savings of INR 709 Crores per year and 355 MW of peak demand avoided.

c) Street Lighting Programme

2.35 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



2.36 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.

ERP implementation

2.37 With the growing thrust towards e-governance and provision of public services on mobile phones in India, JBVNL has implemented 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. The ERP program is being rolled out and various modules are being implemented in a phased manner.

2.38 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.

Way Forward

2.39 This section outlines the various results JBVNL is expecting 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 schemes are aimed at assuring that JBVNL comes out of its operational and financial distress condition and turns 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 expecting to draw out of adoption of various schemes are listed as below:

- Becoming a utility with 100% metering at all levels including rural consumers, utilization of technology and robust energy accounting shall ensure that the reasons for T&D losses can be identified and mitigated.
- The upgradation 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.



- Central and State government schemes such as PM-KUSUM and Jharkhand Sampurn Bijli Achadan Yojana (JSBAY) have been envisioned to boost the adoption of renewable energy and to bolster the electricity distribution infrastructure thereby meeting increasing energy demands resulting from 100% electrification of rural and urban households 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.
- Digital transformation initiatives like smart metering, augmentation of IT infrastructure through cutting edge cloud-based solutions, ERP implementation, GIS and SCADA for monitoring of key parameters is expected to consolidate the ongoing institutional strengthening initiatives.

2.40 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

About JBVNL

- 3.1 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.
- 3.2 JBVNL holds a high consumer base of around 45 Lakhs consumers and the details of consumer mix as of Oct' 2020 are as follows:

Table 2: Consumer Details under JBVNL

Type of consumer	Number of consumer (As on October 2020)
High Tension	1,746
Low tension industrial services	15,762
Domestic services	42,08,943
Commercial services	2,39,500
Agricultural	62,073
Others	434
Total consumer	45,28,458

- 3.3 The consumers of Jharkhand are being served by 5 utilities, viz. JBVNL, Damodar Valley Corporation, JUSCO, TSL and SAIL Bokaro. JBVNL's serves its ~45 lakh consumers through 415 power substations with a capacity of 5,511 MVA. Out of these 415 substations, 125 are urban PSS and 290 are rural.
- 3.4 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

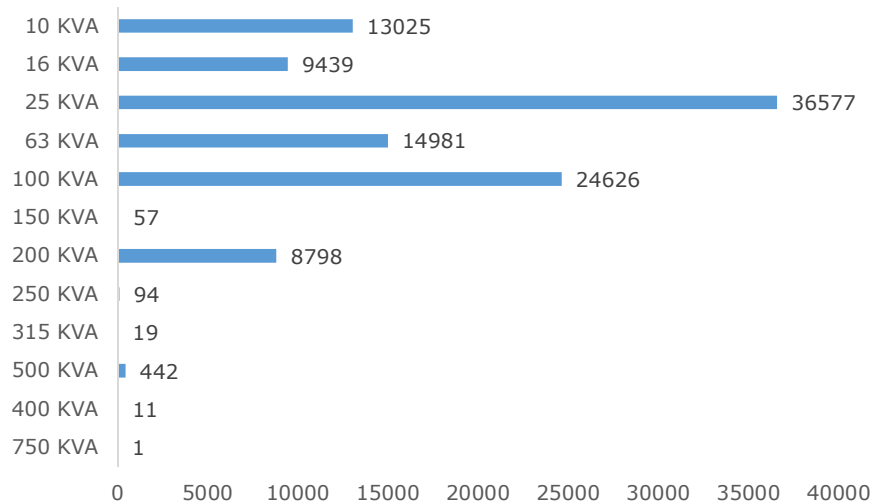
Infrastructure Detail (As on 29 th February 2020)			
No. of 33kV Substations (Nos.)	415	Urban	125
		Rural	290
Capacity of 33kV substations (MVA)	5511	Urban	3,103
		Rural	2,408
No. of 33kV feeder (Nos.)			494
No. of 11kV feeders (Nos.)			1,753
33kV line length (kms)			9,308
11kV line length (kms)			69,858



LT line length (kms)	1,29,720
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The total DTRs capacity under JBVNL is as shown in the Figure below-

Figure 6: Capacity wise DTRs distribution



3.5 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.

JBVNL Business overview

3.6 Jharkhand Bijli Vitran Nigam Ltd. (JBVNL) is undertaking the distribution function of the erstwhile JSEB, with a consumer base of around 45 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.

3.7 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 2025-26 and achieving long term financial viability. There are several steps which have been envisaged to be covered during the MYT Control Period, including:

- The infrastructure augmentation and strengthening for Central Government Schemes is expected to be completed by March 2021 and for JSBAY by March 2022.
- 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

Approach for Capital Expenditure

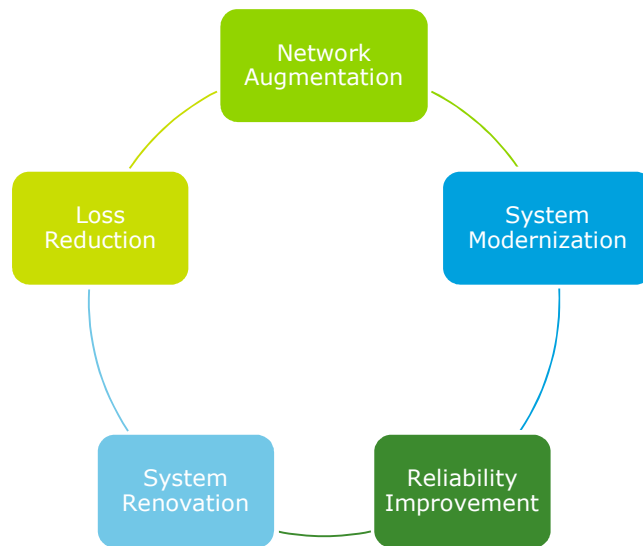
- 4.1 As per the Regulation 6.12 of JSERC Distribution Tariff Regulations 2020, the Distribution Licensee is required to file the Capital Investment Plan for Control Period of five financial years from April 1, 2021 to March 31, 2022, which shall comprise but not be limited to
- a) Purpose of investment (e.g., replacement of existing assets, meeting load growth, technical and distribution loss reduction, non-technical loss reduction, meeting reactive energy requirements, customer service improvement, improvement in quality and reliability of supply, etc.);
 - b) Approval of Competent Authority;
 - c) Capital Structure;
 - d) Detailed Project Report;
 - e) Capitalization Schedule;
 - f) Implementation schedule including timelines;
 - g) Cost-benefit analysis & Rate reasonability;
 - h) Improvement in operational efficiency envisaged in the Control Period;
 - i) Ongoing schemes that will spill over into the year under review along with justification;
 - j) New schemes that will commence during the Control Period but may be completed within or beyond the Control Period.
- 4.2 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. In last Control Period, JBVNL has already succeeded in electrifying 100% households in the state under SAUBHAGYA. Now JBVNL needs to become a commercial successful organization by billing all the electricity it purchases and collecting bills from the consumers. JBVNL plans to do the same by using smart meters and IT intervention.
- 4.3 JBVNL is also planning to strengthen its infrastructure to improve bottlenecks and provide reliable power to consumers. In order to achieve these larger objectives, JBVNL has prepared a comprehensive capital investment plan whereby nearly Rs.5,600 crore is planned to install smart meters, strengthen rural infrastructure, IT software and hardware upgradation and installing SCADA system to automate distribution function.
- 4.4 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 7: Capital Investment Avenues



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

1. State Government Schemes such as Jharkhand Sampoonn Bijli Acchhadan Yojna (JSBAY)
2. World Bank funded Scheme Jharkhand Power System Improvement Project (JPSIP)
3. Annual Development Plan prepared by JBVNL for departmental works

4.6 Under each of these schemes of State government and Multilateral funded project, 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.

- 4.7 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.

Table 4: Capital Expenditure Plan (FY 22 - FY 26)

Scheme Name	Total Project Outlay	FY 21-22	FY 22-23	FY 23-24	FY 24-25	FY 25-26
JPSIP (Funded by World Bank)						
Smart Metering in Ranchi	250.00	80.00	20.00	-	-	-
Smart Meters for Consumers > 10 kW	50.00	10.00		-	-	-
IT Upgradation	100	40.00	20.00	-	-	-
Software for Power Management	10.20	2.00	2.00	2.00	-	-
IT Project Management	8.00	2.00	1.00	-	-	-
Business Process Upgradation	9.00	3.00	2.00	-	-	-
Upgradation of Training Centre	22.00	8.00	7.00	-	-	-
Total	449.20	145.00	52.00	2.00	-	-
JSBAY						
JSBAY-Rural	2777.54	1800.00	176.00	-	-	-
JSBAY -S&D	34.56	13.40	4.00			
Total	2,812.1	1,813.40	180.00	0	0	-
Annual Development Plan						
ADP		636.00	458.00	469.00	562.00	675.00
Grand Total	3,261.3	2,765.0³	690.00	471.00	562.00	675.00

Capital Expenditure Objectives and Details of Infrastructure

- 4.8 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.

Jharkhand Power System Improvement Project (JPSIP)

Background and Administrative Approval:

- 4.9 Government of India (GoI) and Government of Jharkhand (GoJ) had posted the Jharkhand power system improvement project (JPSIP) to the World Bank for Financing vide DEA Letter No. 6/02/2016 F-VIII, and Govt. of Jharkhand Letter No. 268 dated 08.02.2016. The World Bank, accepted the request to finance the Power Project vide letter dated 03.10.2016.

³ Also includes Rs. 170.60 payment for IPDS, work for which would be already completed in FY 2020-21



4.10 In meantime with intervention of World Bank BoD-JBVNL accorded administrative approval for inclusion of Electricity Distribution Project amount to Rs. 449.2 Crore Component as mention in point No. 7, vide Agenda item number item no. 33/13 dated 28.02.2018.

4.11 With reference to the BoD Administrative approval for Electricity Distribution project amounting of Rs 449.2 crores, the cabinet of Govt. of Jharkhand (through Energy department Govt. of Jharkhand) has given approval wide letter no.-03/Urja/planning/11/17/57 dated 06.06.18

Key objectives:

4.12 The Project include components on providing financing for strengthening of Power Transmission Network in the state of Jharkhand and Capacity Building and Institutional Development of the unbundled Power Utilities (JUSNL and JBVNL). Key objective of JPSIP project are defined below:-

- a. Component A- Power Transmission system Strengthening
- b. Component B-Technical Assistance for Institutional Development and Capacity Building at JUSNL
- c. Component C-Institutional Development and Capacity Building of JBVNL

4.13 To meet the requirement of Component C, JBVNL held various meeting with World Bank official and Energy Department Govt. of Jharkhand on the exact contours and sub project that should be included in the project component on Institutional Development of JBVNL. Based on the discussion it is proposed to include the sub-project of "Investment in upgrading the IT system and infrastructure (related to commercial operation), including IT/OT Project Management Consultants." in the World Bank financed JPSIP.

Proposed coverage and funding:

4.14 Total project cost for JPSIP under World Bank funded project comes to Rs. 449.20 crores with 35.62% funds coming from World Bank in the form of loan, 21.38% from the Central Govt. under IPDS Phase-II or NSGM and the remaining 43% from the State Govt. under State Plan. The detail of the same is tabulated below:

S.N	Work / Name of Project	Total Cost (In Crore)	Amount in %		
			State Govt.	Central Govt.	World Bank
1	Smart Metering in Ranchi for 3.5 Lakhs consumer	250	38%	30%	32%
2	Smart Meter >10KW consumer for entire Jharkhand	50	70%	0	30%
3	Upgradation of IT Hardware & Software	100	49%	21%	30%
4	IT projects office and consultant	8	12.5%	0	87.5%
5	Software for Power Management	10.2	21.6%	0	78.4%
6	Business process upgradation	9	0	0	100%
7	Upgradation of training centre and training	22	50%	0	50%
Total		449.2	40%	21.4%	35.6%



JSBAY

4.15 Scheme Coverage and Budget: Jharkhand Sampurna Bijli Achchadan Yojna (JSBAY) is a new State Govt. sponsored scheme which aims to cover the several left over work required to ensure 24x7 power supply to all villages/Habitations and achievement of objectives of UDAY Yojana for reduction of AT&C losses. Detailed Project Reports (DPRs) under the JSBAY Scheme has already been prepared and the some part of Rural Electrification work has already been awarded and is currently under progress. Details of work and amount to be to be covered under the JSBAY scheme is provided in the below section.

Scheme Coverage:

4.16 Detailed Project Reports (DPRs) under the JSBAY Scheme has already been prepared and the some part of Rural Electrification work has already been awarded and is currently under progress. Details of work and amount to be to be covered under the JSBAY scheme is provided in the below section.

SI No.	Work Description	Amount (In Crore)
1	Forest, Railway and other Statutory clearances coming in the schemes of Central and the State Government	25
2	Construction of new 33/11 KV power substation, 33 & 11 KV line and other remaining works & construction / renovation of electric structure for agricultural work.	2085
3. (i)	Installation of meters to un-metered consumer to reduce AT&C loss.	580
(ii)	Metering of Feeders and DTRs to perform energy audit.	
(iii)	Providing new agricultural connections with electricity feeder pillar.	
4 (i)	Work related to underground cabling and other reinforcements in order to provide 24x7 power supply in urban/sub-urban areas including tourist and pilgrim sites.	1700
(ii)	Strengthening of electricity infrastructure in the existing as well as in the industrial areas so as to provide 24x7 uninterrupted power supply to the industrial areas.	
5 (i)	Implementation of SCADA and other IT related work for automation of distribution infrastructure / Sub- Station.	615
(ii)	Installation of smart meters to reduce the AT&C loss and enhance the metering and billing of consumers	
6	Construction and installation of necessary equipments in the new TRW/ Store/ M.R.T alongwith upgradation of existing TRW/ Store/ M.R.T	34.56
7	PMA and other consultancy work to complete the above mentioned tasks within the stipulated timeline.	88
	Total	5127.56

4.17 However, in view of budget constraint, Energy Department, Government of Jharkhand has put work of SCADA and Energy meter; listed at S.no 5 of above table, on hold and hence the work for installation of Smart Meter and SCADA



hasn't been considered in present Business Plan. However if in future State Government provides fund for the same, JBVNL would approach Hon'ble Commission for approval of the same.

Abstract of revised DPR of JSBAY for RE wing:-

Sl. No.	Phase	Description	Qty.	Amount (Rs. in Cr.)
(i)	Phase-I	Tenders have already been floated for Phase-1	--	978.57
(ii)	Phase-II	New additional PSS as per site requirement	118 Nos (Additional)	337.8
(iii)		Additional 33 kV line for additional PSS	1778.80 km (New)	181.96
(iv)		11 kV line (additional, remaining works, Conversion & Renovation)	3751 km.(New) 868 (Conversion)	190.40
(v)		Installation of DTR (new + replacement) & other remaining works related to DTR	6077 Nos. (New) 3172 Nos. Replacement)	255.58
(vi)		Other remaining LT line works including other line crossing	1477 Km (New) 3095 (Conversion)	140.62
		Total		2084.93

4.18 In the first phase works amounting to Rs. 977.46 Cr. was awarded against estimated cost of Rs. 978.57 Cr. in six packages. In the second phase works amounting to Rs. 1,106.84 crore. has been awarded against estimated cost of 1106.35 crore. Therefore overall awarded cost comes to Rs 2,084.30 crore against estimated cost of Rs. 2,084.93 crore.

Abstract of revised DPR of JSBAY for S&P wing:-

4.19 The Petitioner is committed to achieve 100% metering of its consumers & DTs in order to cover the entire distribution value chain and enable energy auditing. Towards this goal fund amounting to Rs. 579.61 Cr. has been sanctioned in metering components for consumer metering, feeder metering, DTR metering and to provide agriculture connections to farmers under the Stores & Procurement (S&P) Wing of JBVNL. The feeder metering work is completed for all rural feeders. The consumer metering work is going on departmentally, tender for providing agriculture connection is in the process.

Sl. No.	Description	Qty.	Amount (Rs. In Cr.)
1	Installation of meters to unmetered consumer	1354237 Nos.	406.27
2	DTR metering for energy auditing	4409 Nos.	14.73
3	Feeder for energy auditing	--	14.00
4	Providing new agricultural connections with electricity feeder pillar.	189282 Nos.	144.61
Total			579.61



- 4.20 Further, balance amount under the JSBAY Scheme has been allocated to the R-APDRP wing, IT wing & S&D wing of JBVNL towards the strengthening of the distribution network and enablement of Information Technology (IT), the. DPRs have already been prepared by the above mentioned Wings of Petitioner.

Urban Wing

- 4.21 Out of sanctioned amount of Rs. 5127.56 Cr. under JSBAY Scheme a sum of Rs. 1699.86 Cr. inclusive of PMC cost is carved out for underground cabling work in six towns for creating infrastructure in eight industrial areas and other works in Government Organization.
- 4.22 Work awarded for underground cabling work, infrastructure development work in industrial area except Ranchi, Khunti Industrial Area. The activities covered under R-APDRP wing are shown in the below table:

Sl. No	Description	No. of District	Amount (Rs. in Cr.)
1.	Industrial area under JIADA	8	476.89
2.	UG cabling & other works	6	1187.59
3.	Other work for various Govt. organizations	-	35.38
Total			1699.86

Annual Development Plan (ADP)

- 4.23 The budget for Annual Development plan is prepared every year by the Sub-Transmission and Distribution Network (erstwhile S&D) wing of JBVNL, based on the requirements raised by the field offices. The budget generally covers the equipment or works not covered under any other State, Central or Multi-lateral scheme and mostly focused towards miscellaneous infrastructure replacement and small works.
- 4.24 In order to cater the load growth and the addition of new consumers in the system, the state has kept aside budget apart from centrally sponsored scheme in the form of ADP budget. In FY 2019-20, no new ADP budget was proposed by JBVNL and re-appropriated budget of FY 2018-19 has been continued for execution in FY 2019-20, Further in FY 2020-21 a budget of Rs. 290 crore has been sanctioned, but the amount hasn't been received.
- 4.25 The funding of Annual Development Plan is provided by State Government in form of loan bearing interest rate of 13% p.a. However, it may be noted that such loans from State Govt. have never been serviced by JBVNL and are most likely to be converted to grant at a future date.

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.
- 4.26 Under the Scheme a grant of Rs 290 crore would be provided by State Government for next 2 years of Control Period. However in first 2 years of Control Period funds received in previous years would also be incurred. Thereafter an annual increase in funding by 20% is being expected.

Capitalization Schedule

- 4.27 Capital expenditure is essential for meeting demand growth and prompt upkeep of the network on sustained basis. JBVNL 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.
- 4.28 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. For opening CWIP in FY 20-21, JBVNL has proposed capitalization in 2 years i.e in FY 20-21 and FY 21-22 in ratio of 60:40.
- 4.29 Further FY 21-22 being last year for Control Period and also due to deadline of completion for various central government funded scheme like IPDS, R_APDRP, DDUGJY (New and Old), JBVNL expects that a large part of capex (at 76%) incurred in FY 20-21 would be capitalized in FY 21 itself. Remaining capex incurred under FY 20-21 would be capitalized in FY 21-22 and FY 22-23 at 12% each year.
- 4.30 JBVNL also expects that it would be capitalizing capex incurred in next Control Period within FY 25-26. Capitalization schedule of capex incurred in various years of next Control Period is tabulated below:

**Table 5: Capitalization Schedule**

Capitalization Year	FY 20-21	FY 21-22	FY 22-23	FY 23-24	FY 24-25	FY 25-26
Capex Incurred in						
FY 2020-21	76%	12%	12%			
FY 2021-22		40%	30%	30%		
FY 2022-23			40%	30%	30%	
FY 2023-24				40%	30%	30%
FY 2024-25					50%	50%
FY 2025-26						100%

4.31 As per year-wise Capex and above capitalization schedule, year-wise capitalization for next Control Period is calculated in table below:

Table 6: Capitalization Schedule (Rs. Crore)

Particulars	FY 20-21	FY 21-22	FY 22-23	FY 23-24	FY 24-25	FY 25-26
Opening CWIP (20-21)	3,163.01	2,108.68	-	-	-	-
Current year Capitalization	2,803.20	1,143.64	292.22	201.42	289.40	703.76
Past year capex		442.61	1,300.34	1,076.89	370.23	425.42
Asset Capitalized	5,966.22	3,694.92	1,592.56	1,278.32	659.63	1,129.17

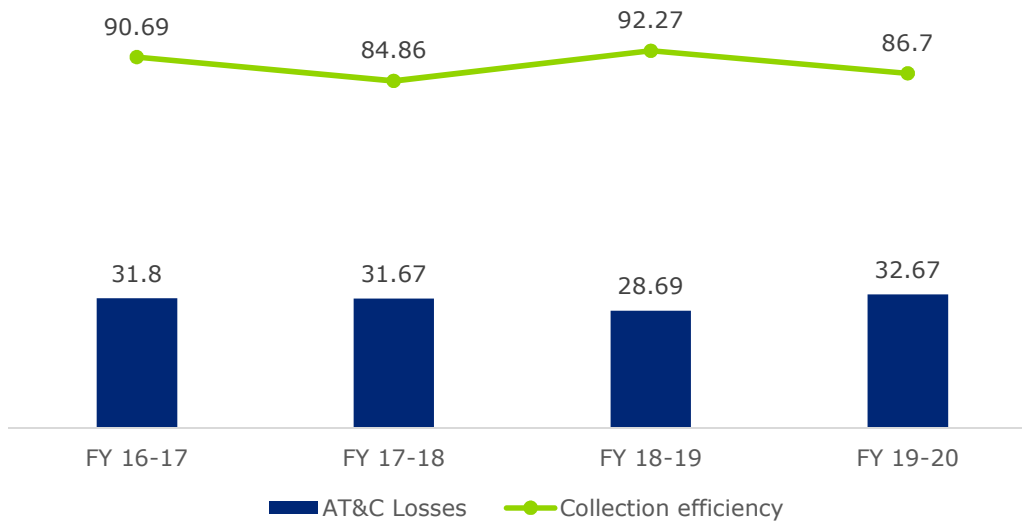


5 Operational Performance Targets and Mitigation Mechanism

Distribution Loss, Collection Efficiency and Targets

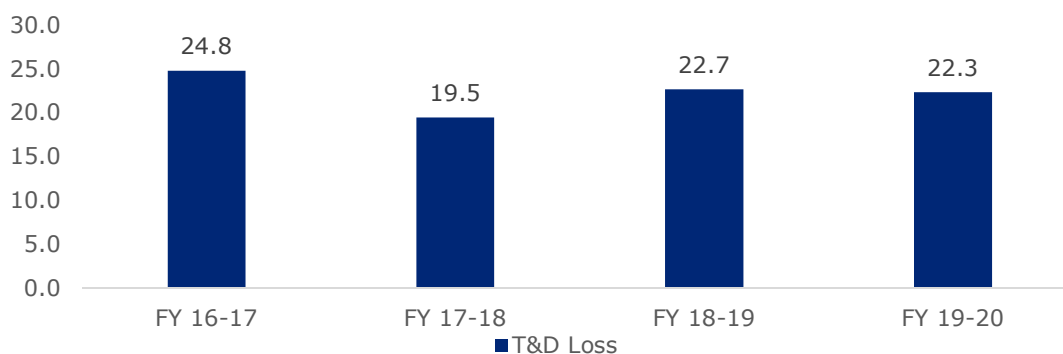
- 5.1 High AT&C losses are considered to be the major factor affecting operational and financial performance of any discom. High level of AT&C losses adversely impacts financial health of the utility. Historically, AT&C losses of JBVNL have been high to the extent of 54.16% in FY 2008-2009 (erstwhile JSEB), however significant improvement has been witnessed during the last 12 years as the losses have been brought down to 22% in FY 2019-20.
- 5.2 The AT&C losses vis-à-vis collection efficiency over the period of FY 16-17 to FY 19-20 (Provisional) are provided in the figure below.

Figure 8: AT&C Losses and Collection Efficiency



- 5.3 It is well appreciated that power distribution sector would remain unviable until AT&C and Distribution Losses are brought down to sustainable levels. SERCs have also made it clear that no burden in tariff would be transferred to consumers due to any losses higher than normative level. Hence 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.
- 5.4 Currently JBVNL has high Distribution Losses upto the level of 22% causing a huge operational and financial loss to the utility. Discoms have to purchase excess power to make up for the excess loss which is not allowed in power purchase cost by regulators. The Distribution Losses over the period of FY 16-17 to FY 19-20 are provided in the figure below.

Figure 9: Past Distribution Losses (in %)



5.5 As projected in the next chapter, the energy requirement at the State periphery is likely to increase from 12,320 MU in FY 20-21 to nearly 17,963 MU in FY 25-26 and the Distribution Losses are expected to reduce from 18% in FY21 to around 15% in FY26, owing to the numerous measures proposed by the State utility as discussed in the paragraphs below.

5.6 The year on year targets for reducing AT&C losses, Distribution Losses and increasing collection efficiency are provided in the table below:

Table 7: Targets AT&C Losses, Collection Efficiency and Billing Efficiency

Parameters	FY 21-22	FY 22-23	FY 23-24	FY 24-25	FY 25-26
Distribution Losses	15.00%	15.00%	15.00%	15.00%	15.00%
Collection Efficiency	95.00%	98.00%	100.00%	100.00%	100.00%
AT&C Losses	19.25%	17.00%	15.00%	15.00%	15.00%



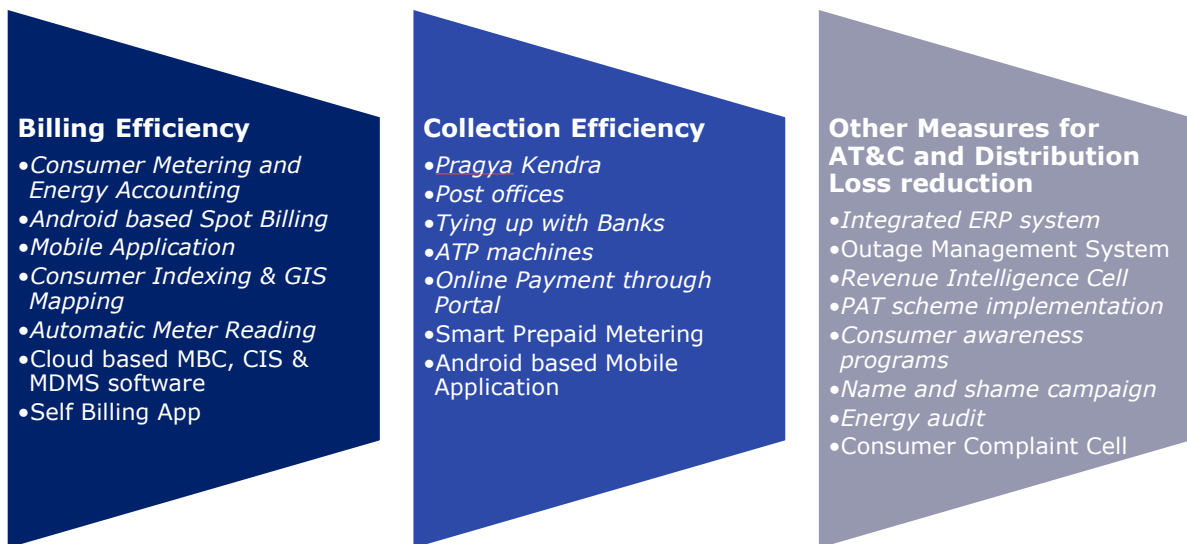
Mitigation Mechanism

- 5.7 In order to facilitate the reduction of AT&C losses and improve the power distribution system, Government of India had already launched various schemes, which have been instrumental in facilitating reduction of AT&C losses in JBVNL areas as well. Some of these schemes included:
- 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.
- 5.8 The Central government schemes mentioned above are on the verge of project closure and will be completed by March 2021. A state government scheme Jharkhand Sampurn Bijli Achadan Yojana (JSBAY) was launched in 2018 to strengthen the electricity distribution infrastructure in the areas not covered by the above mentioned Central Government Schemes. It is entirely funded by the Government of Jharkhand and is being implemented in two phases-rural and urban.
- 5.9 The Jharkhand Power Sector Improvement Project (JPSIP) has been envisioned in the year 2018 with the aim of strengthening and augmenting the IT infrastructure at JBVNL and install smart meters for 3.5 lakh consumers of Jharkhand and all consumers with load above 10kW across the state. Upgradation of the current Metering, Billing & Collection (MBC), Customer Information System (CIS) and Mater Data Management System (MDMS) to a robust, scalable and reliable cloud based solution will form a part of the Distribution component of JPSIP. The projects under JPSIP will be jointly funded by World Bank. Central Government and Government of Jharkhand.
- 5.10 The issues with the IT systems deployed currently in JBVNL are as follows:-
- The earlier R-APDRP systems involved are difficult to use as it has been implemented for a limited number of consumers, many of the applications are out of license period and there are no upgrades available from the OEM.
 - Most of the IT infrastructure/ Hardware (Servers, Routers, Switches etc.) are more than 7 year old and have reached end of life or even end of support in some cases. The hardware is also no-longer supported by respective OEMs' warranties.
 - Support from OEM for running the RAPDRP System is very limited used only for partial town and partial consumer under particular sub-divisions.
 - To meet the requirement, JBVNL had developed custom IT application for consumer services for entire state viz Spot Billing, New Customer Acquisition, Attribute Change, Complaint Resolution, Online Payment etc. (Urjamitra.In, "SUVIDHA") catering to LT consumers, but these are only stop-gap arrangements and enterprise level solution is required for managing the data and business efficiently.



- 5.11 As such, the implementation of a standard enterprise level Revenue Management (MBC) Application was envisioned. The bid process management for installation of a Metering Billing Collection (MBC), Customer Information System (CIS) and Meter Data Management System (MDMS) with scope for Cloud hosted implementation, Project Management, System Integration, Data Migration, Training and Field Management System (FMS) is underway and the tender for the same has been floated which is expected to be finalized within 6 months.
- 5.12 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, IT system upgradation for metering billing and collection, AMR, unmanned sub-stations, business process re-engineering, deployment of SCADA/ DMS and real-time energy auditing and accounting.
- 5.13 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 10: Action Plan for AT&C and T&D Loss Reduction



Improving Billing Efficiency

- 5.14 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. Consumer Metering and Energy Accounting

- 5.15 Metering of all 11 kV feeders has already been completed in the state. Additional in rural areas DT meters have been installed for 97.78% DTs. JBVNL therefore has largely been successful in undertaking required Energy Accounting measures within stipulated timelines of UDAY scheme signed on 5th Jan 2016. Through complete metering and energy accounting, JBVNL is 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 has helped the utility in controlling theft and pilferages and controlling the losses. A comprehensive Energy Audit study has already been done and targets related to metering have been set and JBVNL is make its best endavour to meet those targets.
- 5.16 Moreover, JBVNL is trying to change all the electro-mechanical meters into electronic meters to reduce the theft and the defective meters are being replaced on regular basis.

II. Android based Spot Billing

- 5.17 JBVNL has appointed billing agencies in all 7 Area Boards who monitor and supervise meter readers named as "Urja Mitras" who are 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 has been appointed for a batch of each 1,000-1,500 consumers or batch of DTRs in urban areas or Panchayats.
- 5.18 The entire activities enumerated above are carried out on a centralized android based mobile application platform, with all hardware related to field activities such as mobile and Bluetooth printer etc. provided by the Agency selected for appointing Urja Mitras.
- 5.19 There have been serious concerns regarding the performance of the existing billing agencies. This is being resolved through the appointment of new billing agencies, the tender of which is underway. Evaluation of Technical bids have already been completed and Letter of Award have been issued for various Circles.

III. Mobile Application

- 5.20 JBVNL had appointed a Software Service Agency (SSA) for developing a centralized platform for android based mobile meter photo reading, billing, collection and managing Urja Mitras along with all necessary software and hardware in the last MYT period which has helped in streamlining of billing database. Currently, the re-tendering process for appointment of SSA is underway.

IV. Consumer Indexing & GIS Mapping

- 5.21 Consumer indexing by the use of GIS can effectively help the 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.

- 5.22 To achieve the above the above loss reductions, Utility has already taken significant steps in consumer indexing and GIS mapping. GIS mapping and Consumer indexing of 30 towns covered under R-APDRP has been completed. Additional work of all 5 zones is being done by new agencies.

V. Automatic Meter Reading

- 5.23 JBVNL is focusing on Automatic meter reading (AMR) for assistance 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.
- 5.24 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

- 5.25 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.

VII. Self Billing App

- 5.26 JBVNL has also launched android based app for Self Billing, whereby consumers can generate their own bill by entering their metered consumption in the app. This would ensure that dilligent consumers can generate their own bill if due to any reasons, Urja Mitra or JBVNL couldn't generate bill of such consumers in due period. This would also lead to increase in billing efficiency of JBVNL.

VIII. Other Initiatives

- JBVNL along with JREDA is promoting Roof Top Solar which would reduce distribution of electricity through power distribution network and hence power losses. Additionally Jharkhand has been allotted 10 MW Solar Powered agriculture pumps under KUSUM scheme and is in process of being allotted extra 50 MW under same scheme
- Android based real time mobile photo spot billing (with collection facility) and complete control over database has been implemented



- Dedicated dashboards and analytics for JBVNL, agencies and UMs, for real-time progress and performance monitoring to ensure prompt interventions
- Special focus on the newly connected consumers under various schemes for ensuring timely billing of all the newly connected consumers
- Identification of Never Billed and Un-billed consumers and enforcing billing agencies and field officers to ensure 100% billing - Billing coverage has increased to ~90% (March'19)
- Metering of all unmetered and non-operational metered consumers to enhance billing on actual reading

Collection efficiency Improvement

5.27 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. Pragma Kendra

5.28 In order to facilitate the consumers, JBVNL entered into an agreement with CSC Pragma Kendra for "online electricity bill payment collection of energy bills." However, due to some issues the agreement has been temporarily suspended.

II. Mobile Application

5.29 Payment through Mobile Application has been 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

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

IV. Tying up with Banks

5.31 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 can be paid through cash, cheque and draft.

V. ATP machines

5.32 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, 258 ATP machines are under operation. 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 accepts cheques in the same manner.

VI. Pre-paid Smart Metering

- 5.33 In order to achieve its objective of 100% Collection Efficiency, JBVNL is planning to introduce a concept of Prepaid Smart Metering for all its consumers. The reasons for poor collection efficiency can be manifold. Pre-paid smart 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.
- 5.34 Smart metering in Jharkhand has been planned under two schemes – JPSIP and JSBAY. Under JPSIP, 3,50,000 consumers of Ranchi city and all consumers having load above 10kW will be covered. Other rural and urban consumers will be covered gradually in phases under the Jharkhand Sampoon Bijli Achadan Yojana (JSBAY) scheme. The tender for installation and commissioning of 3,50,000 consumers of Ranchi city has been floated.

VII. Online Payment through Portal

- 5.35 JBVNL initiated the payment of electricity bill through its online portal (<https://www.jbvnl.co.in/apply/viewbill.php>) long time back in the last MYT period 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. It has resulted in increased ease of payments for the consumers thus boosting revenue collections.

VIII. Other Initiatives

- Distribution of the POS machine to the Urja Mitras, to provide consumers "Pay from Home" facility, with multiple mediums like Cash, Credit/ Debit Card and AEPS
- Provision of timely payment rebate of 1% on the energy bill amount and Digital Payment rebate of up to Rs. 250
- Monthly Name and Shame campaign at offline (Newspaper/ Radio) and online medium (Facebook) to reduce the number of defaulters and ensure arrear collection
- Identification of the top 20 defaulter consumers for every circles, to initiate actions like prompt collection or disconnection being done on the fast track basis
- Focus on recovery of revenues through LD consumers by filing certificate case, expediting court cases, recovery of realizable arrears etc.



Other Measures for AT&C and Distribution loss reduction

5.36 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. ERP System Installation

5.37 The scheme for ERP installation is being undertaken under ADP scheme by Yash Technology along with WIPRO as the IT consultant. JBVNL intends to streamline its activities in Metering, Billing and Collection functions through ERP system. For the same, JBVNL would be installing SAP-ISU modules related to Billing, Collection and Energy Accounting. JBVNL would also be installing SAP-ISU modules relating to Meter Management in order to increase metered billing for its consumers.

II. Physical feeder segregation

5.38 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 the 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.

5.39 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.

5.40 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.

III. Revenue Intelligence Cell

5.41 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 include both recovery of revenue (e.g. back-billing) and prevention of future potential revenue loss (e.g. reduced theft). It will also monitor the activities which result in loss of revenue and hence the reduction in efficiencies of scale.

IV. Consumer Indexing

5.42 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 complete in most of the towns in all urban offices of Jharkhand

V. Outage Management System



- 5.43 JBVNL intends to install and operationalize Outage Management System (OMS) in its license area in order to locate any fault as soon as it occurs, isolate just right number of consumers from fault and restore power quickly by correcting the fault. This would lead to better consumer services and in-turn would also lead to reduced losses.

VI. LED for domestic and other category consumers under UJALA

- 5.44 JBVNL has adopted the UJALA scheme 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 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.

VII. PAT scheme implementation

- 5.45 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. 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.
- 5.46 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.

VIII. Consumer awareness programs

- 5.47 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 has further helped in consumer awareness by becoming a utility's touch-point for the consumers, at their door-step.

IX. Name and shame campaign to control power theft



- 5.48 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 has already implemented plan in this respect with the help of print and internet media, whereby the names of dishonest consumers are published on the website. Also, JBVNL is also planning to stick posters in each division / sub-division office highlighting names of dishonest consumers.

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

- 5.49 Energy accounting at various level of distribution system such as PSS, 33 kV feeders, 33 kV HT consumer, 11 kV feeders and Distribution Transformers up to consumer are being performed on routine basis. In case of 33 KV HT consumers and PSS, the purpose of energy accounting is to track energy through a system i.e. incoming and emanating energy. In case of 11 kV feeders and Distribution Transformers, energy accounting is done by comparing input energy with the cumulative sold energy of connected consumers as per consumer indexing to respective feeder or distribution transformer.
- 5.50 In addition to the above, reconciliation of input energy (by taking GSS & PSS readings) of each area board/ circle is being done on quarterly basis. This has enabled JBVNL to identify variation between input energy reported by field offices vis-à-vis input energy computed from GSS and PSS readings. After completion of consumer indexing of all consumer, Energy accounting process would effectively be implemented across JBVNL.



6 Energy Sales Projections

Introduction

- 6.1 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 16-17 to FY 19-20, provisional figures of FY 20-21.
- 6.2 The Petitioner has projected the Sub-Category wise sales based on the addition of consumers, consumption pattern and past trend of consumption growth rate. It is noteworthy, that JBVNL has witnessed a significant growth in the total sales across all categories in the last few years. This is majorly due to increase in the availability of power, reduced load shedding, consumer addition across all category and uninterrupted supply of power. Further, JBVNL aims to provide 24X7 power to all consumers in the State, which shall be the key reason for increase in the energy sales in coming years.

Consumers- Historical and Projections

- 6.3 JBVNL holds a large consumer base of around 45 lakh consumers as on March'20. The details of consumer mix and increase in consumer base over the FY 2016-17 to FY 2020-21 can be depicted from the table below. It can be noted that in FY 19-20, the domestic consumers contribute nearly about 92% in the total consumer mix, while commercial consumers stand at 6% and rest 2% are contributed by Industrial and others consumers. As the Business Plan is to be submitted on or before 30th of November'20, it is not possible to submit the details of connected load and number of Consumers at this juncture of time, in order to Arrive at the Consumers for the FY 2020-21, JBVNL has considered effective consumers as on 31st August'2020 and escalated the same to arrive at the Effective Consumers at the end of FY 2020-21.

Table 8: Consumers- Historical

Consumers	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21
Domestic	26,83,642	29,30,375	34,39,333	37,96,937	41,62,602
Commercial/Non Domestic	1,97,485	2,01,561	2,13,171	2,39,881	2,61,470
Public Lighting / SS	534	387	404	396	400
Irrigation / IAS	44,891	54,666	58,214	60,354	63,372
Industrial LT / LTIS	14,002	14,777	15,764	17,160	18,533
Industrial HT / HTS / S	1,663	1,656	1,684	1,756	1,831
Railway / RTS	5	-	-	-	-
Bulk Supply	3	-	-	-	-
JBVNL	29,42,225	32,03,422	37,28,570	41,16,484	45,08,208

I. Projection of Domestic Consumers



- 6.4 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.
- 6.5 Further, as per the Tariff Order notified by the Hon'ble JSERC, The Domestic Category Rate is also applicable for all consumers with contracted demand of up to 5 kW mixed, commercial, industrial, educational institutions, drinking water schemes or for any other purpose, except streetlight connections and agriculture/allied connections.
- 6.6 In the recent years, the Number of domestic category consumers have significantly increased in the last three years. Increase in number of Domestic Consumers has been primarily due to release of connections under the Saubhagya Scheme. As there has been a drastic growth at the fag end of previous MYT control period, it won't be prudent to consider past years CAGR for the propose of projecting the Number of Consumers for the Control Period i.e. FY 2021-22 to FY 2025-26. The Light of the above, the JBVNL has considered a growth rate of 6% in Domestic Consumers for the complete MYT Control period

II. *Projection of Commercial Consumers*

- 6.7 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.
- 6.8 For projecting the Commercial consumers for FY 2021-22 to FY 2025-26, 3 year CAGR has been computed based on the historical data i.e. 9 %, which has been applied on the actual number of consumers during FY 2020-21. Based on above, the projected number of commercial consumers for the MYT period are shown in the figure below

III. *Projection of Industrial Consumers*

- 6.9 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.
- 6.10 For projecting the industrial consumers for FY 2021-22 to FY 2025-26, a CAGR of 8% has been computed for LT consumers whereas, for HT consumers a CAGR of 5% has been assumed based on the historical data of FY 2016-17 to FY 2020-21. The CAGR of 8% and 5% mentioned above has been applied on the consumers projected at the end of FY 2020-21 to arrive at the consumers for the whole MYT Control period.



IV. **Projection of Irrigation & Agriculture Service Consumers**

- 6.11 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.
- 6.12 . In order to arrive at the Number of Consumers for the MYT Control Period i.e. FY 2021-22 to FY 2025-26, a YoY growth rate of 5% has been considered.

V. **Projection of Other Consumers**

- 6.13 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. In order to arrive at the number of Street Light Consumers, JBVNL has escalated the Consumers base of FY 2020-21 by 1% every year.
 - **MES-** This includes Military Engineering Services (MES) for a mixed load in defense cantonment and related area. JBVNL has assumed the same number of Consumers i.e. 9 throughout the MYT Control Period i.e. FY 2021-22 to FY 2025-26.
 - **Railways-** It is to pertinent to mention that railway traction consumers has been considered to be 2 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.
- 6.14 The category wise Projection of consumers all categories for FY 2021-22 to FY 2025-26 are detailed below.

Table 9: Consumers- Projections

Effective Consumers	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25	FY 2025-26
Domestic	43,75,278	46,37,795	49,16,063	52,11,026	55,23,688
NDS	2,85,003	3,10,653	3,38,612	3,69,087	4,02,304
LTIS	20,015	21,617	23,346	25,214	27,231
IAS	66,540	69,867	73,361	77,029	80,880
HT	1,922	2,018	2,119	2,225	2,336
SS	404	408	412	416	420

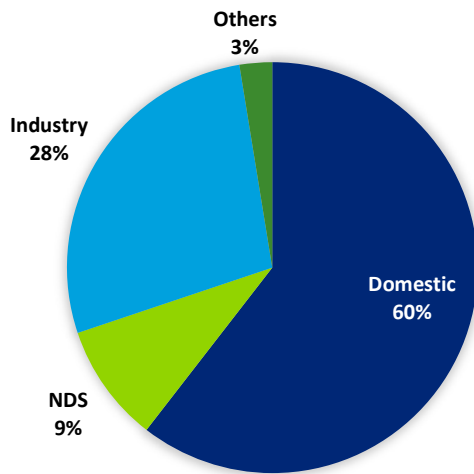


Total	47,49,163	50,42,358	53,53,912	56,84,996	60,36,860
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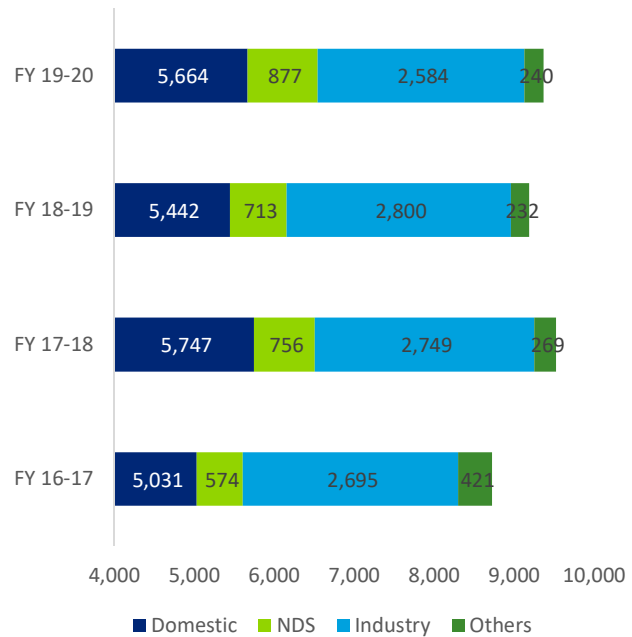
Energy Sales: Past Trend and Projections

6.15 JBVNL holds the high consumer base of around 45 Lacs consumers with total energy sales of around 9,365 MUs in FY 2019-20. As shown in the figure below, it can be noted that during FY 2019-20, the domestic consumers contributes nearly about 60% in the total energy mix, while HT consumers holds 25% and remaining energy consumption is done by LT, Commercial, IAS and other consumer categories.

Figure 11: Sales Mix



The details of sales mix and increase in energy



sales over the FY 2016-17 to FY 2020-21 can be depicted from the table below

Table 10: Sales in MUs- Historical

Sales in MUs	FY 16-17	FY 17-18	FY 18-19	FY 19-20
Domestic	5,031	5,747	5,442	5,664
HT	2,493	2,541	2,578	2,508
NDS	574	756	713	877
LTIS	203	208	222	216
Others	421	269	232	240
Total	8,721	9,521	9,187	9,506

6.16 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

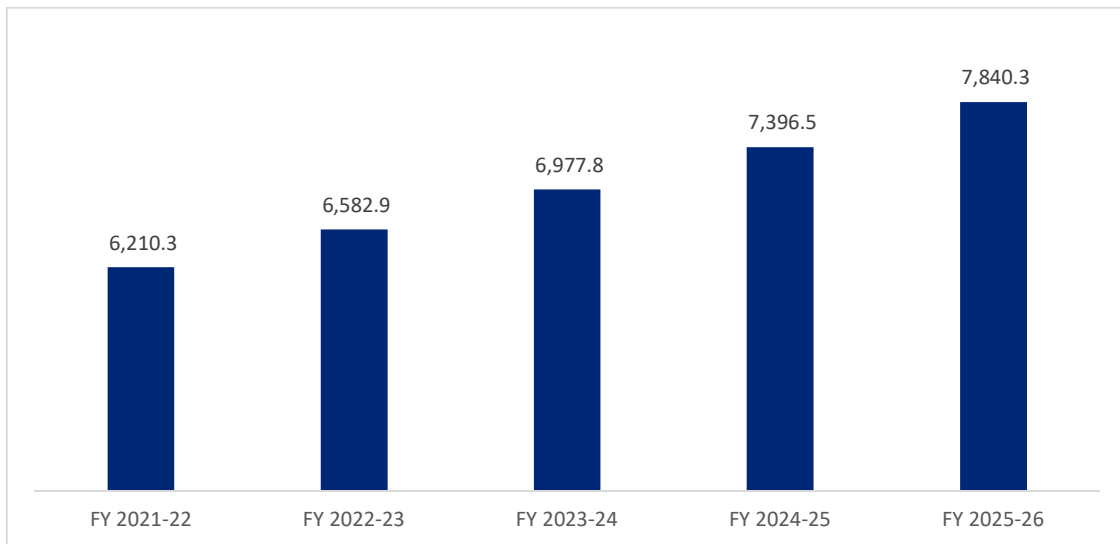


that since 2011, JBVNL has been able to considerably increase the availability of power, because of which the sales of JBVNL have been able to grow at a rapid rate. This is primarily due to the reduced load shedding and additional supply availability. Additional availability of power to the consumers 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 2021-22 to FY 2025-26 are discussed below.

I. Projection of Energy Sales to Domestic Consumers

- 6.17 JBVNL has witnessed an annual growth of 2.41% 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.
- 6.18 The year on year demand of domestic consumers is calculated and 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 12: Projection of Domestic Sales (MUs)



II. Projection of Energy Sales to Commercial Consumers

- 6.19 For projecting the sales of commercial consumers for FY 2021-22 to FY 2025-26,



the number of consumers projected for the MYT Control Period have been multiplied with the Projected load factor and projected load per consumers which have been calculated from the Revenue Statement of FY 2019-20.

III. *Projection of Energy Sales to Industrial Consumers*

6.20 The Sales growth rate for LT Industrial and HT Industrial consumers between FY 2016-17 to FY 2020-21 was 8% and 1 % respectively. It is pertinent to note that since FY 2015-16, JBVNL has been able to considerably increase the availability of power and has substantially reduced the load shedding. The sales for the LTIS and Industrial Consumers has been assuming the the projected number of consumers would have same average load per consumers and would keep consuming the energy at the same load factor.

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

6.21 For projecting the sales of Irrigation & Agriculture Service Consumers for FY 2021-22 to FY 2025-26, the existing sales per consumer and the projected number of consumers have been considered to arrive at the sales for the MYT Control period. As discussed earlier, 1,00,000 connection are to be released under the existing Tilka Manjhi scheme

V. *Projection of sales to Other Consumers*

6.22 For projecting the sales of other consumers for MYT Period from FY 2021-22 to FY 2025-26, 4 year CAGR has been computed based on the historical data of FY12 to FY16. The Category wise sales per consumers has been multiplied with the projected consumers to arrive at the energy sales for the MYT Control Period.

6.23 It is to pertinent to mention that sales to railway traction has been considered to be reduced to only 2 consumers as the railway traction has been shifted from JBVNL's network and opted for purchase of power through open access only.

6.24 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 11: Projection of Sales in MUs

Sales in MUs	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25	FY 2025-26
Domestic	6,210.3	6,582.9	6,977.8	7,396.5	7,840.3



Sales in MUs	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25	FY 2025-26
Non-Domestic	1,042.5	1,136.3	1,238.6	1,350.1	1,471.6
LT Industry	252.3	272.5	294.3	317.9	343.3
IAS	213.8	224.5	235.7	247.5	259.9
HT Industry	2,038.4	2,136.7	2,239.9	2,348.3	2,462.0
HTSS	438.1	460.0	483.0	507.2	532.5
Railway	155.1	155.1	155.1	155.1	155.1
Streetlight	46.9	47.4	47.8	48.3	48.8
MES	17.2	17.2	17.2	17.2	17.2
Total	10,414.5	11,032.5	11,689.5	12,388.0	13,130.7

Connected Load Projections

6.25 Based on the year on year growth of consumers and their energy sales, connected load is forecasted for FY 2021-22 to FY 2025-26 as detailed in the table below:

Table 12: Connected Load Projections (KVA)

Connected Load	FY 2021-22	FY 2022-23	FY 2023-24	FY 2024-25	FY 2025-26
Domestic	49,36,282	52,32,459	55,46,407	58,79,191	62,31,943
Non-Domestic	7,05,901	7,69,432	8,38,681	9,14,162	9,96,437
LT Industry	3,21,440	3,47,155	3,74,928	4,04,922	4,37,316
IAS	76,005	79,805	83,795	87,985	92,384
HT Industry	8,07,039	8,46,299	8,87,521	9,30,805	9,76,253
HTSS	87,397	91,767	96,356	1,01,173	1,06,232
Railway	35,400	35,400	35,400	35,400	35,400
Streetlight	7,325	7,399	7,473	7,547	7,623
MES	5,530	5,530	5,530	5,530	5,530
Total	69,82,320	74,15,246	78,76,090	83,66,716	88,89,117

6.26 The projection of connected load of different consumer categories has been done based on the existing load per consumer, Growth in Number of Consumers and Existing Load Factor.



7 Power Availability and Energy Balance

- 7.1 The requirement of electricity, for JBVNL, both in terms of energy requirement and peak demand are expected to increase significantly from the level of 12,227 MU in FY 15-16 to 13,008 MUs 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.
- 7.2 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.

Present status and key assumptions

- 7.3 The total allocated capacity, including central allocation, in Jharkhand as on 31st October, 2020 is 3,053.79 MW. In which, 600 MW is available from DVC to JBVNL for the DVC command area through Koderma Thermal Power Station. Owing to the proximity to large coal reserves, the fuel mix of the allocated generation capacity is largely skewed towards thermal, with more than 70% of the installed (and allocated) capacity available is from coal based generation plants only.
- 7.4 A detailed breakup of present allocation capacity of JBVNL can be tracked from the exhibit below.

Table 13: Current Power Purchase Allocation in MUs

S.N.	Name of Generating Stations		Allocation (MW)
1	NTPC	Farrakka	139.06
		Farrakka III	84.74
		Khalagaon I	27.66
		Talcher	89.38
		Khalagaon II	45.72
		Barh	80
		Korba	50
		Darlipalli	73.79
		Total	590.35
		Kanti Power	11.5
		Nabinagar	20
		Grand Total	631.85
		2	NHPC
Teesta	62.83		
Total	70.83		



S.N.	Name of Generating Stations		Allocation (MW)
3	PTC	Chukha	38.66
		Tala	116.9
		Total	155.56
4	Total Central Sector		1438.59
5	DVC	KTPS (OA)	600
		HT Points	60
		Total	660
6	TVNL	TVNL	420
7	APNRL	Unit I	63
		Unit II	63
		APNRL (Add.)	63
		Total	189
8	SOLAR	SECI	10
		State	16
		Total	26
9	Wind	PTC	200
		SECI	100
		Total	300
10	INLAND		63
11	ABCIL		11
16	Rungta Mines		4
17	Total Purchase PPA		2943.59
18	SRHPS (Generation)		130
	Grand Total		3073.59

7.5 It is important to mention that a large number of generation capacities are presently under various stages of development in the State as State utility has also entered into a JV with NTPC to revive the existing units of PUVNL and develop subsequent phases with total capacity of 2,400 MW in Stage-I. 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 14: Upcoming Allocations in MWs

Sl. No.	Name of company	Fuel	Allocated/ Requisition (MW)	Exp. CoD
1.	NTPC Darlipalli STPS Unit-II	Thermal	62.5	April-2022
2.	NTPC Nabinagar Unit -III	Thermal	20.0	July 2021
3.	NTPC Barh STPS-I Unit-II	Thermal	67.0	October-2021
4.	NTPC Barh STPS-I Unit-III	Thermal	67.0	April-2022
5.	NTPC North Karnpura Unit-I	Thermal	166.7	October-2021
6.	NTPC North Karnpura Unit-II	Thermal	166.7	April-2022
7.	NTPC North Karnpura Unit-III	Thermal	166.7	October-2022
8.	PUVNL Stage-I Unit-1	Thermal	600	April-2023
9.	PUVNL Stage-I Unit-II	Thermal	600	April-2024
10.	PUVNL Stage-I Unit-III	Thermal	600	April-2025



11.	SECI Solar	Solar	700	April-2021
12.	SECI Wind	Hydro	200	April-2021
Total			3,417.50	

Power Purchase Quantum

7.6 For making power purchase quantum projection for FY 21-22 to FY 25-26, the existing energy availability based on provisional power purchase of FY 20-21 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 20-21 used for projection are provided in the table below.

Table 15: Power Purchase Quantum in MUs for FY 20-21

Particulars	Power Purchase Quantum	
	Approved (MUs)	Estimated (MUs)
NTPC		
FARRAKA	399.62	765.87
FARRAKA III	-	566.28
Kahalgaon I	465.74	174.48
Talcher	537.76	581.01
Kahalgaon STPS II	131.44	123.41
Barh	656.03	489.59
Korba	350.89	449.30
Nabinagar	341.85	182.06
Darilpalli	767.58	293.74
North Karnpura	585.99	-
Barh STPS-I	352.65	81.64
PUVNL		-
Total	4,589.56	3,707.39
NHPC		
Rangit	58.23	58.23
Teesta	326.54	326.54
Total	384.77	384.77
PTC		
Chukha	171.15	171.15
Tala	306.25	306.25
Total	477.40	477.40
Total Central Sector	5,451.73	4,569.56
DVC	4133.45	3,777.22
State Sector		
SHPS	48.16	91.79
TVNL	-	1,815.73
Total State Sector	48.16	1,907.52
Private		



Particulars	Power Purchase Quantum	
	Approved (MUs)	Estimated (MUs)
Inland Power	409.77	364.74
APNRL	-	870.59
APNRL Adjustment		-
APNRL Add	-	467.71
Total Private Sector	409.77	1,703.04
RE		
Solar IPPs	17.92	14.05
SECI	505.10	14.00
Wind Total	1,108.98	1,162.05
Total RE	1,632.00	1,190.10
Rungta Mines	-	43.00
ABCIL	73.72	93.36
KANTI	-	70.96
UI Payable		35.85
UI Receivable		-78.10
PTC (IEX) Purchase	-	26.25
PTC (IEX) Sale		-330.75
Sale of Excess Power		326.00
Grand Total	11,748.83	12,682.02

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

Optimisation of power purchase cost

7.8 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 Bijli Vitran Nigam Ltd (JBVNL) with NTPC, to develop subsequent phases of 3X800 MW by FY 2023-24. A part (unit) of PUVNL is expected to come in FY 2023-24, 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.

Renewables

7.9 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. Due to competitive bidding, power purchase cost of renewable capacity has also reduced considerably as compared to conventional sources. Hence



procurement of renewable capacity also leads to reduction in Power Purchase Cost.

- 7.10 To meet the Solar RPO targets, JBVNL has planned to procure 700 MW solar power from different IPPs recently selected under the recently floated tender by SECI for 2000 MW. JBVNL has already filed Petition for approval of PSA signed with SECI for 700 MW. JBVNL has already planned to procure power from these sources based on the expected CODs of the solar plants in a phased manner. This will not only fulfill solar RPO, but will allow utility to meet its demand and serve its consumers with 24x7 reliable power.
- 7.11 JBVNL is already meeting its Non-Solar RPO target primarily from 300 MW wind power allotted to it. Further it is in process of getting 200 MW additional wind PSA from SECI to meet upcoming additions in Non-Solar RPO target.
- 7.12 Solar and Non-Solar RPO Trajectory has not been finalized as concerned JSERC Regulation is still in draft stage. Once Hon'ble Commission finalizes the same, JBVNL would present its detailed plan towards compliance of the same.

Short Term Open Access (STOA) -

- 7.13 In view of excess power available through-out the Control Period, JBVNL feels it would be feasible to sell power in open market so as to recover variable cost of power scheduled and also certain amount of fixed cost of the plants from which power has been scheduled so that overall power purchase cost may decrease. Further it may need to sell power to avoid paying under-drawal surcharge and compensation charges of a generating station in case power is being surrendered beyond a certain limit. Additionally as per new DSM regulations, Discoms need to reverse sign of deviation after even 7 time blocks in order to avoid paying additional deviation charge. Hence JBVNL may also have to sell power through short-term to meet this condition.
- 7.14 Although JBVNL has contracted adequate capacity and don't need to rely on short-term power for supplying power to consumers. However still in case of emergency like outage of large plants, it may offtake power from Bilateral route or power exchange.

Power Procurement Quantum Projection Methodology

- 7.15 JBVNL has projected the power purchase quantum for next Control Period based on following facts and assumptions:
 - **Generation estimated during FY 2020-21:** Power Purchase quantum for existing power plants has been considered equal to power purchase quantum considered for FY 2020-21. However due to commissioning of new plants having PPA with Jharkhand, it is expected that existing power plants with high variable cost (including NTPC Kahalgaon, NTPC Farakka, NTPC Farakka_III, NTPC Barh Stage I & II, NTPC Nabinagar, Inland Power Limited and APNRL) would be backed down as per Merit Order Despatch



Principle. Moreover, with coming of cheaper and must-run solar and wind power PPAs also, power from costlier power plants is expected to be backed down leading to overall reduction in power purchase cost. Expected reduction in generation from such power plants having high variable cost in next Control Period has been carried out as per below table:

Table 16 Reduction in Power purchase from Plants lower in Merit Order in next Control Period

Financial Year	2021-22	2022-23	2023-24	2024-25	2025-26
Factor for reducing power from Plants with Higher Variable Cost	70%	60%	60%	50%	50%

Additionally due to migration of HT consumers from DVC command area and integration of national grid in Dhanbad and Giridih districts of DVC command area, it is expected that power procurement from KTPS would reduce year on year in following manner.

Table 17 Reduction in Power purchase from KTPS in next Control Period

Financial Year	2021-22	2022-23	2023-24	2024-25	2025-26
Factor for reducing power from KTPS	80%	65%	50%	35%	20%

However, this reduction in power offtake from KTPS may happen only if required transmission system is erected in DVC command area or suitable power evacuation network is built for evacuating power from upcoming PUVNL.

- **Deallocation of Power from Old and Costly Power Plants:** In order to optimize power purchase cost in view of power allocation of 2,605 MW from upcoming conventional power plants; JBVNL is trying to de-allocate power from various existing power plants including following:

Table 18 Power Plants to be considered for De-allocation

Power Plant	Allocated Capacity (MW)
NTPC Farakka	139.06
NTPC Kahalgaon I	27.66
NTPC Barh Stage-I & II	40 + 202 (67*3)
NTPC Nabi nagar	60 (20 *3)
NTPC KBUNL	11.5
Rungta Mines	4



Power Plant	Allocated Capacity (MW)
ABCIL	11
Total	495

Out of Power plant mentioned above, NTPC Farakka and NTPC Kahalgaon has already achieved retirement age and hence may be de-commissioned in next Control Period. JBVNL has already started correspondence with Ministry of Power, Government of India to this effect. It is expected that power from these plants would be de-allocated from FY 2023-24 onwards

- **Deallocation of NTPC Korba and Farakka III Plants:** JBVNL was allocated capacity from NTPC Korba and Farakka III plants in lieu of loss of allocation of Patratu Thermal Power Stations. However, after commissioning of PUVNL allocation from these plants would be de-allocated. It is expected that from FY 2023-24; 100 MW from these two plants (50 MW each) would be de-allocated.
- **Power Requirement in next Control Period:** Based on estimated Sales and Energy balance for next Control Period, excess power available for sale in open market has been calculated.
- **Banking of Power:** Banking of Power has not been considered as amount of power availed and supplied through banking mechanism are roughly the same for full year.
- **Purchase through short-term sources:** No power purchase from IEX (PTC) or UI mechanism has been projected as power supply quantum in FY 2020-21 is greater than power requirement. However due to emergency situation, like outage of a generation plant, JBVNL may be forced to purchase power from exchange.
- **Current status of upcoming Power Stations:** Has been considered as per Table 14. Furthermore PLF of new plants have been considered in range of 60%, as they would be under stabilization mode, just after commissioning and auxiliary losses has been considered at 8%.
- **Commissioning of Renewable Plants:** As per correspondence with SECI and seasonal generation pattern, JBVNL has considered that 200 MW power from Inox Wind under 2000 MW ISTS Tench-III (wind) would be available from 01st April 2021 and 700 MW solar power under 2000 MW ISTS (tranche-I) would be available from 1st April 2021. PLF of renewable sources have been considered at 19%.

7.16 Based on above facts and assumptions, source-wise estimated Power Purchase



quantum and cost for FY 2020-21 is tabulated below-

Table 19: Power Purchase Quantum in MUs

Particulars	Power Purchase Quantum (MU)				
	FY 22	FY 23	FY 24	FY 25	FY 26
NTPC					
FARRAKA	536.11	459.52	-	-	-
FARRAKA III	396.40	339.77	136.33	113.60	113.60
Kahalgaon I	174.48	174.48	-	-	-
Talcher	581.01	581.01	581.01	581.01	581.01
Kahalgaon STPS II	86.39	74.05	123.41	123.41	123.41
Barh	342.71	293.75	-	-	-
Korba	449.30	449.30	-	-	-
Nabinagar	209.90	192.10	-	-	-
Darilpalli	293.74	294.04	294.04	294.04	294.04
North Karnpura	404.56	2,032.54	2,437.10	2,437.10	2,437.10
Barh STPS-I	342.90	590.75	-	-	-
PUVNL	-	-	2,924.52	5,849.04	8,773.57
Total	3,817.50	5,481.32	6,496.41	9,398.21	12,322.74
NHPC					
Rangit	58.23	58.23	58.23	58.23	58.23
Teesta	326.54	326.54	326.54	326.54	326.54
Total	384.77	384.77	384.77	384.77	384.77
PTC					
Chukha	171.15	171.15	171.15	171.15	171.15
Tala	306.25	306.25	306.25	306.25	306.25
Total	477.40	477.40	477.40	477.40	477.40
Total Central Sector	4,679.67	6,343.49	7,358.58	10,260.38	13,184.91
DVC	3,021.78	2,455.19	1,888.61	1,322.03	755.44
State Sector					
SHPS	91.79	91.79	91.79	91.79	91.79
TVNL	1,815.73	1,815.73	1,815.73	1,815.73	1,815.73
Total State Sector	1,907.52	1,907.52	1,907.52	1,907.52	1,907.52
Private					
Inland Power	255.32	218.84	218.84	182.37	182.37
APNRL	609.41	522.35	522.35	435.29	435.29
APNRL Adjustment	-	-	-	-	-
APNRL Add	327.40	280.63	280.63	233.86	233.86
Total Private Sector	1,192.13	1,021.82	1,021.82	851.52	851.52
RE					
Solar IPPs	14.05	14.05	14.05	14.05	14.05
SECI	1,188.40	1,188.40	1,188.40	1,188.40	1,188.40
Wind Total	1,497.60	1,497.60	1,497.60	1,497.60	1,497.60



Particulars	Power Purchase Quantum (MU)				
	FY 22	FY 23	FY 24	FY 25	FY 26
Total RE	2,700.05	2,700.05	2,700.05	2,700.05	2,700.05
Rungta Mines	43.00	43.00	-	-	-
ABCIL	93.36	93.36	-	-	-
KANTI	70.96	70.96	-	-	-
Grand Total	13,708.46	14,635.40	14,876.59	17,041.50	19,399.44

Power Purchase Rate and Power Purchase Cost

7.17 JBVNL has estimated the power purchase Cost or FY 2020-21 based on following facts and assumptions:

- Power Tariff during FY 2020-21:** Power Tariff for existing power plants except renewables as determined for FY 2019-20 has been escalated by 2.5% per annum to arrive at power tariff for next Control Period. Tariff of Renewable plants having levelized tariff have been considered equal to tariff applicable in FY 2019-20. For upcoming renewable plants the rate at which they have been bidded by successful bidder along with trading margin has been considered without any escalation as they are also bided on levelized basis
- Transmission and Scheduling Charges:** Actual Transmission and scheduling Charges for FY 2019-20 has been escalated by 2.5% to arrive at corresponding figure for FY 2020-21
- Power Purchase Cost for new Plants:** Power Purchase cost of new NTPC plants have been considered at Rs 4.00 kWh (Energy Charge- Rs 1.75/kWh and Capacity Charge-Rs 2.25/kWh). No escalation has been considered as any escalation in variable cost may be offset by decrement in interest cost component of capacity charge.
- Sale of Excess Power:** Sale of Excess power has been considered at Average Power Purchase Cost (except transmission and scheduling charges) as per methodology adopted by Hon'ble Commission in its MYT Order dated 21st June'17.

**Table 20: Power Purchase rate in Rs/KWh**

Particulars	Power Purchase Rate (Rs/kWh)				
	FY 22	FY 23	FY 24	FY 25	FY 26
NTPC					
FARRAKA	3.96	4.06			
FARRAKA III	4.43	4.54	4.65	4.77	4.89
Kahalgaon I	3.37	3.46			
Talcher	3.05	3.13	3.21	3.29	3.37
Kahalgaon STPS II	3.66	3.75	3.85	3.94	4.04
Barh	5.28	5.42			
Korba	2.77	2.83			
Nabinagar	4.54	4.65			
Darilpalli	3.37	3.45	3.54	3.62	3.72
North Karnpura	4.00	4.00	4.00	4.00	4.00
Barh STPS-I	4.00	4.00			
PUVNL	-	4.00	4.00	4.00	4.00
Total	3.81	3.90	3.92	3.95	3.97
NHPC					
Rangit	3.70	3.79	3.88	3.98	4.08
Teesta	2.12	2.17	2.22	2.28	2.34
Total	2.36	2.42	2.48	2.54	2.60
PTC					
Chukha	2.46	2.52	2.59	2.65	2.72
Tala	2.21	2.27	2.33	2.38	2.44
Total	2.30	2.36	2.42	2.48	2.54
Total Central Sector	3.54	3.69	3.75	3.83	3.88
DVC	4.71	4.83	4.95	5.07	5.20
State Sector					
SHPS	2.51	2.57	2.64	2.70	2.77
TVNL	3.97	4.07	4.17	4.27	4.38
Total State Sector	3.90	3.99	4.09	4.20	4.30
Private					
Inland Power	5.37	5.50	5.64	5.78	5.93
APNRL	4.14	4.25	4.35	4.46	4.57
APNRL Adjustment	-	-	-	-	-
APNRL Add	4.39	4.50	4.61	4.73	4.85
Total Private Sector	4.47	4.59	4.70	4.82	4.94
RE					
Solar IPPs	17.88	17.88	17.88	17.88	17.88
SECI	2.64	2.64	2.64	2.64	2.64
Wind Total	3.03	3.03	3.03	3.03	3.03
Total RE	2.94	2.94	2.94	2.94	2.94



Particulars	Power Purchase Rate (Rs/kWh)				
	FY 22	FY 23	FY 24	FY 25	FY 26
Rungta Mines	2.35	2.41			
ABCIL	3.46	3.55			
KANTI	5.81	5.95			
Grand Total	4.02	4.05	4.06	4.05	4.05

7.18 Considering the power purchase quantum and rate from different sources, a detailed power purchase cost of all sources for FY 21-22 to 25-26 is provided in the table below.

Table 21: Power Purchase cost in Crores

Particulars	Power Purchase Cost (Rs. crore)				
	FY 22	FY 23	FY 24	FY 25	FY 26
NTPC					
FARRAKA	212.21	186.44	-	-	-
FARRAKA III	175.46	154.15	63.40	54.15	55.50
Kahalgaon I	58.82	60.29	-	-	-
Talcher	177.43	181.87	186.42	191.08	195.85
Kahalgaon STPS II	31.62	27.78	47.46	48.64	49.86
Barh	181.09	159.10	-	-	-
Korba	124.23	127.34	-	-	-
Nabinagar	95.24	89.34	-	-	-
Darilpalli	98.86	101.44	103.98	106.58	109.24
North Karnpura	161.82	813.02	974.84	974.84	974.84
Barh STPS-I	137.16	236.30	-	-	-
PUVNL	-	-	1,169.81	2,339.62	3,509.43
Total	1,453.95	2,137.07	2,545.90	3,714.91	4,894.73
NHPC					
Rangit	21.52	22.06	22.61	23.17	23.75
Teesta	69.14	70.87	72.64	74.45	76.32
Total	90.66	92.92	95.25	97.63	100.07
PTC					
Chukha	42.14	43.19	44.27	45.38	46.51
Tala	67.81	69.50	71.24	73.02	74.85
Total	109.95	112.70	115.51	118.40	121.36
Total Central Sector	1,654.55	2,342.69	2,756.66	3,930.94	5,116.16
DVC	1,422.58	1,184.74	934.12	670.23	392.57
State Sector					
SHPS	23.05	23.63	24.22	24.82	25.44
TVNL	720.34	738.35	756.81	775.73	795.12



Particulars	Power Purchase Cost (Rs. crore)				
	FY 22	FY 23	FY 24	FY 25	FY 26
Total State Sector	743.39	761.98	781.03	800.55	820.57
Private					
Inland Power	137.06	120.41	123.42	105.42	108.06
APNRL	252.48	221.82	227.37	194.21	199.06
APNRL Adjustment	-	-	-	-	-
APNRL Add	143.79	126.33	129.49	110.60	113.37
Total Private Sector	533.32	468.56	480.27	410.23	420.49
RE					
Solar IPPs	25.12	25.12	25.12	25.12	25.12
SECI	313.96	313.96	313.96	313.96	313.96
Wind Total	453.54	453.54	453.54	453.54	453.54
Total RE	792.62	792.62	792.62	792.62	792.62
Rungta Mines	10.11	10.36	-	-	-
ABCIL	32.34	33.15	-	-	-
KANTI	41.20	42.23	-	-	-
PGCIL (Rs. Cr.)	226.27	231.93	237.72	243.67	249.76
Posoco (ERLDC)	1.09	1.12	1.15	1.17	1.20
Posoco (Railway)	-0.08	-0.08	-0.08	-0.08	-0.09
ERLDC(APNRL)	56.20	57.61	59.05	60.53	62.04
Grand Total	5,513.60	5,926.90	6,042.54	6,909.86	7,855.32

Energy Balance

7.19 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.

7.20 JBVNL would like to submit that power to be purchased from various sources has been segregated into different heads, while calculating the energy balance for the control period.

- Power Purchase from Outside JSEB Boundary- Sourced from NTPC, NHPC, PTC, APNRL, part of TVNL, NVVNL, SECI and RE (Wind)
- Energy Input Directly to State Transmission System- Input of power from TVNL directly to State Transmission System
- Energy Input through Renewables sources- Input from Solar IPPs selected through JREDA
- State-owned Generation- PTPS, SHPS, Rungta Mines, ABCIL and Inland Power



- Direct Input of Energy to Distribution System- DVC and Solar IPPs.

- 7.21 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.
- 7.22 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 21-22 and FY 25-26 is shown in the following table.

Table 22: Energy balance

Particulars	FY 22	FY 23	FY 24	FY 25	FY 26
Power Purchase from Outside JSEB Boundary (MU)	9,517.34	11,047.34	11,991.47	14,759.44	17,683.97
Loss in External System (%)	3.00%	3.00%	3.00%	3.00%	3.00%
Loss in External System (MU)	285.52	331.42	359.74	442.78	530.52
Net Outside Power Available (MU)	9,231.82	10,715.92	11,631.73	14,316.66	17,153.45
Energy Input Directly to State Transmission System (MU)	391.68	355.207	218.84	182.37	182.37
State-owned Generation (MU)	763.61	763.614	763.61	763.61	763.61
Energy Available for Onward Transmission (MU)	10,387.11	11,834.74	12,614.19	15,262.65	18,099.43
Transmission Loss (%)	5.00%	5.00%	5.00%	5.00%	5.00%
Transmission Loss (MU)	519.36	591.74	630.71	763.13	904.97
Net Energy Sent to Distribution System (MU)	9,867.76	11,243.00	11,983.48	14,499.51	17,194.46
Direct Input of Energy to Distribution System (MU)	3,035.82	2,469.24	1,902.66	1,336.07	769.49
Energy Available for Sale	12,903.58	13,712.24	13,886.14	15,835.59	17,963.95
Energy Billed	10,414.55	11,032.54	11,689.49	12,387.97	13,130.71
Distribution Loss	15.00%	15.00%	15.00%	15.00%	15.00%
Energy Required at Discom's Periphery	12,252.41	12,979.46	13,752.35	14,574.09	15,447.90
Surplus/(Shortage)	651.18	732.79	133.79	1,261.50	2,516.06



7.23 As discussed above in Clause 7.17 Sale of Excess power for a particular FY would be considered at Average Power Purchase Cost (except transmission and scheduling charges) in that Particular FY.

7.24 Year-wise sale of excess power and revenue generated from the same is tabulated below:

Table 23 Revenue from Sale of Excess Power

Particular	FY 22	FY 23	FY 24	FY 25	FY 26
Sale of Excess Power (MU)	651.18	732.79	133.79	1,261.50	2,516.06
APPC except Transmission charges (Rs/kWh)	3.80	3.83	3.90	3.91	3.92
Revenue from sale of Excess Power (Rs. crore)	247.18	280.85	52.20	493.47	986.42



8. Prayers to Hon'ble Commission

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

- 1) To approve the Business Plan JBVNL for the Control Period (FY 2021-22 to FY 2025-26) in accordance with Regulation 5 of the Jharkhand State Electricity Regulatory Commission (Terms and Conditions of Determination of Distribution Tariff) Regulations, 2020.
- 2) To approve the principles and methodology proposed by JBVNL for projection of ARR.
- 3) To allow the distribution and collection efficiency trajectory as proposed by JBVNL and its impact on the ARR.
- 4) To approve capital expenditure under Schemes provided under Capital Expenditure Plan along with their Funding Pattern
- 5) To approve number of consumers and Energy sold to various consumer categories as projected for next Control Period
- 6) To approve power purchase quantum and cost from various sources as projected for next Control Period
- 7) 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.
- 8) To condone any error/omission and to give opportunity to rectify the same.
- 9) To permit JBVNL to make further submissions, addition and alteration to this Business Plan as may be necessary from time to time.