BUSINESS PLAN

FOR MYT CONTROL PERIOD FY 2021-22 TO FY 2025-26

Submitted by:

TENUGHAT VIDYUT NIGAM LIMITED

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List of Abbreviations

Sl. No.	Abbreviations	Descriptions
1.	MW	Megawatt
2.	TVNL	Tenughat Vidyut Nigam Limited
3.	BU	Billion Units
4.	RES	Renewable Energy Sources
5.	CEA	Central Electricity Authority
6.	FGD	Flue Gas Desulphurization
7.	GW	Gigawatt
8.	NTPC	National Thermal Power Corporation Ltd.
9.	PVUNL	Patratu Vidyut Utpadan Nigam Limited
10.	JBVNL	Jharkhand Bijli Vitran Nigam Limited
11.	DVC	Damodar Valley Corporation
12.	JSERC	Jharkhand State Electricity Regulatory Commission
13.	EA	Electricity Act
14.	SERC	State Electricity Regulatory Commission
15.	TTPS	Tenughat Thermal Power Station
16.	KM	Kilometre
17.	MT	Metric Tonne
18.	DPR	Detailed Project Report
19.	EPC	Engineering, Procurement & Construction
20.	PLF	Plant Load Factor
21.	PAF	Plant Availability Factor
22.	MU	Million Units
23.	ERP	Enterprise Resource Planning
24.	SLDC	State Load Dispatch Centre
25.	SHR	Station Heat Rate
26.	R&M	Repair & Maintenance
27.	MYT	Multi Year Tariff
28.	ARR	Annual Revenue Requirement
29.	*A&G*	Administrative and General
30.	NAPAF	Normative Annual Plant Availability Factor
31.	SFC	Secondary Fuel Consumption
32.	O&M	Operation & Maintenance
33.	AE	Assistant Engineer
34.	JE	Junior Engineer
35.	CE	Chief Engineer
36.	SE	Superintending Engineer
37.	EE	Executive Engineer

1. INTRODUCTION

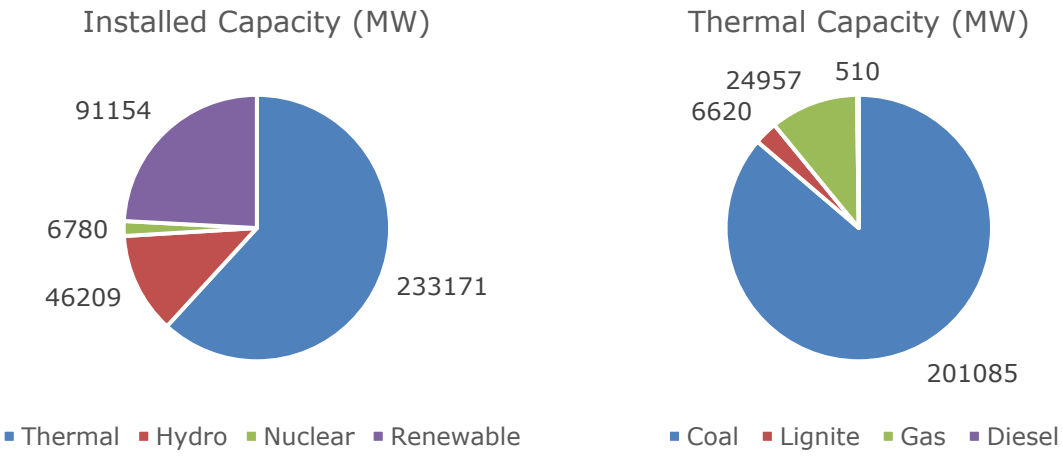
1.1 Indian Power Sector -Present and Future Scenario

1.1.1 India has been the third largest producer and third largest consumer of electricity in the world with installed power capacity reaching 3,79,130 Megawatts (MW) as of February 2021. Electricity production reached 1,250.78 billion units (BU) in FY20. India was ranked fourth in wind power, fifth in solar power and fifth in renewable power installed capacity in 2018. India's rank jumped to 22 in 2019 from 137 in 2014 on World Bank's Ease of Doing Business - "Getting Electricity" rankings.

1.1.2 The electricity generation target of conventional sources for the year 2020-21 was fixed as 1330 Billion Unit (BU). i.e. growth of around 6.33% over actual conventional generation of 1250.784 BU for the previous year (2019-20). The conventional generation during 2019-20 was 1250.784 BU as compared to 1249.337 BU generated during 2018-19, representing a growth of about 0.12%.

1.1.3 The breakup of source wise installed capacity as of February 2021 is given below:

Figure 1: Breakup of installed generation capacity



1.1.4 The contribution of thermal power to overall installed capacity stands at 61.5%, 53% being contributed by coal based thermal power plants. It is subsequently followed by Renewable sources at 24.5% and hydro power at 12.2%. There has been a significant increase in installed capacity of hydro and renewable energy sources which has led to a considerable decline in the share from coal based thermal power in the last decade.

1.2 Trend in Power Generation installed capacity

1.2.1 The installed power generation capacity in the country at the end of 11th Plan was about 2,00,000 MW. The capacity addition programme during the 12th Plan period was targeted at 88,537 MW comprising 72,340 MW in the Thermal Sector; 10,897 MW in the Hydro Sector and 5,300 MW in the Nuclear Sector.

1.2.2 During the five years of 12th Plan period, the following new capacities have been added:

Table 1: Capacity additions in XIIth plan

Year	Central	State	Private	Total
2012-13	5397.3	3977	11257.5	20631.8
2013-14	2574.1	3367	11884	17825.1
2014-15	4395.2	4886.1	13285	22566.3
2015-16	3775.6	7070	13131	23976.6
2016-17	4310.5	5177.3	4722	14209.8

1.2.3 A capacity addition target of 88,537 MW excluding 30,000 MW of RES, was fixed for 12th Plan period. The Twelfth Plans cumulative capacity addition of 99,209 MW was achieved. This is first time in the History of Five year Plan that the Capacity Addition target was overachieved.

1.2.4 For the Year 2018-19, Capacity addition of 5921.755 MW was achieved against planned capacity addition of 8106.15MW, comprising of 140 MW Hydro, 5781.755 MW Thermal, 0 MW Nuclear.

1.2.5 For the Year 2019-20, against a schedule of capacity addition of 12,186.14MW, Capacity addition of 7,065 MW was achieved as on 31.03.2020 comprising of 300 MW Hydro and 6,765 MW Thermal capacity.

1.2.6 The total electricity generation including generation from renewable sources in the country during year 2019-20 was 1250.78 BU as against the generation of 1249.34 BU during the corresponding period last year, showing a growth of 0.11%.

1.2.7 The electricity generation from conventional sources in the country increased from 420.6 Billion Unit (BU) during 1997-98 to 1072.22 BU during the year 2019-20. The electricity generation from renewable sources increased from 3.4 Billion Unit (BU) during 2003-04 to 138.34 BU during the year 2019-20.

1.2.8 The peak energy demand during the year FY 2020-21 reached an all time high of 1,90,198 MW. The peak demand and demand met for the previous years as reported by CEA is mentioned in the table below:

Table 2: Peak demand and demand met (in MW)

Year	Peak Demand (MW)	Demand Met (MW)	% Deficit
2019-20	1,83,804	1,82,533	0.7
2018-19	1,77,022	1,75,528	0.8
2017-18	1,64,066	1,60,752	2.0
2016-17	1,59,542	1,56,934	1.6
2015-16	1,53,366	1,48,463	3.2
2014-15	1,48,166	1,41,160	4.7

Table 3: Energy requirement and energy supplied (MU)

Year	Energy Requirement (MU)	Energy Supplied (MU)	% Deficit
2019-20	12,91,010	12,84,444	0.5
2018-19	12,74,595	12,67,526	0.6
2017-18	12,13,326	12,04,697	0.7
2016-17	11,42,928	11,35,332	0.7

Year	Energy Requirement (MU)	Energy Supplied (MU)	% Deficit
2015-16	11,14,408	10,90,850	2.1
2014-15	10,68,923	10,30,785	3.6

1.2.9 We can observe that the power deficit in terms of peak demand/demand met and energy requirement/energy supplied has reduced drastically over the years with increase in installed capacity. With new projects in construction and commissioning phase till 2022, there will be minimum requirement for new capacity additions in the next few years to come.

1.2.10 Also, regarding installation of Flue Gas Desulphurization (FGD) units, India's power ministry has proposed pushing back the deadlines for adoption of new emission norms by coal-fired power plants, saying "an unworkable time schedule" would burden utilities and lead to an increase in power tariffs.

1.2.11 India initially had set a 2017 deadline for thermal power plants to comply with emissions standards for installing Flue Gas Desulphurization (FGD) units that cut emissions of toxic sulphur dioxide. That was later changed to varying deadlines for different regions, ending in 2022. Under the latest proposal, no new dates have been set. However, a final decision will have to be approved by the Supreme Court, which is hearing the issue.

1.2.12 India has also set itself an ambitious target of producing 175 GW of renewable energy by 2022 which would require considerable amounts of foreign investments in various forms.

1.3 Jharkhand Power Sector Scenario

1.3.1 Jharkhand is highly rich in minerals and is major hub for industrial activity in the country including mining, metal processing, power generation etc. The availability of Coal in abundance makes Jharkhand an ideal state for setting up Thermal Power Plants at the Coal Pits. With the abolition of freight-equalization, there is tremendous cost advantage in setting up thermal power plants at the Coal pit itself.

1.3.2 The Present total installed power capacity is 5610 MW. In view of future requirements NTPC is setting up a 3*800 MW power plant in Patratu (PVUNL) as a joint venture with JBVNL which is in advanced stages of construction and commissioning. Due to several new investments in manufacturing setups coming up, the demand for Power both within the state and the nearby states will increase manifold.

1.3.3 However, the per capita energy consumption of Jharkhand (938 kWh) is lower than the national average of 1181 kWh inspite of having a considerable consumption by industries.

Table 4: Installed power generation capacity in Jharkhand

Sl. No.	Units	Type	Installed Capacity (MW)
1	Tenughat Thermal Power Station	Thermal	420
2	DVC - Koderma Thermal Power Station	Thermal	1000
3	DVC - Bokaro A	Thermal	500

Sl. No.	Units	Type	Installed Capacity (MW)
4	DVC - Bokaro B	Thermal	480
5	DVC - Chandrapura Thermal	Thermal	630
6	Adhunik Thermal Power Station	Thermal	540
7	Maithon Power Limited	Thermal	1050
8	Tata Power Jojobera	Thermal	547.5
9	Inland Power Limited	Thermal	126
10	DVC - Panchet	Hydel	80
11	DVC - Maithon	Hydel	60
12	JUUNL - Sikidri	Hydel	130
13	Renewable - State owned	Renewable	4.05
14	Renewable - Private owned	Renewable	42.53
Total			**5610.08**

1.3.4 The peak energy demand and the demand met of the state of Jharkhand in the past years is provided below (for non-DVC area):

Table 5: Peak energy demand and demand met Jharkhand [Non-DVC area] (in MW)

Year	Peak Demand (MW)	Demand Met (MW)	% Deficit
2019-20	1,396	1,389	0.5
2018-19	1,339	1,291	3.6
2017-18	1,332	1,260	5.4
2016-17	1,498	1,498	0
2015-16	1,153	1,153	0

Table 6: Energy requirement and energy supplied Jharkhand [Non-DVC area] (MU)

Year	Energy Requirement (MU)	Energy Supplied (MU)	% Deficit
2019-20	8,941	8,872	0.8
2018-19	8,737	8,490	2.8
2017-18	7,906	7,753	1.9
2016-17	7,960	7,906	0.7
2015-16	7,735	7,650	2.3

1.3.5 It is observed that after significant additions in installed generation capacity in Jharkhand and 100% electrification achieved in December 2018, the % deficit has reduced both in terms of demand met and energy supplied but it also raises concerns over plans of future capacity addition due to stagnation in load growth.

1.4 Jharkhand State Electricity Regulatory Commission (JSERC):-

1.4.1 The Jharkhand State Electricity Regulatory Commission (hereinafter referred to as the "JSERC" or "the Commission") was established by the Government of Jharkhand under Section 17 of the Electricity Regulatory Commission Act, 1998 on August 22, 2002. The Commission became operational with effect from April 24, 2003.

1.4.2 The Government of Jharkhand vide its notification dated August 22, 2002 had defined the functions of JSERC as per Section 22 of the Electricity Regulatory Commission Act, 1998 to be the following, namely: -

a) To determine the tariff for electricity, wholesale, bulk, grid or retail, as the case may be, in the manner provided in section 29;
b) To determine the tariff payable for the use of the transmission facilities in the manner provided in section 29;
c) To regulate the power purchase and procurement process of the transmission utilities and distribution utilities including the price at which the power shall be procured from the generating companies, generating stations or from other sources for transmission, sale, distribution and supply in the State;
d) To promote competition, efficiency and economy in the activities of the electricity industry to achieve the objects and purposes of this Act.

1.4.3 The Electricity Act, 2003 (hereinafter referred to as "the Act" or "EA, 2003") came into force with effect from June 10, 2003; and the Commission is now deemed to have been constituted and functioning under the provisions of the Act as the earlier Electricity Regulatory Commission Act of 1998 stands repealed and the functions of SERCs are now defined under Section 86 of the Act.

1.4.4 In accordance with Section 86 (1) of the Act, the JSERC discharges the following functions: -

a) determine the tariff for generation, supply, transmission and wheeling of electricity, wholesale, bulk or retail, as the case may be, within the State
b) provided that where open access has been permitted to a category of consumers under section 42, the State Commission shall determine only the wheeling charges and surcharge thereon, if any, for the said category of consumers
c) regulate the electricity purchase and procurement process of distribution licensees including the price at which electricity shall be procured from the generating companies or licensees or from other sources through agreements, for purchase of power for distribution and supply within the State;
d) facilitate intra-state transmission and wheeling of electricity;
e) issue licences to persons seeking to act as transmission licensees, distribution licensees and electricity traders with respect to their operations within the State;
f) promote cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee;
g) adjudicate upon the disputes between the licensees and generating companies; and to refer any dispute for arbitration;
h) levy a fee for the purposes of this Act;
i) specify the State Grid Code consistent with the Grid Code specified under Clause (h) of sub-section (1) of Section 79;
j) specify or enforce standards with respect to quality, continuity and reliability of services by the licensees;
k) fix the trading margin in the intra-state trading of electricity, if considered necessary;

l) discharge such other functions as may be assigned to it under this Act.

1.4.5 The Commission has to also advise the State Government as per sub section 2 of Section 86 of the Act, on all or any of the following matters, namely:-

a) promotion of competition, efficiency and economy in activities of the electricity industry;
b) promotion of investment in electricity industry;
c) reorganisation and restructuring of electricity industry in the State;
d) matters concerning generation, transmission, distribution and trading of electricity or any other matter referred to the State Commission by that Government.

1.4.6 The State Commission ensures transparency while exercising its powers and discharging its functions.

1.4.7 In the discharge of its functions, the State Commission is also guided by the National Tariff Policy and its amendments, as brought out by GoI in compliance to Section 3 of the Act. The objectives of the National Tariff Policy are to:

a) ensure availability of electricity to consumers at reasonable and competitive rates;
b) ensure financial viability of the sector and attract investments;
c) promote transparency, consistency and predictability in regulatory approaches across jurisdictions and minimize perceptions of regulatory risks;
d) promote competition, efficiency in operations and improvement in quality of supply.

1.4.8 This Business Plan is being filed as per Jharkhand State Electricity Regulatory Commission (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020 notified by Hon'ble JSERC under Section 181 of Electricity Act 2003.

1.4.9 These Regulations shall come into force for the period from April 01, 2021 to March 31, 2026, after its publication in the Official Gazette of the Government of Jharkhand and unless reviewed earlier or extended by the Commission, shall remain in force upto March 31, 2026.

2. TVNL: BACKGROUNB AND REGULATORY PROCESS

2.1 Background

2.1.1 Tenughat Vidyut Nigam Limited (A Govt. of Jharkhand Undertaking) is a power generating company incorporated on 26.11.1987 under Companies Act, 1956, Head Quarter at Ranchi.

2.1.2 Keeping in view the availability of abundance source of water and coal from the adjacent coal mines, the Government of Bihar commissioned the Tenughat Thermal Power Project.

2.1.3 The Government of India granted the permission for the first phase in 1979. The first phase of the work was accomplished in 1995 with a total capital investment of Rs.915 crores. This Thermal Power station was dedicated to the nation on 9th December, 1995 by the then Chief Minister of Bihar. But due to some technical snags the first phase came to a stand still on February 5, 1996.

2.1.4 Unit II was synchronized in the year of 1996. It was put under commercial operational from September 1997 and was producing electricity of 210 MW continuously producing electricity according to its capacity.

2.1.5 The project known as Tenughat Thermal Power Station (TTPS) is located at village Lalpania in the District of Bokaro (Jharkhand). It is situated on the left bank of Tenughat reservoir. The nearest railway station is Gomia which is at a distance of 20 KM (approx.) by road. The project site is developed with all modern infrastructure like school, hospital, bank, post office, marketing complex etc.

2.1.6 The total installed capacity of Tenughat Thermal Power Station is 420 MW (2X210 MW). The first unit was put in commercial operation in September 1996 and second unit in September 1997. Existing units are performing well above the national standards.

2.1.7 The daily requirement of coal for full load generation for both of its Units is approximately 7000 MT which is being fulfilled by road and rail transport from its nearby collieries. The organization is run by dedicated & competent team of employees.

2.1.8 TTPS has an acquired land of 1800 acres (approx.) TVNL has planned its future expansion of existing site/plant by addition of 2X660 MW super critical units. The consultant for extension project has been appointed and the consultancy work is under progress. The DPR has been prepared and Global tender for selection of EPC contractor shall be floated shortly for installation of 2X660 MW units. The needed fuel requirement will be met from its allocated coal block Rajbar E & D located in the district of Latehar. Activity for commencement of coal mining is under progress. Water requirement will be met from Tenu Reservoir of water Resources Department of Govt. of Jharkhand. With grey field expansion the total installed capacity of 1740 (2X210 +2X660 MW) MW of TTPS shall be dedicated to the service of the State/Nation.

2.2 Key achievements of TVNL

2.2.1 Some of the key achievements of TVNL during the last few financial years are as follows:

- Highest one day generation/PLF - 10.38 MU/102.98% on 23.10.2011.
- TTPS achieved monthly Plant Load Factor (PLF) of 90.20% during the month of Jan'2013.
- TTPS achieved highest Annual Generation of 2924.87 MU at a Plant Load Factor (PLF)of 79.50% during the FY 2012-13 which is a record since its inception.
- Unit No. I:
  - Highest one day Generation/PLF: 5.19 MU /102.98% on 23.10.2011.
  - Highest Monthly PLF: 100.68% in Feb'2012.
  - Highest Monthly Station Loading Factor: 100.70% in Feb'2012.
- Unit No. II:
  - Highest one day Generation/PLF: 5.19 MU/102.98% ON 23.10.2011.
  - Highest Monthly Loading Factor:100.16% in Feb'2012.
- Allocation of the coal block Rajbar E&D for TVNL
- State Cabinet has accorded approval for installation of TTPS expansion project of 2X660 MW super critical units at TTPS, Lalpania.
- TTPS achieved Annual Generation of 2636.51 MU during the F.Y. 2015-16 at a Plant Load Factor (PLF) of 71.46% which is above national average.
- Rail transportation of coal to TTPS has been successfully operationalized since Oct'2015.
- SAP ERP system introduced wef 01.04.2016 for transparent operations.

2.3 Challenges and Opportunities for TVNL

2.3.1 TVNL over the years of its operation is facing a lot of challenges:

1. There has been a decline in PLF due to continuous backing down by the SLDC as the load growth in the state hasn't been quite encouraging and due to the increase in renewable power purchase by the state discom, JBVNL.
2. Some of the key technical parameters like SHR and auxiliary consumption have deteriorated due to the ageing of the units (Unit-I being in the 25th year of operation and Unit – II being in the 24th year of operation)
3. The ageing of the units has also affected the R&M expenses specially through the increase in the cost of spares and other maintenance expenses.
4. Also the non-payment of energy dues by JBVNL has adversely impacted the performance of TVNL. As on 31st March 2020, JBVNL owes TVNL cumulative dues of INR 4251.97 Cr.

2.4 Regulatory Background

2.4.1 Starting from 2003, TVNL has filed Petitions in accordance with Section 62 of EA 2003. The details of the previous Orders issued by JSERC are given below:

Table 7: Previous orders for TVNL issued by JSERC

Order	Date
Order on Petition for Multi Year Tariff for the period FY 2017-21 (Including truing-up For FY 2014-15 & provisional true-up of FY 2015-16) For Tenughat Vidyut Nigam Limited (TVNL)	28.02.2020 & 14.10.2020
Order on Petition for Annual Performance Review for FY 2014-15 (Including truing-up For FY 2012-13 & FY 2013-14) for Tenughat Vidyut Nigam Limited (TVNL)	30.09.2016
Order on Petition for Annual Performance Review for FY 2012-13 (including truing-up for FY 2011-12) for Tenughat Vidyut Nigam Limited (TVNL)	02.07.2014
MYT Order on Business Plan and Annual Revenue Requirement and Determination of Generation Tariff for First Control Period of FY 2012-13 to 2015-16 for Tenughat Vidyut Nigam Limited (TVNL).	30.05.2012
Tariff Order on Annual Revenue Requirement and Determination of Generation Tariff for Financial Years FY 2010-11 & 2011-12 for Tenughat Vidyut Nigam Limited (TVNL).	31.05.2011
Tariff Order on Annual Revenue Requirement and Determination of Generation Tariff for Financial Years FY 2009-10 & 2010-11 for Tenughat Vidyut Nigam Limited (TVNL)	22.11.2010
Tariff Order on ARR and Determination of Generation Tariff for FY 2008-09 & 2009-10 for Tenughat Vidyut Nigam Limited (TVNL)	05.03.2010
Tariff Order for TVNL FY 2007-2008	03.01.2008
Tariff Order for Tenughat Vidyut Nigam Limited (TVNL) FY 2005-06	30.03.2006
Tariff Order for TVNL FY 2004-2005	23.08.2004

2.4.2 The Hon'ble Commission has notified the JSERC (Terms and Conditions for determination of Generation Tariff) Regulations, 2020 published on 12th Nov 2020 (Hereinafter referred to as JSERC Generation Tariff Regulations, 2020) in exercise of the powers conferred by Section 61 and 62 read with Section 181 of the Electricity Act, 2003.

2.4.3 The sub-clause 6.2 of Clause A6 (Guiding Principles for the MYT Framework) of these regulations require the generating company, to prepare and file Business Plan of the Generating Station for the Control Period FY 2021-22 to FY 2025-26 for getting the same approved by the Hon'ble Commission. In compliance of this provision, the Petitioner is filing this business plan.

2.5 Objective of this Petition:-

2.5.1 The Hon'ble Commission, in exercise of the powers conferred by the EA 2003, notified the Jharkhand State Electricity Regulatory Commission (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020.

2.5.2 Regulation 6.5 of JSERC (Terms & Conditions for Determination of Generation Tariff) Regulations, 2020 (hereafter referred as JSERC Generation Tariff Regulations, 2020) states that:

"Each Generating Company shall file for the Commission's approval a Business Plan approved by an authorized signatory, as per the timelines specified in Section A 39of these Regulations. "

2.5.3 Further Regulations 6.6 of JSERC Generation Tariff Regulations, 2020 states that:

"The Business Plan shall be for the entire Control Period and shall inter-alia contain:-

a) ***Capital Investment Plan**: The Generating Company shall submit the Capital Investment Plan for the entire Control Period, detailing the investments planned by the Generating Company along with the corresponding capitalisation schedule and financing plan. This Plan shall also include capacity enhancement plan, if any, and proposed efficiency improvements and its cost benefit analysis. It shall also submit plant-wise details of Capital Structure and cost of Financing (interest on Debt) and return on equity, after considering the existing market conditions, terms of the existing loan agreements, risk associated in generating business and creditworthiness;*

b) ***Operational Plan**: A set of targets proposed for performance parameters such as Annual Plant Availability Factor (PAF), Plant Load Factor (PLF), Gross Station Heat Rate (SHR), Secondary Fuel Oil Consumption, Auxiliary Power Consumption (Aux)etc., and shall also include Unit-wise Outage Plan;*

c) ***Human Resource Plan**: Human Resource Plan with manpower planning including details of the estimated year wise manpower addition and retirements for the Control Period to run the power plant efficiently and effectively;*

d) *Proposals for Non-Tariff Income with item-wise description and details;*

e) *Proposals in respect of income from Other Business; and*

f) *Business Plan shall also contain the requisite information for the preceding Control Period:*

Provided that requisite information for the preceding Control Period shall include year-wise audited data on Scheme-wise capital investment, capacity enhancement plan, if any, proposed efficiency improvements and its cost benefit analysis, quality improvement measures undertaken, Employee Expenses, Repair & Maintenance Expenses 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 generating plant, such information is required to be submitted for the period of operations up to the start of the Control Period."

2.5.4 Hence in Order to comply with relevant provisions of JSERC (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020, TVNL is filing instant Business Plan for Control Period FY 22 to FY 26.

3. PAST PERFORMANCE ANALYSIS

This section elucidates TVNL's overview of power business into technical and financial performance for the previous years. A comparative analysis of the performance for various years in relation to technical parameters, O&M Expenses, capex incurred capitalization, etc. are discussed herewith.

3.1 Plant Availability Factor (PAF)

3.1.1 The Plant Availability Factor (PAF) of TVNL has improved over the years due to proper maintenance and upkeep of equipment and due to prevention of breakdowns. TVNL has focused a lot on improving its PAF to meet the target of power dispatch as scheduled by the SLDC.

Table 8: PAF from FY 17 to FY 21 (%)

Plant Availability Factor (%)	FY17	FY18	FY19	FY20	FY21
	48.33%	65.14%	54.95%	69.12%	69.66%

3.1.2 The Commission had considered Normative Annual Plant Availability Factor (NAPAF) of 85% as specified in the Generation Tariff Regulation, 2015 for projection of Availability during each year of the Control Period i.e. from FY 2016-17 to FY 2020-21.

3.1.3 TVNL was unable to achieve the Normative Annual Plant Availability Factor (NAPAF) of 85% as specified by the Commission due to unplanned maintenance activities conducted at the plant and delays in supply of primary fuel. Being an old plant entering into the 20th year at the start of the control period of FY 17 to FY 21, frequent shutdowns have had a major impact on all technical parameters leading to their degradation.

3.2 Plant Load Factor (PLF)

3.2.1 The Plant Load Factor (PLF) of TVNL has increased over the control period of FY 2016-17 to FY 2020-21 due to increase in electrification and load growth of JBVNL which has led to a PLF of close to 65% for the last two financial years and a gross generation of over 2200 MUs.

Table 9: PLF from FY 17 to FY 21 (%)

Plant Load Factor (%)	FY17	FY18	FY19	FY20	FY21
	38.62%	52.60%	45.85%	65.65%	60.82%

3.2.2 The Commission had considered Normative Plant Load Factor (PLF) of 85% as specified in the Generation Tariff Regulation, 2015 for each year of the Control Period i.e. from FY 2016-17 to FY 2020-21.

3.2.3 TVNL was unable to achieve the Normative Annual Plant Load Factor (NAPLF) of

85% as specified by the Commission due to backing down by SLDC, Jharkhand. Increase in installed renewable capacity (must run plants) and lower growth of industrial load has led to increase in instances of backing down by the SLDC.

3.3 Gross Station Heat Rate (SHR)

3.3.1 TVNL has improved its Station Heat Rate (SHR) significantly over the control period of FY 2016-17 to FY 2020-21 due to various stringent measures undertaken for monitoring of coal quality, upkeep of equipment and efficient plant operation.

Table 10: Actual SHR from FY 17 to FY 21

Station Heat Rate (in kcal/kWh)	FY17	FY18	FY19	FY20	FY21
	2,795.41	2,691.16	2,709.18	2,609.72	2,696.24

3.3.2 The Commission has approved the station heat rate for the control period as per the norms given in the Generation Tariff Regulations, 2015 as follows:

Table 11: SHR approved by Commission for FY 17 to FY 21

Station Heat Rate (in kcal/kWh)	FY17	FY18	FY19	FY20	FY21
	3043	2908	2773	2638	2503

3.3.3 TVNL was able to control its SHR within Commission approved numbers for four out of the five years of the Control Period FY 2016-17 to FY 2020-21 and strives to improve it further even though coping with low PLF % and maintaining SHR has been a tough and challenging task.

3.4 Secondary Fuel Consumption (SFC)

3.4.1 TVNL has improved its Secondary Fuel Consumption (SFC) considerably over the years of the control period of FY 2016-17 to FY 2020-21 owing to increase in PLF. With fewer instances of backing down, the Secondary Fuel Consumption (SFC) has reduced close to Commission approved

Table 12: Secondary Fuel Consumption for FY17 to FY21

Secondary Fuel Consumption (in ml/kWh)	FY17	FY18	FY19	FY20	FY21
	4.21	2.01	1.80	1.06	1.04

3.4.2 The Commission has approved the Secondary Fuel Consumption (SFC) of 1.00 ml/kWh for the control period as per the norms given in the Generation Tariff Regulations, 2015.

3.4.3 TVNL was able to improve its SFC from 4.21 ml/kWh to 1.04 ml/kWh during the Control Period due to increase in PLF and reduction in the instances of back down by SLDC. It strives to maintain the SFC within Commission approved numbers for

the next Control Period of FY 2021-22 to FY 2025-26.

3.5 Auxiliary Consumption

3.5.1 The Auxiliary Consumption of TVNL has improved over the years of the Control Period FY 2016-17 to FY 2020-21 due to increase in PAF% and PLF%. With fewer instances of backing down, the Secondary Fuel Consumption (SFC) has reduced to <12% although it was greater than the Commission approved numbers.

Table 13: Auxiliary Consumption (%) for FY17 to FY21

Auxiliary Consumption (%)	FY17	FY18	FY19	FY20	FY21
	13.67%	13.08%	12.12%	11.94%	11.39%

3.5.2 As per Regulation 8.6 of the Generation Tariff Regulations, 2015 the auxiliary consumption is a "controllable parameter". Therefore, the Commission had considered the auxiliary consumption at 9.50% for the Control Period FY 2016-17 to FY 2020-21.

3.5.3 TVNL was unable to achieve the Normative Auxiliary Consumption of 9.50% as specified by the Commission due to ageing of the units (Unit-I being in the 25th year of operation and Unit – II being in the 24th year of operation) and as such the efficiency levels have reduced. Moreover due to lower PLF% the auxiliary consumption of TVNL has been on the higher side.

3.6 O&M Expenditure

3.6.1 The O&M expenses of TVNL for the Control Period of FY 2016-17 to FY 2020-21 based on annual accounts and project numbers for FY 2020-21 is as follows:

Table 14: Breakup of O&M expenses for FY17 to FY21

O&M expenses (In Rs. Cr.)	FY17	FY18	FY19	FY20	FY21
Employee Benefits Expense	70.08	83.02	74.88	135.01	92.29
A&G expense	20.30	19.62	20.44	22.97	33.14
R&M expense	88.31	111.07	79.68	65.74	56.50

3.7 Analysis of Capital Expenditure

3.7.1 The Capital Expenditure of TVNL- for the last 5 years is shown as below:

Table 15: Analysis of Capital Expenditure

Particulars	FY 17	FY 18	FY 19	FY 20	FY 21
Opening CWIP	55.25	49.18	55.96	60.78	63.16
Add: Capex during year	43.00	6.96	8.90	3.42	4.39

Particulars	FY 17	FY 18	FY 19	FY 20	FY 21
Total CWIP	98.25	56.15	64.86	64.20	67.55
Less: Trfd to GFA	49.06	0.19	4.08	1.05	3.94
Closing CWIP	**49.18**	**55.96**	**60.78**	**63.16**	**63.60**
Gross Fixed Assets (GFA)					
Opening GFA	1493.00	1542.06	1637.75	1641.83	1642.88
Add: Trfd from CWIP	49.06	0.19	4.08	1.05	3.94
Addition/ Removal during the period		95.50			
Closing GFA	**1542.06**	**1637.75**	**1641.83**	**1642.88**	**1646.82**

;

4. OPERATIONAL PLAN

4.1 Regulatory Provisions for Operational Plan

4.1.1 As per Clause 6.6 of Jharkhand State Electricity Regulatory Commission (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020

"The Business Plan shall be for the entire Control Period and shall inter-alia contain:-

***Operational Plan**: A set of targets proposed for performance parameters such as Annual Plant Availability Factor (PAF), Plant Load Factor (PLF), Gross Station Heat Rate (SHR), Secondary Fuel Oil Consumption, Auxiliary Power Consumption (Aux)etc., and shall also include Unit-wise Outage Plan"*

4.2 Broad Methodology

4.2.1 As per Clause 16.1 of Jharkhand State Electricity Regulatory Commission (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020

"The values for operational norms for the existing generating stations have been decided, based on the past operational data of these plants. The norms of operation as given hereunder shall apply for existing thermal power stations in the State"

4.2.2 TVNL is committed to bring its operational parameter in line with target set by Hon'ble Commission in JSERC Generation Tariff Regulations 2020 in the next Control Period in order to provide cheap power to consumers in state of Jharkhand.

4.3 Plant Availability Factor (PAF)

4.3.1 As per Clause 16.1 of Jharkhand State Electricity Regulatory Commission (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020 TVNL projects Normative Annual Plant Availability Factor (%) of 85% for the Control Period FY 2021-22 to FY 2025-26.

Table 16: Normative Annual Plant Availability Factor (%) for FY22 to FY26

Normative Annual Plant Availability Factor (%)	FY22	FY23	FY24	FY25	FY26
	85%	85%	85%	85%	85%

4.3.2 The Commission after prudence check may modify these norms of operations after considering the capital investments approved for any Renovation and Modernisation activities undertaken.

4.4 Plant Load Factor (PLF)

4.4.1 As per Clause 16.1 of Jharkhand State Electricity Regulatory Commission (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020 TVNL projects Normative Annual Plant Load Factor (%) at 85% for the Control Period FY 2021-22 to FY 2025-26.

Table 17: Normative Annual Plant Load Factor (%) for FY22 to FY26

Normative Annual Plant Load Factor (%)	FY22	FY23	FY24	FY25	FY26
	85%	85%	85%	85%	85%

4.5 Gross Station Heat Rate (SHR)

4.5.1 As per Clause 16.1 of Jharkhand State Electricity Regulatory Commission (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020 TVNL projects Gross Station Heat Rate of 2503 kcal/kWh for the Control Period FY 2021-22 to FY 2025-26.

Table 18: Gross Station Heat Rate for FY22 to FY26 (kcal/kWh)

Gross Station Heat Rate (kcal/kWh)	FY22	FY23	FY24	FY25	FY26
	2503	2503	2503	2503	2503

4.6 Secondary Fuel Consumption (SFC)

4.6.1 As per Clause 16.1 of Jharkhand State Electricity Regulatory Commission (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020 TVNL projects Secondary Fuel Oil Consumption of 1.0 ml/kWh for the Control Period FY 2021-22 to FY 2025-26.

Table 19: Secondary Fuel Oil Consumption for FY22 to FY26 (ml/kWh)

Secondary Fuel Oil Consumption (ml/kWh)	FY22	FY23	FY24	FY25	FY26
	1.00	1.00	1.00	1.00	1.00

4.7 Auxiliary Consumption

4.7.1 As per Clause 16.1 of Jharkhand State Electricity Regulatory Commission (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020 TVNL projects Auxiliary Consumption of 9.50% for the Control Period FY 2021-22 to FY 2025-26.

Table 20: Auxiliary Consumption for FY22 to FY26 (%)

Auxiliary Consumption (%)	FY22	FY23	FY24	FY25	FY26
	9.50%	9.50%	9.50%	9.50%	9.50%

4.8 Non-Tariff Income

4.8.1 As per Clause 15.48 of Jharkhand State Electricity Regulatory Commission (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020 which

states that:

"The amount of Non-Tariff Income relating to the generating business as approved by the Commission shall be deducted from the ARR in determining the Tariff of the generating business; Provided that the Generating Company shall submit full details of its forecast of Non-Tariff Income to the Commission in such form as may be stipulated by the Commission"

4.8.2 For calculation of Non-Tariff Income average year on year growth rate of Non-Tariff Income from FY17 to FY21 has been taken, i.e, 0.67%. The Non-Tariff Income for FY 2021-22 has been considered to be halved from previous year level, primarily due to lower of interest rate being offered by banks on fixed deposit. Thereafter, an escalation of 0.67% has been considered for calculating the values of Non-Tariff Income for the Control Period of FY 2021-22 to FY 2025-26.

Table 21: Non-Tariff Income for the Control Period FY22 to FY26 (in Rs. Crores)

Non-Tariff Income (In Rs. Cr.)	FY22	FY23	FY24	FY25	FY26
	18.46	18.58	18.71	18.83	18.96

4.9 Unit-wise Outage Plan

4.9.1 In accordance with Clause 6.6 of Jharkhand State Electricity Regulatory Commission (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020 TVNL proposes the following unit wise outage plan for the Control Period FY 2021-22 to FY 2025-26 for planned maintenance activities.

Table 22: Unit wise outage plan for FY22 to FY26

Outage Plan (In days and hours)	FY22	FY23	FY24	FY25	FY26
Unit – I	30 days (720 hours)	30 days (720 hours)	30 days (720 hours)	30 days (720 hours)	30 days (720 hours)
Unit - II	30 days (720 hours)	30 days (720 hours)	30 days (720 hours)	30 days (720 hours)	30 days (720 hours)

4.9.2 TVNL proposes for a month's shutdown for each unit for each year due to ageing of the units (Unit-I being in the 25th year of operation and Unit – II being in the 24th year of operation) and as such the efficiency levels have reduced. So, enhanced focus on Repair and Maintenance activities becomes even more essential for efficient operation and running of the plant.

5. CAPITAL INVESTMENT PLAN

5.1 Regulatory Provisions for Capital Investment Plan

5.1.1 As per Clause 6.6 (a) and 6.7 of Jharkhand State Electricity Regulatory Commission (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020 which states that:

"6.6 The Business Plan shall be for the entire Control Period and shall inter-alia Contain:-

*a) **Capital Investment Plan**: The Generating Company shall submit the Capital Investment Plan for the entire Control Period, detailing the investments planned by the Generating Company along with the corresponding capitalisation schedule and financing plan. This Plan shall also include capacity enhancement plan, if any, and proposed efficiency improvements and its cost benefit analysis. It shall also submit plant-wise details of Capital Structure and cost of Financing (interest on Debt) and return on equity, after considering the existing market conditions, terms of the existing loan agreements, risk associated in generating business and creditworthiness;*

6.7 The Generating Company shall file for the Commission's approval a Capital Investment Plan for the entire Control Period along with the Business Plan. The Capital Investment Plan shall be prepared scheme-wise and each scheme shall include:-

1. *Purpose of investment;*
2. *Approval of Competent Authority;*
3. *Detailed Project Report;*
4. *Capital Structure;*
5. *Capitalisation Schedule;*
6. *Implementation schedule including timelines;*
7. *Cost-benefit analysis& Rate reasonability;*
8. *Improvement in operational efficiency envisaged in the Control Period;*
9. *On-going schemes that will spill over into next financial year under review along with justification;*
10. *New schemes that will commence during the Control Period but may be completed within or beyond the Control Period."*

5.1.2 As per Regulation 14.11 of JSERC (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020 a generating company may opt to avail a special allowance for meeting the requirement of expenses including R&M beyond the Useful Life of the generating station or a Unit thereof, and in such an event revision of the capital cost shall not be allowed and the applicable operational norms shall not be relaxed but the special allowance shall be included in the annual fixed cost.

5.1.3 TVNL Unit-I is completing 25 years in FY 2021-22 and Unit-II is reaching its age of 25 years in FY 2022-23. TVNL has decided to opt special allowance for Unit-I from FY 2022-23 onwards and for Unit-II from FY 2023-24 as per Regulation 14.12 of

JSERC (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020. From these years, TVNL is not requesting any capex/capitalization towards renovation & modernization.

5.1.4 Additionally, in order to achieve revised emission norms for coal based power plants as issued by MoEFCC; TVNL also proposes installation of FGD, D-NOx and ESP systems as per Regulation 14.13 of JSERC (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020. These expenditures are due to change in law and hence should not be regarded as Renovation & Modernization capex and hence can be availed along with special allowance.

5.1.5 In line with specified provisions of JSERC (Terms and Conditions for Determination of Generation Tariff) Regulations, 2020, TVNL hereby submits a detailed Capital Investment Plan and Capitalization schedule for MYT control period for FY 2021-22 to FY 2025-26 as tabulated below:

Table 23: Summary of Capital Investment Plan (In Rs. Cr.)

Capital Expenditure	FY 22	FY 23	FY 24	FY 25	FY 26
Control & Instrumentation (C&I)	27.14	1.48	-	-	-
Information Technology (IT)	0.37	4.50	-	-	-
Electrical Maintenance (EM-I)	15.62	3.12	-	-	-
Electrical Maintenance (EM-II)	4.48	6.18	-	-	-
Turbine Maintenance (TMD)	4.86	21.26	-	-	-
Boiler Maintenance (BMD)	4.11	6.25	-	-	-
Coal Handling Plant (CHP-I)	5.25	1.80	-	-	-
Coal Handling Plant (CHP-II)	-	0.35	-	-	-
Operation (OPN)	-	0.28	-	-	-
Civil	4.41	2.20	-	-	-
Environmental Management Group (EMG)	29.65	20.10	67.70	50.10	68.10
Total	**95.89**	**67.50**	**67.70**	**50.10**	**68.10**

Table 24: Summary of capitalization schedule (In Rs. Cr.)

Capital Expenditure	FY 22	FY 23	FY 24	FY 25	FY 26
Control & Instrumentation (C&I)	27.14	1.48	-	-	-
Information Technology (IT)	0.37	4.50	-	-	-
Electrical Maintenance (EM-I)	15.62	3.12	-	-	-
Electrical Maintenance (EM-II)	4.48	6.18	-	-	-

Capital Expenditure	FY 22	FY 23	FY 24	FY 25	FY 26
Turbine Maintenance (TMD)	4.86	21.26	-	-	-
Boiler Maintenance (BMD)	4.11	6.25	-	-	-
Coal Handling Plant (CHP-I)	5.25	1.80	-	-	-
Coal Handling Plant (CHP-II)	-	0.35	-	-	-
Operation (OPN)	-	0.28	-	-	-
Civil	4.41	2.20	-	-	-
Environmental Management Group (EMG)	14.83	18.95	45.81	49.38	106.69
Total	**81.07**	**66.35**	**45.81**	**49.38**	**106.69**

TVNL proposes the following Capital Investment Plan for the Control Period (FY 2021-22 to FY 2025-26) before the Hon'ble Commission. The cost benefit analysis and the Detailed Project Report for each of the items will be submitted for kind consideration of Hon'ble Commission in due course.

6. HUMAN RESOURCE PLAN

6.1 Introduction

6.1.1 As per Sub-Clause (c) of Regulation 6.6 of JSERC Generation Tariff Regulations, 2020 TVNL is required to HR Plan as part of its Business Plan. The Regulation is reproduced here-under:

> *"**Human Resource Plan**: Human Resource Plan with manpower planning including details of the estimated year wise manpower addition and retirements for the Control Period to run the power plant efficiently and effectively"*

6.1.2 Accordingly, TVNL hereby is providing details of addition in Employees in next Control Period and rationale there-off in subsequent paragraphs.

6.2 Employees Addition Details

6.2.1 TVNL proposes no manpower addition for the Control Period FY 2021-22 to FY 2025-26. The department and function wise number of personnel to retire in the next Control Period is mentioned in the table below:

Table 25: Manpower to be retired in next Control Period

Retirement		FY22	FY23	FY24	FY25	FY26	Total
Technical Stream	C.E	0	1	0	0	0	**1**
	E.S.E	0	0	0	1	0	**1**
	E.E	1	0	1	1	4	**7**
Non – Technical	C.E	0	0	3	3	5	**11**
	E.S.E	0	1	0	0	0	**1**
	E.E	0	0	0	0	0	**0**
HR	HR Posts	0	2	2	2	2	**8**
Finance	Finance Posts	2	0	0	0	0	**2**