BEFORE

JHARKHAND STATE ELECTRICITY REGULATORY COMMISSION

PETITION

FOR

APPROVAL OF

BUSINESS PLAN

FOR MYT CONTROL PERIOD

FY 2016-17 TO FY 2020-21

FILED BY

TENUGHAT VIDYUT NIGAM LTD.

(A GOVERNMENT OF JHARKHAND UNDERTAKING)

HINOO, DORANDA, RANCHI-834002

APRIL 2017

BEFORE THE HON'BLE JHARKHAND STATE ELECTRICITY REGULATORY COMMISSION

FILE / PETITION NO……

IN THE MATTER OF

FILING OF THE PETITION FOR APPROVAL OF BUSINESS PLAN FOR MYT CONTROL PERIOD FY 2016-17 to FY 2020-21 FOR TENUGHAT VIDYUT NIGAM LTD. UNDER THE JHARKHAND STATE ELECTRICITY REGULATORY COMMISSION's MULTI YEAR TARIFF (GENERATION) REGULATIONS, 2015 AND UNDER SECTION-62 READ WITH SECTION 86 OF THE ELECTRICITY ACT 2003.

AND IN THE MATTER OF

TENUGHAT VIDYUT NIGAM LIMITED; HINOO, DORANDA, RANCHI-834002

PETITIONER

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ABBREVATIONS

AC	Alternating Current
APR	Annual Performance Review
ARR	Aggregate Revenue Requirement
CAPEX	Capital Expenditure
CERC	Central Electricity Regulatory Commission
Ckt-Km	Circuit Kilometre
FY	Financial Year
GoM	Government of Maharashtra
HVDC	High Voltage Direct Current
IPTC	Independent Power Transmission Company
KV	Kilo Volt
JSERC / Commission	Jharkhand State Electricity Regulatory Commission
MVA	Mega Volt Ampere
MW	Mega Watt
MYT Regulations, 2011	MERC (Multi Year Tariff), Regulation, 2011
MYT Regulations, 2015	MERC (Multi Year Tariff), Regulation, 2015
MYT	Multi Year Tariff
O&M	Operation & Maintenance
MYT Order /MYT Order No.17 of 2014	Order of ARR and MYT determination of Second control period From FY 2013-14 to FY 2015-16
R&M	Renovation & Modernisation
RoE	Return on Equity
S/S	Sub Station
Third Control Period	FY 2016-17, FY 2017-18, FY 2018-19, FY 2019-20
TVS	Technical Validation Session
WREB	Western Region Electricity Board
WRPC	Western Region Power Committee

Chapter 1. EXECUTIVE SUMMARY

1.1 Preamble

1.1.1 Tenughat Vidyut Nigam Limited (TVNL) (Hereinafter referred to as Petitioner) has filed the current petition for approval of Business Plan for Control Period FY 2016-17 to FY 2020-21, for its distribution business regulated by the Hon'ble Jharkhand State Electricity Regulatory Commission (JSERC).

1.1.2 This section highlights the need for Business Plan, profile of TVNL along with brief past performance of TVNL and future plans of the petitioner.

1.2 Need for Business Plan

1.2.1 The Hon'ble Commission has notified the JSERC (Terms and Conditions for determination of Generation Tariff) Regulations, 2015 published on 20th January, 2016 (Hereinafter referred to as JSERC Generation Tariff Regulations, 2015) in exercise of the powers conferred by Section 61 and 62 read with Section 181 of the Electricity Act, 2003. The sub-clause (3) & (6) of Clause 6 of these regulations require the generating company, to submit a Business Plan as part of the Multi Year tariff framework from FY 2016-17 to FY 2020-21.

1.2.2 TVNL has prepared the Business Plan taking cognizance of the existing internal factors and external business environment affecting the business of TVNL.

1.2.3 It is submitted that the Business plan being a dynamic document may need to be updated at periodic intervals taking into account the changes in the internal and external environment and these changes would be intimated to the Hon'ble Commission from time to time.

1.3 Profile of TVNL: Power Business in Jharkhand

1.3.1 Tenughat Vidyut Nigam Limited (TVNL) is now identified as the prime source of electricity in the State of Jharkhand.

1.3.2 To establish power station at Tenughat, a study was undertaken in the year 1976 and it was indicated that Tenughat Thermal Power Station (TTPS) would be the most ideal site for installation of Super Thermal Power Station and based on the above mentioned study it was established in Lalpania in Bokaro district of Jharkhand.

1.3.3 TTPS can be developed as a mega power project as it enjoys all the benefits of a pithead thermal power project. The planned capacity of 1550 MW was envisaged to be completed in two stages, as given under:

Stage- I: Two units of 210 MW each already in operation and generating power on an average of 110 MU per month.

Stage-II: Two units of 660 MW each under expansion plan. The approval of the Cabinet of State Government has already been accorded and preparation of DPR is in progress. The cost of the project is envisaged to the tune of INR 6,500 Cr. approximately.

1.4 Objectives of preparing Business Plan

1.4.1 The Business Plan for TVNL is being prepared with the objective of assessing the current performance of the generating utility, setting the performance targets till FY 2020-21 and assessing various interventions required to achieve the same by FY 2020-21.

1.4.2 The key areas which are vital for the growth of the utility and have been given specific focus in the Business Plan are underlined below as:

- Gross Station Heat Rate;
- Normative Annual Plant Availability Factor
- Auxiliary Energy Consumption;
- Secondary Fuel Oil Consumption;
- Operation and Maintenance Expenses;
- Capital Investment as well as Capital Structure including Financing cost which includes cost of debt (interest), cost of equity (return);
- Depreciation

1.4.3 Performance Gap in the aforesaid areas has been assessed and the initiatives required to achieve the performance targets have been identified. The details of the same have been provided in the subsequent sections.

Chapter 2. INTRODUCTION

2.1 Preamble

2.1.1 This section presents the background scenario of the Indian Power Sector as well as that of Jharkhand Power Sector Scenario. The section also dealt with the reasons for filing of the Petition and approach of filing the petition.

2.2 Background: Power Sector, India

2.2.1 India in the emerging markets has been one of the fastest growing economies. The Indian economy has posted more than 6% growth for three years consecutively and has seen a decade of more than 7% growth consistently.

2.2.2 Energy requirement and supply is a strategic input and one of a key driver for economic and social development behind any growing country.

2.2.3 As energy plays a very vital role in industrial production and common man's life, it has become extremely essential to boost the growth in energy segment for the growth of the country.

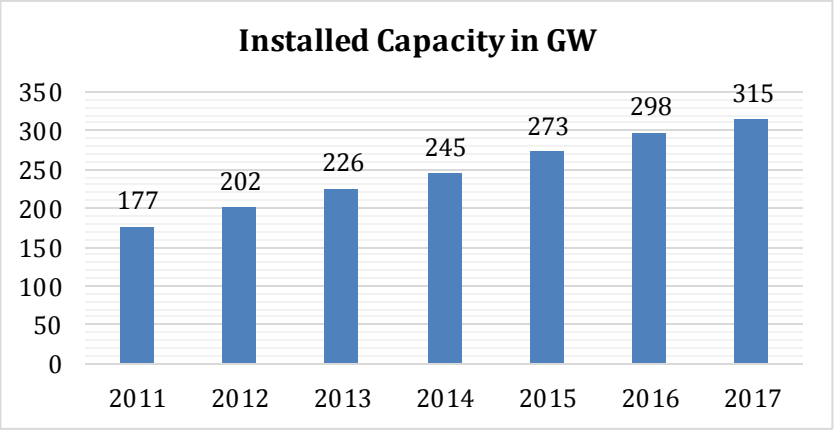
2.2.4 With the growing demand in energy requirement, the annual per capita energy consumption has grown significantly. The low per capita consumption of electric power in India compared to the world average presents a significant potential for sustainable growth in the demand for electric power in India.

2.2.5 According to the Central Electricity Authority, India's peak demand is expected to grow at a CAGR of 7.6% over a period of 10 years (FY 2011 to FY 2021) and would require a generating capacity of 469 GW by 2021.

2.3 Current Scenario of Indian Power Sector

The all India generating installed capacity (GW) of Power Utilities is given hereunder:

Figure 1: All India Installed Capacity - As on 28th February 2017



Source: Central Electricity Authority

2.3.1 India has the fifth largest generation capacity in the world with an installed capacity of approx. 315 GW as on 28th February 2017.

Table 1: Category wise generation

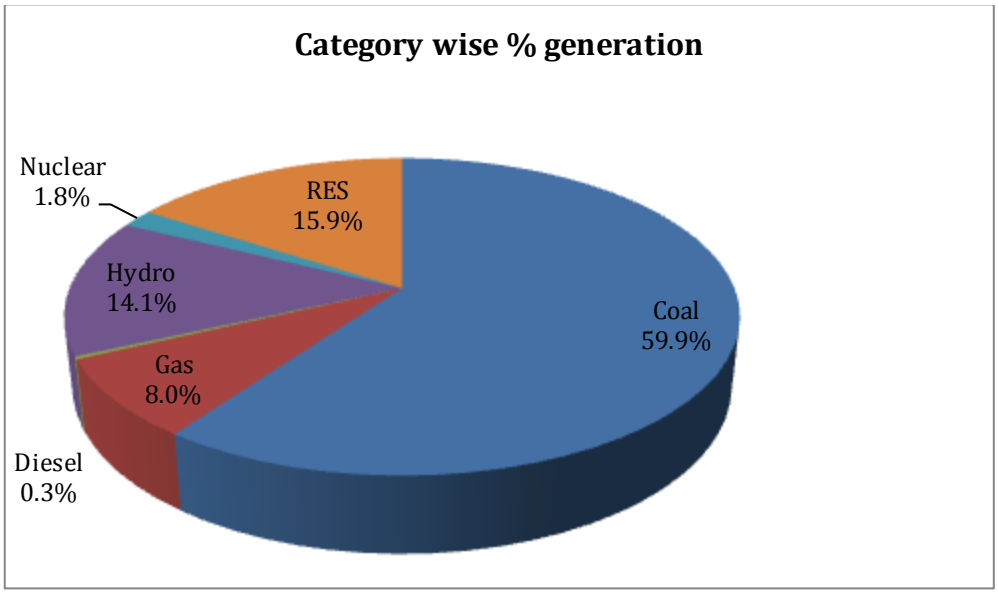
Fuel	MW *as per February 2017 data					
	Western	Southern	Northern	Eastern	North Eastern	Islands
Coal	72713.01	39652.50	46524.50	29847.87	310.00	0.00
Gas	11203.41	6473.66	5781.26	100.00	1771.05	0.00
Diesel	0.00	761.58	0.00	0.00	36.00	40.05
Hydro	7447.50	11739.03	19246.78	4738.12	1242.00	0.00
Nuclear	1840.00	2320.00	1620.00	0.00	0.00	0.00
RES	16861.14	21721.42	10246.98	896.63	280.44	11.40
Total Region wise MW	**110065.05**	**82668.19**	**83419.52**	**35582.62**	**3639.49**	**51.45**

Source: Central Electricity Authority

2.3.2 The average per capita consumption of electricity in India has been estimated to be 1075 kWh during 2015-16 and was 1010 kWh during 2014-15. However, this is fairly low when compared to that of some of the developed and emerging nations such as US (~14753 kWh) and China (~4014 kWh).

2.3.3 The installed capacity from coal based generation plants accounts for around 60% of the country's total installed capacity. The details of fuel wise share in power generation are given below:

Figure 2: Fuel wise share in total installed generation capacity



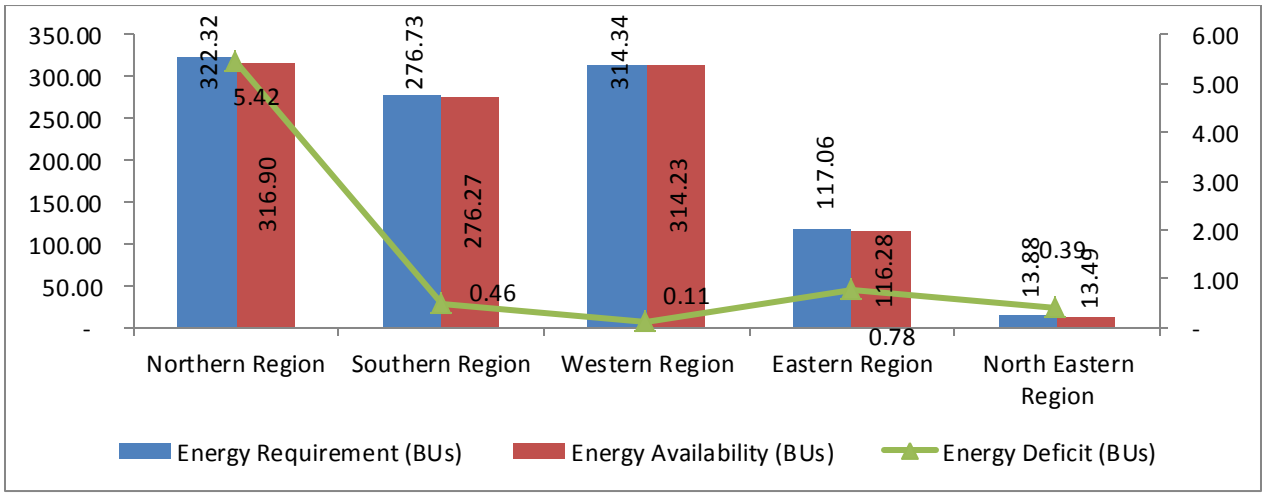
Source: Central Electricity Authority

2.3.4 Historically, India has experienced shortages in energy and peak power requirements. The Peak deficit averaged 5.56% and energy deficit averaged 5.56% during FY 2013 to FY 2015.

2.3.5 The demand supply for electricity has increased manifold, despite significant overall progress in the power sector. The Western and Northern regions are the major contributors to this deficit.

2.3.6 In the last one year (from February 2016 to January 2017) India's average Energy Deficit has reduced from -2.16% or – 22,036 MUs to -0.71% or -6,751 MUs. The maximum average energy deficit between April 2016 and January 2017 was recorded in the Northern region i.e. of -5042 MUs followed by -770 MUs in the Eastern region.

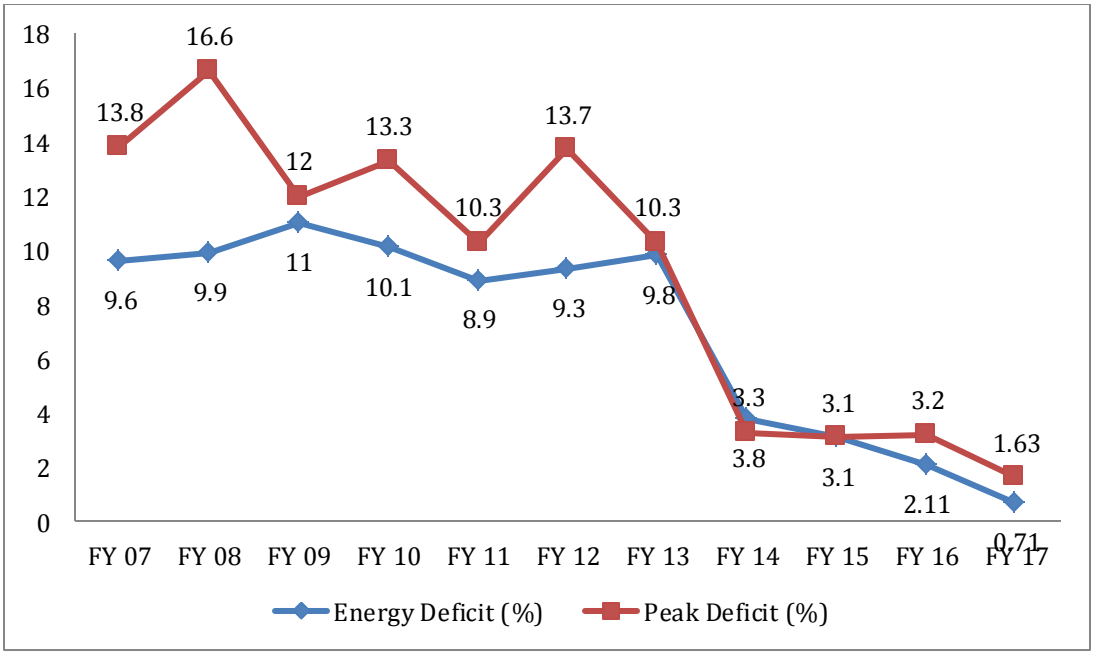
Figure 3: Region wise Energy Demand and Availability as at February 2017



Source: Central Electricity Authority

2.3.7 The deficit in energy and peak power have been primarily due to the growing demand and poor plant load factor of generating stations because of backing off of distribution companies from purchasing power.

Figure 4: Peak and Energy Deficit in India (As at January 2017)



Source: Central Electricity Authority

2.4 Power Sector Scenario, Jharkhand

2.4.1 Installed Capacity

As at end of February 2017 the state has a total installed capacity of 2,312.42 MW (State's generating Capacity and Allocation from Central Generating Stations as well as Private). Approx. 90% of the Installed Capacity in the state is Coal based, 9% is from Hydro (Renewable) and balance 1% from Renewable Energy Sources (Solar, Wind, Biomass, etc.).

The capacity from central plants forms 17% of the total installed capacity for the State, 40% of the state's installed capacity is from private sector plants and 44% from state generating plants.

Figure 5: Fuel Mix of Jharkhand

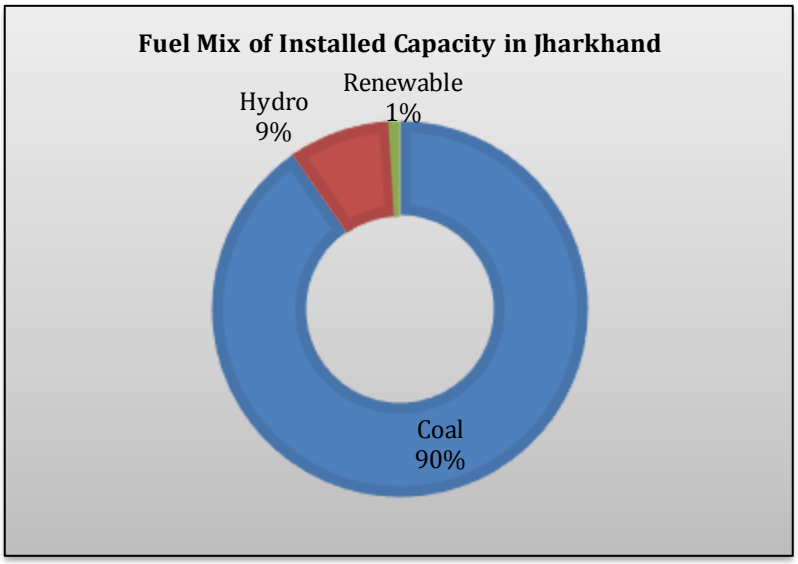


Table 2: Plant Wise Installed Capacity (MW) in Jharkhand

Sector	Thermal (Coal)	Hydro (Renewable)	RES (MNRE)	Total
State	875.00	130.00	4.05	1009.05
Private	900.00	0.00	17.51	917.51
Central	314.93	70.93	0.00	385.86
Total	2089.93	200.93	21.56	2312.42

Source: CEA Executive Summary February 2017

2.4.2 Key Players in Jharkhand Power Sector

After separation from erstwhile Bihar, Department of Energy and Department of Water Resources of Jharkhand Government were functioning jointly. Later these were bifurcated; the Department of Energy started functioning independently and started looking after the energy requirements of the State. The Department has following Corporations, Authorities and undertakings / projects under its control.

- Jharkhand Urja Vikas Nigam Limited (JUVNL)
- Jharkhand Urja Utpadan Nigam Limited (JUUNL)
- Jharkhand Bijli Vitran Nigam Limited (JBVNL)
- Jharkhand Urja Sancharan Nigam Limited (JUSNL)
- Tenughat Vidyut Nigam Limited
- Jharkhand Renewable Energy Development Authority

2.5 Approach for Business Plan Petition

2.5.1 The Hon'ble Commission has notified the regulations on JSERC Generation Tariff Regulations, 2015 in exercise of the powers conferred by Section 61 and 62 read with Section 181 of the Electricity Act, 2003. The sub-clause (3) & (6) of Clause 6 of these regulations require the generating company, to submit a Business Plan as part of the Multi Year tariff framework from FY 2016-17 to FY 2020-21.

2.5.2 TVNL has prepared the Business Plan taking cognizance of the existing internal factors and external business environment affecting the business of TVNL. It is submitted 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.

2.5.3 Provision of Law

The Hon'ble Commission has notified the JSERC Generation Tariff Regulations, 2015. The provision for filing Business Plan as per Clause No. 6.6 is quoted as below:

"The Generating Company shall file for the Commission's approval, a Business Plan approved by the Board of Directors as per the timelines specified in Section A17: of these Regulations. The Business Plan shall be for the entire Control Period and shall, inter alia, contain:

(a) Capital Investment Plan: This shall include details of the investments planned by the Generating Company, along with the corresponding capitalization schedule and financing plan. This plan shall be commensurate with capacity enhancement and proposed efficiency improvements for various plants of the Company and shall include cost benefit analysis;

(b) Capital Structure: The Generating Company shall submit plant-wise details of the 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, risks associated in generation business and creditworthiness;

(c) Operation and Maintenance (O&M) expenses: This shall include the costs estimated for the Base Year, the actual expenses incurred in the previous two years and the projected values for each year of the Control Period based on the proposed norms for O&M cost, including indexation and other appropriate mechanisms;

(d) Depreciation: This shall include details of depreciation based on the fair life of the asset and capitalization schedules for each year of the Control Period;

(e) Performance Targets: A set of targets proposed for other controllable items such as NAPAF, Station Heat Rate, Secondary Fuel Oil Consumption, and Auxiliary Power Consumption. The targets shall be consistent with the Capital Investment Plan proposed by the Generating Company;

(f) Other Information: This shall include any other details considered appropriate by the Generating Company for consideration during determination of tariff. "

2.5.4 Accordingly, TVNL is filing this Business Pan for the entire Control Period of FY 2016-17 to FY 2020-21.

2.6 Petition Structure

2.6.1 The Business Plan Petition includes the following Chapters:

(a) **Chapter 1** contains the executive summary of the Petition

(b) **Chapter 2** contains introduction and overall approach to filing of the Petition

(c) **Chapter 3** contains briefing profile of TVNL as a company

(d) **Chapter 4** contains with a view of business scenario

(e) **Chapter 5** contains describing past performance of TVNL

(f) **Chapter 6** contains laying a complete business plan for future

(g) **Chapter 7** contains Performance Improvement Trajectories of TVNL

(h) **Chapter 8** contains TVNL's conclusion regarding its Business Plan

(i) **Chapter 9** contains TVNL's prayers to the Hon'ble Commission

Chapter 3. PROFILE OF TVNL

3.1 Background

3.1.1 Tenughat Vidyut Nigam Limited is a power generating company incorporated on 26th November 1987 under Indian Company's Act, 1956. With the creation of Jharkhand state on 15th November 2000 from the erstwhile Bihar State, the TVNL became an undertaking of Government of Jharkhand. The TVNL owns and operates an installed power generation capacity of 420 MW with two units of 210 MW each at Tenughat Thermal Power Station located at Lalpania at the banks of Tenughat reservoir in Bokaro district with its head office at Ranchi. The units were commissioned as detailed below:

- Unit I - September 1996
- Unit II - September 1997

3.1.2 TVNL further aims to consolidate its position as the leading thermal power generation company in Jharkhand and to diversify across the power value chain in Jharkhand by considering backward and forward integration into areas such as transmission, distribution, coal mining etc.

3.2 Company Profile

3.2.1 Tenughat Vidyut Nigam Limited (TVNL) is a company registered under the Companies Act 1956, primary aim of powering Jharkhand's growth. TVNL is also engaged in improving its technical performance with reference to national benchmarks by adopting the best available practices and absorbing the best available technologies subject to its financial constraints. These initiatives have been guided by the existing Vision of the company. The same has been outlined in the subsequent paragraphs.

3.2.2 Vision & Objective

3.2.3 TVNL has a Vision for the company which states that:

Vision and Mission of TVNL

Vision: To be among the best 25 Power Plants in India.

Mission: To fulfill the requirement of electrical energy of Jharkhand

3.2.4 The key element of the Vision was to focus on being an efficient generating utility and to provide power at competitive and affordable rates.

3.2.5 TVNL saw the flight of day on 9th Dec., 1995, having the following objective:-

- Generation of electricity
- Eco-conservation and Afforestation
- Social and economic uplift of the area

3.2.6 TVNL has been constantly striving to meet the elements which have been envisioned for the company and has undertaken the steps towards achieving this vision, few of which are outlined below:

- Improvement in performance – *through constant R&M activities;*
- To Initiate accelerated power development by planning and implementing new power Projects – *plans for capacity enhancement are underway;*
- Achieve high reliability and safety levels in all operational areas – *taking appropriate steps towards ensuring safety and adhering to environmental norms;*
- Adopt best industry practices to become the best and efficient generating stations;
- To generate a power at a competitive and affordable rates and achieve high level of efficiency – *trying to meet the operational efficiency parameters prescribed by the Hon'ble Commission;*

3.2.7 This Vision has enabled TVNL to develop its future outlook and to plan for the future of the business, looking at the changing business environment.

Installed Capacity of TVNL

3.2.8 The TVNL owns and operates an installed power generation capacity of 420 MW with two units of 210 MW each at Tenughat Thermal Power Station located at Lalpania at the banks of Tenughat reservoir in Bokaro district. The units were under commercial operation as detailed below:

- Unit I - September 1996
- Unit II - September 1997

3.2.9 The projects have also been envisaged for future expansion. Two units of 660 MW each under expansion plan. The approval of the Cabinet of State Government has already been accorded and preparation of DPR is in progress. The cost of the project is envisaged to the tune of INR 6,500 Cr. approximately.

Fuel Supplies

The daily requirement of coal for full load generation from its 2x210 MW units is about 7000-7500 MT which is met from coal mines of Central Coalfields Limited (CCL) situated in the vicinity of plant within 50 Kms.

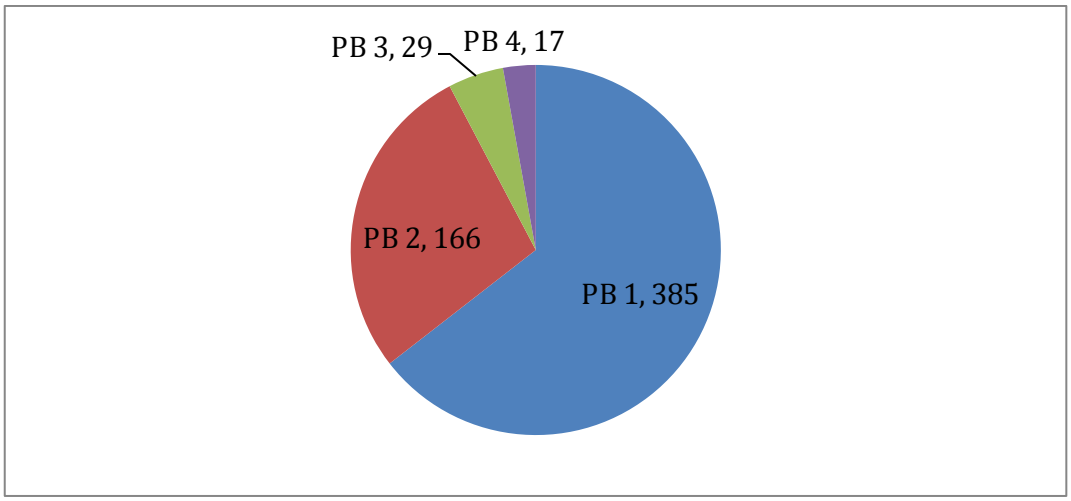
TVNL has been allocated one (1) coal block – Rajbar E&D with reserve coal capacity of 420.22MT and a peak capacity of 10MTPA through an Allotment Agreement executed on 30th March 2015 followed by an Allotment Order dated 30th June 2015. Due to change in the geographical coordinates of the Coal Block boundary mentioned in the Allotment Order, an amendment to the Allotment Order was issued with the renewed geological coordinates on 21st December 2016. Also an amendment to the Allotment Agreement dated 17th January 2017 was provided to TVNL. TVNL had submitted a Mine Plan upon allotment of the coal block and also sent a revised Mine Plan after the renewed geographical coordinates were incorporated in the Allotment Agreement & Order amendment.

TVNL submitted a Mining Lease Agreement Application to the concerned authority on 18th September 2015 and is planning to issue a tender to appoint a Mine Development Operator (MDO) for its allocated mine with the assistance of their transaction advisor AXYKNO consultants. Environment Clearance (EC) and Forest Clearance (FC) are yet to be obtained from the concerned ministry. The coal from the said mine shall be utilized for TVNL's extension project and also for its existing plant (420MW).

Organization Structure

The staff strength of TVNL as on March 2016 was 597. The company has been streamlining functions with an eye on improving efficiency and has focused its efforts on enhancing the capabilities of employees by imparting multi-disciplinary training. The composition of the present manpower based on the nature of job that they undertake can be depicted as follows:

Figure 6: Current Manpower Strength



From the above chart; it can be seen that the company predominantly comprises of staff in Pay Band 1 which consists of Basic Pay ranging from INR 5,200 to INR 20,200. The various Pay Bands refer to:

(a) Pay Band 1 (PB 1) – Basic Pay of INR 5200 to INR 20200

(b) Pay Band 2 (PB 2) – Basic Pay of INR 9300 to INR 34800

(c) Pay Band 3 (PB 3) – Basic Pay of INR 15600 to INR 39100

(d) Pay Band 4 (PB 4) – Basic Pay of INR 37400 to INR 67000

The Company is governed by a Board of Directors which are appointed by Government of Jharkhand, and is headed by a Chairman and Managing Director. A corporate office structure has been developed for effective management of the Company. There are 5 functional heads reporting to the Managing Director. The details of the same are outlined below:

- **Operations Services (OS):** Operations department provides technical guidance & support to power station in the area of O&M for achieving the generation performance goals of organization.
- **Planning & Systems (P&S):** The Department deals in all matters related to corporate planning & systems relating with new projects, mining initiatives and present investments being carried out in MGR system.
- **Accounts & Finance:** Department is responsible for finance, accounts, treasury, audits and overall payments to suppliers and employees.
- **Human Resources:** Department is responsible for Recruitment and Training, Employee welfare, Security issues etc.
- **Contracts & Materials:** Department is responsible for award of work contract & procurement of materials. The emphasis on streamlining the functioning of TVNL is reflected in the concise corporate organizational chart as shown in Figure 3.2. In addition to the corporate structure outlined above, there exists a separate hierarchy at the plant level for managing the day to day activities of the plants, which has been illustrated in Figure 3-3.

Figure 7: Organizational Chart – Corporate Office

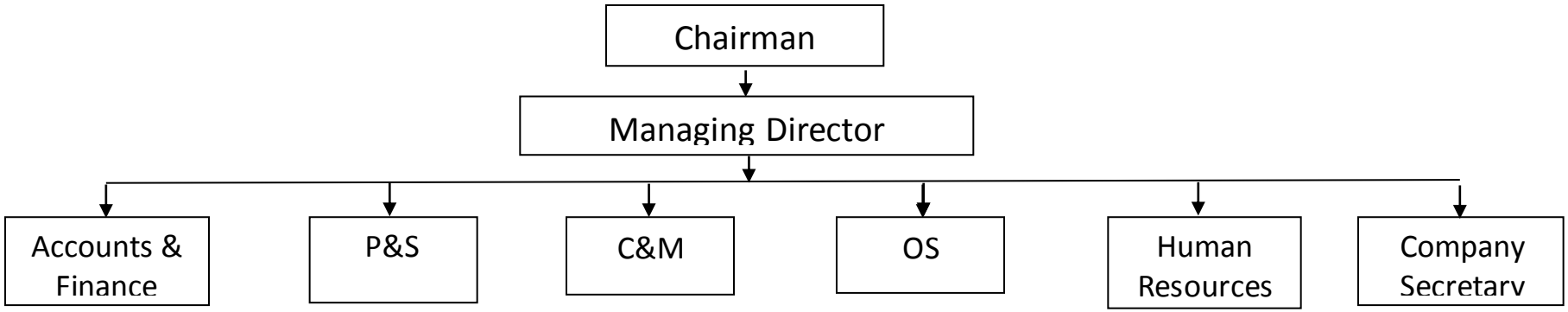
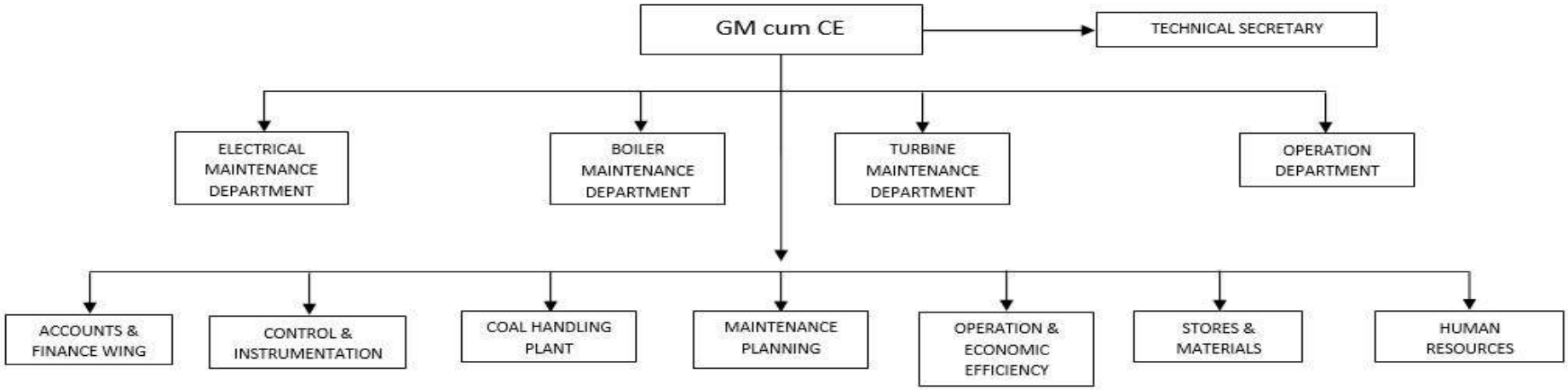


Figure 8: Organizational Chart - Plant Level



3.2.10 Human Resources

Employees are the most precious asset of an organization and favorable environment is necessary to encourage creativity, innovation and performance excellence amongst them. The company has focused its efforts to enhance the capabilities of employees to develop competent, trained and multi- disciplinary human capital. TVNL strongly believes in achieving organizational excellence though human resources and aims at leveraging the potential of its employees to fulfil its business plan.

Training

Once organization structure is established and operational there is a need to ascertain the training need of the existing as well new human resource and to identify their core competencies with an aim to enhance their skills and finally place them in appropriate job positions. TVNL has undertaken the following Study Tours, Trainings & Workshops in the past:

Table 3: List of Training/ Courses

S. No	Name of the Training Course/ Visits	Organized by
1	Introductory training on SAP at Corporate Office and at Plant Office	Zensar Technologies
2	Training on development of Soft Skills of Middle level employees at Tenughat Thermal Power Station, Lalpania	Freelance Trainer
3	12 weeks training program on "Power plant familiarization & simulator training" at National Power Training Institute (SR), Neyvelli for 23 newly recruited engineers in FY 2016-17	National Power Training Institute (SR), Neyvelli

TVNL also endeavours to conduct training at periodic intervals for capacity building of its manpower.

Performance Appraisal:

Performance Appraisal is an important tool to evaluate the performance of employees. It helps the Company to identify the needs of development of each employee and prepare the employees for higher roles in the Organization. The employee also gets an opportunity for self-evaluation of Strengths and weakness and thereby setting goals for the future.

The Company also undertakes a Key Performance Assessment annually for its employees wherein it takes into account qualitative factors like job proficiency, team building ability, knowledge about the job etc.

This exercise culminates into the Annual appraisal being conducted for all employees in which the review of the fulfilment of targets, performance review, and training imparted and potential assessment for undertaking higher posts is evaluated.

The Performance appraisal is an indicator of the performance of the employees and his potential for taking up increased responsibilities and TVNL considers the performance for further opportunities for accelerated growth and as and when there are vacancies, the existing staffs is considered for such promotions.

Recruitment Policy

For the purposes of recruitment, TVNL follows a broad classification of Services into Technical and Non-Technical Staff. The Technical Staff comprises of engineers, supervisors, technicians. The rest of staff forms the non-technical staff, viz. Accounts, HR, Fire Fighting, Security and Medical Staff.

Each of the above groups is further divided into three categories viz., category I, II, III and IV. In regard to appointment for a post, it is either made by promotion or by direct recruitment.

Also, the Recruitment Process adheres to the Governmental norms for Reservation Policies for Scheduled Tribes, Scheduled Castes and Other Backward Classes. There are Posts intended to be filled in by Departmental promotion from the members of Reserved Categories. In case such persons are not available, then it is filled by way of direct recruitment.

Reward Mechanism

TVNL proposes to improve the performance of generation power stations as well provide incentive to motivate its employees towards better performance.

Health and Safety Management

TVNL is of the firm belief that the health and safety of the employees is of paramount importance. TVNL is committed to identify and assess all types of occupational health and safety risk and takes proactive steps to reduce the significant risk in turn to reduce the occurrences of accidents. The measures taken are listed under:

- Power station is equipped with dispensaries with qualified doctors have all primary facilities;
- All the major locations in power station are equipped with primary aid box and Provision of round the clock ambulance is made in the power station;
- All employees are issued with personal protective safety equipments and Safety officers are posted at power station to take care of safe working practices;

- Efforts are made to create awareness of occupation health and safety in all employees, contractors and contract labour and training them adequately for safe working practices.

Environmental Protection

In order to ensure effective implementation of the above, TVNL ensures that the following practices are adopted regularly:

- Complying with the requirements and spirit of applicable environmental laws and striving to exceed required level of compliance wherever feasible;
- Ensuring that employees acquire the necessary skills to meet environmental standards;
- Conserving natural resources by improving efficiency and reducing wastages;
- Making business decisions that aim towards sustainable development;

Initiatives undertaken for environment friendly operation

The following key initiatives have been undertaken by TVNL in pursuit of the Environmental protection:

(a) **Pollution Control System:** TVNL has integrated many environmental friendly provisions into plant design. The following state of the art pollution control system devices have been installed to control air pollution:

- Well-designed Electrostatic Precipitators for controlling the stack emission
- Ash Dykes and Ash Handling System
- Up gradation and retrofitting of Pollution Control Systems

(b) **Water Pollution Control:** System Necessary measures are adopted to conserve water and to avoid the contamination of soil and water bodies in the power station adjoining area.

(c) **Ash Utilization:** Currently, TVNL has tied-up with brick manufacturer for taking around 17,000 MT/month of ash from bottom of ESP Hoppers. Ash is currently being used to fill low lying areas. Also, TVNL has written letter to RCD of Jharkhand department to use the ash free of cost. TVNL has also approached CCL for using ash to fill their abandoned mines.

(d) **Installation of Solar Rooftop project:** As a part of the Green Initiative, one 45 kWp Grid Connected Solar Rooftop Plant on Net Metering Basis as been installed at a school at Lalpania.

Corporate Social Responsibility

The Company's focus is to help enrich the quality of life of the community and preserve ecological balance and heritage through a strong environment conscience.

As a constructive partner in the communities in which it operates, TVNL will be taking concrete action to realize its social responsibility objectives, thereby building value for its stakeholders. The Company respects human rights, values its employees and will invests in innovative technologies and solutions for sustainable energy flow and economic growth.

Besides focusing primarily on the welfare of economically and socially deprived sections of society, TVNL also aims at developing techno-economically viable and environment-friendly output for the benefit of society, ensuring the highest standards of safety and environment protection in its operations.

TVNL has a concerted social responsibility program to partner communities in health, family welfare, education and environment protection. This scope will be widened to meet the expansions company intends for generate power to meet the growing demand.

While there are operational issues and deterioration in performance on account of a number of factors, TVNL is evaluating various methods and programs to improve efficiency. The Company is making efforts to improve profitability of the Organization and become a financially viable company and to enhance investments for its expansion plans. It is making efforts to enhance skill and efficiency of its employees.

Chapter 4. BUSINESS ENVIRONMENT

4.1 Overview

The Hon'ble Commission has notified the regulations on Terms and Conditions for Determination of Generation Tariff on 10th November, 2015 in exercise of the powers conferred by Section 61 and 62 read with Section 181 of the Electricity Act, 2003. The sub-clause (3) & (6) of Clause 6 of these regulations require the generating company, in case of existing generating station, to submit a Business Plan as part of the Multi Year tariff framework from FY 2016-17 to FY 2020-21.

TVNL has prepared the Business Plan taking cognizance of the existing internal factors and external business environment affecting the business of TVNL. It is submitted 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.

A business plan is typically defined as:

> ***"Business Plan is a formal statement of a set of business goals, the reasons why they are believed attainable, and the plan for reaching those goals. It may also contain background information about the organization or team attempting to reach those goals."***

Accordingly, TVNL has also attempted to develop this business plan for the Control period with a view to chart out the growth plan for the control period after considering the strength and weakness of the company and evaluating its business environment. The business environment has evolved considerably in a number of ways that affects TVNL's strategic planning. The Business Plan is intended to give a comprehensive and up-to-date picture of the company, its market and the impact of new regulations, and the strategies that TVNL develops to achieve the company goals, carry out its mission and reach its vision. However, as mentioned above, there are number of internal and external factors which affect the planning of the company and thus it makes this document a very dynamic document and which calls for regular reviews of the plan with a view to introduce any mid-term corrections.

Thus, it is TVNL's submission that the Hon'ble Commission should take cognizance of the fact that the business plan is a dynamic document which may need to be updated at various intervals to align the growth path of the company with the external business environment and internal factors affecting the business/ operations of the company.

Depending on the amount and complexity of the content that needs to be updated, one could distinguish two levels of update. On a lower level, there is detail and factual updates that require changes within the business plan. Factual updates are relatively straight forward and mostly comprise minor changes of specific data, such as numerical or other factual information. At the higher level, there is the conceptual update. Conceptual updates may be dictated by an market shifts, changes in the competitive environment, legislative reforms, and many other factors, and thus, require deeper analysis, and more profound changes in the business plan. Thus, updation of the Business Plan would be dependent on the management as they would have to decide which events and changes are important and how they need to be reflected in the business plan.

4.2 Regulatory Framework

4.2.1 Background

As per the Constitution, the power sector in India was combined responsibility of Central and State Government. **The Electricity Supply Act, 1948** was the governing Act and the entities involved in the power sector were the State Electricity Boards (SEBs), electricity departments, generating companies and licensees. The SEB were integrated utilities responsible for generation, transmission and distribution of power for each of the states in the country. The generating companies were the Central Generating companies responsible for supplying power to the grid without any specific responsibility for retail distribution, for e.g. NTPC, NHPC and NPCIL. The licensees were private-sector utilities licensed by a State Government for power generation, distribution, or both within a specified area viz, Gujarat Industrial Power Corporation Limited (GIPCL), Bombay Suburban Electric Supply Limited (BSES) and Tata Electric Company (TEC), etc.

However, by the 1990s, the SEBs were found to be beset with unsustainable inefficiencies, unviable tariffs, high T&D losses, mounting subsidies, sub-optimal performance, wasteful practices and lackadaisical financial management. All these factors led to financial fragility of the entire sector. Due to the uninspiring financial position of the vertically integrated monolithic SEBs, the power sector was failing to attract the much-needed investments for its development. Power sector reforms were necessary to boost the economic liberalization going on in the country. Certain policies were introduced like the Private Power Policy, Policy for setting up Mega Power Projects in Private Sector, enactment of **Electricity Regulatory Commission Act, 1998.** These Policies still did not have the desired impact of increasing Private generation and bringing the desired investment in the Power sector. This was followed by enactment of **the Electricity Act, 2003** whose underlying spirit was to introduce competition in the sector.

4.2.2 Electricity Act 2003

The Central Government enacted the Electricity Act, 2003 on 10th June 2003 which was a milestone in the development of the power sector in India. It has introduced a number of innovative concepts like de-licensing of generation, power trading, Open Access, Appellate Tribunal, etc., and special provisions for the rural areas. The Act has made it mandatory for all the States to restructure their SEBs.

The major provisions of the electricity Act 2003 were:

- Thrust to complete the rural electrification and provide for management of rural distribution by Panchayats, Cooperative Societies, non-Government organizations, franchisees etc. (Sections 4, 5 & 6);
- Generation being de-licensed and captive generation being freely permitted. Hydro projects would, however, need clearance from the Central Electricity Authority (Sections 7, 8 & 9);
- Provision for license free generation and distribution in the rural areas (Section 14);
- Open access in transmission from the outset (Sections 38-40) ;
- Open access in distribution to be introduced in phases with surcharge for current level of cross subsidy to be gradually phased out along with cross subsidies and obligation to supply. SERCs to frame regulations within one year regarding phasing of open access. (Section 42);
- The State Electricity Regulatory Commission is a mandatory requirement (Section 82);
- Provision for payment of subsidy through budget (Section 65);
- Trading, a distinct activity is being recognized with the safeguard of the Regulatory Commissions being authorized to fix ceilings on trading margins, if necessary. (Sections 12, 79 & 86);
- Provision for reorganization or continuance of SEBs. (Sections 131 & 172);
- Metering of all electricity supplied made mandatory. (Section 55);
- Role of the CERC and SERC's clarified and strengthening of the Commission's through empowerment (Sections 70 to 75 and 76 to 109);
- An Appellate Tribunal to hear appeals against the decision of the CERC and SERCs. (Section 111);

- Provisions relating to theft of electricity made more stringent. (Section 135-150);
- Provisions safeguarding consumer interests. (Sections 57-59, 166) Ombudsman scheme (Section 42) for consumer's grievance redressal.

Thus, the Electricity Act, 2003 is a historic legislation which not only integrates the previous Act, but also goes beyond by creating a competitive environment and facilitating investment in the sector and at the same time giving due importance to consumers.

4.2.3 National Electricity Policy

The Ministry of Power in compliance to the section 3 of the Electricity Act 2003 notified the National Electricity Policy in February 2005 through which the legislative provisions of the EA 2003 were to be administered and implemented. The main aim of the policy was:

- Access of power to all house hold by year 2009;
- Eliminating power shortages by year 2012 and Energy and peaking shortages to be overcome and adequate spinning reserve to be available;
- Protection of consumer interests;
- Financial turnaround of power utilities.

The Ministry of Power has notified Draft National Electricity Policy, 2016 which majorly focusses on increasing green energy generation (Solar & Wind) in the future years. Moreover, renewable energy being a variable source of power generation, conventional power plants are also required in order to maintain the stability in the grid.

4.2.4 National Tariff Policy

Another important policy initiative was the Tariff Policy which was notified by the Ministry of Power in compliance to the section 3 of the Electricity Act 2003 and in continuation of the National Electricity Policy (NEP) in January, 2006. The objective of this Policy was to:

- Reduce the cost of power through competitive process of capacity development;
- Operationalize Open Access in Transmission and Distribution;
- A clear-cut policy on management of subsidy and cross-subsidy encouraging renewable energy sources of generation;
- Optimize utilization of captive plant capacity.

The union government has amended the National Tariff Policy for Electricity on 20th January, 2016. **The National Tariff Policy (NTP) 2016** focused on renewable energy and sourcing of power through competitive bidding. The amendments also aimed at achieving the objectives of UDAY scheme. The major amendments made under the NTP, 2016 were:

- **Electricity to all:** The policy envisages 24*7 power supply to all consumers by 2022.
- Procurement of power from waste-to-energy plants has been made compulsory.
- **Increased Efficiency:** To increase efficiency through optimal utilization of land and other resources.
- **Renewable Purchase Obligation (RPO):** To increase solar RPO by 8% by 2020

4.2.5 Amendment to National Tariff Policy

The government recently amended the National Tariff Policy (NTP). Several reform measures have been announced in this change. NTP 2016 has increased focus on renewable energy, sourcing power through competitive bidding and the need for 'reasonable rates'.

Key features of the amendment are provided below:

- Co-generation from non-RE sources to attract RPO
- Competitive bidding to be the norm for RE procurement (maximum 35% of installed capacity can be sourced from determined/preferential tariff)
- Provisions for Renewable Generation Obligations (RGO) announced
- Long term RPO to be announced by Ministry of Power
- Vintage and technology multiplier allowed in REC
- Inter-state transmission charges waived off for RE power
- Solar RPO to be 8% by 2022 (excluding hydro power)
- Calculation of Cross-subsidy methodology is suggested to be changed to make it less arbitrary

4.2.6 Tariff Based Competitive Bidding

The next policy instrument adopted by the Government was the comprehensive guidelines on competitive bidding for power project development. The Central Government issued detailed guidelines for tariff based bidding process for

procurement of electricity by distribution licensees for medium or long-term period vide notification in January, 2005. The main objective of these guidelines was to see that the distribution companies get electricity at best possible price and thereby consumers get electricity at optimal tariff. This also aims at a transparent process of selection of project developer. Similar dispensation in Transmission segment was also extended and comprehensive guidelines were issued in May 2006.

4.2.7 Renewable sources

There are a number of initiatives from the Ministry of New and Renewable Energy (MNRE) for matters relating to renewable energy such as solar, wind, biomass, small hydro, hydrogen, geothermal etc. The endeavor of the Ministry is to promote renewable energy technologies and increase the contribution of renewable energy in the total energy mix in the years to come.

The Ministry has a wide range of programs on research and development, demonstration and promotion of renewable energy for rural, urban, commercial and industrial applications as well as for grid-interactive power generation. A three-fold strategy is being followed:

- Providing budgetary support for research, development and demonstration of technologies;
- Facilitating institutional finance through various financial institutions; and
- Promoting private investment through fiscal incentives, tax holidays, depreciation allowance and remunerative returns for power fed into the grid.

The Government of India has approved of a new policy on the development of Solar Energy through the Jawaharlal Nehru National Solar Mission. This will constitute a major contribution by India to the global effort to meet the challenges of climate change.

4.2.8 National Action Plan for Climate Change (NAPCC)

The country today is faced with a challenge of sustaining its rapid economic growth while dealing with the growing threat of Climate change. The Government has formulated the National Action Plan on Climate Change (NAPCC) outlining existing and future policies and programs addressing climate mitigation and adaptation. For achieving this, the Plan has identified eight National Missions which represent the long term integrated strategies for combating the climate change issues. Of these the National Mission in relation to energy relate to:

National Solar Mission: The NAPCC aims to promote the development and use of solar energy for power generation and other uses with the ultimate objective of making solar competitive with fossil-based energy options. The mission includes

specific goals for increasing use of solar thermal technologies in urban areas, industry, and commercial establishments. Other objectives include the establishment of a solar research centre, increased international collaboration on technology development, strengthening of domestic manufacturing capacity, and increased government funding and international support.

National Mission for Enhanced Energy Efficiency: Building on the Energy Conservation Act 2001, the plan recommends:

- Mandating specific energy consumption decreases in large energy-consuming industries, with a system for companies to trade energy-savings certificates;
- Energy incentives, including reduced taxes on energy-efficient appliances; and
- Financing for public-private partnerships to reduce energy consumption through demand-side management programs in the municipal, buildings and agricultural sectors.

Apart from the above, the NAPCC also talks of need for better technology in power generation through use of super critical technology, development of IGCC, retirement of inefficient coal based power plants, promotion of nuclear energy, hydel energy etc.

Thus, it can be observed that a number of path breaking initiatives have been taken in the recent past in terms of policy pronouncements to revamp the power system. From the generation perspective, the de-licensing of generation would have a significant impact in the market mainly on account of entry of other players in the generation sector, especially IPP/ Merchant as well as Captive Power Producers, thus increasing the competition in the market. The unleashing of the non-discriminatory open access to the transmission system will have a positive impact on wheeling of power from power surplus states to deficit areas. The generators are in a position to sell their power anywhere in the grid now. On the threat of climate change, there is a need to look at renewable energy as an option for generation on a large scale. Thus the enablers for growth have been put in place to a large extent which will enable growth of the sector in the coming time.

4.2.9 Regulations Enacted by State Regulatory Commission

The above mentioned developments at the national level were followed up by similar enabling environment at the state level also through intervention by State Regulatory Commissions. Various regulations were enacted by the Regulatory Commissions in compliance with the provisions of the EA 2003 and as guided by the National Tariff Policy and National Electricity Policy. Some of the key regulations which were enacted by the Jharkhand State Electricity Regulatory Commission as outlined below:

Table 4: JSERC Regulations

S. No.	Regulation
1	JSERC (State Advisory Committee) Regulations 2003
2	JSERC (Delegation of financial powers) regulation,2004
3	JSERC (Open Access in Intra-State Transmission and Distribution) Regulations, 2005.
4	JSERC (Distribution License Conditions) Regulations, 2005.
5	JSERC (Electricity Supply Code), Regulations, 2005.
6	Jharkhand Electricity Regulatory Commission (Procedure, Terms and Conditions for grant of Intra-State Trading Licence) regulations, 2006
7	JSERC (Terms and Conditions of Tariff Determination, Multi-Year Tariff Framework) Regulations, 2007
8	JSERC (Terms and Conditions of Tariff Determination, Small Hydropower Generation) Regulation, 2007
9	JSERC Regulations in respect of methods and principles for fixation of charges including cross subsidy charges recoverable by distribution licensee for supply of Electricity (In short methods and principles of fixing electricity charges).
10	JSERC (State Grid Code) Regulations 2008
11	JSERC (Terms and Conditions for Tariff Determination for Biomass and non-fossil fuel based co-generation projects) Regulations, 2010
12	JSERC Final Regulations (Balancing & Settlement Mechanism for Open Access) Regulations, 2010
13	JSERC (Open Access in Intra- State Transmission and Distribution- First Amendment) Regulations, 2010
14	JSERC (Utilization of surplus capacity of captive power plants based on conventional fuel) Regulations, 2010.
15	JSERC (Determination of Tariff for procurement of power from Wind Electric Generators) Regulations, 2010
16	JSERC (Determination of Tariff for procurement of power from Solar PV Power Project and Solar Thermal Power Project)Regulations,2010
17	JSERC (Renewable purchase obligation and its compliance) Regulations, 2010.
18	JSERC (Demand Side Management) Regulations, 2010.
19	JSERC (Terms and Conditions for Determination of Transmission Tariff) Regulations,2010
20 (a)	Regulatory Compliance Formats for ARR & Tariff filing by Transmission Licensee

S. No.	Regulation
21	JSERC (Terms and Conditions for Determination of Generation Tariff) Regulations,2010.
21 (a)	Formats for Generating Company (Hydro)
21 (b)	Formats for Generating Company (Thermal)
22	JSERC (Terms and Conditions for Determination of Distribution Tariff) Regulations,2010.
22 (a)	Formats of Allocation Statement for MYT Control Period
22 (b)	Distribution Formats for Transition and Control Period
23	Levy of Collection of Fees and Charges by SLDC
23 (a)	Format for Levy of Collection of Fees and Charges by SLDC
24	JSERC (Conduct of Business) Regulations, 2011.
25	JSERC (Compliance Audit for Regulated Entities) Regulations, 2011
26	JSERC (Guidelines for Establishment of Forum for Redressal of Grievances of the Consumers and Electricity Ombudsman) Regulations,2011
27	JSERC (Renewable Purchase Obligation And Its Compliance - First Amendment)Regulations, 2012.
28	JSERC (Conduct of Business Amendment) Regulations, 2014
29	JSERC (Distribution Licensees' Standards of Performance) Regulations, 2015
30	JSERC (Electricity Supply Code) Regulations, 2015
31	JSERC (Conduct of Business Regulations), 2016
32	JSERC (Determination of Tariff for Procurement of Power from Solar PV Power Project and Solar Thermal Power Project
33	JSERC (Rooftop Solar PV Grid Interactive Systems and Net/ Gross Metering) Regulations, 2015
34	JSERC (Terms and Conditions for Determination of Distribution Tariff) Regulations, 2015
35	JSERC (Terms and Conditions for Determination of Transmission Tariff) Regulations, 2015
36	JSERC (Terms and Conditions for Determination of Generation Tariff) Regulations, 2015
37	JSERC (Determination of Tariff for procurement of power from wind, biogas, municipal solid waste and refuse derived fuel based power projects) regulations, 2016
38	JSERC (Small hydro Tariff) Regulations 2016
39	JSERC (Scheduling and forecasting for wind and solar) Regulations 2016

S. No.	Regulation
40	JSERC (Renewable Energy Purchase Obligation and its Compliance) Regulations 2016
41	JSERC (Power Regulatory Accounting) Regulations 2016
42	JSERC (Intra State Open Access) Regulations 2016
43	JSERC (Determination of Tariff for procurement of Power from Biomass-Rankine and Gasification based projects and non-fossil fuel based co-generation projects) Regulations 2016

The power sector in the state has been regulated based on the above outlined regulations and the same has also brought in an element of regulatory certainty to an extent in the way the sector functions. As mentioned previously, the above mentioned enactments have had an impact on the sector at the national as well as the state level. The impact of the above on national and state level power sector is as detailed below:

(a) **National Level**

The Electricity Act (EA) 2003 envisages a competitive power market for all sector players including generation companies to expand their market base. The EA 2003 has de-licensed generation (though Hydro projects do need clearances from CEA) and major competition is expected from Independent Power Producers, Merchant Generation Companies and even Captive plants in addition to initiatives from the existing plants inside and outside states to increase their market share.

With favorable legislation and potential market for generation, the market entrants are likely to scrutinize TVNL's operations, efficiency and financial characteristics to identify viable opportunities. These new entrants have an advantage of flexibility in terms of choosing and timing their investments to respond to the market's new and evolving needs. This flexibility can be exercised, for example, in the choice of technology, customers, contracting and financing mechanism. In comparison, TVNL is unfortunately saddled with the existing machines of older technology, balance sheets in red, primary ongoing responsibility to single consumer – JUVNL / JBVNL, etc.

The provision in the EA 2003 for non-discriminatory open access to the transmission system removes the boundaries for competition. Enhanced role of Trading in the Act further increase the options of consumers to decide source of supply, which in turn makes market more competitive.

The CERC has approved the setting up of Power exchanges which are operational in the country. This provides a platform for trading of electricity which can be an alternate source of supply of electricity.

(b) **State Level**

The State of Jharkhand has a well-established Regulatory regime under the Jharkhand Electricity Regulatory Commission which was established on August, 2002. The Function of the Commission as mandated under the Act is to promote competition, efficiency and economy in the power sector and to regulate tariffs of power generation, transmission and distribution and to protect the interests of the consumers and other stakeholders.

TVNL has regularly submitted its cost data to the regulator for tariff determination based on tariff principles laid down by the regulator. In the process of tariff determination, the regulator has directed TVNL to improve efficiencies and reduce costs of power production. At present, the regulator is requiring various improvements in efficiencies for which all-out efforts are being made, within the available resources.

As mentioned earlier, the regulatory interface with the Hon'ble Commission as far as TVNL is considered is mainly in the area of tariff determination. This area being the single most important area for the company, any adverse decisions of the Hon'ble Commission in this regards affects the financial viability of the company significantly.

- The main reason for the amount approved by the Commission being lower than the amount claimed by TVNL is on account of computation of expenses based on the approved generation and revised performance parameters as approved in this Order as against the consideration of actual expenses submitted by TVNL.
- Provisional truing up of O&M expenses on account of change in the approved O&M expenses as against the consideration of actual O&M expenses as submitted by TVNL.

The Business Environment has thrown open a lot of opportunities for the power Industry. The existing demand supply gap is expected to continue in the coming years, giving a ready market of consumers/ utilities for the generator. India is poised to achieve overall economic growth of over 8% per annum which will translate into growth of the infrastructure sector including power. A number of enabling initiatives have been taken including the enactment Electricity Act, notification of regulations and other policies and programmes ranging from bringing about efficiency in generation segment through introduction of super critical technology to penetration of commercial energy in the rural areas and consolidation of electricity delivery system. The requirement of reduction of green-house gases emission is an important driver the world over for looking at alternate sources of fuel.

While there a number of enablers in the environment for growth opportunities, there are also challenges that would need to be analysed, along with the inherent strengths and weakness of TVNL to consider the future outlook of the Company.

4.3 Business Activities of TVNL

The Company is a Generating Company within the meaning of section 2 (28) of Electricity Act 2003. Further, the section 10 of Electricity Act 2003 prescribes following duties of generating companies:

- Subject to the provisions of this act, the duties of a generating company shall be to establish, operate and maintain generating stations, tie-lines, substations and dedicated transmission lines connected therewith in accordance with the provisions of this Act or the rules and regulations made there under.
- A generating company may supply electricity to any licensee in accordance with this Act and rules and regulations made there under and may, subject to the regulations made under sub-section (2) of section 42, supply electricity to any consumer.

4.4 SWOT Analysis

Like any other business, it is very important for TVNL to evaluate the environment – both internal and external while charting out its growth path. The SWOT analysis comes to the aid while evaluating the same. The aim of any SWOT analysis would be to identify the key internal and external factors that are important to achieving the objective of the company. These come from within the company's unique value chain. The information being used for the SWOT analysis is grouped into two main categories:

- **Internal factors** – The strengths and weaknesses internal to the organization;
- **External factors** – The opportunities and threats presented by the external environment to the organization;

This section provides the analysis of the strength, weakness, opportunities and threats as perceived by TVNL, which is summarized in the following diagram:

Figure 9: SWOT Analysis

	Helpful *In achieving the objective*	Harmful *In achieving the objective*
Internal Origin Attributes of the Organisation	**STRENGTHS** ✓ Captive Coal Assets ✓ Experienced Manpower ✓ Low Market Risk ✓ Value of Existing Asset Base	**WEAKNESS** ✓ Old Machines ✓ HR Issues ✓ Lack of Integrated Systems
External Origin Attributes of the Environment	**OPPORTUNITIES** ✓ Joint Ventures ✓ Merchant Mining ✓ Merchant Power ✓ Prospects outside Jharkhand ✓ Participating in Competitive Bids	**THREATS** ✓ Non Payment of dues from JUVNL / JBVNL ✓ High Sensitivity to Operational Variations ✓ Lack of preparadeness to face real time situation

Strengths

TVNL has an inherent strength of having a strong engineering base for its operations. TVNL has been allocated one (1) coal block – Rajbar E&D with reserve coal capacity of 420.22MT and a peak capacity of 10MTPA through an Allotment Agreement executed on 30th March 2015 followed by an Allotment Order dated 30th June 2015.

Weakness

Generating units of TVNL are old and most of the control systems have become obsoletes and are required to be renovated. The use of these control systems has led to difficulties in meeting operational norms and additional expenditure needs to be done for maintenance of the units and to ensure compliance to environmental norms. TVNL also faces issues on the human resources front with increasing attrition levels with professional and competent staff leaving with better opportunities in the power sector. There is a need for an integrated system to be in place for ensuring organization-wide accounting and control measures to be implemented more effectively.

Opportunities

There is huge market potential for TVNL in the power sector being a well-established generation company. Having been allotted coal blocks, TVNL is keen on exploring options of entering into Joint ventures for captive mine development and establishment of power projects. There is tremendous opportunity for setting up non-conventional energy which would be favorable in terms of being environment friendly and can also have scope of accruing benefits under the Carbon Development

Mechanism. TVNL can in future look at providing other services relating to Operations & maintenance activity, laboratory facilities, Research & Development, Training, Technical consultancy. Going forward, TVNL can attempt to participate in Competitive bidding process as an opportunity to benchmark its competitiveness vis-à-vis other private players since competitive bidding is expected to become mandatory in the near future for tying up power in the medium and long term. TVNL can look at option of setting up Merchant Power plant in the future where it is possible to take advantage of the market prices and get better returns. Having strength in design and implementation of power projects, TVNL can look at options of setting up power projects through MOU route in other states of the country and capitalize on this expertise. Plus, with coal mines at disposal, company may aim for merchant mining (subject to regulatory approvals) of coal to meet country's ever increasing coal demand.

Threats

With the de-licensing of generation and encouragement to private sector investment in power sector, other players in the market with higher efficiencies would be an emerging threat to TVNL. While TVNL is going for capacity expansion in a major way, the constraints of equipment supply in the country can create implementation issues. However, the major threat that still remains is that TVNL finds itself in terms of non-payment of dues by JUVNL / JBVNL due to which TVNL is defaulting on its suppliers and its ability to negotiate better terms with them has been less fruitful.

4.5 Market Issues and Challenges

A number of market-related issues and challenges are expected to create uncertainty in the power generation business environment and, therefore, required measures to be taken. These issues and challenges are as follows:

4.5.1 Scarcity of Financial Resources:

TVNL submits that dues on JUVNL / JBVNL against the power sold by TVNL as on 31st March 2017 have been INR 3283 Cr. The Petitioner further submits that the Non-payment has been impacting its financial performance; which in turn has been severely impacting its operating performance as its performance improvement plans are being impacted. Lower tariffs, delayed tariff Order and revenue gaps of earlier years pending for true up have also been hampering the petitioner's financial performance.

Chapter 5. PAST PERFORMANCE ANALYSIS

5.1 Operational Performance

5.1.1 A comparative analysis of the operational performance for various years of the thermal plant is discussed here. Normal life of any coal based Power Station is around 25 years. During this life span also, the performance of the plants gradually deteriorates. After completion of normal life, the plants are either to be retired or major Renovation and Modernization is required to be carried out to bring their performance back to a reasonable level.

5.1.2 Petitioner lays stress on improvement of its performance both operationally and financially. It aims to improve its performance each year by undertaking suitable investments and carrying out suitable analysis by internal/external agencies.

5.1.3 The station heat rate and other operational parameters like auxiliary consumption, PLF, O&M Expenses, etc over a period of time are as tabulated below:

Table 5: Past Performance

Factors	Units	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16
SHR	(Kcal/Kwh)	3031.71	2939.68	2778.07	2843.31	2753.24
Specific Oil Consumption	(ml/Kwh)	2.049	1.609	1.881	1.490	1.153
Plant Availability Factor (PAF)	%	85.75	88.55	80.10	79.91	87.36
Plant Load Factor (PLF)	%	63.81	79.42	61.32	64.70	71.46
Auxiliary Consumption	%	9.71%	10.43%	11.29%	11.34%	11.68%
O&M Expenses	Rs. Cr.	124.42	215.18	147.66	173.81	156.03

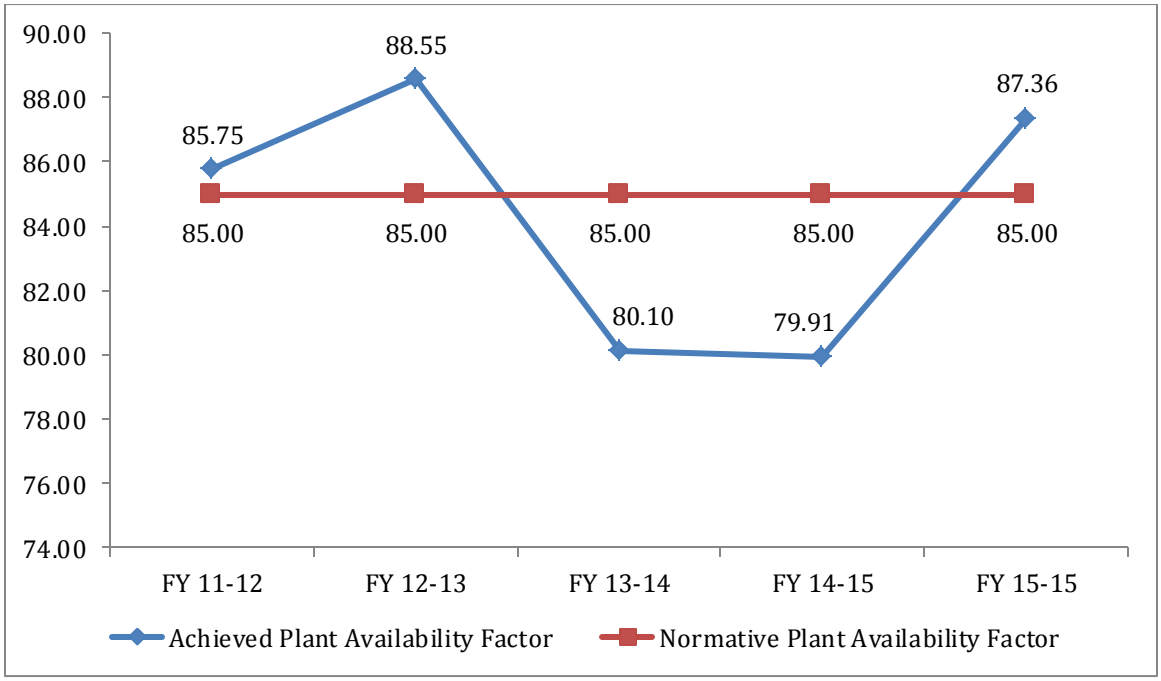
5.1.4 Plant Availability Factor

JSERC Generation Tariff Regulations, 2015 has stipulated the Target availability for full recovery of annual fixed charges shall be 85% per cent, but TVNL has not achieved these availability levels over the past few years. The percentage of availability achieved from FY 11-12 to FY15-16 is shown in the table below:

Table 6: Historical Plant Availability Factor

Factors	Units	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16
Achieved Plant Availability Factor (PAF)	%	85.75	88.55	80.10	79.91	87.36
Normative Plant Availability Factor (PAF)	%	85.00	85.00	85.00	85.00	85.00

Figure 10: Availability of the Station



The key reasons for non-achievement of Availability in FY 14 and FY 15 are as outlined below:

- Plant being backed down by JUVNL / JBVNL;
- Tripping of transmission lines,
- Tripping of Units and partial load operation attributed to different technical reasons

However, TVNL does expect that things are bound to improve in coming years and expects 85% PAF for the Second Control Period, i.e. FY 2016-17 to FY 2020-21.

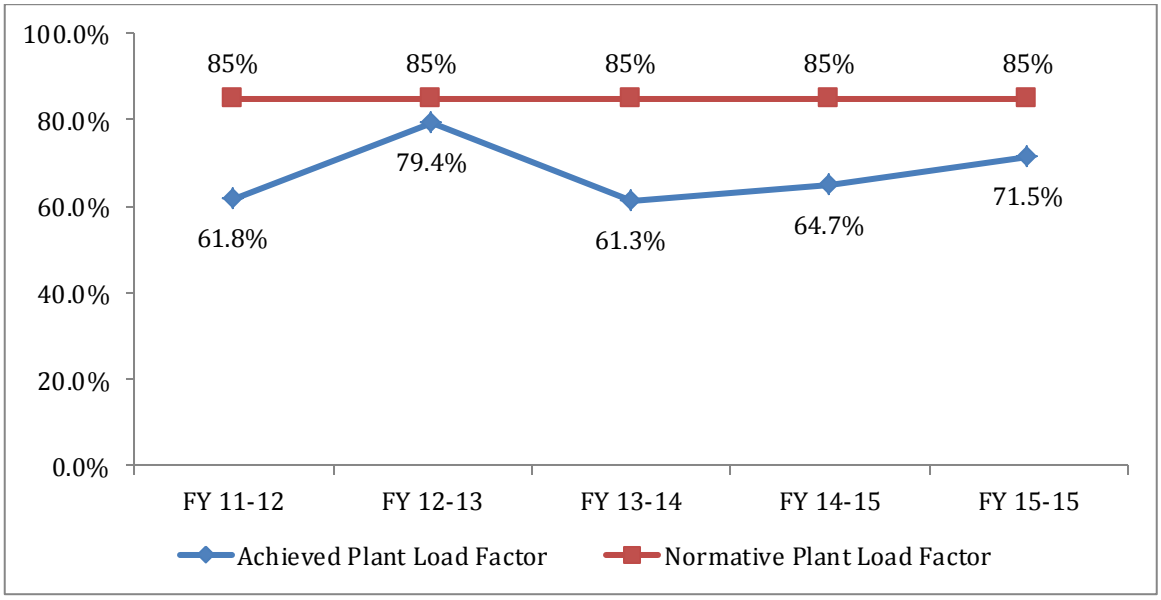
5.1.5 Plant Load Factor (PLF)

The percentage of plant load factor achieved from FY 2011-12 onwards is shown in the table below:

Table 7: Historical Plant Load Factor

Factors	Units	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16
Achieved Plant Load Factor (PLF)	%	61.81	79.42	61.32	64.70	71.46
Normative Plant Load Factor (PLF)	%	85.00	85.00	85.00	85.00	85.00

Figure 11: Plant Load Factor



Various factors attributable to low PLF are grid being backed down by JUVNL / JBVNL, tripping of transmission lines, tripping of Units and partial load operation attributed to different technical issues.

TVNL aims to improve the PLF on year-on-year basis to 85% for the Second MYT Control Period.

5.1.6 Auxiliary Consumption

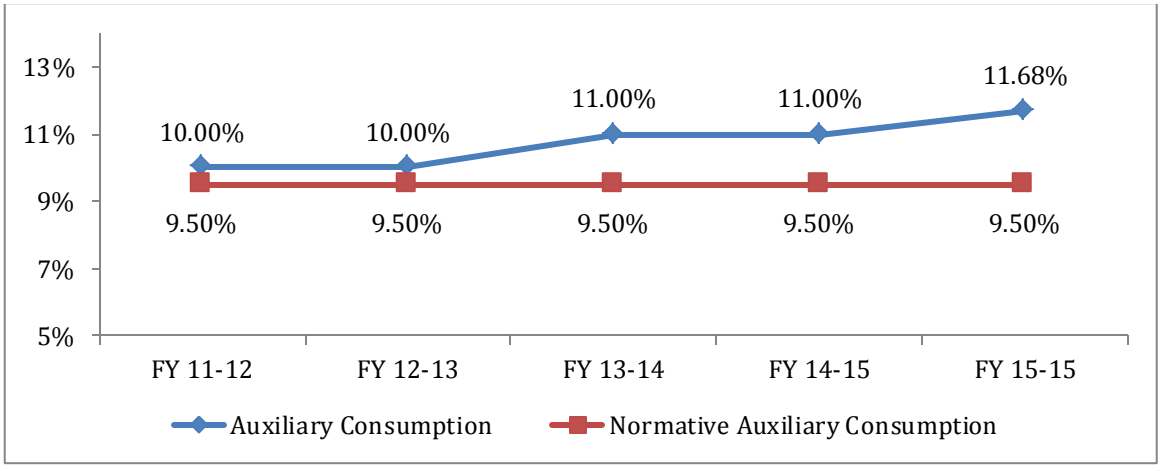
The percentage of auxiliary consumption achieved from FY 2006-07 onwards is shown in the table below:

Table 8: Auxiliary Consumption

Particulars	Units	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16
Auxiliary Consumption	%	9.71%	10.43%	11.29%	11.34%	11.68%
Normative Auxiliary	%	9.50%	9.50%	9.50%	9.50%	9.50%

Particulars	Units	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16
Consumption						

Figure 12: Auxiliary Consumption



The main reason for higher auxiliary consumption is less generation and partial loading of units due to poor quality of coal, backing down of grid etc. (Reasons).

However for the Second Control Period, the Petitioner aims to maintain the auxiliary consumtion within the desirable limits.

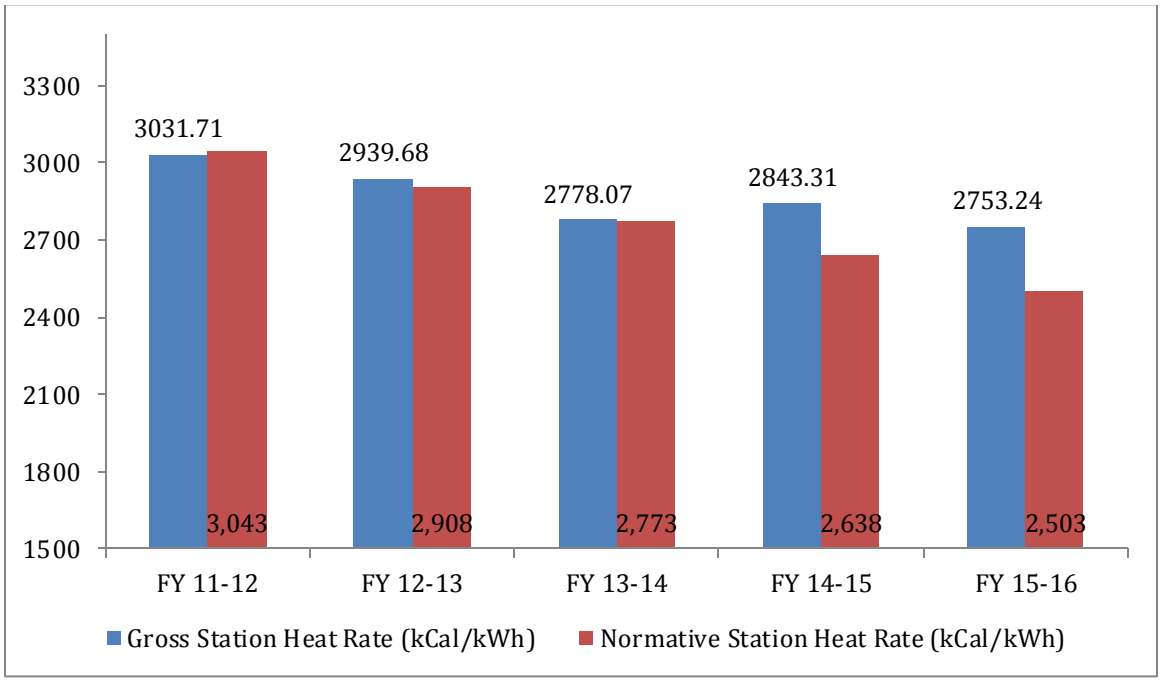
5.1.7 Station Heat Rate (SHR)

The performance of TVNL on SHR parameter is given below:

Table 9: Station Heat Rate

Factors	Units	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16
Gross Station Heat Rate	(Kcal/Kwh)	3031.71	2939.68	2778.07	2843.31	2753.24
Normative SHR	(Kcal/Kwh)	3043	2908	2773	2638	2503

Figure 13: Station Heat Rate



The key factors besides the specific reasons for slight deviation in SHR of the stations are:

- Poor quality of coal.
- Coal quality effects.
- Degradation and ageing of machines.
- Partial load operation due to grid backing down & transmission line constraints

However, for the present Control period; TVNL with incorporation of new investment plans; expects SHR to achieve the levels as desired by the Hon'ble Commission.

5.1.8 Specific Secondary Oil Consumption

Secondary Oil consumption is directly related to the number of start-ups of the units and the average unit loading. The need of secondary fuel support for flame stabilization is normally required. There had been a significant increase in secondary oil consumption which is primarily on account of the following reasons:

- Shortages of Coal Supply
- Grid backing down forcing multiple start-ups
- Frequent tripping of the units leading to multiple start-ups

Table 10: Specific Oil Consumption

Particulars	Units	FY11-12	FY12-13	FY13-14	FY14-15	FY15-16
Specific Oil Consumption	(ml/Kwh)	2.049	1.609	1.881	1.489	1.152
Normative Specific Oil Consumption	(ml/Kwh)	1	1	1	1	1

Figure 14: Specific Oil Consumption

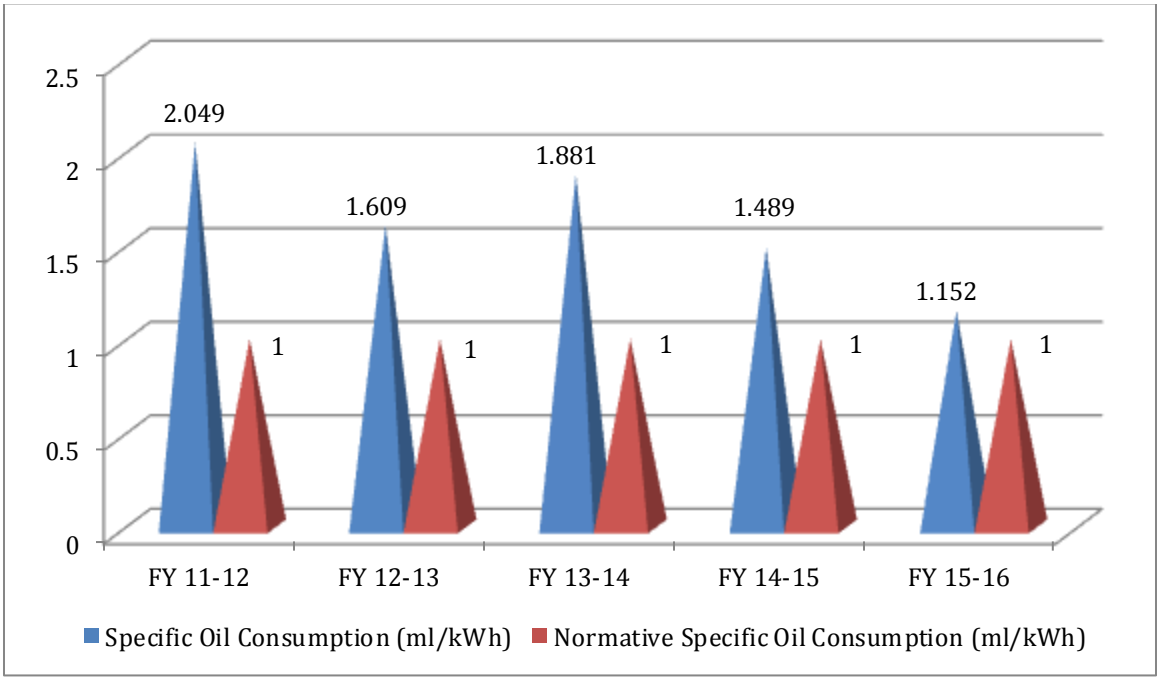
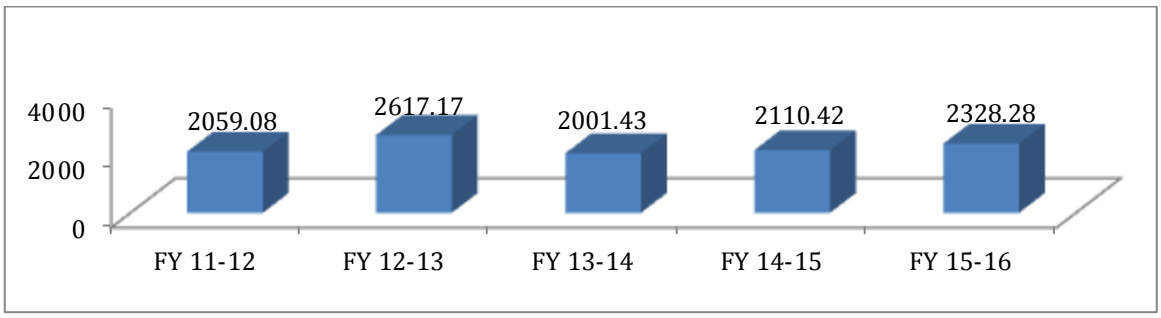


Table 11: Historical Net Generation

Overall Performance	Units	FY11-12	FY12-13	FY13-14	FY14-15	FY15-16
Net Generation	MUs	2059.08	2617.17	2001.43	2110.42	2328.28

Figure 15: Net Generation



The main reasons for such deterioration in performance are:

- Issues of Poor quality of coal which lead to higher quantum of coal being burnt and also more oil consumption leading to higher SHR.
- Poor financial situation due to non-payment of dues by JUVNL / JBVNL; causing deferment of typical repair & maintenance activities and non-payment to the fuel suppliers i.e. CCL.
- Shortage of coal supply has affected the availability of thermal stations.

In order to maximize the potential of the generation plant for further generation, TVNL has been undertaking best possible internal exercises/ external help permissible in its financial situation.

5.2 Financial Performance

5.2.1 Profit & Loss Statement

The comparison of Profit & Loss Statement of Company's Accounts of last 5 years is shown below:

Table 12: Past Profit & Loss Statement

Factors	FY 11-12		FY 12-13		FY 13-14		FY 14-15		FY 15-16		Inc/Dec in last 5 years		CAGR
Assets	Rs. Cr	% of Total Income	Rs. Cr	% of Total Income	Rs. Cr	% of Total Income	Rs. Cr	% of Total Income	Rs. Cr	% of Total Income	Rs. Cr	% of Total Income	%
INCOME													
Revenue from Power sale	490.38	96.82%	810.85	96.63%	612.60	94.98%	741.37	95.30%	815.03	95.96%	324.65	94.70%	13.54%
Other income	16.11	3.18%	28.24	3.37%	32.37	5.02%	36.58	4.70%	34.29	4.04%	18.18	5.30%	20.78%
TOTAL	**506.49**	**100.0%**	**839.09**	**100.0%**	**644.97**	**100.0%**	**777.95**	**100.0%**	**849.31**	**100.0%**	**342.82**	**100.0%**	**13.80%**
EXPENDITURE													
Cost of Raw Material Consumed	287.79	56.82%	445.53	53.10%	314.63	48.78%	399.28	51.32%	537.88	63.33%	250.09	72.95%	16.92%
Admin. & other Expenses	15.98	3.16%	12.56	1.50%	13.37	2.07%	14.70	1.89%	13.84	1.63%	-2.14	-0.63%	-3.54%
Employee Costs	28.86	5.70%	121.13	14.44%	18.00	2.79%	50.59	6.50%	62.34	7.34%	33.48	9.77%	21.23%
Repair & Maintenance	39.78	7.85%	40.62	4.84%	59.07	9.16%	55.11	7.08%	81.54	9.60%	41.76	12.18%	19.65%
Depreciation & Amortization	46.19	9.12%	46.49	5.54%	46.54	7.22%	46.72	6.01%	46.66	5.49%	0.47	0.14%	0.25%
Interest & Finance Charges	83.13	16.41%	86.70	10.33%	324.86	50.37%	103.05	13.25%	103.13	12.14%	20.00	5.83%	5.54%
TOTAL	**501.73**	**99.06%**	**753.03**	**89.74%**	**776.47**	**120.39%**	**669.45**	**86.05%**	**845.39**	**99.54%**	**343.66**	100.24%	13.93%
Net Profit/(Loss) Before Tax	4.76	0.94%	86.06	10.26%	(131.50)	-20.39%	108.50	13.95%	3.92	0.46%	(0.84)	-0.24%	-4.73%
Prior Period Charges	-	-	-	-	-	-	(123.26)	-15.84%	(204.28)	-24.05%	-204.28	-59.59%	
Net Profit/(Loss) After Tax	4.76	0.94%	86.06	10.26%	(131.50)	-20.39%	(14.76)	-1.90%	(200.36)	-23.59%	(205.12)	-59.83%	-154.71%
Profit/Loss for the year	**4.76**	**0.94%**	**86.06**	**10.26%**	**(131.50)**	**-20.39%**	**108.50**	**13.95%**	**3.92**	**0.46%**	**(0.84)**	**-0.24%**	-4.73%
Power Generation (MU)	2059.08		2617.17		2001.43		2380.46		2328.28				3.12%
Units Sold (MUs)	2048.83		2606.95		1991.21		2100.20		2318.04				3.13%
Revenue per unit (Rs/Kwh)	**2.47**		**3.22**		**3.24**		**3.70**		**3.66**				10.34%

(a) **Revenue from the Generation Business:**

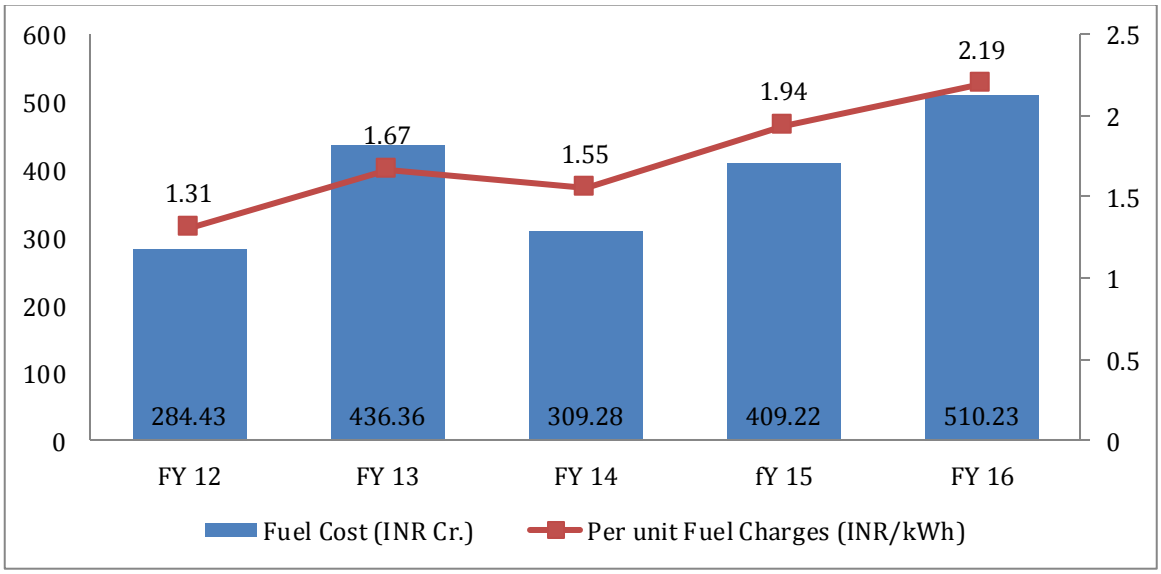
- The revenue from sale of power of TVNL from FY 2011-12 to FY 2015-16 has seen a growth rate of 13.54% whereas increase in power generation is ~ 3.12%
- The total expenditure in FY 2012-13 increased by 58% compared to previous year of which major role was played by the fuel cost.
- The average revenue per unit has witnessed an increase of overall CAGR of ~14% over last 4 years.

(b) **Cost of Fuel:**

Table 13: Cost of Fuel

Fuel Cost	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16
Coal (Rs Cr)	258.62	407.28	281.66	387.54	497.20
Oil (Rs Cr)	25.80	29.08	27.63	21.68	13.04
Total (Rs Cr)	**284.43**	**436.36**	**309.28**	**409.22**	**510.23**
Net Generation (MUs)	2,059.08	2,617.17	2,001.43	2,110.42	2,328.28
Fuel cost per unit	**1.38**	**1.67**	**1.55**	**1.94**	**2.19**

Figure 16: Historical Variation in Cost of Fuel



- The fuel cost has played the role of major contributor to the total expenses which is approx. 58.28% in FY 2014-15.

- The total fuel cost to the total income has increased from ~56.82% to nearly 63.33% of TVNL during the FY 2011-12 to FY 2015-16;
- It was analysed that due to the substantiate increase in rate of coal as well oil and further increase in generation has led to an increase of fuel cost per unit by Rs 0.81/ unit in past five years.
- However, on account of mismatch between the actual performance visa - vis the performance levels as per the regulatory norms plus non-payment by JUVNL / JBVNL, the overall costs are not recovered through cost plus mechanism resulting in under recovery of the cost which is severely hampering the company's financial viability.

(c) **Administration & General (A&G) Expenses**

- As observed from the table, A&G Expenses have shown a gradual decrease as proportion of the total income from FY 2011-12 to FY 2015-16.
- However, in last 5 years, there is no substantiate variation in the A&G expense, and is nearly constant rather has decreased by ~3.54% from FY 2011-12 to FY 2015-16.

(d) **Repair & Maintenance Expenses**

- Overall in last 5 years, the CAGR is around 19.65% for R&M cost due to the ageing of the plants which has resulted into frequent R&M expenses. The main factor among others for accelerating the degrading of the units is the poor quality of coal, wet coal issues etc.

(e) **Employee Cost**

- It is noted that the employee expenses in FY 2015-16 was ~7% of the total income while in FY 2011-12 it was 5.70%.
- Further in FY 2012-13 there was a substantiate increase in the Employee Cost i.e. 14.44% of total income this was on account of high terminal liabilities.
- The overall CAGR for Employee Cost in last 5 years is ~21%.

(f) **Depreciation**

- Depreciation is cost of using the assets during the year. The depreciation in the past 5 year is nearly constant where overall CAGR for the last five years comes out to be 0.25%.

(g) **Interest Expenses**

- Interest & finance charges has increased by 5.83% in last 5 years.
- The Interest & Finance Charges were exceptionally high for the FY 2013-14 due to Reason.

(h) **Profit before Tax**

- The loss of Rs. 131.5 Cr in FY 2013-14 was on account of high interest and finance charges, while in FY 2014-15 loss was Rs. 14.76 Cr & Rs. 200.36 Cr in FY 2015-16. Further increase in loss is due to high amount of prior period expenses of Rs. 123.26 Cr & Rs. 204.28 Cr in FY 2014-15 & FY 2015-16 respectively.

5.2.2 Balance Sheet of TVNL

The comparison of Balance Sheet of Company's Accounts of last 5 years is shown below:

Table 14: Historical Balance Sheet

Particulars	FY 11-12		FY 12-13		FY 13-14		FY14-15		FY 15-16		Inc. / Dec.		CAGR
Assets	Rs. Cr	%	Rs. Cr	%	Rs. Cr	%	Rs. Cr	%	Rs. Cr	%	Rs. Cr	%	%
Net Fixed Assets	727.80	85.08%	682.27	83.07%	636.56	81.52%	592.81	80.33%	311.61	84.94%	-416.19	85.19%	-19.11%
Asset under Const.	127.60	14.92%	139.00	16.93%	144.32	18.48%	145.20	19.67%	55.25	15.06%	-72.35	14.81%	-18.88%
Total Fixed Assets	**855.39**	**100.00%**	**821.28**	**100.00%**	**780.87**	**100.00%**	**738.00**	**100.00%**	**366.86**	**100.00%**	**-488.54**	**100.00%**	**-19.08%**
Investments	0.00		0.00		0.00		0.00		0.00		0.00		
Current Assets													
Cash & Bank	303.87	8.11%	365.59	11.88%	370.12	10.38%	393.78	9.84%	427.01	10.44%	123.15	36.09%	8.88%
Inventory	123.89	3.31%	125.61	4.08%	151.00	4.24%	144.47	3.61%	166.70	4.08%	42.81	12.55%	7.70%
Trade Receivables	3217.06	85.83%	2463.55	80.06%	2878.48	80.76%	3322.18	83.01%	3328.76	81.40%	111.70	32.74%	0.86%
Short Term Loans	93.15	2.49%	112.26	3.65%	154.35	4.33%	131.36	3.28%	156.59	3.83%	63.44	18.59%	13.87%
Other Current Assets	10.33	0.28%	10.25	0.33%	10.40	0.29%	10.40	0.26%	10.44	0.26%	0.10	0.03%	0.25%
Total Current Assets	**3748.29**	**100.00%**	**3077.25**	**100.00%**	**3564.36**	**100.00%**	**4002.19**	**100.00%**	**4089.50**	**100.00%**	**341.20**	**100.00%**	**2.20%**
Total Assets	**4603.69**		**3898.53**		**4345.23**		**4740.20**		**4456.35**		**-147.33**		
Non Current Liabilities	**2404.06**		**2582.47**		**2892.43**		**3008.81**		**3133.30**		729.24		
Current Liabilities	65.64	2.47%	70.83	4.19%	71.05	3.63%	71.41	3.17%	26.11	1.28%	-39.53	6.42%	-20.58%
Trade Payables	506.92	19.07%	565.51	33.48%	563.83	28.81%	591.77	26.29%	101.13	4.95%	-405.79	65.88%	-33.17%
Provisions	2085.99	78.46%	1052.60	62.32%	1322.32	67.56%	1587.39	70.53%	1915.35	93.77%	-170.64	27.70%	-2.11%
Total Current Liability	**2658.55**	**100.00%**	**1688.93**	**100.00%**	**1957.19**	**100.00%**	**2250.56**	**100.00%**	**2042.58**	**100.00%**	**-615.96**	**100.00%**	**-6.38%**
Total Liability	**5062.60**		**4271.40**		**4849.62**		**5259.37**		**5175.88**		**113.28**		
NET WORTH													
Equity	105.00		105.00		105.00		105.00		105.00		0.00		0.00%
Reserves	-563.92		-477.86		-609.39		-624.17		-824.53		-260.61		9.96%
Total Networth	**-458.92**		**-372.86**		**-504.39**		**-519.17**		**-719.53**		**-260.61**		**11.90%**
Total Long term Liability	**4603.69**		**3898.54**		**4345.23**		**4740.20**		**4456.35**		**-147.33**		

5.2.3 Analysis of Balance Sheet

a. Net Fixed assets

- In last 5 years, Net Fixed Assets have declined at a CAGR of 19.11% due to by depreciation and asset capitalization being undertaken;
- The asset under construction has decreased in FY 2015-16 to Rs. 55.25 Cr from Rs. 145.20 Cr in FY 2014-15 due to capitalisation of MGR System.
- However, as can be noticed in the balance sheet, in FY 2011-12, 85.08% of the total Assets of TVNL are part of Fixed Assets which has marginally reduced in FY 2015-16 to 84.94% due to increase in the requirement of the working capital (increase in Net Current Assets);

b. Net Current Assets

- Last 5 years CAGR of the Net Current Assets is around 2.20% which is due to working capital woes being faced due to TVNL's precarious financial position.
- The major portion in the current assets is the Trade Receivables which has almost been around 80-85% of the Total Current Assets. This is due to the reason attributing to JUVNL / JBVNL non-payment of past dues.
- Further, the total current liabilities have decreased in last 5 years, the 5 year CAGR comes out to be around -6.38%. The decrease in Current liabilities is primarily due to decrease in the trade payables of the petitioner.

c. Equity in line with Debt

- The Company has been primarily funding its capex plans through internal accruals and has debt leverage on the higher side.

Chapter 6. FUTURE BUSINESS PLAN

6.1 Capital Investment Plan

6.1.1 Capital Investment Plan

The section deals with the Proposed Capital Investment Plan to be followed and implemented during the control period FY 2016-17 to FY 2021-22.

As can be seen from the table below the petitioner has planned capital investment for the control period in order to smooth functioning and running of the plant along with focusing on areas like "R&M, additional plant or anything"?

Following tables summarizes the capital expenditure projections for MYT control period (FY 2016-17 to FY 2020-21):

Table 15: Capital Investment Plan for the Second Control Period

Capital Expenditure	FY 17	FY 18	FY 19	FY 20	FY 21
Control & Instrumentation	25.88	12.00	22.15	2.55	0.35
Chemistry (OPN)	0.00	0.00	0.65	0.65	0.00
Civil Works	3.51	4.00	35.50	34.00	12.50
MGR System	0.00	0.00	5.00	5.00	10.00
Electrical Dept.(EWD) Works	35.04	24.24	23.20	12.15	11.35
Turbine Dept. (TMD) Works	33.20	11.84	18.08	27.46	50.66
Boiler Dept. (BMD) Works	2.10	17.27	13.82	9.12	13.32
Others	0.69	0.00	0.00	0.00	0.00
Coal Handling Plant (CHP)	0.00	5.00	10.00	16.20	13.00
Total	**100.42**	**74.35**	**128.40**	**107.13**	**111.18**

6.1.2 Capitalization Schedule

Details of the Capitalization schedule are given at Annexure X. With this, proposed capitalization schedule; the project cost shall be determined as per the table below:

TVNL proposes to fund the capitalized assets with 70:30 debt-equity ratio with equity infusion expected from internal accruals and/or external equity support and loans from Govt. of Jharkhand.

The details of proposed Capitalization as well as its funding are provided in the table given below:

Table 16: Capitalization and Capital Structure

Capital Expenditure	**FY 17**	**FY 18**	**FY 19**	**FY 20**	**FY 21**
Opening Capitalization	55.25	15.57	8.99	13.74	12.09
Capex added during the year	100.42	74.35	128.40	107.13	111.18
Capex Converted to GFA	140.10	80.92	123.65	108.78	110.94
Closing Capitalization	**15.57**	**8.99**	**13.74**	**12.09**	**12.33**
Opening GFA	1,588.50	1,728.60	1,809.52	1,933.17	2,041.96
GFA Conversion from Capitalization (90% of CWIP)	**140.10**	**80.92**	**123.65**	**108.78**	**110.94**
Closing GFA	1,728.60	1,809.52	1,933.17	2,041.96	2,152.90
Debt (70%)	98.07	56.65	86.56	76.15	77.66
Equity (30%)	42.03	24.28	37.10	32.63	33.28

Chapter 7. Performance Improvement Trajectories

7.1 Operational Parameters Trajectory

7.1.1 Petitioner lays stress on improvement of its performance both operationally and financially. It aims to improve its performance each year by undertaking profitable & efficiency improvement investments and carrying out analysis by internal/ external agencies.

7.1.2 The operational parameters kept in focus by the Hon'ble Commission and adopted by the petitioner are:

- Station Heat Rate (Kcal/ kWh)
- Auxiliary Consumption
- Plant Availability Factor
- Plant Load Factor
- Specific Oil Consumption

7.1.3 The Operational Parameters Trajectory as set by the Hon'ble Commission for Control Period FY 2-16-17 to FY 2021-22 vide JSERC Generation Tariff Regulations, 2015 are provided in the below table:

Table 17: Approved Operational Parameters & Performance Targets

Particular	FY 17	FY 18	FY 19	FY 20	FY 21
PAF (%)	85%	85%	85%	85%	85%
PLF (%)	85%	85%	85%	85%	85%
Station Heat Rate (Kcal/kWh)	3,043	2,908	2,773	2,638	2,503
Aux Cons (%)	9.50%	9.50%	9.50%	9.50%	9.50%
Secondary Oil Cons (ml/kWh)	1.00	1.00	1.00	1.00	1.00

7.1.4 The petitioner would like to bring it to the kind attention of the Hon'ble Commission that plant is under commercial operation since September, 1997, while TVNL is doing best efforts to improve the performance of the plant, but as the life of the machinery as well of the plant increases the operational efficiency tends to reduce. In light of the above the petitioner would like to request the Hon'ble Commission to set realistic operational parameter targets as provided in the table below keeping in view the life of the plant:

Table 18: Proposed Operational Parameters & Performance Targets

Particular	FY 17	FY 18	FY 19	FY 20	FY 21
PAF (%)	85%	85%	85%	85%	85%
PLF (%)	85%	85%	85%	85%	85%
Station Heat Rate (Kcal/kWh)	3,043	2,908	2,773	2,638	2,503
Aux Cons (%)	9.50%	9.50%	9.50%	9.50%	9.50%
Secondary Oil Cons (ml/kWh)	1.00	1.00	1.00	1.00	1.00

7.2 Return on Equity

7.2.1 In the previous MYT Tariff Order dated 30th May 2012 for the Control Period FY 2012-13 to FY 2015-16, the Hon'ble Commission had approved the Opening Equity of INR 169.18 Cr. for FY 13 (As on 01st April 2012). For arriving the Opening Equity for FY 2016-17 (01st April 2016), the Petition has added the equity component of Actual Capitalized Assets for FY 13 to FY 16 and the same has been provided below:

Table 19: Actual Capitalization during the period FY 13 to FY 16

Return on Equity	Unit	FY 13	FY 14	FY 15	FY 16
Asset Capitalization (INR Cr.)	Rs Cr	0.97	0.83	2.98	131.40
Equity Component (%)	Rs Cr	30%	30%	30%	100%
Equity Addition (INR Cr.)	Rs Cr	0.29	0.25	0.89	131.40

7.2.2 The Petitioner here would like to submit that the Equity Component of the Asset Capitalized (INR 131.40 Cr.) for FY 16 has been considered as 100% as the same has been completely funded by the cash generated from the core business which is a deviation from the JSERC Generation Tariff Regulations, 2015 and requests the Hon'ble Commission to approve the same.

7.2.3 The Petitioner would further like to submit to the Hon'ble Commission that currently the Shareholder Capital (Equity) of the Petitioner is only INR 105 Cr. whereas as per the Regulation 7 of the JSERC Generation Tariff Regulations, 2015,, the Opening Equity for FY 2016-17 should be around INR 475 Cr. (30% of INR 1,588.50 Cr.) which results in huge loss to the utility on account of non-approval of Return on Equity for the difference amount. Thus, in view of the same, the Petitioner requests the Hon'ble Commission to allow 100% equity on the Capitalized Assets for FY 2015-16. Even after considering the 100% equity, the overall opening equity component for FY 2016-

17 would become INR 302.02 Cr. which would still be 19% of the total capitalized assets (Less than 30%).

7.2.4 Based on the above, the opening equity for the Second MYT Control Period comes out to be INR 302.02 Cr. and the computation of the same is provided below:

Table 20: Computation of Opening Equity for the Control Period

Return on Equity	Unit	FY 13	FY 14	FY 15	FY 16
Equity (Opening Balance)	Rs Cr	169.18	169.47	169.72	170.61
Net additions during the year	Rs Cr	0.29	0.25	0.89	131.40
Equity (Closing Balance)	Rs Cr	169.47	169.72	170.61	302.02

7.2.5 The Normative Equity addition during each year of the Control Period has been considered as 30% of the assets capitalized during the year.

7.2.6 As per the Clause 7.16 of JSERC Generation Tariff Regulations, 2015, the Return on Equity shall be computed on pre-tax basis at the base rate of 15.50%. Since there is no income tax envisaged to be paid by the Petitioner during the Control Period, the Post Tax Rate of Equity has been considered.

7.2.7 Based on the opening Normative Equity, Normative Equity addition during the Control Period on account of Additional Capitalization and RoE, the Return on Equity during the Second Control Period (FY 2016-17 to FY 2020-21) is provided in the table given below:

Table 21: Computation of Return on Equity for Second Control Period

Return on Equity	FY 17	FY 18	FY 19	FY 20	FY 21
Equity (Opening Balance)	302.02	344.04	368.32	405.42	438.05
Net additions during the year	42.03	24.28	37.10	32.63	33.28
Equity (Closing Balance)	344.04	368.32	405.42	438.05	471.33
Average Equity	323.03	356.18	386.87	421.73	454.69
Rate of Return on Equity	15.50%	15.50%	15.50%	15.50%	15.50%
Return on Equity	**50.07**	**55.21**	**59.96**	**65.37**	**70.48**

7.2.8 Thus, the petitioner requests the Hon'ble Commission to approve the Return on Equity as projected above.

7.3 Interest and Financing Charges on Debt

7.3.1 For computation of Interest and Finance Charges, the Petitioner has considered the opening loan balance and interest rates as per the annual accounts of FY 2015-16 and the normative debt addition during the Control Period on account of additional capitalization (as discussed in the previous sections).

7.3.2 In the Current Petition, the Petitioner has considered the Interest and Finance Charges for the control Period as given below:

Interest Charges on the loans outstanding as on 31st March 2016 - Refers to the interest charge payable by the Petitioner on the outstanding loans at the end of FY 15. The said loans have been raised from Bihar Government, Jharkhand Government, etc

Interest on additional capitalization – Interest charges payable for the loans projected to be raised for the additional capitalization projected for the Second Control Period i.e. FY 2016-17 to FY 2020-21. In accordance with the JSERC Generation Tariff Regulations, 2015, the Normative Debt on account of Additional Capitalization has been considered as 70%.

Repayment of Loan – The repayment has been considered equal to the depreciation computed for the Control Period in accordance with the clause 7.21 of JSERC Generation Tariff Regulations, 2015.

Rate of Interest – The Interest charges for the on-going loans have been considered as per the actual rate of Interest. For the new loans projected during the Control Period, the Interest Rate has been considered in accordance with clause 7.23 of JSERC Generation Tariff Regulations, 2015, i.e. SBI Base Rate plus 200 basis points. As on 01st April 2016, the SBI Base Rate was 9.30% and accordingly, the Interest Rate on Normative Loan comes out to be 11.30%.

7.3.3 Based on the Opening Actual Debt, Normative Debt addition during the Control Period on account of Additional Capitalization and Rate of Interest, the Interest and Finance Charges on Debt during the Second Control Period (FY 2016-17 to FY 2020-21) is provided in the table given below and requests the Hon'ble Commission to approve the same:

Table 22: Debt Schedule for the Second Control Period

Interest on Loan	FY 17	FY 18	FY 19	FY 20	FY 21
Opening Balance	3016.09	3031.37	2999.40	2991.93	2967.92
Loan received during the Year	98.07	56.65	86.56	76.15	77.66
Repayment during the year	82.78	88.62	94.02	100.16	105.97
Balance O/S at the end of the year	3031.37	2999.40	2991.93	2967.92	2939.61

Table 23: Computation of Interest on Debt for Second Control Period

Revenue Requirement	FY 17	FY 18	FY 19	FY 20	FY 21
Bihar Govt.	78.09	75.90	73.63	71.28	68.85
Jharkhand Govt.	7.31	7.11	6.89	6.67	6.44
Interest payable on Bihar Govt. Loan	51.36	49.93	48.43	46.88	45.28
Interest payable on Jharkhand Govt. Loan	2.45	2.38	2.31	2.23	2.16
Sub Total	**139.21**	**135.31**	**131.26**	**127.07**	**122.73**
Other Interest & Finance Charges	0.01	0.01	0.01	0.01	0.01
Interest on new loan for Additional Capitalization	5.47	13.93	21.48	29.83	37.35
Total	**144.68**	**149.25**	**152.75**	**156.91**	**160.09**

7.4 Depreciation

7.4.1 Based on the Opening GFA and asset addition during each year of the Control Period, Depreciation has been computed. The depreciation rates have been computed as per JSERC Generation Tariff Regulations, 2015.

7.4.2 The depreciation projected for the Control Period is provided in the table given below:

Table 24: Projected Depreciation for Second Control Period

Depreciation	FY 17	FY 18	FY 19	FY 20	FY 21
Depreciation for Plant	82.49	88.31	93.69	99.81	105.60
Depreciation for HO	0.30	0.32	0.33	0.35	0.37
Total Depreciation	**82.78**	**88.62**	**94.02**	**100.16**	**105.97**

7.5 O&M Expenses

7.5.1 The O&M expenses include expenditure incurred in the operation and maintenance of the generating station for smooth running of the plant. The O&M expense includes employee cost, repairs and maintenance, consumption of stores and spares, insurance and other administrative and general expenses of the Petitioner corporate office at Ranchi, as well of the plant.

7.5.2 As per JSERC Generation Tariff Regulations, 2015; O&M Expenses Comprises of:

- Salaries, wages, pension contribution and other employee costs i.e. Employee Expenses
- Administrative and General costs;
- Repairs and maintenance expenses; and Other miscellaneous expenses statutory levies and taxes
- Other miscellaneous expenses statutory levies and taxes (except corporate income tax).

7.5.3 Following tables summarizes the O&M expenses Summary for FY 2016-17 to FY 2020-21:

Table 25: Summary of O&M Expenses for Second Control Period

O&M Expenses	FY 17	FY 18	FY 19	FY 20	FY 21
Employee Expenses	70.11	81.84	85.03	87.10	90.74
A&G Expenses	14.65	15.51	16.42	17.39	18.41
R&M Expenses	86.33	91.41	96.78	102.47	108.49
Total	**171.09**	**188.76**	**198.23**	**206.96**	**217.65**

7.5.4 The petitioner has followed the below mentioned approach to project the different components of O&M Expense.

7.5.5 **Employee Expenses**

As per the clause 7.41 (a) of the JSERC Generation Tariff Regulations, 2015,

"The Applicant shall submit details of O&M expenses as required by the Commission. The O&M expenses excluding terminal liabilities for the Base Year shall be determined based on accounting statements for the base year, estimates of the Generating Company for relevant years and other factors considered relevant."

The Employee Expenses for the base year i.e. FY 2015-16 excluding the Terminal Benefits is provided below:

Table 26: Employee Expense for FY 2015-16

Employee Expenses	FY 2015-16
Salaries	36.57
Honorarium/Overtime	1.39
Pay Revision Arrears	
Sub Total	**37.96**

Employee Expenses	FY 2015-16
Medical Expanses Reimbursement	0.40
Earned Leave Encashment	1.92
Any Other Item	0.01
Payment Under Workman's Compensation And Gratuity	0.32
Sub Total	**2.66**
Contribution to Terminal Benefits	21.72
Any Other Item	
Grand Total	**62.34**

The employee costs (except the Terminal Benefits) for the control period has been evaluated on the basis of per unit employee cost adjusted for an inflationary increase of 5.88% (based on 20% weightage of WPI & 80% weightage of CPI) over FY 2015-16 per unit employee cost.

The Employee strength projection of TVNL during the Control Period is provided below:

Table 27: Employee Strength projection during the Control Period

Employee Pay Bands		FY 17	FY 18	FY 19	FY 20	FY 21
PB 1	37400/- to 67000/ (GP 10000, GP 9000, GP 8700)	16	12	8	1	1
PB 2	15600 to 39100/- (GP 6600)	29	29	29	29	29
PB 3	9300 to 34800/- (GP 5600, GP 5500, GP 5300, GP 4600, GP 4500, GP 4300, GP 4200)	196	215	215	215	215
PB 4	5200 to 20200 (GP 3300, GP 3000, GP 2700, GP 2400, GP 2100)	389	478	478	467	465
	Total	**630**	**734**	**730**	**712**	**710**

Also as per the clause 7.41 (b) of the JSERC Generation Tariff Regulations, 2015,, Terminal Liabilities will be approved as per actual submitted by the Generating Company or be established through actuarial studies. Thus, the Terminal Benefits as per the accounts of FY 2015-16 has been considered for projection of Terminal Benefits during the Control Period. The same shall be trued up as per the actual terminal liabilities incurred by the Petitioner after due prudence check by the Commission

In addition to the above, the Petitioner submits that on account of sixth pay Commission, the Petitioner expects the additional liability of INR 3 Cr. for FY 2016-17 and the same has also been considered for projection of Employee Expenses for the Second MYT Control Period.

Based on the above, the Employee Expenses projected for the Control Period (FY 2016-17 to FY 2020-21) is tabulated below:

Table 28: Employee cost for the Control Period

Employee Expenses	**FY 17**	**FY 18**	**FY 19**	**FY 20**	**FY 21**
Salaries	40.86	50.40	53.07	54.81	57.86
Honorarium/Overtime	1.56	1.92	2.02	2.09	2.21
Pay Revision Arrears					
Sub Total	**42.41**	**52.32**	**55.09**	**56.89**	**60.07**
Medical Expanses Reimbursement	0.45	0.56	0.59	0.60	0.64
Pension	2.14	2.64	2.78	2.87	3.03
Payment Under Workman's Compensation And Gratuity	0.36	0.45	0.47	0.49	0.51
Any Other Item	0.02	0.02	0.02	0.02	0.02
Sub Total	**2.97**	**3.66**	**3.86**	**3.98**	**4.20**
Contribution to Terminal Benefits	21.72	21.72	21.72	21.72	21.72
Total	**67.11**	**77.71**	**80.67**	**82.60**	**86.00**
Additional Impact on account of Sixth Pay Commission	3.00	4.13	4.35	4.50	4.75
Grand Total	**70.11**	**81.84**	**85.03**	**87.10**	**90.74**

7.5.6 A&G Expenses

As per the clause 7.41 (a) of the JSERC Generation Tariff Regulations, 2015,

"The Applicant shall submit details of O&M expenses as required by the Commission. The O&M expenses excluding terminal liabilities for the Base Year shall be determined based on accounting statements for the base year, estimates of the Generating Company for relevant years and other factors considered relevant."

The A&G Expenses for the base year i.e. FY 2015-16 is provided below:

Table 29: Actual A&G Expenses for FY 2015-16

A&G Expenses	**FY 16**
Lease/Rent	0.58
Insurance	0.32

A&G Expenses	FY 16
Telephone, Postage, Telegram & Telex Charges	0.19
Consultancy Charges	0.29
Other Professional Charges	0.11
Conveyance and Travelling	0.26
Security/Service Charges Paid to Outside Agencies	9.07
Late Penalty/ Intt Charges	0.01
License and Registration Fees	0.07
Rates & Taxes	0.02
Sub Total	**10.92**
Fee and Subscription of Books and Periodicals	0.67
Printing and Stationary	0.09
Advertisement Expenses (Other than Purchase	0.13
Electricity Charges to Offices	0.19
Water Charges	0.13
Meeting and Entertainment Charges	0.12
Miscellaneous Expenses	0.05
Sub Total	**1.39**
Legal Charges	0.26
Auditor's Fee	0.05
Vehicle Running Expenses Truck/Delivery Van	0.13
Vehicle Hiring Expenses Truck/Delivery Van	1.08
Others	0.00
Sub Total	**1.52**
Direction and Supervision Charges	
Grand Total	**13.84**

The costs of MYT control period for FY 2016-17 to FY 2020-21 have been evaluated on the basis of an inflation rate of 5.88% (based on 20% weightage of WPI & 80% weightage of CPI) for % increase in FY 2015-16 on year-on-year basis.

Based on the above, the projected A&G Expenses for the MYT Control Period (FY 17 to FY 21) are provided below:

Table 30: A&G Expenses projected for Second Control Period

A&G Expenses	FY 17	FY 18	FY 19	FY 20	FY 21
Lease/Rent	0.62	0.65	0.69	0.73	0.77
Insurance	0.34	0.36	0.38	0.41	0.43
Telephone, Postage, Telegram & Telex Charges	0.20	0.21	0.22	0.23	0.25
Consultancy Charges	0.31	0.32	0.34	0.36	0.38
Other Professional Charges	0.12	0.12	0.13	0.14	0.15
Conveyance and Travelling	0.27	0.29	0.31	0.33	0.34
Security/Service Charges Paid to Outside Agencies	9.60	10.17	10.76	11.40	12.07
Late Penalty/ Int. Charges	0.01	0.01	0.02	0.02	0.02
License and Registration Fees	0.07	0.08	0.08	0.08	0.09
Rates & Taxes	0.02	0.03	0.03	0.03	0.03
Sub Total	**11.56**	**12.24**	**12.96**	**13.73**	**14.53**
Fee and Subscription of Books and Periodicals	0.71	0.75	0.80	0.84	0.89
Printing and Stationary	0.10	0.11	0.11	0.12	0.13
Advertisement Expenses (Other than Purchase	0.14	0.15	0.16	0.17	0.18
Electricity Charges to Offices	0.21	0.22	0.23	0.24	0.26
Water Charges	0.13	0.14	0.15	0.16	0.17
Meeting and Entertainment Charges	0.13	0.14	0.15	0.16	0.16
Miscellaneous Expenses	0.05	0.05	0.05	0.06	0.06
Sub Total	**1.47**	**1.56**	**1.65**	**1.75**	**1.85**
Legal Charges	0.28	0.29	0.31	0.33	0.35
Auditor's Fee	0.05	0.05	0.06	0.06	0.06
Vehicle Running Expenses Truck/Delivery Van	0.14	0.15	0.16	0.17	0.18
Vehicle Hiring Expenses Truck/Delivery Van	1.14	1.21	1.28	1.36	1.44
Others	0.00	0.00	0.00	0.00	0.00
Sub Total	**1.61**	**1.71**	**1.81**	**1.91**	**2.03**
Direction and Supervision Charges					
Grand Total	**14.65**	**15.51**	**16.42**	**17.39**	**18.41**

Therefore, the petitioner requests the Hon'ble Commission to approve the A&G expenses as projected above.

7.5.7 R&M Expenses

As per the clause 7.41 (a) of the JSERC Generation Tariff Regulations, 2015,

"The Applicant shall submit details of O&M expenses as required by the Commission. The O&M expenses excluding terminal liabilities for the Base Year shall be determined based on accounting statements for the base year, estimates of the Generating Company for relevant years and other factors considered relevant."

The R&M Expenses for the base year i.e. FY 2015-16 is provided below:

Table 31: R&M expenses for FY 2015-16

R&M Expenses	FY 16
Plant and Machinery	65.39
Building	1.26
Civil Works	6.03
Hydraulic Works	0.41
Lines, Cables Net Works etc.	-
Vehicles	0.02
Furniture and Fixtures	-
Office Equipments	0.10
Station Supplies	-
Other Credits to R&M Charges	8.32
Total	**81.54**
Any other items (Capitalization)	-
Total	**81.54**

The costs of MYT control period for FY 2016-17 to FY 2020-21 have been evaluated on the basis of an inflation rate of 5.88% (based on 20% weightage of WPI & 80% weightage of CPI) for % increase in FY 2015-16 on year-on-year basis.

Based on the above, the projected R&M Expenses for the MYT Control Period (FY 17 to FY 21) are provided below:

Table 32: R&M Expenses for Second Control Period

R&M Expenses	FY 17	FY 18	FY 19	FY 20	FY 21
Plant and Machinery	69.23	73.30	77.61	82.17	87.00
Building	1.34	1.41	1.50	1.58	1.68
Civil Works	6.39	6.76	7.16	7.58	8.03
Hydraulic Works	0.44	0.46	0.49	0.52	0.55
Lines, Cables Net Works etc.	-	-	-	-	-
Vehicles	0.02	0.03	0.03	0.03	0.03

R&M Expenses	FY 17	FY 18	FY 19	FY 20	FY 21
Furniture and Fixtures	-	-	-	-	-
Office Equipments	0.10	0.11	0.12	0.12	0.13
Station Supplies	-	-	-	-	-
Other Credits to R&M Charges	8.81	9.33	9.88	10.46	11.07
Total	**86.33**	**91.41**	**96.78**	**102.47**	**108.49**
Any other items (Capitalization)	-	-	-	-	-
Total	**86.33**	**91.41**	**96.78**	**102.47**	**108.49**

Therefore, the petitioner requests the Hon'ble Commission to approve the R&M expenses as projected above.

Chapter 8. Conclusion & Future Plans

In the rapidly changing power sector scenario and based on the opportunities available in the market, the company focus areas are as given below:

8.1 Key Actions to fulfil Vision:

- Adequate power to Jharkhand:
- Efficient operational performance
- Commitment to employees

8.2 Future Business Opportunities

8.2.1 In terms of business opportunities that TVNL could target in the near future, the SWOT analysis has helped identify the following:

- Joint Ventures
- Providing Ancillary Services to other power sector players
- Ancillary Services
- Participating in Competitive Tariff Based Bidding Projects
- Merchant Power

8.2.2 While, the above mentioned Business Opportunities have emerged, the first two related to forming JVs with other partners for Greenfield project, would be the focus areas in the short to medium term. Also, for the future capacity addition plan, certain financial commitment for capital infusion would be required, considering the financial constraint due to non-payment of dues by JUVNL / JBVNL. TVNL does understand that they would have to look for sources other than GoJ; due to their financial constraint and also due to their obligation towards other sectors in the State, it would be necessary for TVNL to look at alternate sources. Therefore, the other opportunities would be looked at in the long terms which are being detailed out in the following paragraphs.

8.2.3 Joint Ventures

TVNL plans to initiate a few Joint Ventures with private players, mostly due to financial crunch. It looks forward to forming JVs and partnerships with major private sector players for setting up power projects. The JV partners would be able to bring in resources may also have ability to obtain statutory clearances expeditiously.

8.2.4 Participating in Competitive Tariff Based Bidding Projects

For effectively participating in competitive tariff based bidding projects TVNL would require detailed analysis of a lot of internal as well as external operational factors in order to ensure coming out with a competitive yet low-risk tariff to be quoted. TVNL would take time to evaluate this option in detail before deciding to go ahead with this in the long term.

8.2.5 Merchant Power

TVNL, with the approval of its board and approval from Hon'ble Commission, is targeting selling surplus power through the merchant route by entering into medium or short term contracts with traders or by becoming a member of the power exchanges. This can be through existing capacity as being mandated by Hon'ble Commission.

8.2.6 Future Plans in Other areas

While TVNL would be looking at other Future Business Opportunities, there is a need to strengthen the working of the Organization in order to enable it to implement its future Plans. This Chapter looks at the initiatives already initiated / planned to be taken up by TVNL on the Operational & Organizational front.

8.2.7 Key Initiatives

TVNL has already put in place measures to improve upon the operational parameters. Some of the key initiatives taken by TVNL are:

- Introduction of knowledge centre for Knowledge dissemination & management
- MGR system
- Technical committee to study plant R&M proposals with cost benefit analysis
- Introduction of best practices in O&M system.
- Commission pending systems & equipment's such as HP Heaters & UAT for improving efficiency & reliability.
- Combustion optimization & diagnostics process.
- SAP Implementation in the organization w.e.f. April'2016

8.3 Risk Mitigation Plan

To mitigate the risks; TVNL lays stress on preventive maintenance and to mitigate its operational risks; it has started multiple groups such as:

- Operation & Energy Efficiency group
- Maintenance Planning group
- Total Quality Management group
- Contracts & Materials Management group
- Station Management Committee
- Technical committee to review all major expenditure
- Business Excellence Group
- Environmental Management Group

TVNL is carrying out preventive maintenance on critical equipment's and area technical audits to improve the operational parameters and life expectancy of the power stations. The focus is mainly on:

- Plant load factor
- Plant availability factor
- Gross overall efficiency
- Unit heat rate
- Specific fuel oil consumption
- Auxiliary energy consumption

Submission to Hon'ble Commission

TVNL submits that the performance of the Plant is a function of several input parameters, viz., the quality and availability of coal, planned and forced shutdowns, availability of time for undertaking planned maintenance, etc. TVNL has been trying to streamline its processes over the years. Going forward, TVNL does expect that with release of dues from JUVNL/JBVNL shall ease the financial and operational performance considerably during the years to come.

Chapter 9. Prayer to Hon'ble Commission

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

1. To admit the Business Plan of TVNL for the Control Period (FY 2016-17 to FY 2020- 21) in accordance with Regulation 6 of the Jharkhand State Electricity Regulatory Commission (Multi Year Tariff) Regulations, 2015.
2. To approve the Business Plan TVNL for the Control Period (FY 2016-17 to FY 2020-21) in accordance with Regulation 6 of the Jharkhand State Electricity Regulatory Commission (Multi Year Tariff) Regulations, 2015.
3. To approve the principles and methodology proposed by TVNL for projection of ARR.
4. To allow the Operational Parameters as proposed by TVNL and its impact on the ARR.
5. To approve the deviation from the norms for certain parameters prescribed in JSERC Generation Tariff Regulations, 2015, provisions thereof, as sought in this Business Plan during the period FY 2016-17 to FY 2020-21.
6. To approve the Operating Parameters as per the norms provided in the Regulation and allow the Petitioner to retain the gains on account of the efficiency improvement in the Operating Parameters.
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 condone the delay in filing this MYT Petition
10. To permit TVNL to make further submissions, addition and alteration to this Business Plan as may be necessary from time to time.

Picture 1: Tenughat Vidyut Nigam Limited (TVNL) 2*210 MW Power Plant