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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US\$310 MILLION

TO THE

REPUBLIC OF INDIA

FOR A

JHARKHAND POWER SYSTEM IMPROVEMENT PROJECT

September 7, 2018

Energy and Extractives Global Practice  
South Asia Region

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## CURRENCY EQUIVALENTS

(Exchange Rate Effective April 16, 2018)

Currency Unit = Indian Rupees (INR)

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INR 65.0 = US\$1

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FISCAL YEAR  
April 1 - March 31

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## ABBREVIATIONS AND ACRONYMS

ABT	Availability-Based Tariff
AT&C	Aggregate Technical and Commercial
BAFO	Best and Final Offer
CAAA	Comptroller of Aid, Accounts, and Audit
CAG	Comptroller and Auditor General of India
CEA	Central Electricity Authority
CGFA	Corporate Governance and Financial Accountability
CIS	Customer Information System
COD	Commercial Operation Date
CPTD	Compensatory Plan for Temporary Damages
CQS	Selection based on Consultant's Qualification
DC	Direct Contracting
DDOs	Drawing and Disbursing Officers
DDUGJY	Deendayal Upadhyaya Gram Jyoti Yojana
DISCOM	Distribution Utility or Company
DPR	Detailed Project Report
DVC	Damodar Valley Corporation
E&S	Environmental and Social
EMP	Environment Management Plan
ERP	Enterprise Resource Planning
ERR	Economic Rate of Return
ESIA	Environment and Social Impact Assessment
ESMF	Environmental and Social Management Framework
FM	Financial Management
FY	Fiscal Year
GAP	Gender Action Plan
GDF	Gender Development Framework
GeM	Government eMarketplace
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GoI	Government of India
GoJ	Government of Jharkhand
GRC	Grievance Redressal Committee
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
HO	Head Office
HR	Human Resources
IA	Implementing Agency
IBRD	International Bank for Reconstruction and Development
ICB	International Competitive Bidding
ICT	Information and Communication Technology
IPDS	Integrated Power Development Scheme
IPF	Investment Project Financing
IPP	Independent Power Producer
IT	Information Technology
IUFR	Interim Unaudited Financial Report
JBVNL	Jharkhand Bijli Vitran Nigam Limited
JPSIP	Jharkhand Power System Improvement Project

JSERC	Jharkhand State Electricity Regulatory Commission
JSEB	Jharkhand State Electricity Board
JUSNL	Jharkhand Urja Sancharan Nigam Limited
kV	Kilovolt
kVA	Kilovolt Ampere
kWh	kilowatt-hour
MBC	Metering, Billing, and Collection
MFD	Maximizing Finance for Development
MoF	Ministry of Finance
MoP	Ministry of Power
MoU	Memorandum of Understanding
M&E	Monitoring & Evaluation
MU	Million Units
MVA	Megavolt-Ampere
MW	Mega Watts
NCB	National Competitive Bidding
NLTA	Non-Lending Technical Assistance
O&M	Operations and Maintenance
OPGW	Optical Ground Wire
PAP	Project Affected Persons
PAT	Profit After Tax
PFA	Power for All
PIE	Project Implementing Entity
PIU	Project Implementation Unit
PMC	Project Management Consultant
PMO	Project Management Office
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PPSD	Project Procurement Strategy Document
Saubhagya	Pradhan Mantri Sahaj Bijli Har Ghar Yojana
R&R	Resettlement and Rehabilitation
R-APDRP	Restructured Accelerated Power Development and Reform Program
RAP	Resettlement Action Plan
RE	Renewable Energy
RFB	Request for Bids
RGGVY	Rajiv Gandhi Grameen Vidyutikaran Yojana
RHS	Right Hand Side
RPF	Resettlement Policy Framework
RoW	Right-of-Way
SA	Social Assessment
SBD	Standard Bidding Document
SC	Scheduled Caste
SF6	Sulphur Hexafluoride
S&I	Supply and Installation
SIA	Social Impact Assessment
SMP	Social Management Plan
SLDC	State Load Dispatch Centre
SPD	Standard Procurement Document
ST	Scheduled Tribe
T&D	Transmission and Distribution
TL	Transmission Line

TPDP  
TPDPF  
ToR  
UDAY

Tribal People Development Plan  
Tribal People Development Planning Framework  
Terms of Reference  
Ujwal DISCOM Assurance Yojana (Program for the Financial  
Turnaround of DISCOMs)





**BASIC INFORMATION**

Country(ies)	Project Name	
India	Jharkhand Power System Improvement Project	
Project ID	Financing Instrument	Environmental Assessment Category
P162086	Investment Project Financing	B-Partial Assessment

**Financing & Implementation Modalities**

<input type="checkbox"/> Multiphase Programmatic Approach (MPA)	<input type="checkbox"/> Contingent Emergency Response Component (CERC)
<input type="checkbox"/> Series of Projects (SOP)	<input type="checkbox"/> Fragile State(s)
<input type="checkbox"/> Disbursement-linked Indicators (DLIs)	<input type="checkbox"/> Small State(s)
<input type="checkbox"/> Financial Intermediaries (FI)	<input type="checkbox"/> Fragile within a non-fragile Country
<input type="checkbox"/> Project-Based Guarantee	<input type="checkbox"/> Conflict
<input type="checkbox"/> Deferred Drawdown	<input type="checkbox"/> Responding to Natural or Man-made Disaster
<input type="checkbox"/> Alternate Procurement Arrangements (APA)	
Expected Approval Date	Expected Closing Date
01-Oct-2018	31-May-2024
Bank/IFC Collaboration	
No	

**Proposed Development Objective(s)**

The project development objectives (PDO) are to increase the transmission capacity of electricity network in the state of Jharkhand and strengthen the institutional capacity of state-owned power transmission and distribution utilities.

**Components**



Component Name	Cost (US\$, millions)
Component 1: Intra-state transmission system strengthening	396.20
Component 2: Technical assistance for institutional development and capacity building of JUSNL	13.80
Component 3: Improving operational efficiency and developing institutional capacity of JBVNL	69.20

**Organizations**

Borrower:	Republic of India
Implementing Agency:	Jharkhand Urja Sancharan Nigam Ltd. Jharkhand Bijli Vitran Nigam Ltd.

**PROJECT FINANCING DATA (US\$, Millions)****SUMMARY**

<b>Total Project Cost</b>	480.00
<b>Total Financing</b>	480.00
<b>of which IBRD/IDA</b>	310.00
<b>Financing Gap</b>	0.00

**DETAILS****World Bank Group Financing**

International Bank for Reconstruction and Development (IBRD)	310.00
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**Non-World Bank Group Financing**

Counterpart Funding	170.00
Borrower	170.00

**Expected Disbursements (in US\$, Millions)**

WB Fiscal Year	2019	2020	2021	2022	2023	2024
<b>Annual</b>	8.10	24.80	31.00	62.00	93.00	91.10
<b>Cumulative</b>	8.10	32.90	63.90	125.90	218.90	310.00





**INSTITUTIONAL DATA**

**Practice Area (Lead)**

**Contributing Practice Areas**

Energy & Extractives

**Climate Change and Disaster Screening**

This operation has been screened for short and long-term climate change and disaster risks

**Gender Tag**

**Does the project plan to undertake any of the following?**

a. Analysis to identify Project-relevant gaps between males and females, especially in light of country gaps identified through SCD and CPF	Yes
b. Specific action(s) to address the gender gaps identified in (a) and/or to improve women or men's empowerment	Yes
c. Include Indicators in results framework to monitor outcomes from actions identified in (b)	Yes

**SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)**

Risk Category	Rating
1. Political and Governance	● Moderate
2. Macroeconomic	● Low
3. Sector Strategies and Policies	● Moderate
4. Technical Design of Project or Program	● Moderate
5. Institutional Capacity for Implementation and Sustainability	● High
6. Fiduciary	● Substantial
7. Environment and Social	● Substantial
8. Stakeholders	● Substantial
9. Other	



10. Overall

● Substantial

**COMPLIANCE**

**Policy**

Does the project depart from the CPF in content or in other significant respects?

Yes  No

Does the project require any waivers of Bank policies?

Yes  No

**Safeguard Policies Triggered by the Project**

	Yes	No
Environmental Assessment OP/BP 4.01	✓	
Performance Standards for Private Sector Activities OP/BP 4.03		✓
Natural Habitats OP/BP 4.04		✓
Forests OP/BP 4.36	✓	
Pest Management OP 4.09		✓
Physical Cultural Resources OP/BP 4.11	✓	
Indigenous Peoples OP/BP 4.10	✓	
Involuntary Resettlement OP/BP 4.12	✓	
Safety of Dams OP/BP 4.37		✓
Projects on International Waterways OP/BP 7.50		✓
Projects in Disputed Areas OP/BP 7.60		✓

**Legal Covenants**

Sections and Description

Name: Subsidiary Agreements

Recurrent: X

Due Date: By Effectiveness

Frequency: N.A



Description of Covenant:

Jharkhand to ensure that the respective subsidiary agreements for making the loan proceeds available have been executed between Jharkhand and each of JBVNL and JUSNL respectively.

Sections and Description

Name: Project Implementation Units

Recurrent: X

Frequency: CONTINUOUS

Description of Covenant:

Jharkhand to ensure that each of JUSNL and JBVNL maintains throughout the period of implementation of their respective parts of the Project, a project implementation unit (“PIU”), headed by a Project Director, assisted by multi-disciplinary and competent staff, all with experience and qualifications, in numbers and under terms of reference agreed with the Bank; which unit shall be provided with such powers, financial resources, functions and competencies, agreed with the Bank, as shall be required for them to carry out the day-to-day implementation of the activities under the respective parts of the Project, including compliance with the Safeguard Documents, and monitoring and evaluation requirements.

Sections and Description

Name: Consulting Firm/s-Internal Audit

Recurrent: X

Due Date: Within 6 months of Effectiveness

Frequency: N.A

Description of Covenant:

Jharkhand to ensure that each of JUSNL and JBVNL select and engage, and thereafter maintain throughout the period of implementation of its respective parts of the Project, the services of one or more consulting firm(s), with qualifications and experience and under terms of reference agreed with the Bank, in order to carry out internal audits on, inter alia, financial management performance, procurement process and decisions and contract



administration.

Sections and Description

Name: JUSNL Environmental and Social Cell

Recurrent: NA

Due Date: Within 6 months of Effectiveness

Frequency: N.A

Description of Covenant:

Jharkhand to ensure that JUSNL establishes and thereafter maintain throughout the period of implementation of its part of the Project (being Component 1 and 2), an environmental and social cell (the "E&S Cell"), with competent, experienced and qualified staff, in sufficient numbers and under terms of reference acceptable to the Bank, vested with powers, financial resources, functions and competences, acceptable to the Bank, in order to: (i) prepare and/or implement the Safeguard Documents; (ii) monitor and evaluate contractors' and consultants' compliance therewith; and (iii) carry out any necessary updates thereto

Sections and Description

Name: JUSNL PMC

Recurrent:

Due Date: Within 3 months of Effectiveness

Frequency: N.A

Description of Covenant

Jharkhand to ensure that JUSNL select and engage, and thereafter maintain throughout the period of implementation of its part of the Project (being Component 1 and 2), the services of a project management consulting firm ("JUSNL PMC") with qualification and experience and under terms of reference agreed with the Bank, in order to assist its respective PIU with the planning, implementation and execution of activities under its respective parts of the Project, including: (i) factory inspection and site supervision, and monitoring on the physical progress in the implementation of civils works under Component 1 of the Project; (ii) certification of payments to Project contractors under Components 1 of the Project; (iii) providing guidance and recommendations to JUSNL's



PIU and JUSNL contractors to ensure compliance with the Safeguards Documents; and (iv) preparing the Project Reports and supporting documentation for Loan withdrawals.

Sections and Description

Name: JBVNL Institutional Arrangements

Recurrent: X

Due Date:

Frequency: CONTINUOUS

Description of Covenant

Jharkhand to ensure that JBVNL maintains throughout the implementation period of its Component 3 of the Project, the services of a project management consulting firm ("JBVNL PMC") with qualification and experience and under terms of reference agreed with the Bank, to assist its respective PIU with the planning, implementation and execution of activities under its respective parts of the Project, including inter alia (i) preparing bidding documents and supporting bid evaluations thereof for contracts (ii) supervising contract implementation including commissioning for contracts and (iii) certifying payments to service providers and/or Project contractors under Component 3 of the Project.

Sections and Description

Name: Civil Works- Contractor Safeguards

Recurrent: X

Due Date

Frequency: CONTINUOUS

Description of Covenant:

Jharkhand shall cause JUSNL to, and JUSNL shall, ensure that, each contract for civil works under the Project includes the obligation of the relevant contractor to comply with the relevant Safeguard Documents applicable to such civil works commissioned/awarded pursuant to said contract.



Sections and Description

Name: Grievance Redressal Mechanism

Recurrent: X

Due Date: Within 6 months of Effectiveness

Frequency: CONTINUOUS

Description of Covenant:

Jharkhand shall cause the JBVNL and JUSNL to establish and thereafter maintain and operate, throughout the period of implementation of their respective parts of the Project, a multi-layered grievance redress mechanism, in a manner and substance and with operational standards and procedures acceptable to the Bank, for the handling of any stakeholder complaints arising out of the implementation their respective activities under the Project.

Sections and Description

Name: Safeguards -JUSNL

Recurrent: X

Due Date

Frequency: CONTINUOUS

Description of Covenant:

JUSNL shall carry out its respective parts of the Project (Component 1 and 2) pursuant to, and in compliance with, the objectives, policies, procedures, time schedules, compensation arrangements and other provisions set forth in the ESMF, as well as the respective investment-specific ESMP(s), CPTD(s), RAP(s), and TPDP(s) prepared, and/or to be prepared in form and substance satisfactory to the Bank, (the ESMF and the investment-specific ESMP(s), CPTD(s), RAP(s) and/or TPDP(s) are hereinafter collectively referred to as the "Safeguard Documents").

Sections and Description

Name: Civil Works

Recurrent: X

Due Date



Frequency: CONTINUOUS

Description of Covenant:

With respect to each transmission line and substation to be erected/built or augmented under Component 1 of the Project, JUSNL shall, refrain from commencing any civil works or undertaking any activities ancillary thereto, until and unless (i) the same is done in accordance with the Safeguard Documents, (ii) prior to commencing any civil works for any transmission line, substation or distribution network under Component 1, Jharkhand shall cause JUSNL to, and JUSNL shall, ensure that: (a) all necessary governmental permits and clearances for such civil works for such transmission line, substation or distribution network have been obtained and submitted to the Bank; (b) all pre-construction conditions imposed by the governmental authority/ies under such permit(s)/clearance(s) shall have been complied with/fulfilled; and (c) all resettlement measures for the respective transmission/distribution substations, set forth in the applicable RAP(s) and/or CPTD(s), shall have been fully executed.

Sections and Description

Name: Monitoring and Evaluation

Recurrent: X

Due Date

Frequency: CONTINUOUS

Description of Covenant:

Jharkhand shall cause JUSNL, and JUSNL undertakes, to maintain monitoring and evaluation protocols and record keeping procedures agreed with the Bank and adequate to enable the Borrower, Jharkhand, JUSNL and the Bank to supervise and assess, on an on-going basis, the implementation of/compliance with the Safeguards Documents, as well as the achievement of the objectives thereof; and furnish to the Bank, throughout the period of Project implementation, jointly with the Project Reports quarterly reports prepared by JUSNL PMC, in a manner and substance satisfactory to the Bank, detailing JUSNL's and its contractors' adherence to/compliance with the Safeguard Documents and the achievement of the objectives thereof.

**Conditions**

Type	Description
Disbursement	Source Of Fund: IBRD Name: Retroactive Financing



	No withdrawal shall be made for payments made prior to signing of the Loan Agreement, except that withdrawals up to an aggregate amount not to exceed fifty million United States Dollars (USD 50,000,000) may be made for payments made prior to this date but on or after December 1, 2017, for eligible expenditures under the Project.
Type Disbursement	<p>Description</p> <p>Source Of Fund: IBRD</p> <p>Name: Operations Manual</p> <p>No withdrawals shall be made under Category (1) of the Project, until and unless, JUSNL has prepared and adopted the Operations Manual for Component 1 and 2 of the Project, in a manner and substance acceptable to the Bank.</p>

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INDIA  
JHARKHAND POWER SYSTEM IMPROVEMENT PROJECT

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## I. STRATEGIC CONTEXT

### A. Country Context

1. **India has been one of the world's fastest-growing large economies.** In the past three decades, per capita incomes have quadrupled, illiteracy rates have tumbled, and health conditions have improved. The pace of poverty reduction accelerated threefold during 2005–12, relative to the previous decade, and India halved the share of the population in extreme poverty from 45 percent in 1994 to 22 percent in 2012<sup>1</sup>. India lifted more than 160 million people out of poverty in recent years<sup>2</sup>.

2. **Even though India is the world's third-largest economy in purchasing power parity terms, most Indians are still relatively poor compared to people in other middle income or rich countries and income inequality is rising.** Ten percent of Indians, at most, have consumption levels above the commonly used threshold of US\$10 (purchasing power parity) per day expenditures for the global middle class. The rapid economic growth and positive human development have not been widely shared as the Indian society remains highly segmented and income inequality is rising with some states performing better than others. Jharkhand, located in the eastern part of the country and carved out of erstwhile Bihar in the year 2000, is the 14<sup>th</sup> most populous state in India and home to 33 million people. It lags the rest of the country on most human and social indicators. More than 75 percent of the state's population lives in rural areas (2011 Census). Poverty (at 37 percent) is among the highest in the country today<sup>3</sup> and the share of workers with salaried jobs is the lowest in the country.

3. **Years of political instability affected development in Jharkhand.** With nine governments over 14 years, the state had faced significant political instability that affected economic and social development. With the election of a stable government in the state in 2014, the outlook has turned positive with the state embarking on several initiatives to place itself on a path of economic growth. In 2017, the state of Jharkhand was ranked 13<sup>th</sup> in 'ease of doing business'. Despite the strides in economic growth and being resource rich in minerals, the state is yet to realize its full potential, and one of the reasons is a significant infrastructure gap, which constrains the state's ability to provide reliable basic services to its citizens and hinders growth. Recognizing this challenge, the state is now focusing on developing infrastructure particularly in roads, energy, education, industry and health sectors.

### B. Sectoral and Institutional Context

4. **India's power sector is going through sustained growth to fuel the economy and meet the needs of its population.** India's annual gross domestic product (GDP) growth rates over the last decade have averaged at above 7 percent, accompanied by rising power and energy demand at 4.9 percent and 5.3 percent annually, respectively since 2008. Energy demand is expected to continue to increase rapidly with

<sup>1</sup> Estimates are for 1993-94 and 2011-12, based on national poverty lines and data from the National Sample Survey consumption expenditure surveys

<sup>2</sup> Based on the US\$1.90 per person a day line (in 2011 purchasing power parity)

<sup>3</sup> <http://documents.worldbank.org/curated/en/767291467992476557/pdf/105854-BRI-P157572-PUBLIC-Jharkhand-Proverty.pdf>



rising incomes and rapidly urbanizing populations purchasing more electrical appliances, contributing about a quarter of the increase in global energy demand by 2040.

**5. Per capita consumption in India at 1,075 kWh is only one-third of the global average.**

Generation capacity at 343 GW (May 2018) now exceeds connected demand. There is steady growth in the quantity (and competitiveness) of renewables in the generation mix (especially wind and solar). Renewables (excluding large hydropower) currently represent about 20.1 percent of power generation capacity, and their share is expected to only go further as the country has set an ambitious target of increasing renewable energy (RE) based generation capacity to 175 GW by 2022.

**6. Reliable grid connected electricity supply in some states remains a challenge.**

Compared to generally well governed central institutions managing the generation and inter-state transmission sectors, the situation at the state level varies. While some states have robust and well managed intra-state transmission and distribution (T&D) networks, there are others where the network is inadequate and unreliable. It is estimated that about 200 million people are without grid connections, and of these many choose not to connect because electricity supply is unreliable. Many grid-connected consumers face unreliable supply, and, those who can afford it, use expensive, inefficient and polluting back-up generation. At the intra-state transmission level, the issue is of inadequate investments and/or poor maintenance of assets. At the distribution level, the issues lie with heavily-indebted loss-making state distribution utilities or companies (Discoms), which are for the most part publicly owned, and their limited resources leave them incapable to finance network investments and pay for the power purchases required to maintain a reliable supply. In 2016-17, most parts of the country had on average a generation capacity surplus<sup>4</sup>, but the actual energy generated was less than demand because Discoms were unable to pay for power. Discoms are choosing load shedding because of financial difficulties.

**7. In 2014, the Government of India (GoI) announced an 24x7 Power for All (PFA) program, in partnership with states, to ensure reliable electricity supply within the next five years.**

This initiative aims at providing uninterrupted supply of quality power to existing consumers and ensuring access to electricity to all unconnected consumers by 2019. Roadmaps for 24x7 PFA have been prepared by each state and implementation is underway. To support the development of electricity transmission and distribution (T&D) infrastructure in states, the GoI is providing central sector funds under three key schemes: Integrated Power Development Scheme (IPDS) – for urban areas; Deendyal Upadhyaya Gram Jyoti Yojana (DDUGJY)- for rural areas; and the more recently launched Sahaj Bijli Har Ghar Yojana (Saubhagya), to support downstream electricity connections to all unconnected households. In 2015, GoI announced a program for financial and operational turnaround of the Discoms - Ujjwal Discom Assurance Yojna (UDAY), which seeks to restructure the debt of distribution companies', requiring State governments to take responsibility for part of this debt, in return for improvements in service delivery and commercial performance by the Discoms.

**8. Jharkhand completed the unbundling of its vertically integrated Jharkhand State Electricity Board (JSEB) in January 2014.**

JSEB was unbundled into four independent companies - Jharkhand Urja Vikas Nigam Limited (JUVNL or the Holding Company); Jharkhand Urja Utpadan Nigam Limited (JUUNL or the Generation Company); Jharkhand Urja Sancharan Nigam Limited (JUSNL or the Transmission Company and State Load Dispatch Center [SLDC]) and Jharkhand Bijli Vitran Nigam

<sup>4</sup> CEA, Load Generation Balance Report, 2017



Limited (JBVNL or the Distribution Company). These companies share space in Jharkhand with one other key utility<sup>5</sup>, Damodar Valley Corporation (DVC), which has a presence across generation, transmission and distribution segments but distributes electricity only to industrial customers in about eight districts of Jharkhand. In terms of geographical area and consumers served, the state owned Discom, JBVNL, distributes electricity to all twenty-four districts in the state. These utilities are regulated by Jharkhand State Electricity Regulatory Commission (JSERC).

9. **The development of electricity infrastructure and the performance of power sector in the state has lagged those of other states in India.** The state's power sector faces challenges on multiple fronts, like the following:

i. **Large un-electrified population.** Although Jharkhand is endowed with rich mineral resources and is a potential hub for power generation, it has the lowest levels of rural electrification, as only 45 percent of the rural households have been electrified. About 3 million households, close to half the state's population, were without access to electricity at end of December 2017<sup>6</sup>. The per capita consumption of electricity in Jharkhand at 552 kWh is roughly half of the national average. Improved availability of power in the region from plants owned by the Central Government and independent power producers (IPPs) has helped the state achieve lower demand supply deficits in recent years.

ii. **Inadequate T&D infrastructure.** The poor financial performance of the state's power sector has resulted in under investment in the T&D infrastructure causing a significant supply constraint. The peak load met in Jharkhand state in FY16 was 3,255 MW, of which about 1,810 MW is served by JBVNL. With increases in electrification, the peak demand in JBVNL area alone is expected to more than double to 4.2 GW by FY22. The growing power demand has already exposed bottlenecks in the T&D network in the state, which are expected to worsen if the network is not augmented and strengthened.

iii. **Poor operational and financial performance of the distribution sector.** Despite improvements over the last few years, the state Discom (JBVNL) faces significant challenges on operational and financial performance as indicated by the high level of aggregate technical and commercial (AT&C) losses at 32 percent in FY17<sup>7</sup>, and below cost retail tariffs. The financial pressures on JBVNL are expected to increase over the next few years due to rapid electrification of households, majority of whom are going to be Below Poverty Line (BPL) consumers and will be falling under the lowest tariff category.

iv. **Low institutional capacity of the unbundled power sector entities.** The unbundled utilities have inherited the limited capacity and institutional weaknesses of their parent organization, JSEB, which was one of the poorest performing utilities in the country on both operational and financial measures. The companies suffer from weaknesses in human resources (HR) management, financial management (FM), project planning, procurement, and project implementation. The distribution company (JBVNL) suffers from poor commercial systems and processes, and low customer satisfaction.

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<sup>5</sup> There are three other utilities in the state of Jharkhand viz. Jamshedpur Utility Service Company (JUSCO, a private distribution licensee which operates in the town of Jamshedpur and the surrounding industrial area), Tata Steel and SAIL (both of which serve consumers only within the perimeters of their steel factories).

<sup>6</sup> As per GoI's Saubhagya portal <http://saubhagya.gov.in/>

<sup>7</sup> The AT&C losses in FY16 were higher at 39 percent while billing losses were 30.4 percent and collection efficiency was 88 percent (per true-up petition for FY16 filed by JBVNL with regulator)



10. **The Government's focus on improving the power sector in the state.** The leadership of the state has accorded a high priority to improving the availability and quality of power supply to support the state's economic development, as demonstrated by the following actions:

i. **Implementation of the 24x7 PFA roadmap for the state.** Jharkhand was one of the first states to sign the Memorandum of Understanding (MoU) for the 24x7 PFA plan with the Central Government. The plan envisages addition of over 4.5 GW generation capacities by 2022<sup>8</sup> (including a significant share of 1.5 GW from solar energy), through a mix of private and public-sector investments. The GoI has allotted funds for the state under the centrally sponsored schemes, the DDUGJY and the IPDS, for distribution network strengthening in rural and urban areas, respectively, and achieving 100 percent household electrification.

ii. **Augmentation of T&D networks to support universal access goal in the state.** To meet the expected growth in demand, the state needs an investment of close to US\$3.5 billion over the next five to six years to strengthen and augment the intra-state T&D network. A combination of resources will be involved – central and state government funds, multilateral borrowings, and private funds mobilized through public-private-partnership (PPP) mode. In fact, Jharkhand is running one of the biggest PPP programs in transmission sector in the country (US\$ 750 million), and plans to select private investors to construct, operate and maintain the higher voltage transmission network (400kV and 220kV).

iii. **Joining UDAY program.** Jharkhand was the first state to join the UDAY program of GoI in January 2016, to improve the operational and financial performance of the Discom. Under UDAY, the State has agreed to take over a substantial portion of the debt<sup>9</sup> of the Discom, and provide support for improving operational efficiency in the Discom. JBVNL has started implementation of several initiatives to improve systems and processes related to commercial aspects of meter reading, billing and revenue collection.

iv. **Strengthening institutional capacity of JUSNL and JBVNL.** Government of Jharkhand (GoJ) recognizes that implementing such a large capital expenditure program and improving the financial health of the sector, would require deep institutional development of its T&D utilities. Hence, one of the key elements of the current project request to the World Bank has been to support institutional strengthening. Supported by the World Bank, the companies have prepared a reform roadmap and started its implementation. As a key first step, the World Bank is supporting the development of organization structures for JBVNL and JUSNL to meet the business needs. These organization structures need to be supported with re-engineered business processes (especially for project implementation and commercial aspects), revised Delegation of Financial Powers (DoFP), upgrade of IT systems, improved human resource practices supported by strong business review frameworks. The proposed organization structures also look at how the skill mix and numbers of employees in the two utilities need to transition going forward. JUSNL and JBVNL have already initiated action on a number of these activities through advance procurement under the current project (discussed later under project components). The World Bank is also supporting Jharkhand's utilities to adopt the best practices on procurement and project management from POWERGRID, with which JUSNL is also collaborating to implement some of its schemes.

<sup>8</sup> The PFA plan figures have been subsequently updated using JUSNL load flow analysis

<sup>9</sup> Under UDAY, the State has issued INR 61,360 million worth of bonds



11. **Considering the current challenges and the investment needs, GoJ has requested the World Bank’s support for financing investments in the transmission sector and for institutional development of the state T&D utilities.** The distribution infrastructure will be financed by the state and central government funds. This engagement will also support the national and state objective of achieving 24x7 PFA and it will be another step forward in replicating the practices followed by strong central-sector institutions such as POWERGRID (with whom the World Bank has had a long and fruitful engagement) at the state level and contribute toward setting up strong state-level institutions.

### **C. Higher Level Objectives to which the Project Contributes**

12. The project is aligned with the findings of the Systematic Country Diagnostic (SCD) for India and aligns itself with the focus area “Resource Efficient Growth” in the sub-area of “increasing access to sustainable energy”. Further, the project is also aligned with the implementation strategy of “engaging a Federal India” and “strengthening public-sector institutions” as outlined in the Country Partnership Framework for India for period FY18-22 (Report No. 1266667-IN) distributed to the World Bank’s Board for discussion on September 20, 2018. The CPF and SCD specifically focus the World Bank’s efforts on supporting state-owned T&D utility reforms and institutional strengthening to ensure increased access to reliable power in alignment with the GoI’s 24x7 PFA Program. This project, through its focus on strengthening power transmission network in the state and supporting the institutional development of the power T&D utilities, will facilitate increase in access to electricity and supply of more reliable electricity to the citizens in the state of Jharkhand.

13. The project’s higher-level outcome of increasing availability of electricity supply in the low-income state of Jharkhand, will spur growth of its productive uses in the state, leading to enhanced quality of life, inclusive growth, and sustainable development.

## **II. PROJECT DEVELOPMENT OBJECTIVES**

### **A. PDO**

14. The project development objectives (PDO) are to increase the transmission capacity of electricity network in the state of Jharkhand and strengthen the institutional capacity of state-owned power transmission and distribution utilities.

### **B. Project Beneficiaries**

15. The direct beneficiaries of the project are the (existing and new) customers of the power distribution company in the state of Jharkhand, who will benefit from an increase in the supply and reliability of grid-based electricity, resulting from the augmentation and strengthening of the intra-state transmission network.

16. By increasing the supply of reliable electricity to households, industries, businesses, and various other productive sectors, the project will also contribute to economic development, poverty alleviation, and inclusive growth in Jharkhand. The customers would also benefit from the improved customer information systems leading to improved responsiveness of the power distribution company to handle any supply related complaints.



### C. PDO-Level Results Indicators

17. PDO level results indicators for the project are (a) the amount of electricity wheeled through JUSNL network for supply to consumers in the state (gigawatt hour [GWh]); (b) Increase in transformation capacity of the power transmission network in the state under the project (kilovolt-ampere [kVA]); (c) Percentage of consumers serviced through upgraded commercial system; and (d) Financial, Procurement and Contract management framework strengthened in JUSNL.

18. The intermediate outcome indicators will be:

- (a) Transmission Lines constructed (in circuit kilometers);
- (b) Number of transmission substations constructed (Number of 220/132kV, 220/33kV and 132/33kV substations);
- (c) Number of smart meters installed;
- (d) Commercial Systems (Billing, Collection and Customer Resource Management) of JBVNL upgraded;
- (e) Person-days of JUSNL and JBVNL staff participating in trainings;
- (f) Person-days of trainings provided to women employees of JUSNL and JBVNL;
- (g) Women employed as a percentage of total persons employed in construction activities (percentage);
- (h) Establishment of sexual harassment prevention cell in JBVNL;
- (i) Number of persons consulted during project implementation;
- (j) Grievances received that are addressed within two months of receipt (percentage)

## III. PROJECT DESCRIPTION

### A. Project Components

19. The proposed project would support the implementation of the 24x7 PFA plan in the state of Jharkhand by providing financial and technical support for investments in the expansion and strengthening of transmission network and institutional development of state T&D utilities to improve operational efficiency in the sector. The project is designed to have following components:

**Component 1: Intra-state transmission system strengthening (US\$ 396.2 million of which IBRD US\$ 274.5 million).** This component would support the state transmission utility, JUSNL, in making priority investments in the following two areas:

- a. Construction of new substations and associated transmission lines: This sub-component will strengthen the intra-state power transmission system to increase the system's capacity and reliability to transmit additional power (including renewable energy) within the state. These investments have been identified based on a detailed load flow analysis<sup>10</sup> undertaken by JUSNL and cleared by the Central Electricity Authority. The prioritization of investments has been done based on a phasing analysis. While investments at higher voltage levels (400 kV and 220 kV) are expected to be funded through PPP, this component would be financing the construction of new substations and transmission lines, primarily at 132kV voltage level (and a

<sup>10</sup> analysis includes short circuit studies, contingency analysis for n-1-1 contingency, and transient stability analysis





few 220kV voltage level components as well). A long list of twenty-five 132/33kV substations and associated transmission lines (approximately 2000 circuit km) have been identified to be financed under this sub-component.

- b. Strengthening scheduling, dispatch and communication systems:* This sub-component will support JUSNL in setting up systems for strengthening the State Load Dispatch Centre (SLDC) operations including financing Availability-Based-Tariff (ABT)<sup>11</sup> meters and software solutions for improving scheduling and dispatch functions which will be particularly important for integration of RE in the state grid. The component would also finance operational communication systems (including optical ground wire) both at the network level and within the utility.

*Climate change co-benefits.* These investments will help in reducing technical losses, improve reliability and help in integration of renewable energy into state grid. Component 1 is well aligned with the multilateral development bank (MDB) list of eligible climate mitigation activities under Category 1.3 “Measures to facilitate integration of renewable energy into grids ...new, expanded and improved transmission systems (lines, substations); new information and communication technology, smart grid..” and under Category 2.1 “Transmission and distribution systems”<sup>12</sup>.

**Component 2: Technical assistance for institutional development and capacity building of JUSNL (US\$ 13.8 million of which IBRD US\$ 9.7 million).** This component would continue to build upon the institutional development activities undertaken during project preparation and support implementation of following key activities:

- a. *Improving the organization structure and Delegation of Financial Powers (DoFP):* Using Trust funds from ESMAP and ASTAE, JUSNL is developing detailed recommendations on organization structure and manpower numbers (including suggestions on outsourcing where appropriate). Once these are approved by the Board of the company, this component would support the implementation of the structure. It would further support an updated DoFP for the organization.
- b. *Strengthening the project planning, procurement and contract management practices:* Through grant funds mobilized, the project has helped JUSNL in developing detailed procedures for procurement and contract management, documented as Works and Procurement Policy and Procedures (WPPP) document<sup>13</sup> and Standard Bidding Documents for domestic funded packages. This component would support in implementation of the WPPP and other interventions for improving project implementation
- c. *Strengthening FM framework:* This would include support for improving the FM and corporate governance practices, strengthening internal controls (improving internal audit functions), and automating the accounting in the company. JUSNL has already initiated advance action on these aspects (has purchased licenses for Tally ERP 9 and has initiated advance procurement action for appointing consultants to support in preparation and implementation of relevant manuals and IT solutions)
- d. *Automating internal business functions like inventory management, payroll management, human resource management etc.:* The component would support in the deployment of IT

<sup>11</sup> Availability Based Tariff meters

<sup>12</sup> <http://pubdocs.worldbank.org/en/266191504817671617/2016-joint-report-on-mdbs-climate-finance.pdf>

<sup>13</sup> WPPP would be presented to the Board of JUSNL after the decision on organizational re-structuring has been reached



solutions either as stand-alone systems or as integrated Enterprise Resource Planning (ERP) in the utility to provide better control and automation of business functions (including business process re-engineering wherever required)

- e. *Appointing Project Management Consultants (PMC) to assist in supervising and monitoring sub-projects under Component 1 of the project;*
- f. *Building staff capacity through training, workshops, knowledge exchange visits etc.*

**Component 3: Improving operational efficiency and developing institutional capacity of JBVNL (US\$ 69.2 million of which IBRD US\$ 25 million).** This component would build upon the institutional development activities undertaken during project preparation and support implementation of JBVNL's action plan to reduce AT&C losses, improve revenue management systems and reduce power procurement costs through following activities:

- a. *Sub-component 3.1: Smart metering for high value and urban consumers:* Support smart metering of high value consumers and consumers in selected urban geographies, to reduce AT&C losses and improve revenue realization. To begin with, the component would finance smart metering (including back-end System Integration) for around 50,000 high value consumers (with connected load of higher than 10kW) across the state of Jharkhand, and around 350,000 consumers in Ranchi (the capital of the state).
- b. *Sub-component 3.2: Upgrading the commercial IT systems and processes related to billing, collection and customer relationship management:* Together with financing the billing, collections and customer relationship management systems, this sub-component would also finance (i) Upgrading the Data Center and Data Recovery Center; (ii) Communication links required; (iii) Integration with other IT systems in the company (particularly SAP-ERP which is under deployment in JBVNL). As advance procurement, JBVNL has already appointed a PMC to prepare technical documents and supervise the implementation of the contracts for this work
- c. *Sub-component 3.3: Technical assistance for capacity building of JBVNL:* This sub-component would support the following activities:
  - i. Improving human resource management: Support to implement an improved organizational structure (already prepared through grant funds mobilized by the Bank), standardizing human resource practices (through preparation of employee manuals), and updating the DoFP. It would also include support to develop business review frameworks cascading objectives and results from organization to individual level
  - ii. Business process re-engineering especially related to commercial processes and capital project implementation.
  - iii. Support to optimize power procurement costs (including RE purchases) by deploying a software tool and setting up related business processes.
  - iv. Strengthening FM framework: This would include support for improving the FM and corporate governance practices and strengthening internal controls (improving internal audit functions) in the company. *JBVNL has already initiated advance action on these aspects.*
  - v. Building staff capacity through training, workshops, study tours etc.



*Climate change co-benefits.* The activities towards smart meters, commercial system improvement and IT systems upgrade which will help in AT&C loss reduction, under Component 3 are well aligned with the MDB list of eligible climate mitigation activities under Category 9.1 “Support to national, regional or local policy, through technical assistance or policy lending”.

20. As noted in the previous sections and demonstrated by advance procurement actions undertaken by the utilities, GoJ has planned to leverage the proposed project to build institutional capacity of its T&D utilities, beyond just financing of assets. In transmission, the current focus is to put in place systems and processes to execute a large capital expenditure program, set-up robust communication infrastructure, and strengthen the SLDC to facilitate RE deployment and support its integration in the grid. At the same time, the current focus in distribution sub-sector is to further automate and integrate the commercial and business processes to improve transparency and governance of utilities, improve operational efficiency and integrate RE in the portfolio. These changes are expected to be sustained over longer term by clearly defined roles and responsibilities (under new organizational structures) backed by institutionalizing systematic business review methodology. During implementation, the World Bank will be closely involved on the further development and implementation of the technical assistance components.

21. The proposed operation is consistent with the World Bank’s Maximizing Finance for Development (MFD, or ‘Cascade’) approach to development finance since (i) the state is already leveraging commercial and private sector financing in the areas feasible (generation and transmission at higher voltage levels) and the proposed project plugs the investment gap where commercial financing may not be readily available; (ii) a strengthened transmission network will facilitate investment in upstream generation segment (including RE) through commercial sources of financing and (iii) capacity building and institutional strengthening of transmission and distribution utilities will lower investment risk and reduce the cost of private capital to Jharkhand’s power sector and will encourage private investment.

**B. Project Cost and Financing**

22. The project will be financed through the Investment Project Financing (IPF) instrument. The GoI and GoJ has chosen to denominate the loan in U.S. dollars. The GoI and GoJ has opted for a variable spread option for this loan. Loan agreement will be signed with GoI, and the World Bank loan will be passed on to GoJ on similar terms and on-lent to the project implementing agencies (JUSNL and JBVNL). Further, there will be project agreement among GoJ and the project implementing agencies and the World Bank. Lastly, a Subsidiary Agreement would be signed between GoJ and JUSNL and JBVNL to support the implementation of the project.

**Table 1: Project Cost and Financing Summary (All figures in US\$ million)**

Project Components	Project Cost	IBRD Financing	Trust Funds	Counterpart Funding
Component 1: Intra-state transmission system strengthening	396.2	274.5	-	121.6
Component 2: Technical assistance for institutional	13.8	9.7	-	4.2



development and capacity building of JUSNL				
Component 3: Improving operational efficiency and developing institutional capacity of JBVNL	69.2	25.0	-	44.2
<b>Total Costs</b>	479.2	309.2	-	170.0
Total Project Costs	479.2	309.2	-	170.0
Front End Fees	0.8	0.8	-	-
<b>Total Financing Required</b>	480.0	310.0	-	170.0

### C. Lessons Learned and Reflected in the Project Design

23. The project builds on the lessons learned from the World Bank’s long-term engagement with POWERGRID and from the World Bank’s experiences in state level projects in India in Andhra Pradesh, Haryana, North-East Region, Rajasthan, West Bengal, and Maharashtra and GoI’s R-APDRP<sup>14</sup> program.

24. The first phase of an engagement should seek to help secure an improvement in the sector’s technical performance and at the same time build traction for a more ambitious reform program, which will ultimately be implemented once the ownership of and commitment for reform by the state government increases. Up-front visible improvements in the quality of power supply and customer service are important for fostering a pro-reform constituency and building stakeholder consensus for reform.

25. The implementation of the R-APDRP is in different stages in the various states but one common learning is that even though investments have been made in the information and communication technology (ICT) systems, these technologies are not being fully utilized by the utilities. Further the utilities are dependent on a third party for updating the software and feeding and updating system data. This indicates that it is important to focus on the softer aspects of running successful ICT systems like training of key personnel, building a strong IT skill set and most importantly, developing an IT Roadmap integrated with business needs followed by putting in place operations integrated with IT applications.

26. The project design has also benefitted from lessons from other World Bank-funded projects located outside South Asia such as the Vietnam Distribution Efficiency Project (P125996), and Electricity Supply Accountability and Reliability Improvement Project in the Kyrgyz Republic (P133446). The key lessons incorporated into the project design are (a) advanced project preparation, including bidding documents for procurement of goods and works, is important to speed up project implementation; (b) project design must ensure rapid start-up; to ensure this, subprojects that meet the defined readiness criteria should be taken up first while action on other subprojects is initiated simultaneously to meet the

<sup>14</sup> Restructured Accelerated Power Development and Reform Program: A centrally sponsored program for IT enablement of distribution sector and strengthening of distribution network



readiness criteria; (c) social and environmental requirements need to be incorporated into contract design and project implementation including adding appropriate clauses to the bidding document; (d) adequate implementation monitoring and evaluation (M&E) systems need to be set up to keep the project on track; and (e) adequate flexibility needs to be built in the project design to allow resources to be moved across subprojects.

27. Given the above learning, the project will initially focus on operational reforms creating operationally efficient utilities and business centers, capable of providing reliable supply of electricity to their customers. This is in accordance with the state government's strategy of balancing the twin objectives of providing adequate, reliable, and affordable 24x7 power to its citizens, and facilitating sustainable operations of its T&D utilities. The Project will also develop the building blocks for ongoing policy dialogue, and potential longer-term policy reforms.

## **(i) IMPLEMENTATION**

### **A. Institutional and Implementation Arrangements**

28. The project will be implemented in the state of Jharkhand, by two state-owned but legally separate entities/companies — JUSNL and JBVNL - referred to as the Implementing Agencies (IAs). The IAs will implement the project based on the Loan Agreement and Project Agreement that will be signed for the project.

29. The two IAs have set up dedicated Project Implementation Units (PIUs) to implement the project. This does not imply that the project would be ring-fenced from the IAs broader organization. Within the existing departmental structure (procurement, finance, etc.), the IAs will have designated individuals with clear responsibility for dealing with all issues related to the project.

30. All the sub-projects envisaged under Component 1 are being designed, procured, and implemented by JUSNL. Contractors engaged through national or international competitive bidding will carry out the supply and installation works. To ensure that JUSNL develops the capacity required to operate and maintain the assets created through this project, a PMC will be engaged during project implementation to work with JUSNL officials in implementing the schemes and thus help them develop an understanding of the technical and operational requirements of the assets created. This will also help enhance the technical capacity of JUSNL which will support them in carrying out the Operations & Maintenance (O&M) of assets created under the project.

### **B. Results Monitoring and Evaluation**

31. Monitoring and evaluation (M&E) mechanisms have been established at the project and entity level. As mentioned earlier, PMC's would be appointed to monitor the progress on the field (especially for investments under Component 1). The PMC and the PIUs will provide quarterly physical progress reports, audited financial statements (within six months of the end of each financial year), and other such information as the World Bank may reasonably require. Because of the nature of the contracts awarded under the project will be primarily turnkey supply and installation (under Component 1), several activities will be monitored automatically upon completion of milestones such as delivery of material, erection, commissioning etc.



32. Similarly, activities under Component 3 involve deployment of technology solutions that are highly specialized in nature. PMC has already been hired (through advance procurement) for technical design, bid process management and implementation supervision of activities under sub-components 3.1 and 3.2.

33. Lastly, JUSNL PIU is preparing an Operations Manual for the project (Component 1), where a group of monitoring indicators will be put in place to track the progress of the project – (i) information on results indicators (ii) information on additional monitoring indicators related to sub-steps per detailed project schedules. Additional data on project progress across various functional areas such as environment, social, technical and financial indicators will also be collected and reported on a periodic basis.

### **C. Sustainability**

34. There is strong ownership of the project at the level of the state government and the IAs, as the project supports investments identified under the PFA plan of the state. The investments have been prioritized and phased by load flow studies and cleared by CEA.

35. Environmental and social sustainability is facilitated through the adoption of environmental and social management framework (ESMF) by JUSNL. JUSNL has experience in the operations of the assets, and the O&M practices would be further strengthened under the technical assistance component of the project.

36. The subprojects identified under the project are economically and operationally sustainable, and analysis has been undertaken in the sub-project specific Detailed Project Reports (DPRs). In addition, the sustainability of the project will be ensured by continuous improvement in the operational, commercial, and financial performance of the IAs for which parallel and concurrent action will be taken under Component 2 and 3. JUSNL and JBVNL have identified a priority list of measures to be implemented which were recommended after the detailed diagnostic studies, and which are now being proposed for funding under Component 2 and 3. Although the IAs are incurring a loss now, the technical improvements in the utility systems and capacity strengthening initiatives, particularly around improvement in commercial and procurement processes, organizational restructuring and IT system, are expected to contribute toward putting them on the path to recovery and long-term sustainability. During the implementation period, the World Bank will continue the dialogue with all key stakeholders of the sector on the implementation of measures that will further improve the sector's financial performance over the long term. This prudent approach is based on the lessons from similar projects around the world.

### **D. Role of Partners**

NA

## **(ii) KEY RISKS**

### **A. Overall Risk Rating and Explanation of Key Risks**

37. The risk associated with 'Institutional Capacity for Implementation and Sustainability' is rated as 'High', given the weak institutional capacity of the T&D utilities (JUSNL and JBVNL). Achieving the objectives of PFA plan involve implementing a five-fold increase in annual capital expenditure, extending



connections to and metering three million consumers. This requires substantial capacity building as well as a transformation of institutional culture. To mitigate these risks, the project includes technical assistance components to build the institutional capacity of the utilities. As discussed earlier, this starts with the project supporting the utilities in carrying out a strategic human resource planning exercise, and recommending structures with adequate and separate focus on projects and commercial aspects at both the corporate and field level. The utilities are redesigning their processes in project implementation and commercial operations, which would be suitably scaled-up under the project. However, recognizing that these changes will require time to take effect, the project is developing an operations-manual with re-defined and simplified processes to execute works under the World Bank funded project (which provides role clarity and faster decision making). Lastly, PMCs will be appointed to support the utilities in implementing large and complex projects.

38. Stakeholder risk has been rated as ‘Substantial’ due to the need to align incentives of multiple stakeholders (utility staff, utility management, political leadership, consumers and regulator) to achieve operational efficiency improvement the sector. The sector faces regulatory risk from the absence of cost-reflective tariffs in both transmission and distribution sub-sectors, leading to financial distress. Recognizing this risk, the utilities have submitted and received the regulatory approval for business plans for the period FY17 to FY21. Further, based on tariff petitions filed by the utilities, the transmission tariff has been raised to INR0.25/kWh in February 2018 (vs. INR0.19/kWh earlier). Similarly, the tariff for the distribution company has also been raised by almost 43% in April 2018. Lastly, GoJ has taken-over the past liabilities of the JBVNL under UDAY providing financial relief to the Discom.

39. The fiduciary risk for this Project has been rated as “Substantial”. Financial management risk is rated “Substantial” as auditors of the IAs have reported internal control weaknesses. Based on a detailed corporate governance and financial accountability (CGFA) assessment of JUSNL and JBVNL, an action plan has been prepared and will be agreed for implementation. (*both the utilities have initiated advance procurement on certain actions in the plan*). Procurement risk is rated “Substantial” as the IAs need to improve their internal practices dealing with procurement and contract management, record keeping, complaint handling processes etc. The project is developing an operation manual to mitigate some of these risks.

40. Key social safeguard risks include securing lands for new substations and securing Right-of-Way (RoW) for new transmission lines, while key environmental risks are (i) clearance/felling of trees within the RoW for transmission lines and substation sites, (ii) any incidental impacts on local fauna, (iii) leakage of hazardous material including e-wastes, and (iv) safety of workers. However, these risks are expected to be mitigated through various safeguard measures detailed later in the document.

41. Given the weak institutional capacity of the IAs, and their first engagement with a multilateral agency, the overall risk for this project has been rated as 'Substantial'. The Component 2 and 3 on technical assistance for institutional development are expected to mitigate this risk.

## (iii) APPRAISAL SUMMARY

### A. Economic and Financial Analysis



42. **Economic rate of return.** The proposed project is economically viable. As part of the state's PFA program, project investments will bring substantial economic benefits to Jharkhand's power sector by helping improve electricity access, displacing expensive diesel based self-generation, meeting growing demand and improving the efficiency of the power system. The baseline economic rate of return (ERR) of the 'with-project' scenario is 31.2 percent (NPV US\$12.9 billion), using average electricity tariffs as conservative estimates of willingness-to-pay for electricity in Jharkhand. The additional energy supplied because of the T&D investments accounts for 92 percent of the benefits and the reduction in technical losses accounts for the remaining benefits. The analysis considers direct project costs as well as associated investments in higher voltage transmission (funded by the state government and PPP) and downstream distribution (funded by state and central government) needed to deliver electricity to consumers, and thus derive benefits of the project. See Annex 4 for more information on the methodology, assumptions and the results.

43. **Greenhouse gas (GHG) accounting.** GHG accounting indicates that the project would lead to reduction in emissions of 12.6 million tons of CO<sub>2</sub>e over the life of the project<sup>15</sup>. The reduction in GHG emissions is primarily because of reduction in technical losses from the implementation of the Project. ERR with environmental benefits is 36.4 percent

44. **Sensitivity analysis.** Sensitivity analysis shows that the project ERR is robust to unfavorable outcomes of input variables such as Commercial Operation Date (COD) delay, increase in capital cost and additional electricity supplied (see Table 2 for summary of switching values<sup>16</sup>).

**Table 2: Switching Values**

Variable	Base Case	Switching value	Comments
Electricity Supply	6866 GWh	3090 GWh	Project will meet the hurdle rate if the additional electricity delivered is at least 45 percent of the planned 6866 GWh.
Capital Cost	US\$1.4 billion	US\$9.4 billion	Cost variations of this magnitude are highly unlikely given that the technology associated with transmission lines are well established.
COD Delay	0	6 years	Commercial Operation date of the project would have to be delayed significantly for project ERR to fall below the hurdle rate

45. **Financial Analysis:** A detailed entity level financial analysis has been undertaken for the transmission utility (JUSNL). According to the existing tariff regulations in Jharkhand, JUSNL gets reimbursed for the expenditure incurred and gets a return on equity of 15.5 percent, through wheeling charges (to be paid by JBVNL). However, the regulator (JSERC) has in the past not allowed full cost recovery to JUSNL in the wheeling charge (even though it recognized the gap between the costs and the revenue that can be realized). The financial analysis suggests that the transmission company will need wheeling charges of INR 0.40/kWh to breakeven in FY24 (vs. INR 0.25/kWh announced recently in February 2018) and make small profits thereafter. This assumes 30 percent equity contribution from GoJ to the World Bank funded project and capital expenditure financing from GoJ or domestic financial

<sup>15</sup> GHG accounting of the Project follows the approach laid out in World Bank's 2015 Guidance Manual on Greenhouse Gas Accounting for Energy Investment Operations

<sup>16</sup> Switching value is defined as the value of the input parameter at which the ERR falls below the hurdle rate of 10%



institutions at interest rate of 9 percent for all other schemes. The analysis also assumes a maintenance capex from FY23 onwards (once the assets start getting commissioned).

**Table 4: JUSNL’s financial analysis summary**

	<b>FY17 (P)</b>	<b>FY18</b>	<b>FY19</b>	<b>FY20</b>	<b>FY21</b>	<b>FY22</b>	<b>FY23</b>	<b>FY24</b>
Wheeling Charges assumed in the analysis (INR/kWh)	0.19	0.20	0.25	0.28	0.30	0.33	0.37	0.40
EBITDA (INR million)	121	137	224	291	390	517	679	889
Profit before taxes (INR million)	-1,070	-1,430	-1,351	-1,815	-2,006	-1,716	-855	528

*Note: P=provisional*

## B. Technical

46. The project design follows well-proven designs and technologies and replicates established and efficient practices. JUSNL has designed the project’s investments under Component 1 based on comprehensive planning and an appropriate level of system studies using expert agencies. The overall investment plan has also been cleared by the CEA. While implementation capacity of JUSNL is weak, it is mitigating the risk by engaging consultants (firm) to assist them in project preparation (including bid process management till contract award) using their own funds and later, plans to use loan funds to engage a PMC for assisting in smooth and efficient implementation. Investments proposed to be implemented by JBVNL under sub-components 3.1 and 3.2 are of a higher technical complexity than what has been implemented by the company earlier. Hence, JBVNL has appointed a PMC (firm) to assist in preparation of design documents, bidding document, bid process management and supervision during implementation.

## C. Financial Management

47. The FM arrangements for the project include budgeting at state government, JUSNL and JBVNL end using the existing processes. Accounting would be carried out at the companies using the software systems (such as Tally in JUSNL or the ERP system being implemented in JBVNL) and chart of account created for the project. The internal and external audit of the project will be carried out by the firms selected on a competitive basis and as per Terms of Reference (ToR) agreed with the Bank.

48. A review of the corporate governance and financial management arrangements at JUSNL suggests that as a result of the corporatization, while some of the initial arrangements have been put in place (company incorporated, appointment of auditors and company secretaries in place), others are still work-in progress (audit committee is not functional, cadre division for some staff yet to be completed, etc.). The audit opinion on the first annual financial statements of JUSNL for FY 2013/14 is a “disclaimer opinion” and for (FY16/17) was “qualified”, highlighting significant inadequacies of the existing accounting system, inadequate internal controls and non-compliance with the prescriptions on internal audit, cost audit and secretarial audit. A detailed corporate governance and financial accountability (CGFA) assessment of JUSNL and JBVNL has been undertaken as part of the project preparation. Based on the assessment, an action plan has been prepared and will be agreed for implementation.

## D. Procurement



49. All procurements under the project will be carried out in compliance with the latest applicable World Bank's procurement regulations and policies for IPF (Procurement Regulations for IPF Borrowers, July 2016). All procurements under the project shall be done through e-procurement (National Informatics Center [NIC] platform which has been assessed by the World Bank). At this stage, it is envisaged that all works/turnkey contracts above US\$10 million and goods/non-consulting contracts above US\$2 million will be subject to prior review. Similarly, selection process to hire consultant firms above US\$1 million will be prior reviewed by the World Bank. The World Bank will review the terms of reference (ToR) for the selection of the consulting firm. Special methods for procurement or selection are not required in this operation at this stage. The World Bank will carry out the post procurement review every twelve months of implementation. This operation will be subject to procurement supervision on basis of independent post-review procedures as well. The projects implementation arrangements in terms of procurement aspects will be clearly reflected in the project's Operational Manual.

50. **Procurement risk assessment.** A procurement assessment of the IAs, JUSNL and JBVNL, carried out for the project has assessed the procurement risk for this operation as 'Substantial'. Most of the issues/risks concerning the procurement function for implementation of the project have been identified and include: (a) lack of familiarity of IA's staff with procurement procedures in accordance with the World Bank's procurement policies; (b) lack of comprehensive internal procurement manuals and hence, the need to improve the set of procedures to ensure fairness and transparency in procurement process ; (c) need for improvement in record keeping; (d) strengthening the procurement review function and resolution of complaints; and (e) of need for building capacity of the staff in procurement and contract management.

51. The set of proposed mitigation measures for the project include: i) training of procurement staff; ii) hiring of consultant (firm) experienced on Bank's financed project aiming to prepare documents, and to strengthen IAs' procurement capacity; iii) streamlining contract management system to ensure a satisfactory contract performance needed by the project; iv) adopting clear and fair complaint mechanism and disseminating among bidding community; v) improving document filing; and vi) adopting best practices in advertisement of procurement opportunities and increasing the competition.

52. **Project procurement strategy.** According to the requirement of the Regulations, a draft Project Procurement Strategy for Development (PPSD) has been prepared. Extensive market analysis has been carried out for different packages of procurement, and decisions on packages and lots are made to ensure adequate participation of bidders. Consultancy contracts are also framed based on market research. Based on the draft PPSD, the Procurement Plan has been prepared to set out the selection methods to be followed in the procurement of goods, works, and non-consulting and consulting services financed under the project.

## E. Social (including Safeguards)

53. **Issues and Impacts.** Communities are expected to benefit from the project because of upcoming additional employment opportunity during construction phase and project's contribution to increasing availability of power and resultant provision of power supply especially to vulnerable groups such as rural communities and the urban poor. Issues related to construction of substations may include loss of (i) private land; (ii) livelihood; (iii) common property resources; and (iv) access to property; etc. Based on initial assessment of the proposed sub-projects, although many land parcels are already available with JUSNL, there is requirement for securing approximately 30 acres of private land for four substations in later phases of the project and there could be possible land acquisition for sub-projects not identified yet.



Issue during construction of transmission lines relate to crop damages and securing RoW, leading to interface with the local communities. The World Bank's OP 4.10 on Indigenous People has also been triggered as the state has substantial tribal population and sites of substations and transmission lines, pass through tribal areas.

54. The project will be implemented across the state of Jharkhand and as some substation locations and exact transmission line alignments are yet to be finalized, a framework approach has been adopted for the project. JUSNL has prepared an Environment and Social Management Framework (ESMF) for the project, which is to be followed by subprojects already identified and ones to be later identified. Preparation of the ESMF is based on social profiling of candidate sites. The ESMF provides guidelines to screen the potential negative impacts and likely benefits of the project, and also provides guidelines for preparation of Environment and Social Impact Assessment (ESIA), if applicable. The ESMF is to be applied to all sub-projects under this project and includes the following: (i) Resettlement Policy Framework (RPF); (ii) an Tribal Peoples Planning Framework (TPPF); (iii) a Gender Development Framework (GDF); (iv) Grievance Redress Mechanism (GRM); (v) specific procedures on public consultation and disclosure; (vi) monitoring arrangements covering subproject selection, appraisal, and implementation; (vii) schedule, procedures, and ToRs for periodic social audits; and (viii) a plan to augment the institutional capacity of IAs to manage project-related social issues.

55. Public consultations were held with a range of stakeholders during the preparation of ESMF and a state level consultation was also conducted by JUSNL on September 22, 2017 at Ranchi. The ESMF has been disclosed both in the country on September 11, 2017 as well as on the World Bank's website on December 27, 2017.

56. As part of the ESIA's, JUSNL has prepared the Social Impact Assessment (SIA) and Social Management Plan (SMP) for first thirty percent of schemes. The SIA's have been disclosed on JUSNL's website and the World Bank's website. According to SIA reports, the transmission line is passing through tribal areas and JUSNL has prepared a draft Tribal Peoples Development Plan (TPDP) for first thirty percent of schemes and the TPDP will be finalized before start of construction work. Various ESIA's for the first phase of the project have been disclosed in-country and on World Bank's website.

57. Although JUSNL has no previous experience of working with the World Bank, it still has knowledge and experience of addressing social issues as it has implemented, or is currently implementing, several similar projects with the state government funding. Towards mainstreaming social and environment aspects, the IA will appoint safeguards focal points, while the project will also support building dedicated social capacity in the IA. Further, for managing issues regarding RoW, JUSNL shall prepare a Compensatory Plan for Temporary Damages (CPTD) for transmission lines after the contractors have been mobilized.

58. **Gender:** The female work participation rate in the state is low at 29 percent with only 33 percent of the female workers being main workers and 67 percent being marginal workers. The female literacy rate is only 56 percent. The enrolment of girl students at primary and upper primary levels remained stagnant at 50 percent, according to the state's economic survey. The sex ratio of women is 941 to 1000 males. Maternal mortality in Jharkhand is very high though in the last few years it has shown a decreasing trend. It is well known that women have a substantial role as household energy managers, in general and agricultural producers in rural areas. It is also highly likely that women can benefit a lot from the project as it is expected to result in increased access to modern energy thereby reducing drudgery and providing opportunities that may lead to improvement in productivity and livelihoods. At the household level,



affordable and clean energy sources for lighting, food processing, cooking, and heating will significantly contribute to improved health and reduced drudgery of women and children.

59. The following gaps have been identified as part of preparation of a Gender Action Plan (GAP) for the project: (i) limited information regarding the female labor force participation in power transmission sector projects, (ii) improving the skillsets of women employees in the IAs, (iii) implementing the Sexual Harassment of Women at Workplace (prevention, prohibition, redressal) Act, 2013 [referred to as the 'POSH' act]. To mitigate the gaps, under the project the IAs would (i) monitor the level of female labor participation by the contractors during construction related activities and monitor the implementation of labor management plan by the contractors, (ii) develop capacity building plans for women employees in the IAs, and (iii) implementation of some aspects of the POSH act.

60. **Grievance Redress Mechanism:** A systematic Grievance Redress Mechanism (GRM) will be setup for the project which will help in resolving grievance/disputes related to the project. The system will be available to all stakeholders including affected/displaced persons to raise any concerns/grievance/disputes in the project and seek redressal of the same thereby ensuring effective participation. A three-tier grievance mechanism has been considered in the project and would be active for the entire life of the project. If the grievance/ complaint is not resolved at Grievance Redressal Committee (GRC) or the complainant is not satisfied with the solution offered by the GRC, the person may approach the Court of Law. All costs involved in resolving the complaints/grievances (meetings, consultations, communication and reporting/information dissemination) will be borne by the project; while costs related to escalation of grievances to Court of Law will be met by JUSNL. Cost estimates for grievance redress are included in resettlement cost estimates.

## F. Environment (including Safeguards)

61. The project includes construction of new substations and transmission lines throughout the state under Component 1 of the project. Potential adverse environmental impacts during the implementation stage would include (i) clearance/felling of trees within the RoW of transmission lines, (ii) any incidental impacts on local fauna, localized and short-term drainage issues during substation construction, and (iii) health and safety of workers and potential residents. Similarly, the operational phase impacts could arise from indiscriminate use and disposal of electrical wastes, transformer oil, e-waste and SF6 gas leakage (used in some substation equipment). Most of these environmental impacts are manageable and are likely to be short-term, modest, site-specific and reversible in nature. Mitigation measures can be implemented to reduce the negative impacts of most of these interventions. Thus, the project has been assigned an environmental "Category B". Further, in accordance with World Bank environmental safeguards policies, OP 4.01 Environmental Assessment and OP/BP 4.36 Forest Policies have been triggered.

62. As discussed in sections above, ESMF has been prepared, disclosed and consulted. The ESMF will guide the preparation of the Environment Impact Assessment (as part of ESIA) for transmission line, substations and a site-specific Environment Management Plan (EMP). The ESMF incorporates a detailed ToR of the ESIA. In addition, a generic ESMP has also been prepared on project level as part of the ESMF, while site specific ESMPs have been prepared for the first 30 percent of the sub-projects identified. The ESIAs include indicative costs for environmental management. The ESMF also includes provisions for training the staff of JUSNL in environmental aspects at the corporate level as well as in the field. The ESIA and other safeguards studies and tools will be subject to consultation and review by the World Bank. The ESIA for other sub-projects (beyond first 30 percent) will be undertaken once exact locations are identified and finalized.



63. The JUSNL PIU, along with field teams, shall be responsible for the implementation of ESMF/ESMP provisions. This will be undertaken through integration of the environmental management requirements within contract documents, and day-to-day monitoring of works on-site during implementation (through JUSNL staff and PMC).

#### **G. World Bank Grievance Redress**

64. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, because of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit <http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service>. For information on how to submit complaints to the World Bank Inspection Panel, please visit [www.inspectionpanel.org](http://www.inspectionpanel.org).



VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: India

Jharkhand Power System Improvement Project

Project Development Objective(s)

The project development objectives (PDO) are to increase the transmission capacity of electricity network in the state of Jharkhand and strengthen the institutional capacity of state-owned power transmission and distribution utilities.

Project Development Objective Indicators

Indicator Name	DLI	Baseline 2018	Intermediate Targets						End Target 2024
			1	2	3	4	5	6	
<b>Increase the transmission capacity of electricity network in the state of Jharkhand</b>									
Amount of electricity wheeled through JUSNL network for supply to consumers in the State (Gigawatt-hour (GWh))		9,705.00	10,676.00	11,743.00	12,917.00	14,209.00	16,340.00	18,792.00	18,792.00
Increase in transformation capacity of the power transmission network in the state under the project (Kilovolt-		0.00	0.00	0.00	0.00	800,000.00	1,000,000.00	2,400,000.00	2,400,000.00



Indicator Name	DLI	Baseline 2018	Intermediate Targets						End Target 2024
			1	2	3	4	5	6	
Amphere(KVA))									
<b>Strengthen the institutional capacity of state-owned power distribution utility</b>									
Percentage of consumers serviced through upgraded commercial system (Percentage)		0.00	0.00	0.00	25.00	75.00	90.00	90.00	90.00
<b>Strengthen the institutional capacity of state-owned power transmission utility</b>									
Financial, Procurement and Contract management framework strengthened in JUSNL (Text)		AFS manually prepared and limited standardization in procurement and contract management practices	SBD for main types of procurement prepared and approved by BoD	WPPP document prepared and approved by BoD	DoFP revised and approved by BoD	Accounting system computerized and Annual Financial Statements prepared on basis of same			FM, Procurement and Contract management framework strengthened

**Intermediate Results Indicators by Components**

Indicator Name	DLI	Baseline 2018	End Target 2024
<b>Component 1: Intra-state transmission system strengthening</b>			
Transmission lines constructed under the project (circuit km) (Kilometers)		0.00	2,000.00
Number of transmission substations constructed under the project (Number)		0.00	25.00
Women employed as a percentage of total persons employed in		0.00	5.00



Indicator Name	DLI	Baseline 2018	End Target 2024
construction activities; (Percentage)			
Grievances received that are addressed within two months of receipt (Percentage)		0.00	90.00
Number of persons consulted during project implementation (Number)		0.00	500.00
<b>Component 2: Technical assistance for institutional development and capacity building of JUSNL</b>			
Person-days of JUSNL and JBVNL staff participating in trainings (Number)		0.00	500.00
Person-days of trainings provided to women employees of JUSNL and JBVNL (Number)		0.00	30.00
<b>Component 3: Improving operational efficiency and developing institutional capacity of JBVNL</b>			
Number of smart meters installed (Number)		0.00	300,000.00
Commercial Systems (Billing, Collection and Customer Resource Management) of JBVNL upgraded (Text)		Existing system has limited capacity	Upgraded commercial system has been deployed
Establishment of sexual harassment prevention cell in JBVNL (Yes/No)		No	Yes

**Monitoring & Evaluation Plan: PDO Indicators**

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Amount of electricity wheeled through JUSNL network for supply to consumers in the State		Annual	Reports of the CEA (like Load Generation Balance		JUSNL and JBVNL





			Report), state utility reports, Eastern Region Load Dispatch Centre reports		
Increase in transformation capacity of the power transmission network in the state under the project		Annual	Progress reports		JUSNL
Percentage of consumers serviced through upgraded commercial system		Annual	Progress reports		JBVNL
Financial, Procurement and Contract management framework strengthened in JUSNL		Annual	Progress reports		JUSNL

**Monitoring & Evaluation Plan: Intermediate Results Indicators**

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Transmission lines constructed under the project (circuit km)		Annual	Progress reports		JUSNL
Number of transmission substations constructed under the project		Annual	Progress reports		JUSNL
Women employed as a percentage of total persons employed in construction activities;		Annual	Progress reports		JUSNL



Grievances received that are addressed within two months of receipt		Annual	Progress reports		JUSNL
Number of persons consulted during project implementation		Annual	Progress reports		JUSNL
Person-days of JUSNL and JBVNL staff participating in trainings		Quarterly	Progress reports	Progress reports	JUSNL and JBVNL
Person-days of trainings provided to women employees of JUSNL and JBVNL		Quarterly	Progress reports	Progress reports	JUSNL and JBVNL
Number of smart meters installed		Quarterly	Progress reports	Progress reports	JBVNL
Commercial Systems (Billing, Collection and Customer Resource Management) of JBVNL upgraded		Quarterly	Progress reports	Progress reports	JBVNL
Establishment of sexual harassment prevention cell in JBVNL		Annual	Progress Report	Reporting by JBVNL	JBVNL



## ANNEX 1: DETAILED PROJECT DESCRIPTION

COUNTRY : India

### Jharkhand Power System Improvement Project

#### A. Introduction

1. **Jharkhand is one of the states with the lowest electricity access in India.** Although Jharkhand is endowed with rich mineral resources and is a potential hub for power generation, it has the lowest levels of rural electrification, as only 45 percent of the rural households have been electrified. Around 3 million households or close to half the state's population were without access to electricity at the end of December 2017.<sup>17</sup>

2. **In 2014, the state completed unbundling of its vertically integrated utility into successor generation, transmission and distribution companies.** The vertically integrated JSEB was unbundled into four independent companies - JUVNL or the holding company; JUUNL or the generation company; JUSNL or the transmission company and SLDC; and JBVNL or the Distribution Company.

3. **The state distribution company (JBVNL) shares space in Jharkhand with four other utilities.** These include the DVC, a Central Public-Sector Undertaking, which has presence across generation, transmission and distribution segments but distributes electricity only to industrial customers in about eight districts of Jharkhand<sup>18</sup>, JUSCO, a private distribution licensee which operates in the town of Jamshedpur, Tata Steel and SAIL (both of which serve consumers only within the perimeters of their steel factories). JBVNL accounted for 46 percent of the electricity distributed in the state of Jharkhand in FY15 followed by DVC (34 percent), Tata Steel (17 percent), JUSCO (2 percent) and SAIL (1 percent). However, in terms of geographical area, the state owned Discom, JBVNL, has the largest mandate of distributing electricity to all twenty-four districts in the state<sup>19</sup>. These utilities are regulated by Jharkhand State Electricity Regulatory Commission (JSERC) which was established on August 22, 2002 and became operational from April 24, 2003.

#### B. Power Demand and Supply

4. **The state made rapid progress in closing the gap between peak electricity demand and supply in the state in FY16.** Having faced a persistent peak shortage of more than 10 percent between FY2011 and FY15, Jharkhand faced a zero-reported shortage in FY17. These figures do not consider network constraints and servicing all peak loads. The peak demand met by JBVNL in FY16 was about 1860 MW (including sales in DVC command area). Nonetheless, access to electricity continues to be an issue and around 55 percent households in rural areas were not connected to the grid in December 2017. Sales to domestic category of consumers in JBVNL accounts for about 55 percent of the total sales while sales to industrial consumers accounts for 30 percent. However, sales to domestic consumers (falling in the lowest tariff slab) are expected to increase rapidly with the increase in electricity access (Domestic

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<sup>17</sup> According to the Gol's Saubhagya dashboard.

<sup>18</sup> The state of Jharkhand has 24 districts

<sup>19</sup> Distribution of electricity to domestic consumers even in the DVC served areas (called DVC command areas) is undertaken by JBVNL



category sales increased by 22 percent in a single year from FY15 to FY16 vs only a 1 percent increase in industrial category sales).

5. **Improved availability of power in the region from plants owned by the central government and independent power producers has helped the state achieve lower demand supply deficits.** The effective capacity from state-owned generation plants in Jharkhand is only 217 MW. The remaining power is sourced from central sector power stations (including a large share bought from DVC) and independent power producers.

6. **To support rapid electrification in the state, electricity demand is expected to grow many folds reaching 5.6 GW by FY22.** The peak demand served by JBVNL is projected to reach around 4.2 GW in the same period.

7. **Jharkhand was one of the first states to sign the MoU for 24x7 PFA plan with GoI to ensure 24x7 power to all its consumers** and electricity access to all unconnected consumers in the next five years by FY19. To achieve this goal, a total investment of more than US\$ 3.5 billion, including a central financial assistance component to the tune of US\$1.2 billion, has been planned over a period of next five years till FY22 in the state of Jharkhand. The details of the plans in each of the sub-segment are discussed in the following sections.

### C. Generation Expansion Plan

8. **To meet the expected increase in demand, the state has already started implementing a generation expansion plan.** The generation capacity available to JBVNL will increase from 1.1GW in FY16<sup>20</sup> to more than 5.8 GW by FY22<sup>21</sup>. Most of this power is expected to be sourced from generation plants within the state by leveraging commercial financing through (i) Central sector companies, (ii) Joint Venture between the state generation company and a central sector company, NTPC<sup>22</sup>, and (iii) IPPs. By FY22, generation plants allocated to JBVNL are expected to export up to 1.4 GW of power to other states (excluding power available from IPPs). As can be seen from Table 1.1, against a demand of 4.2 GW in FY22, JBVNL is expected to have access to 5.8 GW and hence can trade the surplus.

**Table 1.1 – Projected generation capacity available to JBVNL**

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<sup>20</sup> Excludes the power served by DVC in its command area and excludes power sourced by DVC but sold by JBVNL in DVC command area

<sup>21</sup> Excludes the power served by DVC in its command area

<sup>22</sup> National Thermal Power Corporation



Particulars	Generation (MW)						
	2016	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
State Sector	217	719	719	817	817	817	3031
IPP/CPP	94	91	149	149	149	149	149
Import from Central sector	832	1203	1636	2648	3033	3413	2605
<b>Total</b>	<b>1143</b>	<b>2013</b>	<b>2504</b>	<b>3614</b>	<b>3999</b>	<b>4379</b>	<b>5785</b>

9. **Jharkhand has an ambitious plan to install about 1500 MW renewable energy (solar) capacity – or almost a third of the total installed capacity - by FY2022.** JBVNL has already decided to sign power purchase agreements for over ~600 MW of solar and wind energy.

**D. Transmission System Strengthening Plan**

10. **The existing inter-state transmission system in the region is adequate for meeting the existing demand of the distribution utilities in the state of Jharkhand.** The inter-state transmission network in state is owned and operated by the national transmission utility, POWERGRID which owns and operates substations with transformation capacity of 4,890 MVA and 4,587 circuit km of transmission lines at higher voltages (220 kV and above). POWERGRID is regulated by the Central Electricity Regulatory Commission (CERC) and follows the transmission planning criteria and grid code set by CEA. The inter-state transmission network is reliable as indicated by the system availability of 99.95 percent.

11. **However, the intra-state transmission system will need to be strengthened significantly to meet the growing demand in the state.** Even at existing restricted demand, the JUSNL network is already overloaded at several network points and fares poorly in terms of meeting contingency standards defined by the CEA. JUSNL currently owns and operates seven 220/132 kV substations, thirty 132/33 kV substations and 2,855 circuit km of associated transmission lines. The transformation capacity at 220 kV level is only 2000 MVA while at 132 kV level it is 2,228 MVA and needs significant augmentation to meet the 4.2 GW load expected to be transmitted by JUSNL in FY22. Further, another gap in the JUSNL network is that it does not have any presence in about eight districts which are part of the DVC command area thus limiting JBVNL’s ability to service loads in that area<sup>23</sup>. Recognizing this challenge, JUSNL has undertaken a detailed transmission system load flow study, including short circuit and transient analysis to prepare the investment plan for a reliable<sup>24</sup> transmission system capable of meeting peak demand in FY22. The load flow study included the following steps:

- a. Establishment of the base case for FY16 and its validation by comparing with actual SLDC data (within 95 percent accuracy);

<sup>23</sup> JBVNL, currently uses DVC’s transmission network in DVC command area to distribute electricity to non-industrial consumers. However, DVC network is overloaded and no augmentation is planned to transmit loads for non-industrial consumers

<sup>24</sup> n-1 contingency for entire network and n-1-1 contingency for critical elements



- b. Base case analysis to identify and suggest corrections for network constraints and reactive power management over immediate term and determine fault level for operational load flow;
- c. Detailed load flow studies for peak load conditions and light load conditions in FY22 along with various generation/load scenarios and prepare transmission investment plan till FY22;
- d. N-1 contingency analysis at all voltage levels, and N-1-1 contingency analysis for critical network
- e. Detailed short circuit analysis, both three-phase to ground and single line to ground fault; and
- f. Detailed transient stability study according to the grid code.

12. The analysis shows that the JUSNL network needs to be quadrupled to deliver 4.2 GW of demand required to meet the state’s PFA objectives by FY22. The breakdown of number of substations and transformation capacity addition required at various voltage levels to transmit the load is provided Table 1.2 and Table 1.3 below. Total financial outlay for executing these schemes is estimated at upwards of INR 100 billion (of which INR 10 billion is already incurred).

<b>Table 1.2: Expected yearly transformation capacity addition required by JUSNL at various voltage levels</b>									
S. No	Voltage level (kV)	Existing on May- 2016	FY17	FY18	FY19	FY20	FY21	FY22	Total capacity by end of FY22
1	400/220	-	-	1,260	3,000	-	-	1,000	5,260
2	220/132	2,000	300	1,200	3,000	-	1,200	1,800	9,500
3	132/33	2,795	570	500	3,900	400	500	600	9,265
<b>Total</b>		<b>4,795</b>	<b>870</b>	<b>2,960</b>	<b>9,900</b>	<b>400</b>	<b>1,700</b>	<b>3,400</b>	
JUSNL load in MW		1,068	1,813	2,152	3,005	3,351	3,780	4,193	

Source: JUSNL load flow studies

<b>Table 1.3: Expected yearly substations addition required by JUSNL at various voltage levels</b>									
S. No	Voltage level (kV)	Existing on May- 2016	FY17	FY18	FY19	FY20	FY21	FY22	Total number by end of FY22
1	400/220	-	-	2	3	-	-	1	6
2	220/132	6	1	4	10	-	4	6	31
3	132/33	30	6	5	39	4	5	6	95
<b>Total</b>		<b>36</b>	<b>7</b>	<b>11</b>	<b>52</b>	<b>4</b>	<b>9</b>	<b>13</b>	<b>132</b>

*\*note: If any substation is having more than one transformation level, then each transformation level is counted separately. Example 220/132kV in 400/220/132 kV is counted separately as 2 numbers*

Source: JUSNL load flow studies



13. JUSNL recognizes the challenges with implementing such a massive transmission capacity expansion – because of lack of the financial resources and project designing and implementing capabilities – and has adopted the following multi-pronged approach for undertaking these investments:
- a. **Collaboration with POWERGRID:** JUSNL has signed an agreement with POWERGRID to implement construction of 10 substations and about 26 transmission lines (with an estimated cost of about INR 10 billion) on its behalf and hand over the commissioned assets to JUSNL for O&M. POWERGRID has already awarded these sub-projects to various EPC contractors and these are in various stages of completion.
  - b. **Undertaking PPP through Tariff Based Competitive Bidding:** GoJ has decided that all new investments at 400 kV and 220 kV level would be undertaken through Tariff Based Competitive Bidding wherein the private developer would be competitively selected to build, own, operate and maintain these assets. JUSNL plans to implement about INR 50 billion worth investments through this route and has already invited expressions of interest from potential developers.
  - c. **Self-executing schemes under state financing plan (in DVC command area):** For building its transmission network in the eight districts of DVC command area (where JUSNL does not have its network), JUSNL would be implementing schemes on its own through funding from the state government budget, with an estimated cost of about INR 12 billion. During the project preparation phase, the World Bank has used grant funds to support JUSNL in improving its procurement, contract management, financial management and human resource practices, towards better execution of these schemes.
  - d. **Self-executing schemes under World Bank funding:** Lastly, JUSNL would be executing most of the transmission network strengthening schemes at the 132kV level under the World Bank funding with an estimated cost of about INR 25 billion. In addition to funding investments, the World Bank funding would also build upon the support provided during preparation phase and assist JUSNL in strengthening internal business processes related to project planning and implementation, inventory management, Financial and HR management, automating them through ERP systems and supporting connectivity between different offices and substations of JUSNL. It would also strengthen the SLDC by automating its functions to better meet Regulatory and Legal requirements. The support to SLDC would include installation of ABT<sup>25</sup> meters, software to acquire, analyze and process meter data and generate reports<sup>26</sup>, computer hardware, and design of an interactive website for receiving and processing Open Access applications, displaying system parameters, energy schedules, generator data and so on.

## E. Distribution System Strengthening Plan

14. **The distribution system in Jharkhand faces significant challenges.** JBVNL's system comprises 33/11 kV sub-transmission substations (which forms the distribution backbone), associated 11 kV distribution lines, and low tension (LT) distribution systems which deliver electricity to end consumers (including commercial systems to manage metering, billing and collections). The main challenges faced by the distribution system include: (i) need for extension of the grid to achieve universal electricity access (as close to 3 million households or almost half of the state's population is without electricity access); (ii) need for infrastructure upgrades to improve reliability and service growing electricity demand in the state; and (iii) high levels of AT&C losses.

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<sup>25</sup> Availability Based Tariff

<sup>26</sup> Energy Accounting, UI and RE bill invoicing, Transmission Service Charge calculation, Open Access and Unscheduled Interchange (UI) bill invoicing



15. **The Discom has initiated implementation of a major infrastructure improvement program through substantial funding from central and state government.** JBVNL plans to implement distribution system strengthening through investments about INR 140 billion<sup>27</sup>, towards improving electricity access and improving the urban and rural distribution network (33 kV and below). This includes several thousand kilometers of distribution lines, substation capacity and distribution transformer capacity additions, along with release of new connections. Of this INR 140 billion, about half of the investments are being financed through two central government schemes, DDUGJY<sup>28</sup> and IPDS<sup>29</sup>, while the other half is funded through the state government budget.

16. **At the same time, JBVNL has also initiated several measures to improve operational efficiency and commercial performance.** Recognizing that a healthy distribution sector is vital for the success of the power sector, Jharkhand was the first state to join the UDAY program of GoI in January 2016, under which the State Government has agreed to take over a substantial portion of the debt of the Discom, and would provide support for infusing operational efficiency in the Discom. JBVNL is targeting a reduction in AT&C losses from 39 percent in FY16 (32% in FY17) to 26 percent in FY19 and has launched several ICT based initiatives for improving its metering, billing, and collection systems and processes. Given that JBVNL was formed in 2014 and still carries the legacy organization structure, the World Bank provided support using grant funds, during project preparation to develop an organization structure capable of meeting the business needs of JBVNL. JBVNL has also initiated key reforms in improving procurement, contract management, and human resource practices. The Discom is also implementing ERP to automate its processes and has also taken initial steps towards consolidating billing databases.

## F. Project Description:

17. As noted in the previous sections, GoJ is making use of both public and private financing to meet the investment needs of the PFA program. While the financing needs for generation and distribution sub-sectors have already been met through commercial financing, and central and state government schemes respectively, there exists a financing gap in the transmission sub-sector. Further, both the T&D companies need institutional strengthening to be able to undertake such large investments, and improve their commercial performance and operational efficiency. Therefore, the current project, financed by the World Bank, will support GoJ in the implementation of the PFA plan, in specific areas of transmission network augmentation and strengthening, and in improving the institutional capacity of the T&D companies.

18. The key components under the proposed project are as follows:

**Component 1: Intra-state transmission system strengthening (US\$ 396.2 million of which IBRD US\$ 274.2 million).** This component would support the state transmission utility, JUSNL, in making priority investments in the following two areas:

- a. **Construction of new substations and associated transmission lines**, for strengthening the intra-state power transmission system to increase the system's capacity and reliability to transmit additional power (including RE) within the state. These investments have been identified based

<sup>27</sup> Per the Business Plan submitted by JBVNL to JSERC for FY17-FY21

<sup>28</sup> Deen Dayal Upadhyay Grameen Jyotikaran Yojna for rural areas (including erstwhile RGGVY schemes)

<sup>29</sup> IPDC scheme for urban areas (including erstwhile R-APDRP scheme)





on a load flow analysis<sup>30</sup> undertaken by JUSNL and cleared by the CEA. The N-1-1 planning criteria used in system planning would improve the resilience of the transmission system. The prioritization of investments has been done based on a phasing analysis. This component would be financing construction of new sub-stations and transmission lines, primarily at 132kV voltage level (and a few 220kV voltage level components as well). A long list of twenty-five 132/33kV substations and associated transmission lines (approximately 2000 circuit km) have been identified to be financed under this sub-component. This component will also finance some emergency restoration measures.

**b. Strengthening scheduling, dispatch and communication systems:** This sub-component would support JUSNL in setting up systems for strengthening the SLDC operations including financing ABT<sup>31</sup> meters and software solutions for improving scheduling and dispatch functions. The component would also include strengthening operational communication system (including OPGW) at the network level and within the utility.

**Component 2: Technical assistance for institutional development and capacity building of JUSNL (US\$13.8 million of which IBRD US\$ 9.7 million).** This component would continue to build upon the institutional development activities undertaken during project preparation and support implementation of following key activities:

- a. Improving the organization structure and the DoFP.
- b. Strengthening the project panning, procurement and contract management practices
- c. Strengthening financial management framework
- d. Automating internal business functions like inventory management, payroll management, HR management etc.
- e. Appointing PMC for supervising and monitoring sub-projects under Component 1 of the Project;
- f. Building staff capacity through training, workshops, knowledge exchange visits etc.

**Component 3: Improving operational efficiency and developing institutional capacity of JBVNL (US\$ 69.2 million of which IBRD US\$ 25 million).** This component would build upon the institutional development activities undertaken during project preparation and support implementation of JBVNL's action plan to reduce AT&C losses, improve revenue management systems and reduce power procurement costs through following activities:

- a. *Sub-component 3.1: Smart metering for high value and urban consumers:* To begin with, the component would finance smart metering (including back-end System Integration) for around 50,000 high value consumers (with connected load of higher than 10kW) across the state of Jharkhand, and around 350,000 consumers in Ranchi (the capital of the state).
- b. *Sub-component 3.2: Upgrading the commercial IT systems and processes related to billing, collection and customer relationship management:* Together with financing the billing, collections and customer relationship management systems, the component would also

<sup>30</sup> analysis includes short circuit studies, contingency analysis for n-1-1 contingency, and transient stability analysis

<sup>31</sup> Availability Based Tariff meters



finance (i) Upgrading the Data Center and Data Recovery Center; (ii) Communication links required; (iii) Integration with other IT systems in the company (particularly SAP-ERP which is under deployment in JBVNL). As advance procurement, JBVNL has already appointed a PMC to prepare technical documents and supervise the implementation of the contracts for this work

- c. *Sub-component 3.3: Technical assistance for capacity building of JBVNL:* This component would support:
  - i. Improving human resource management:
  - ii. Business process re-engineering especially related to commercial processes and capital project implementation.
  - iii. Support to optimize power procurement costs (including RE purchases) by deploying a software tool and setting up related business processes.
  - iv. Strengthening FM framework
  - v. Building staff capacity through training, workshops, study tours etc.

19. The project cost details are provided below:

**Table 2: Project Cost and Financing Summary (All figures in US\$ million)**

<b>Cost Description</b>	<b>Project Costs</b>	<b>IBRD financing</b>	<b>Counterpart Funds</b>
<b>Component 1</b>			
Base cost (estimated contractual costs)	349.2	274.5	74.7
Land, and Resettlement and Rehabilitation (R&R) costs	4.6		4.6
Compensation towards forests, trees, crop, PTCC etc.	15.4		15.4
Compensation for land under RoW	26.9		26.9
<b>Sub-total for Component 1</b>	<b>396.2</b>	<b>274.5</b>	<b>121.6</b>
<b>Component 2</b>			
Technical Assistance	<b>13.8</b>	<b>9.7</b>	<b>4.2</b>
<b>Component 3</b>			
Investments in smart meters	46.2	14.6	31.5
Investments in IT	15.4	4.6	10.8
Capacity Building	7.7	5.8	1.9
<b>Sub-total</b>	<b>69.2</b>	<b>25.0</b>	<b>44.2</b>
<b>Grand Total</b>	<b>479.2</b>	<b>309.2</b>	<b>170</b>
Front-end fees	0.8	0.8	
<b>Grand Total</b>	<b>480.0</b>	<b>310.0</b>	<b>170.0</b>





## **ANNEX 2: IMPLEMENTATION ARRANGEMENTS**

**COUNTRY : India**

**Jharkhand Power System Improvement Project**

### **Project Institutional and Implementation Arrangements**

1. The Project will be implemented in the state of Jharkhand, by two state-owned but legally separate entities/companies - JUSNL and JBVNL - referred to as Implementing Agencies (IAs). The IAs will implement the project based on the Loan and Project Agreement that will be signed for the project. The two IAs have set up dedicated Project Implementation Units (PIUs) to implement the project. This does not imply that the project would be ring-fenced from the IAs broader organization. Within the existing departmental structure (procurement, finance, etc.), the IAs will have designated individuals with clear responsibility for dealing with all issues related to the proposed project.
2. To ensure that JUSNL develops the capacity required to operate and maintain the assets created through this project (under Component 1), the PMC will be engaged during project implementation to work with JUSNL officials in implementing the schemes and thus help them develop an understanding of the technical and operational requirements of the assets created. This will also help enhance the technical capacity of JUSNL which will support them in implementing similar projects in future, and enable them to carry out the O&M of assets created under the Project. The PMC and the PIUs will provide quarterly physical progress reports, audited financial statements (within six months of the end of each financial year), and other such information as the World Bank may reasonably require.
3. Similarly, activities under Component 3 involve deployment of technology solutions that are highly specialized in nature. The PMC has already been hired (through advance procurement) for technical design, bid process management and implementation supervision of activities under sub-components 3.1 and 3.2.
4. Lastly, the JUSNL PIU is preparing an Operations Manual for the project, where a group of monitoring indicators will be put in place to track the progress of the project especially related to sub-steps per project schedules. Further, the Operations Manual will also define clear procedures on contract management, and implementation of environment and social safeguard management. As part of the project preparation, the World Bank has worked with JUSNL to define simplified procedures for contract management which will be suitably incorporated in the Operations Manual.

### **Financial Management**

5. The Project will be implemented by JUSNL and JBVNL, state owned public sector undertakings operating under the administrative control of the Energy Department, GoJ and wholly owned subsidiaries of JUVNL. JUSNL and JBVNL were constituted as companies in accordance with the prescriptions of the Companies Act, 1956 (now 2013) and the legal and regulatory environment is established under the Companies Act, Electricity Act, and the rules framed thereunder. The overall responsibility for conduct of business and management of affairs vests with the respective Board of Directors (BoD) of JUSNL and JBVNL. The composition of the BoD has been established in the Articles of Associations of the two



companies and the Chairman of JUVNL is the ex-officio Chairman of JUSNL and JBVNL<sup>32</sup>. A review of the corporate governance and financial management arrangements at JUSNL suggests that as a result of corporatization, while some of the initial arrangements have been put in place (company incorporated, appointment of auditors and company secretaries in place), others are still work-in progress (cadre division yet to be completed, independent directors yet to be appointed etc.). The audit opinion on the first annual financial statements of JUSNL for FY 2013/14 is a “disclaimer opinion” and for (FY15/16 and FY16/17) was “qualified”, highlighting significant inadequacies of the existing accounting system, inadequate internal controls and non-compliance with the prescriptions on internal audit, cost audit and secretarial audit. Similarly, for JBVNL, while the audit opinion was “disclaimer” in the initial years, it is now “qualified”. The most recent audit for FY 16/17 has been completed by chartered accountancy firms and is now awaiting CAG audit. JUSNL and JBVNL broadly continue to operate practicing rules and procedures<sup>33</sup> of the erstwhile JSEB. These needs to be reviewed and suitably revised to align with the current operating and control environment. As part of the Component 2 and 3 under the project, activities will be carried out to strengthen financial management in the two companies. A Corporate Governance and Financial Accountability (CGFA) assessment has been carried out by the two companies to identify the areas for reform. The FM risk rating for the project is rated as Substantial. As a mitigation measure, both JBVNL and JUSNL have initiated the process for hiring consultants to strengthen the existing FM systems through a multi-layered approach involving (i) Drafting of the FM Manual (“Manual”) which is amenable to ERP environment and complies with the applicable regulatory prescriptions; (ii) training of staff in the application of the manual; and (iii) support in implementing the Manual.

6. **Staffing.** The Finance function in JUSNL and JBVNL is headed by a Finance Controller (FC)/Chief Financial Officer, while each zonal office is headed by Sr. Manager (Finance & Accounting). In addition, each office has subordinate accounts staff of accountants, assistant accountants etc. JBVNL and JUSNL will allocate requisite FM staffing for the project.

7. **Budgeting.** Annual budget estimates of JUSNL and JBVNL are broadly classified under (a) capital projects largely funded by the GoJ<sup>34</sup> and (b) estimates for revenues and expenditures from own sources. Project expenditure estimates will also be budgeted in the annual State budget. The budget (GoJ and World Bank share) will be consolidated under a dedicated Plan budget head codes of the Energy Department in the annual budget of the GoJ. The budget head will specifically be earmarked for the World Bank/externally-aided program. JUSNL and JBVNL will also have to establish separate line items for the project activities within the overall budget of the two companies and develop formats duly aligned with the project activities for consolidating expenditure estimates. Project progress will be monitored against the annual budget in both physical and financial terms.

8. **Project accounting:** Project activities at JUSNL will be broadly classified as investment activities primarily involving contractor payments and consulting services. According to the existing practices, project accounting will be done both at the Head Office (HO) and the Circle offices. Accounting will be done on Tally accounting software, (or any other software that the companies may decide to use) for which a separate chart of accounts will be agreed with the World Bank. Investment activities will be executed by the circle offices through their respective subordinate offices for which

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<sup>32</sup> The current Chairman is also the Secretary, Energy Department, GoJ.

<sup>33</sup> e.g. Bihar State Electricity Board – Financial and Account Code (Financial Rules and Procedures) and Financial and Account Code (Works, Works Accounts, Accounts and Statutory Audit and Internal Audit).

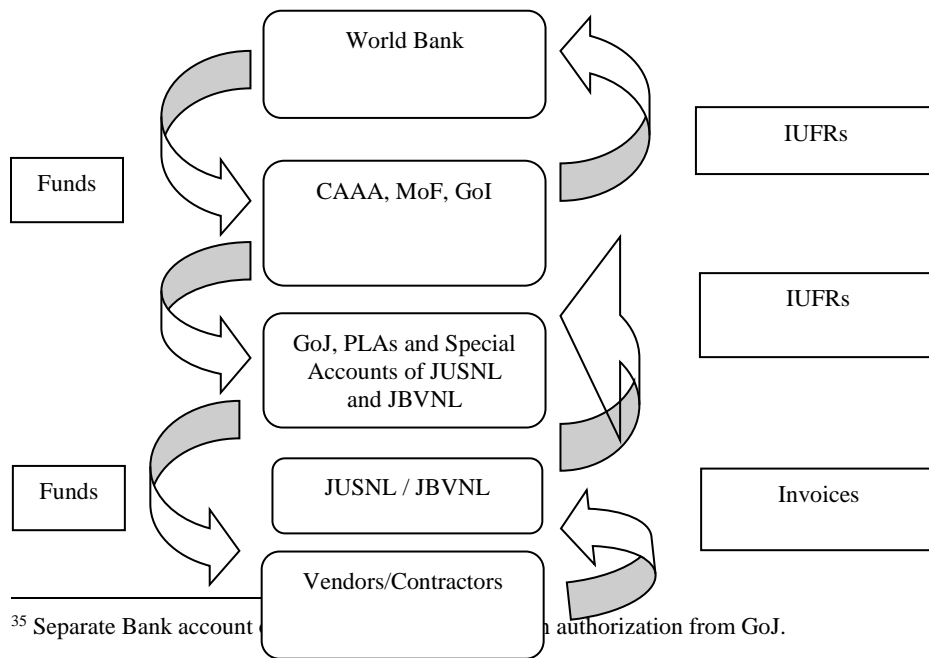
<sup>34</sup> for which the budget estimates are also included in the annual State budget (Plan)



payments will be made by the HO through the PL Account or Special Account<sup>35</sup> on behalf of the respective Circle offices. Documents evidencing such payments e.g. contractor invoices, stores receipt and issue documents, copies of measurement books and joint measurement certificates etc. will also be maintained at the HO. Accounting at each Circle office shall follow the existing practices and shall involve recording of expenditure maintaining fixed asset register for asset created/acquired under the project. Monthly accounts will be submitted by the circle offices to the HO for consolidating the project accounts, reconciliation and preparation of project financial statements in formats agreed with the World Bank. These project accounts will form the basis for the preparation of the Interim Unaudited Financial Reports (IUFs).

9. **Funds flow:** Project funds will flow from the World Bank to the GoI (office of Controller of Aid, Accounts and Audit or CAAA). In line with normal practices, an appropriate budgetary line item will be established by Department of Economic Affairs, CAAA for external funds, and similarly appropriate arrangements will be made on the expenditure side for transfer of these proceeds to GoJ (by way of regular channel of 'Additional Central Assistance') on a back-to-back basis. In line with the existing practice for transfer of funds by the Energy Department, GoJ to the two companies, project funds will also be deposited in the PL Accounts and Special Accounts of JUSNL and JBVNL and project payments will be centralized at HO and shall be made through the PL Account and Special Accounts. The Managing Director (MD) of JUSNL and JBVNL are the Drawing and Disbursing Officers (DDO) for operating the respective PL Accounts. Similarly, DDOs will be designated to operate Special Accounts by the two companies. The Special Account will be segregated and shall be used for the purposes of project related transactions only. Based on the expenditure incurred, the two IAs will prepare IUFs and submit the same electronically to the office of CAAA, the office of the CAAA will then submit the IUFs along with withdrawal applications to the World Bank for disbursement. The funds flow and reporting arrangements under the project will be as shown in figure 2.1 below:

Figure 2.1: Funds Flow





10. **Reporting.** The FM reporting under the project shall be as follows:
- a. **IUFR.** JUSNL and JBVNL will be required to submit to the World Bank quarterly IUFRs within 45 days from the end of the quarter. The IUFR will be prepared by the two IAs based on books of accounts and shall contain information on project implementation, including the expenditure incurred during the last quarter. The format of the IUFR is provided in the Operations Manual and will also be appended to the World Bank’s Disbursement Letter. JUSNL will act as a coordinating agency to submit a combined IUFR for the two companies;
  - b. **Project annual financial statements.** The project annual financial statements will include (i) IUFRs for the fourth quarter; and (ii) any other statement agreed with the Bank.
11. **Internal Control and Internal audit.** The Companies Act, 2013 has assigned responsibilities on the BoD and the auditors to annually report on the adequacy of the internal financial controls over financial reporting. The internal audit of the project shall be carried out by a consultancy firm hired on a competitive basis according to the criteria acceptable to the World Bank. The scope of the audit will be according to the agreed ToR and will include integrated procurement, FM, and contract management audit. The internal auditors will also carry out on a sample basis, physical verification of the inventory and assets created under the project. Based on the audit, the auditor will provide suggestions for improvement.
12. **External audit.** The external audit of the project will be carried out by a firm of chartered accountants appointed on a competitive basis according to the procurement method acceptable to the World Bank. The ToR for the external audit will be agreed with the Bank and provided in the Operations Manual. The annual audit reports shall be submitted to the World Bank within nine months of the closure of the financial year. The format of the audit report will be provided in the Operations Manual and will include audited project financial statements, management assertion letter, an opinion on (i) the project financial statements and (ii) the accuracy of the IUFRs submitted under the project and a management letter highlighting significant issues to be reported to the management. In addition to the Project Audit Report, the two companies will also be required to submit their entity annual audit reports and CAAA shall be required to submit an audit report for the Designated Account maintained. The annual audit reports will be tracked by the World Bank’s PRIMA system:

**Table 2.1. Audit Requirements**

Agency	Audit Report	Audited By	Due Date
JUSNL and JBVNL	Annual entity audit reports as required under the Companies Act	Statutory Auditors appointed by CAG	December 31
JUSNL and JBVNL	Annual project audit reports	An independent firm of Chartered Accountants	September 30



CAAA	Audit report for Designated Account	CAG	December 31
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13. **Ineligible expenditure.** The following expenditures are treated as ineligible expenditures for financing from the World Bank under this project:

- a. All land acquisition/ purchases required for the project;
- b. Any compensation, R&R payment to affected person in accordance with the provision of the RAPs, CPTD and TPDP;
- c. Any compensatory afforestation payments;
- d. Any retention money deducted from contract payments, and not released by Closing Date;
- e. Interest during construction; and
- f. Any expenditures objected or considered ineligible by the World Bank, internal auditors or independent auditors in the Project’s Financial Statements prepared pursuant to Section 5.09 of the General Conditions

14. **Disclosure.** Under the Access to Information Policy of the World Bank, the annual project audit report and the audited project financial statements will be disclosed on the World Bank’s website.

**Disbursements**

15. IBRD funds will be disbursed using reimbursement method, based on expenditure reported in the quarterly IUFs. The other methods of disbursement that can be considered based on project needs are advance payment and direct payment. Supporting documents required for World Bank disbursement using these various methods are documented in the Disbursement Letter issued by the World Bank.

**Table 2.2. Disbursement Table**

Category	Amount of the Loan Allocated (US\$ million)	Percentage of Expenditures to Be Financed (Inclusive of Taxes)
(1) Goods, works, non-consulting services, consulting services, training and workshops, and incremental operating costs for Components 1 and 2 of the Project	284.2	Up to 85%
(2) Goods, works, non-consulting services, consulting services training and workshops, and incremental operating costs for Component 3 of the Project	25.0	Up to 70%
(3) Front-end fee	0.8	100%
<b>Total Amount</b>	310	

16. **Retroactive financing.** No withdrawal shall be made for payments made before the date of the Loan Agreement, except that withdrawals up to an aggregate amount not to exceed US\$ 50 million may





be made for payments made prior to the date of Loan Agreement date but on or after December 1, 2017, for eligible expenditures

Procurement

17. Procurement for the proposed project will be carried out in accordance with the World Bank’s Procurement Regulations for IPF Borrowers, July 2016. The project will be subject to the World Bank’s Anticorruption Guidelines, dated October 15, 2006, and revised in January 2011 and July 2016.

18. **Project Procurement Strategy for Development.** Extensive market analysis has been carried out for different packages of procurement and based on the findings, decisions on packages and lots are finalized for civil works to ensure adequate participation of bidders. Consultancy contracts are also framed based on market research and packaging of the same in terms of scope of services and period are decided. Based on the market experience, the project has also decided to implement (i) Government e Marketplace [GeM] for various Goods and Works procurement items. Based on risk and market analysis, the procurement plan has been prepared to set out the selection methods to be followed by the Borrower during project implementation in the procurement of goods, works, non-consulting and consulting services financed by the World Bank as follows:

Table 2.3: Procurement Methods

Category	Description	Approximate Estimated Cost / Duration / Section Methods and Market Approach Options
Works	Including supply and installation works	RFB-National; RFQ-National
Goods	Vehicles, Computers and accessories, Survey Equipment’s, Lab testing equipment, software etc.	RFB-National, RFQ- National, GeM; a few may be Direct Selection
Consultancy	PMC, Internal Audit, Third party Technical Supervision, Environmental Assessments, Research Activities, Capacity Building activities etc.	QCBS, LCS, FBS, CQS, a few may be Direct Selection

Note: CQS = Selection based on Consultant’s Qualifications; FBS = Selection under a Fixed Budget; LCS = Least-Cost Selection; QCBS = Quality- and Cost-Based Selection; RFB = Request for Bids; RFQ = Request for Quotations.

Table 2.4 Procurement and Contract Approaches:

Attribute	Selected Arrangement
Best and Final Offer [BAFO]	No*
Negotiations	Yes**

\* Packaging strategy for Component 3.1 (smart metering) may undergo some revisions once the full technical details are available, in which case, dynamic BAFO may be applied in accordance with the World Bank procurement guidelines and after suitable revisions in PPSD, which will be duly reviewed and cleared by the Bank.

\*\* Negotiations may be allowed for package under component 3.2 involving deployment of billing and CRM system

19. **Systematic Tracking of Exchanges in Procurement (STEP).** The details of the procurement activities, presently prepared in the Procurement Plan, would be transferred into the STEP system. Initial training on the operation of the STEP system has been provided to the procurement staffs of the IAs.

20. **E-procurement system.** The IAs will be using the NIC e-procurement system for all ICB/NCB procurements. The NIC e-procurement system assessment was carried out against the multilateral



development banks’ requirements and has been accepted for use for procurements under the World Bank funded projects. This is likely to increase the efficiency and transparency of procurement. Based on the packages already identified, majority of the procurement is likely to use the NCB method.

21. **Procurement capacity.** A procurement assessment of the IAs, JUSNL and JBVNL, has been carried out. The project procurement risk established for this operation is ‘Substantial’. The assessment reviewed the IAs’ organizational structures and the current operation environment available for implementing procurement transactions expected by the project. Most of the issues/risks concerning the procurement function for implementation of the project have been identified and include: (a) lack of familiarity of IAs’ staff with procurement procedures in accordance with World Bank’s procurement policies; (b) lack of comprehensive internal procurement manuals and hence, need to improve the set of procedures to ensure fairness and transparency in procurement process ; (c) need for improvement in record keeping; (d) strengthening the procurement review function and resolution of complaints; and (e) need for building capacity of the staff in procurement and contract management.

22. **Procurement planning.** For each contract to be financed by the loan, the different procurement methods or consultant selection methods to be used, the need for prequalification, estimated costs, prior review requirements, and timeframe will be reflected in the Procurement Plan to be agreed between the borrower and the World Bank team. The Procurement Plan, as agreed, will be uploaded in STEP.

23. **Procurement training.** Key staff may be sent for trainings at various institutes in India offering courses on World Bank’s procurement methods. The project teams at JUSNL/JBVNL could also avail of the free Massive Open Online Course on public procurement ([www.procurementlearning.org](http://www.procurementlearning.org)) offered by the World Bank as well as the paid Professional Diploma in Public Procurement course delivered through the Charter of Public Procurement Studies.

24. **Procurement risk assessment.** Table 2.5 describes major procurement-related risks and the mitigation plan. The risk ratings have been decided based on both the probability of occurrence of various events as well as their likely impact. Based on the risk factors and mitigation measures, the overall residual procurement risk rating for the project is determined as ‘Substantial. The residual rating on procurement will be reviewed and updated periodically by the World Bank.

**Table 2.5 Assessed Procurement Risks and Mitigation Measures (to be updated after PRAMS is completed)**

<b>Risk Factor</b>	<b>Initial Risk</b>	<b>Mitigation Measure</b>	<b>Completion Date</b>	<b>Residual Risk</b>
Limited capacity and inefficiencies resulting in delays in procurement and contract management processes	Substantial	<ul style="list-style-type: none"> <li>• Use of skilled procurement staffs for handling procurement activities</li> <li>• Monitoring through the Procurement Plan and quarterly reports</li> <li>• Use of e-Procurement and contract management tools</li> <li>• Participation in trainings and workshops</li> </ul>	Continuous from year 1	Substantial



Risk Factor	Initial Risk	Mitigation Measure	Completion Date	Residual Risk
Noncompliance with agreed procurement arrangements	Substantial	<ul style="list-style-type: none"> <li>• Training and hand-holding provided by the World Bank</li> <li>• Prior and post reviews by the World Bank</li> <li>• Internal and external audits</li> </ul>	Continuous from year 1	Substantial
External interference in the procurement process	Substantial	<ul style="list-style-type: none"> <li>• Disclosure of procurement-related information</li> <li>• Appropriate handling of complaints</li> </ul>	Continuous from year 1	Substantial
<b>Overall Risk</b>	<b>Substantial</b>			<b>Substantial</b>

25. **Procurement methods.** Table 2.6 below describes various procurement methods to be used for activities financed by the loan. These, along with agreed thresholds, will be reproduced in the Procurement Plan. The thresholds indicated in apply to the initial 18-months of implementation period and are based on the procurement performance of the project; these thresholds may be subsequently modified.

**Table 2.6 Procurement Thresholds**

Procurement Approaches and Methods	Thresholds (US\$ equivalent)
Open international (goods, IT, and non-consulting services)	> 3 million
Open national (goods, IT, and non-consulting services)	> 100,000 and up to 3 million
National request for quotation (goods/works)	Up to 100,000
Open international (works)	>40 million
Open national (works)	>100,000 and up to 40 million
Direct selection	No threshold; For goods/works/non-consulting services: According to paragraphs 6.8–6.10 of the Regulations; For consultants: According to paragraphs 7.13–7.15 of the Regulations
Shortlist of national consultants	Up to 800,000

26. **Procurement prior-review thresholds.** The World Bank will prior review (thresholds are based on ‘Substantial’ rating) the following contracts:

- (a) Works: All contracts more than US\$10 million equivalent
- (b) Goods and IT: All contracts more than US\$2 million equivalent
- (c) Non-consulting services: All contracts more than US\$2 million equivalent
- (d) Consultants: All contracts >US\$1 million equivalent for firms and >US\$300,000 equivalent for individuals

27. The above thresholds are for the initial 18-month implementation period; based on the procurement performance of the project, these thresholds may be subsequently modified. Even for large-



value post review cases, the inputs of the World Bank on technical specifications/ToR will be obtained by the project. The prior review thresholds will also be indicated in the Procurement Plan. The Procurement Plan will be subsequently updated annually (or at any other time if required) and will reflect any change in the prior review thresholds.

28. In the case of contracts subject to prior review, the IAs shall seek the World Bank's no objection before granting/agreeing to (a) an extension of the stipulated time for performance of a contract that either increases the contract price or has an impact on the planned completion of the project; (b) any substantial modification of the scope of works, goods, non-consulting services, or consulting services and other significant changes to the terms and conditions of the contract; (c) any variation order or amendment (except in cases of extreme urgency) that, singly or combined with all variation orders or amendments previously issued, increases the original contract amount by more than 15 percent; and (d) the proposed termination of the contract.

29. **National procurement procedure conditions.** National competition for the procurement of goods, works, and non-consulting services according to the established thresholds will be conducted in accordance with paragraphs 5.3–5.5 of Section V of the Regulations and the following provisions:

- (a) Only the model bidding documents agreed with the World Bank (and as amended from time to time) shall be used for bidding.
- (b) Invitations to bid shall be advertised in at least one widely circulated national daily newspaper (or on a widely-used website or electronic portal with free national and international access along with an abridged version of the said advertisement published in a widely circulated national daily, among others, giving the website/electronic portal details from which the details of the invitation to bid can be downloaded) at least 30 days before the deadline for the submission of bids.
- (c) No special preferences will be accorded to any bidder either for price or for other terms and conditions when competing with foreign bidders, state-owned enterprises, small-scale enterprises, or enterprises from any given state.
- (d) Extension of bid validity shall not be allowed with reference to contracts subject to the World Bank prior review without the prior concurrence of the World Bank (i) for the first request for extension if it is longer than four weeks and (ii) for all subsequent requests for extension irrespective of the period (such concurrence will be considered by the World Bank only in cases of force majeure and circumstances beyond the control of the purchaser/employer).
- (e) Re-bidding shall not be carried out with reference to contracts subject to the World Bank prior review without the prior concurrence of the World Bank.
- (f) The system of rejecting bids outside a predetermined margin or 'bracket' of prices shall not be used in the project.
- (g) To improve efficiency and transparency of small value purchases in World Bank financed projects, the Bank has agreed to allow use of GeM as follows: (i) Use of GeM is allowed in lieu of shopping up to US\$ 30,000 in catalog mode; (ii) Use of GeM is allowed in lieu of shopping up to US\$ 100,000 provided there are at least 3 suppliers for the item on GeM and



the Purchaser uses RFQ (mini competition or bidding among suppliers) feature on GeM to discover the final price; (iii) In both above cases Borrowers will record their assessment on reasonableness of price; and (iv) GeM is not to be used in lieu of NCB.

- (h) No negotiations are conducted even with the lowest evaluated responsive bidders.
- (i) Two or three envelope system will not be used except when using e-procurement system assessed and agreed by the Bank.

30. **Domestic preference.** The provision of domestic preference will be applied in the evaluation of bids in accordance with Annex VI of the Regulations.

31. **Disclosure of procurement information.** The following documents shall be disclosed on the project/state websites: (a) a Procurement Plan and updates, (b) an invitation for bids for goods and works for all contracts, (c) request for expression of interest for selection/hiring of consulting services, (d) contract awards of goods and works procured following international and national procedures, (e) a list of contracts/purchase orders placed following shopping procedures on a quarterly basis, (f) a list of contracts following direct contracting (DC) on a quarterly basis, (g) a monthly financial and physical progress report of all contracts, and (h) an action taken report on the complaints received on a quarterly basis.

32. The following details shall be sent to the World Bank for publishing on the United Nations Development Business and the World Bank external website: (a) an invitation for bids for procurement of goods and works using open international procedures, (b) contract award details of all procurement of goods and works using open international procedure, and (c) a list of contracts/purchase orders placed following DC procedures on a quarterly basis.

33. Further, IAs will also publish on their websites any information required under the provisions of 'suo moto' disclosure as specified by the Right to Information Act.

#### Environmental and Social (including safeguards)

34. **Issues:** Issues related to sub stations includes loss of (i) private land; (ii) livelihood; (iii) common property resources; and (iv) access to property; etc. Based on initial assessment of the proposed sub projects, although many land parcels are already available with JUSNL, there is requirement for securing over 30 acres of private land for four substations and there could be possible land acquisition for sub-projects not identified yet. Both siting of substations and transmission line passes through tribal areas. Issue with respect to stringing of transmission lines relates to crop damages and securing Right-of-Way leading to interface with the local communities and ensuring safety.

35. To address any adverse social impact, JUSNL has prepared a Social Management Framework (SMF) for the project (as part of the ESMF), which is to be followed by subprojects to be later identified. Preparation of the SMF is based on social profiling of candidate sites. The SMF will provide guidelines to screen the potential negative impacts and likely benefits of the project and preparation of safeguard documents such as RAP and TPDP, if applicable. The SMF has been disclosed in the country on September 11, 2017, as well as in the World Bank's IDU on December 27, 2017. JUSNL conducted social impact assessment (SIA) and prepared draft social management plan for first thirty percent of identified investments.



36. The SIAs have been prepared for the first thirty percent of investments (part of ESIAAs) and the draft version of the reports has been disclosed on March 16<sup>th</sup>, 2018 on bank website. As per the SIA findings, the transmission route passes through tribal areas which require preparation of TPDP. The draft TPDP has already been prepared and will be finalized before start of construction activities.

37. **Gender:** Women face multiple barriers to progress in Jharkhand. Child sex ratio, though higher than in most low-income states in India, is declining. Maternal mortality is high. There has been a sharp decline in female labor force participation in the state after 2005. There are limited non-farm jobs for rural women. Jharkhand has high gender disparity in education of adults where rural women lag urban women. On a positive note, gender gaps in schooling have narrowed. It is well known that women have substantial role as household energy managers and agricultural producers in rural areas. It is likely that women would benefit from the project as it is expected to result in increased access to modern energy, thereby, reducing drudgery and providing opportunities that may lead to improvement in productivity and livelihoods. At the household level, affordable and clean energy sources for lighting, food processing, cooking, and heating will significantly contribute to improved health and reduced drudgery of women and children. At the labor market level, key barriers women face in taking advantage of new labor market opportunities are lack of construction and engineering skills, occupational segregation by gender, and employer stereotyping. Working conditions in construction areas may also be a deterrent. Surmounting these persistent barriers will generally require the long-term commitment of national and local governments and public policies and investments. As part of the ESMF, a Gender Action Plan (GAP) has been prepared which identifies the following gaps: (a) Limited knowledge about female employment in construction of power transmission sectors; (b) Gender balanced capacity improvement and training; (c) Implementation of Sexual Harassment of Women at Workplace Act, 2013. As part of the project implementation, the IAs would implement measures to plug the identified gaps to the extent possible according to the actions listed below:

**Table 2.7: Planned interventions and indicators for tracking implementation of GAP**

Gender Gap	Gender action that addresses the gap	Output Indicators to measure closing of the Gender Gap	Outcome
Lack of information regarding female employment in construction activities of power transmission sector; and possible low levels of female employment	Monitoring female labor force participation during construction activities; Labor management plan, to be implemented by the contractor, assigns separate toilet and cooking facility as part of the bidding document	Number of women employed as a percentage of total persons employed in construction activities	Improved knowledge on female labor force participation in power sector projects of similar nature; Increased Female Labor Force Participation in construction
Gender balanced capacity and	Creating an enabling environment for females to be encouraged to	Person-days of trainings provided to women employees	Improved skill-set of



training plan	attend trainings for updating their professional skills. The project may also explore avenues for sponsoring professional certifications for women such as SAP certification, IEEE membership etc.	of JUSNL and JBVNL	women employed in the IAs
Implementation of Sexual Harassment of Women at Workplace Act, 2013	Assistance in implementation of some provisions of the Act	Establishment of sexual harassment prevention cell in JBVNL	Prevention and redressal of sexual harassment in the work place

38. The JUSNL PIU is located at the headquarters in Ranchi and is headed by the Chief Engineer (Transmission World Bank project). The PIU and the field staff at each of the circle offices would also be responsible for driving the implementation of the E&S safeguards in the project. For the implementation of the E&S safeguards, the JUSNL PIU would include an E&S Officer of the rank of Executive Engineer. The Executive Engineer would be trained on E&S aspects and the implementation requirements of the ESMF. At the field level, the divisional/ circle offices of JUSNL would be responsible for implementing the technical aspects of the project and would also be responsible for the implementation of the E&S safeguards. Land acquisition will be responsibility of JUSNL. To the extent possible, land will be procured through negotiation. The preliminary consultation for the negotiated settlement would be carried out by the social officer with the oversight/supervision of the circle office of JUSNL implementing the sub-project.

39. The environmental sensitive activities would be carried out under Component 1, which mainly involves schemes for expanding and strengthening the intra-state transmission system (comprising construction of substations and transmission lines throughout the state). Potential adverse environmental impacts during the implementation phase would include (i) clearance/felling of trees within the Right of Way for transmission lines, (ii) any incidental impacts on local fauna, localized and short-term drainage issues during substation construction, and (iii) safety of workers and near-by residents (if any). Similarly, the operational phase impacts could arise from indiscriminate use and disposal of electrical wastes, transformer oil, e-waste and SF6 gas leakage (used in some sub-station equipment). Most of these environmental impacts are manageable and are likely to be short-term, modest, site-specific and reversible in nature. Mitigation measures can be implemented to reduce the negative impacts of most of these interventions. Thus, the project has been assigned an environmental “Category B”. Further, in accordance with World Bank environmental safeguards policies, OP 4.01 Environmental Assessment and OP/BP 4.36 Forest Policies have been triggered.

40. The project will be implemented across the state of Jharkhand and as some substation locations and exact transmission line alignments are yet to be finalized, a framework approach has been adopted for the project. As discussed in the earlier sections, ESMF has been prepared, disclosed and consulted. The ESMF will guide the preparation of the specific ESIA for transmission line sub-projects and a site-specific EMP. Currently, ESIA (and ESMPs) for transmission lines for the first 30% of the project schemes has been prepared. ESIA for other sub-projects will be undertaken once locations are identified and finalized. However, the ESMF has adequate guidelines to prepare required tools and environmental safeguards instruments policies where applicable. In addition, a generic ESMP has also been prepared at



the project level as part of the ESMF, while site specific ESMPs would also be prepared during project implementation stage.

41. JUSNL would implement the main investment component of the project involving construction of transmission substations and lines. JUSNL will establish an E&S cell where E&S member of the teams will be responsible for the implementation of ESMF/ESMP provisions in their respective subprojects. This will be undertaken through integration of the environmental management requirements within contract documents, and monthly monitoring of works on-site during implementation.

42. The ESMF has included indicative costs for environmental management which will be firmed up as sub-projects are finalized. It also has developed training details based on an assessment of training needs and capacity building at the corporate level as well as in the field.

43. State level public consultations have been held with a range of stakeholders during the preparation of the ESMF and a state level consultation was also conducted by JUSNL on September 22, 2017 at Ranchi.

### **Monitoring and Evaluation**

44. JUSNL PIU through the respective division/ circle offices would monitor the implementation of the project including environmental and social safeguards in all the subprojects to ensure conformity to the requirements of the ESMF. While monitoring would be carried out continuously on a weekly, monthly and quarterly basis, more substantive quarterly Progress Reports (QPR) would be submitted to the World Bank for review. As part of the QPR, JUSNL shall also include Safeguards Implementation Reports (SIR), consolidating various field level inputs. Given weak capacity, JUSNL shall be assisted by PMC for day-to-day supervision and quality assurance. The PMC shall also include capabilities and specific manpower for managing environment and social safeguards.

45. The QPR would document the process of E&S Implementations E.g. land procurement/acquisition, forest clearance, ESMP implementation, resettlement plan, tribal people development plan etc. This would help the PIU to identify areas where the E&S Implementation needs to be strengthened. In addition to the PMC, a Third Party would also be appointed by JUSNL to review the process of land purchase. They would oversee the process of consultation and engagement with the land owner during the land procurement and certify the process of purchase of land has been free, fair and transparent.





## ANNEX 3: IMPLEMENTATION SUPPORT PLAN

COUNTRY : India

Jharkhand Power System Improvement Project

### Strategy and Approach for Implementation Support

1. The strategy for implementation support has been developed based on the nature of activities involved in the project and their commensurate risk profile in accordance with the Systematic Operations Risk Rating Tool. The implementation Support Plan will be a live document and will be reviewed regularly and revised, as and when required during project implementation.
2. **Technical.** The World Bank will provide required support through sector specialists and institutional specialists to the utilities on technical aspects. The implementation support will be provided through regular implementation support missions and continuous exchange of correspondence and regular communication. Telecommunication will be frequently used to maintain a close coordination among the World Bank team and the project staff.
3. **Procurement.** Implementation support will include (a) reviewing procurement documents and providing timely no objection; (b) monitoring procurement progress against the detailed Procurement Plan; (c) review of contract management activities; and (d) and providing training to project staff and officials of the utilities on procurement processing, if required. The support will be provided through regular interactions, implementation support missions, and thematic implementation support missions, if required.
4. **Financial Management:** In the initial years, intensive implementation support is envisaged to ensure implementation of agreed FM arrangements, which will be done through field visits/ missions and desk reviews. FM support will cover timeliness of release of funds to the project, quality of financial reports, reconciliation of financial data, capacity building of FM staff, review of IUFRA/audit reports, follow up for mitigation of issues and implementation of recommendations, and ensuring that the agreed auditing, reporting, and disbursement arrangements are adhered to.
5. **Environmental and social safeguards.** The World Bank safeguards specialists in the team will monitor various activities to ensure full compliance with the World Bank's operational policies/procedures and the agreed readiness criteria for subprojects related to environment and social safeguards aspects. Gender issues will be covered, as required, by a social development/gender specialist. The implementation support will be provided through regular interactions, implementation support missions, and thematic review missions, if required.

### Implementation Support Plan and Resource Requirements

6. Most of the World Bank team members will be based in the India country office, including the task team leader, technical, procurement, FM, and social safeguards specialists, who would facilitate timely, efficient, and effective implementation support to the client.



7. Project implementation and supervision will be conducted through the following activities:
  - a. Project launch, to be conducted soon after project approval, to bring all project officials together and ensure a clear understanding of the project scope, design, process, and responsibilities;
  - b. At least two regular supervision missions in a year during the project duration;
  - c. Intermediate technical missions by specialists, as needed;
  - d. Quarterly implementation progress reports (physical and financial progress) shared by the PIUs;
  - e. A midterm review once the project is around halfway in project implementation/loan tenure to review the progress and assess the need for any mid-course correction;
  - f. An Implementation Completion and Results Report at the end of the project to assess achievement toward the PDO and lessons learned.
  
8. The focus of implementation support is summarized in the following tables:

**Table 3.1 Staff resource estimate**

<b>Time</b>	<b>Focus</b>	<b>Skills Needed</b>	<b>Resource Estimate</b>	<b>Partner Role</b>
First 12 months	All three components	Technical, Fiduciary, Safeguards, Institutional, M&E	52 staff weeks	-
12-48 months	All three components	Technical, Fiduciary, Safeguards, Institutional, M&E	50 staff weeks	-

**Table 3.2 Skills Mix Required**

<b>Skills Needed</b>	<b>Number of Staff Weeks</b>	<b>Number of Trips</b>	<b>Comments</b>
Technical Specialist	10 for the first year and then 8 annually	4	Country based
Procurement specialist	8 for the first year and then 6 annually	3	Country based
FM specialist	5 for the first year and then 4 annually	3	Country based
Social Specialist	5 every year	3	Country based
Institutional Development Specialist	4 every year	3	HQ based
Environment Specialist	5 every year	3	Region based
Task team leader	10 every year	4	Country based



## ANNEX 4: ECONOMIC ANALYSIS

COUNTRY : India

### Jharkhand Power System Improvement Project

1. This annex discusses the rationale for public financing of the project, the value added from the World Bank support presents the analysis of the project's development impact in terms of expected benefits and costs. The economic analysis finds that ERR of the project is 31.2 percent (NPV US\$ 12.9 billion).

#### **Rationale for Public Sector Provision/Financing**

2. The T&D utilities in Jharkhand are wholly owned by the government and are expected to remain in public ownership over near to medium term. Thus, to service the growing demand in the state, and to transmit and distribute the power that would be available through the generators (built using commercial finance), significant public investments are needed to upgrade the T&D network while ensuring that the burden on the consumers and state government finances is minimized.

#### **Value added of the Bank's support**

3. The World Bank's is expected to add value in this project by (i) drawing on the World Bank's global and Indian experience in the implementation of power transmission projects; (ii) tapping into the World Bank's experience with institutional development of transmission and distribution utilities, including improved planning and corporate governance; (iii) using transparent procurement processes under World Bank-financed projects to enable discovery of competitive prices; and (iv) bringing credibility to Jharkhand's power sector reform and reducing the risk perception of some investors towards Jharkhand's power sector.

#### **Development Impact**

4. The development impact of the project is assessed through a cost-benefit analysis. Jharkhand faces significant economic costs from not having a universal, cost-effective and reliable supply of electricity. The state had a peak load deficit of 14.6 percent in FY2016. Average electricity consumption of Jharkhand (530 kWh) is a sixth of the global average consumption (3,298 kWh). There will be a large economic payoff from the successful implementation of the PFA program.

#### *Project Costs*

5. **Capital costs.** According to the detailed technical and cost analysis conducted by JUSNL, it requires an investment of more than US\$ 1.6 billion to increase the evacuation capacity power system. Subtracting price taxes and duties from the base cost, the estimated economic cost is US\$ 1.4 billion (which includes the approximately US\$410 million under Component 1 and 2 of the current project). The economic analysis also considers the associated the distribution investments (US\$ 1.4 billion excluding



taxes)<sup>36</sup> required during the implementation of the PFA program.

6. **Operating and maintenance (O&M) costs.** The O&M costs of transmission and distribution investments are estimated as 2 percent and 5 percent of the capital costs, respectively.

7. **Cost of incremental generation.** The capital costs of generation used in the analysis is based on benchmarks issued by Central Electricity Regulatory Commission (US\$0.96/MW for thermal and US\$0.83/MW for solar). Gas price forecast are based on the April 2017 World Bank commodity forecasts.

8. **Negative global externalities.** GHG emission factors for different sources of generation used in the analysis include emissions of 0.83 kg/kWh for thermal plants and 0.6 kg/kWh for diesel self-generation. As per World Bank guidance, carbon emission reductions are valued in the base case at US\$ 32 in 2017 and increasing to US\$ 67 in real terms by 2050.

*Project Benefits*

9. **Energy Supply.** Table 4.1 presents the energy balance of the project. The project benefits have been calculated by proportionately allocating the overall benefits of the program to Bank investments. The World Bank investments are made in the 132kV level and schemes above these voltage levels are being built in PPP mode. Further, at 132kV level, which is the critical link for the transmitting power to distribution, the current project is financing 70% of the 132kV level investments. Thus, the analysis considers only 70 percent of the total benefits that is generated. Furthermore, the peak demand forecast of the state shoes that it would not be able to consume everything it generates, therefore to reflect this energy supply is capped to match the demand.

Table 4.1: Energy Balance of the Jharkhand 24x7 PFA Project

Energy Balance								
		2018	2019	2020	2021	2022	2023	2024
Energy supply without program	[GWh]	2103	3703	4606	5651	6253	8358	8358
Energy supply with program	[GWh]	7009	12344	15355	18837	20844	27859	27859
Additional supply with program	[GWh]	4906	8641	10748	13186	14591	19501	19501
Technical loss without program (5% Transmission and 10% Distribution)	%	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Technical loss with program (T&D)	%				7.0	7.0	7.0	7.0
Technical loss reduced due to program	[GWh]				1054.9	1167.2	1560.1	2228.7
Total additional supply	[GWh]	4906	8641	10748	12263	13569	18136	25909

10. **Technical losses.** The sector is expected to have technical losses of over 15 percent in 2018. The investment proposed under this project are forecast to reduce losses to 7 percent by 2020.

11. **Incremental benefits.** Table 4.2 presents the estimates of willingness-to-pay (WTP) for different sector for FY16.

<sup>36</sup> While total investments required for strengthening distribution network is US\$ 2 billion, only 70% of the cost has been considered as these can be attributed to the project benefits as explained in later sections



Table 4.2: Estimate of Average WTP (based on avoided cost and tariff)

Consumer Category	Share	WTP (INR/kWh)	Assumptions
Domestic	61%	3.2	Tariff for highest consumption slab in JSERC 2017 Tariff order
Commercial and Industrial	31%	14.1	Based on cost of back up diesel generator sets. 30% Utilization Factor; capital costs of \$383/kw
Others and Agricultural	8%	3.8	Tariff for highest consumption slab in JSERC 2017 Tariff order
	Avg. Tariff (INR/kWh)	6.6	
	Weighted Average (US cents/kWh)	10.3	

12. **Avoided local externalities.** The emission factors for SO<sub>2</sub>, NO<sub>x</sub>, and PM<sub>10</sub> for coal generation plants in India are from Cropper et al. (2012). Damage costs are from the latest version of the World Bank’s Guidelines for Economic Analysis of Power projects (which are based on the 2015 Update of the Six Cities Study). The local environmental damage costs of coal are based on modern coal units with state-of-the art pollution control (and tall stacks).

Table 4.3: Environmental and health damage costs

	Units	NO <sub>x</sub>	PM <sub>10</sub>	SO <sub>2</sub>
Emission factor, coal	g/kwh	2.09	0.227	1.44
Emission factor, gas	g/kwh	1.79	0	0
Emission factor, self-generation	g/kwh	18.8	1.34	0
Damage costs, coal	US\$/ton	16	66	21
Damage costs, gas	US\$/ton	16	66	21
Damage costs, self-generation	US\$/ton	575	2396	767

13. **Assumptions.** In addition to the costs and benefits noted in the previous section, the economic analysis rests on the following additional assumptions:

- a. Discount rate: The World Bank’s guideline on discount rate, issued in May 2016, recommends the use of discount rate twice the expected long term per capita growth rate. Because India has grown at an average rate of 5 percent over the last 20 years and can be expected to maintain this rate going forward, a 10 percent discount rate is used in this analysis in the base case together.
- b. Construction cost phasing including T&D investments for implementing the entire PFA plan is shown in the following table:

Table 4.4: Phasing of capital expenditure

FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024
4%	13%	24%	25%	24%	9%	5%

*Results*

14. The baseline ERR of proposed project is 31.2 percent (NPV US\$ 5.5 billion). The additional energy supplied accounts for 97 percent of the benefits and reduction in technical losses accounting for the remaining.



Table 4.5: Economic Analysis Summary

Summary of Economic Analysis results			Base Case
	Discount rate		10.0%
	Levelized cost of elec. through grid	US\$/kWh	0.06
	Levelized cost of diesel self-generation	US\$/kWh	0.23
<b>Composition of NPV</b>			
<i>Costs</i>			
	Cost of additional electricity generation	[\$US million]	8,290
	Transmission Costs	[\$US million]	916
	Distribution Costs	[\$US million]	854
	Transmission O&M	[\$US million]	76
	Distribution O&M	[\$US million]	190
	<b>total costs</b>	[\$US million]	<b>10,326</b>
<i>Benefits [additional supply of electricity]</i>			
	Additional electricity supplied	[\$US million]	21,470
	of which Technical loss reduced	[\$US million]	1,804
	<b>total benefits</b>	[\$US million]	<b>23,274</b>
	<b>NPV</b>	[\$US million]	<b>12,948</b>
	<b>ERR</b>	%	<b>31.2</b>
	<b>ERR including GHG</b>	%	<b>36.9</b>

15. **Sensitivity Analysis.** Sensitivity analysis shows that the project ERR is robust to changes in key input variables. The sensitivity analysis calculates the switching values for input variables identified in the project risk matrix such as electricity supply, cost overruns and schedule delays.

Table 4.6: Summary of Switching Value Analysis

Variable	Base Case	Switching value	Comments
<b>Electricity Supply</b>	6,866 GWh	3,090 GWh	Project will meet the hurdle rate if the additional electricity delivered is at least 45 percent of the planned 6866 GWh.
<b>Capital Cost</b>	\$1.4 billion	\$9.4 billion	Cost variations of this magnitude are highly unlikely given that the technology associated with transmission lines are well established.
<b>COD Delay</b>	0	6 years	Commercial Operation date of the project would have to be delayed significantly for project ERR to fall below the hurdle rate



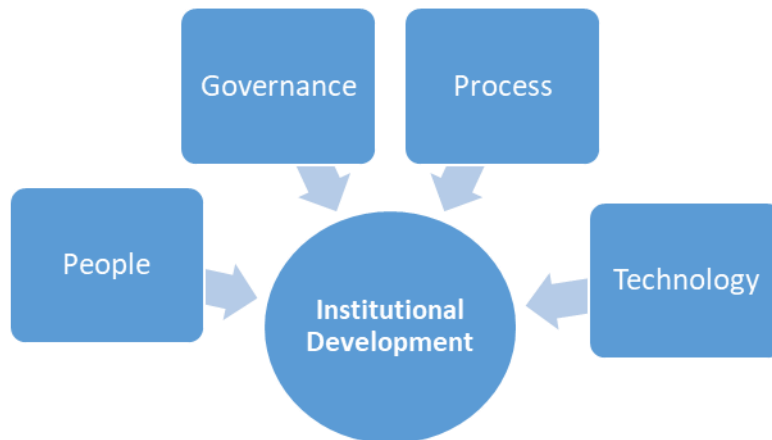
ANNEX 5: INSTITUTIONAL STRENGTHENING PLAN FOR JUSNL AND JBVNL

COUNTRY : India

Jharkhand Power System Improvement Project

- JUSNL and JBVNL have inherited the limited capacity and institutional weaknesses of their parent organization.** The erstwhile JSEB was one of the poorest performing utilities in the country on both operational and financial parameters/ aspects, which reflected weaknesses in human resource, financial management, procurement, planning, and project management. The unbundling of JSEB in 2014 was expected to facilitate improvements in performance through corporatization. While JUSNL and JBVNL are gradually making efforts to address some of the weaknesses, the approach so far has been on piece meal basis and a more wholistic approach is needed to improve upon institutional gaps and for both to emerge as high performing electricity utilities.
- JUSNL and JBVNL need to significantly increase their capacity to deliver upon GoJ’s goal of providing 24x7 PFA.** Achieving the same entails a five-fold increase in investments in transmission and extending connections and metering to 3 million unconnected consumers in the state. This will require substantial capacity building across core functions as well as a transformation of institutional culture. Recognizing this fact, GoJ has requested the proposed project to have a significant focus towards supporting the institutional development of the T&D utilities, along with financing priority transmission sector investments.
- Approach to Institutional strengthening under JPSIP:** As agreed with the IAs, the project will adopt a wholistic but an incremental and step-by-step approach to institutional development, recognizing that institutional development is a complex task. The approach in the project would be to undertake activities along the people, governance, processes and technology dimensions, which would aim to lead JBVNL and JUSNL into stronger institutions. Further, while several activities may be directly funded under the project, there would be several other important actions and reforms that GoJ and the utilities would be expected to undertake on their own.

Figure 5.1: Framework for institutional development of power utilities





4. **Institutional strengthening plan under the project:** Given the complex political economy of power sector reforms, this project would assist in implementing near to medium term actions across the dimensions mentioned in the earlier paragraph. Further, while some of the actions would be needed by both the utilities, there would be some actions that would be specific to each utility. Based on several discussions and diagnostics undertaken by the World Bank, table 5.1 details the institutional strengthening plan proposed for the two utilities. Under the plan, while the actions identified as short to medium term are expected to be undertaken under the project, the long-term actions would go beyond project's timeline.





Table 5.1: Institutional Strengthening Plan for JBVNL and JUSNL

Dimension	Implementing Agency	Action Area	Proposed Intervention		
			Short Term (1-2 years)	Medium Term (2-6 years)	Long Term (> 6 years)
People	JBVNL and JUSNL	Organizational structure; Manpower planning	Reviewing and aligning organizational structure to emerging business needs (Draft recommendations developed and under consideration of Board of Directors or BoD)	Appointment of staff at key positions	
			BoD approval for revised manpower planning (based on revised organizational structure and benchmarking with other utilities) - Draft recommendations developed and under consideration	Preparation of an implementation roadmap for revised manpower plan and its initiation	To be monitored and updated on an ongoing basis taking into account business needs
	JUSNL and JBVNL	Employee policies	Prepare recommendations for revised employee policies	BoD approval for the revised employee policies, and initiating their implementation	Continuous adherence to the policies, with reporting to the BoD through internal audit
	JUSNL and JBVNL	Staff skills	Undertake training needs assessment	Explore and finalize partnership with training institutes	Regular staff trainings are institutionalized through



				Regular staff trainings especially on topics involving newer technology concepts	annual training calendar
Governance	JUSNL and JBVNL	BoD structure		Prepare draft recommendations for the revised BoD structure and selection rules for board members	GoJ's approval of the BoD level re-structuring and selection rules  Filling up positions in line with approved board structure (including appointment of independent directors)
	JUSNL and JBVNL	Internal audit function	Undertake gap analysis and prepare an implementation plan to strengthen the internal audit function	Appoint third-party agency for undertaking the internal audit function in the interim period till the internal wing is formed and fully functional  Formation of an internal audit wing in the organization	Formation of audit committees in the companies with fully functional internal audit wing
	JUSNL and JBVNL	Financial management	Updating the FM manuals and initiating the implementation of the Manual in Tally ERP 9 <sup>37</sup>	JUSNL's Annual financial statements are automated in Tally ERP 9	JUSNL implements a full-fledged ERP  SAP-ERP systems mature

<sup>37</sup> Licenses purchased by JUSNL



			(for JUSNL) and SAP-ERP for JBVNL <sup>38</sup>	Major inventory and financial accounting transactions in JBVNL start taking place in SAP-ERP (limited manual transactions)	in JBVNL wherein all transactions happen in ERP
	JUSNL and JBVNL	Delegation of Financial Powers (DoFP)	BoD approval for Updated delegation of financial powers (more decentralized decision making) for JBVNL	Implementation of the new DoFP (and revisions thereof) in JBVNL  BoD approval for updated delegation of financial powers (more decentralized decision making) for JUSNL	Implementation of the new DoFP (and revisions thereof) in JUSNL
Technology	JBVNL	Commercial operations management and customer information management systems	Selection of an IT PMC (already completed)  Preparation of an IT implementation roadmap and its approval by the BoD  Selection of Implementing Agency for deployment of new commercial system	Implementation of new commercial operations management system and customer information system (CIS) and its integration with existing/on-going ERP system (and other applications)	The new commercial management system and CIS systems, along with other applications such as ERP have matured
	JBVNL	Power procurement cost optimization	Selection of an agency for deploying a system	Deployment of a power procurement cost optimization	Strategies for reducing the medium-to-long term

<sup>38</sup> Already under implementation by JBVNL



			for automating some of the processes for deciding scheduling from generation companies	solution and implementation of strategies for optimizing the immediate to near term power purchase costs and unscheduled interchange penalties	costs
	JBVNL	Consumer and network metering	Selection of an agency for smart metering for selected urban sub-divisions;  Changing the meters at important network points (agency already selected and work on-going)	Implementation of smart meters in selected urban sub-divisions;  Initiating a metering upgradation program for non-urban consumers	All urban sub-divisions have smart metering  All non-urban sub-divisions have well-functioning meters
	JUSNL	Process automation	Selection of an agency to deploy simplified automation systems for payroll management	Implementation of automated payroll management systems;  Implementation of automated solutions for other functions (such as fixed assets enumerations/valuation, inventory management etc.)	Implementation of a standard ERP solution
Processes	JBVNL	Commercial and business processes	Commercial process re-engineering	Business process review and re-engineering and its adoption in the ERP system	
	JUSNL	Procurement and contract management	Preparation of a standard policy and procedures document for procurement and contract	Initiating implementation of the policies and procedure document (WPPP) by JUSNL for capital	



		practices	management, and its approval by the BoD	projects execution	
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