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Report No: PAD3670

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US\$135 MILLION

TO

INDIA

FOR A

WEST BENGAL ELECTRICITY DISTRIBUTION GRID MODERNIZATION PROJECT

October 28, 2021

Energy and Extractives Global Practice
South Asia Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective May 27, 2021)

Currency Unit = Indian Rupee (INR)

INR 72.61 = US\$1

FISCAL YEAR

April 1 – March 31

ABBREVIATIONS AND ACRONYMS

ABC	Aerial Bunched Cable
ACS	Average Cost of Supply
AIIB	Asian Infrastructure Investment Bank
AMI	Advanced Metering Infrastructure
ARR	Average Revenue Realized
AT&C	Aggregate Technical and Commercial
CAAA	Comptroller of Aid, Accounts, and Audit
CAGR	Compound Annual Growth Rate
Capex	Capital Expenditure
CCC	Customer Care Center
CERC	Contingent Emergency Response Component
CESC	Calcutta Electric Supply Corporation
CPF	Country Partnership Framework
CQS	Selection Based on Consultant's Qualifications
DDUGJY	Deendayal Upadhyaya Gram Jyoti Yojana
Discom	Distribution Company
DPL	Development Policy Loan
DS	Direct Selection
DVC	Damodar Valley Corporation
EBITDA	Earnings Before Interest, Taxes, Depreciation, and Amortization
ERP	Enterprise Resource Planning
ERR	Economic Rate of Return
ESCP	Environmental and Social Commitment Plan
ESF	Environment and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standards
FBS	Selection under a Fixed Budget

FCDO	Foreign, Commonwealth and Development Office
FM	Financial Management
FPIC	Free, Prior and Informed Consent
FPPCA	Fuel and Power Purchase Cost Adjustment
GBV	Gender-Based Violence
GDP	Gross Domestic Product
GeM	Government eMarketplace
GHG	Greenhouse Gas
GIS	Geographic Information System
GoI	Government of India
GoWB	Government of West Bengal
GRS	Grievance Redress Service
GSDP	Gross State Domestic Product
GST	Goods and Services Tax
HVDS	High Voltage Distribution System
IA	Implementing Agency
ICT	Information and Communication Technology
IFR	Interim Financial Report
IMF	International Monetary Fund
IPF	Investment Project Financing
IT	Information Technology
LCS	Least-Cost Selection
LMP	Labor Management Procedures
LT	Low Tension
LTRO	Long-Term Repo Operation
M&E	Monitoring and Evaluation
MDB	Multilateral Development Bank
MFI	Micro Finance Institution
MIS	Management Information System
MOSPI	Ministry of Statistics and Program Implementation
MSMEs	Micro, Small, and Medium Enterprises
NDC	Nationally Determined Contribution
NLTA	Non-Lending Technical Assistance
NPV	Net Present Value
O&M	Operations and Maintenance
OHS	Occupational Health and Safety
OMS	Outage Management System
PBITDA	Profit Before Interest, Tax, Depreciation, and Amortization
PBT	Profit Before Tax
PDO	Project Development Objective
PFA	Power for All
PFS	Project Financial Statement
PIU	Project Implementation Unit
PMC	Project Management Consultant
PPSD	Project Procurement Strategy for Development
QCBS	Quality- and Cost-Based Selection

R-APDRP	Restructured Accelerated Power Development and Reform Program
RAP	Resettlement Action Plan
RFB	Request for Bids
RFQ	Request for Quotations
RGRO	Regional Grievance Redressal Officer
RoW	Right-of-Way
RPF	Resettlement Policy Framework
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
SEP	Stakeholder Engagement Plan
STEP	Systematic Tracking of Exchanges in Procurement
ToR	Terms of Reference
TPPF	Tribal People Planning Framework
WBERC	West Bengal Electricity Regulatory Commission
WBG	World Bank Group
WBPDC	West Bengal Power Development Corporation Limited
WBSEDCL	West Bengal State Electricity Distribution Company Limited
WBSETCL	West Bengal State Electricity Transmission Company Limited
WePOWER	Women in Power Sector Professional Network
y-o-y	year-on-year

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
India	West Bengal Electricity Distribution Grid Modernization Project	
Project ID	Financing Instrument	Environmental and Social Risk Classification
P170590	Investment Project Financing	Moderate

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"/> Performance-Based Conditions (PBCs)	<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)	<input type="checkbox"/> Hands-on Enhanced Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
29-Nov-2021	30-Nov-2026

Bank/IFC Collaboration

No

Proposed Development Objective(s)

The project's development objective (DO) is to improve the operational efficiency and reliability of electricity supply in selected areas of West Bengal.

Components

Component Name	Cost (US\$, millions)
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Distribution System Strengthening	315.45
Smart Grid Development in Urban Areas	63.57
Technical Assistance for institutional development and capacity building of WBSEDCL	6.00
Contingent Emergency Response Part	0.00

Organizations

Borrower: INDIA

Implementing Agency: West Bengal State Electricity Distribution Company Limited

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

Total Project Cost	385.70
Total Financing	385.70
of which IBRD/IDA	135.00
Financing Gap	0.00

DETAILS**World Bank Group Financing**

International Bank for Reconstruction and Development (IBRD)	135.00
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Non-World Bank Group Financing

Counterpart Funding	115.70
Borrower/Recipient	115.70
Other Sources	135.00
Asian Infrastructure Investment Bank	135.00

Expected Disbursements (in US\$, Millions)

WB Fiscal Year	2022	2023	2024	2025	2026	2027
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Annual	3.50	13.00	23.00	28.00	35.00	32.50
Cumulative	3.50	16.50	39.50	67.50	102.50	135.00

INSTITUTIONAL DATA**Practice Area (Lead)**

Energy & Extractives

Contributing Practice Areas**Climate Change and Disaster Screening**

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

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

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

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Relevant
Community Health and Safety	Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Relevant
Cultural Heritage	Relevant
Financial Intermediaries	Not Currently Relevant

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

Legal Covenants

Sections and Description

Section I.C.1(a) of the Schedule to the Project Agreement: Prepare and adopt within one (1) month from the Effective Date, an Operations Manual for the Project, in form and substance acceptable to the Bank, setting out the details as specified in the Project Agreement

Sections and Description

Section I.B.2(a) of the Schedule to the Project Agreement: The Project Implementing Entity shall cause the Implementing Agency, and the Implementing Agency undertakes, to maintain throughout the period of



implementation of the Project, a project implementation unit (“PIU”), headed by a Project Director, 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 Project

Sections and Description

Section I.B.2(b) of the Schedule to the Project Agreement: The Project Implementing Entity shall cause the Implementing Agency, and the Implementing Agency undertakes, to select and engage, by no later than six (6) months after the Effective Date, and thereafter maintain throughout the period of implementation 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 for the Project.

Conditions

Type Signing	Financing source IBRD/IDA	Description The Project Implementing Entity shall cause the Implementing Agency, and the Implementing Agency undertakes, to recruit before the Signature Date and maintain throughout the period of implementation of the Project, a team of project management consultants (“PMC”) with qualification and experience and under terms of reference agreed with the Bank, in order to assist the PIU with the planning, implementation and execution of activities of the Project including monitoring and supervision of contracts for the carrying out of Sub-projects
Type Effectiveness	Financing source IBRD/IDA	Description The Subsidiary Agreement has been executed on behalf State of West Bengal and WBSEDCL and the conditions precedents for its effectiveness have been met



I. STRATEGIC CONTEXT

A. Country Context

1. **India's gross domestic product (GDP) growth was already slowing when the COVID-19 outbreak unfolded.** Real GDP growth moderated from an average of 7.4 percent during FY15/16–FY18/19 to an estimated 4.0 percent in FY19/20.¹ The growth deceleration was mostly due to (a) shocks to the financial sector and (b) decline in private consumption growth.² Against this backdrop of pre-existing weaknesses, the outbreak of COVID-19 had a significant impact, with real GDP contracting by 7.3 percent in FY20/21.³ On the fiscal side, the general government deficit widened significantly in FY20/21, owing to higher spending and low revenues.⁴ With the easing of COVID-19 restrictions, Goods and Services Tax (GST) collections for July, August, and September 2021 have crossed the INR 1 trillion mark. The robust GST revenues are expected to continue as the economic recovery gathers momentum. Given the significant uncertainty pertaining to epidemiological developments, real GDP growth for FY21/22 is likely to be in the range of 7.5 to 12.5 percent.⁵ The expected recovery will put India among the world's fastest-growing economies. India's GDP grew at 20.1 percent year-on-year (y-o-y) during the April to June quarter of 2021.

2. **Although India has made remarkable progress in reducing absolute poverty in recent years, the COVID-19 outbreak has delayed the course of poverty reduction.**⁶ Between 2011–12 and 2017, India's poverty rate is estimated to have declined from 22.5 percent⁷ to 8.1–11.3 percent.⁸ However, recent projections of GDP per capita growth, considering the impact of the pandemic, suggest that poverty rates in 2020 have likely reverted to estimated levels in 2016.⁹ Labor market indicators from high frequency surveys—including from the Centre for Monitoring Indian Economy (CMIE)—suggest that vulnerability has increased, particularly for urban households. Overall, the pandemic and its economic impacts are estimated to have raised urban poverty, creating a set of 'new poor' that are relatively more likely to be engaged in the non-farm sector and to have received at least secondary education.

3. **West Bengal is India's second most densely populated state and the fourth most populous with 96 million people.** The state is the sixth largest contributor to India's net domestic product, and agriculture accounts for the largest share of the labor force with 39 percent.¹⁰ West Bengal's record on economic growth has improved in recent years. The annual average growth rate of real gross state domestic product (GSDP) for the state was 6.7 percent in the five years between FY15/16 and FY19/20, in line with the national average. This improved to 7.3 percent in FY19/20, supported by faster growth in manufacturing, construction, and services. However, due to the COVID-19 outbreak and the impact of Cyclone Amphan, the state's economy is expected to contract in FY20/21 and recover only gradually

¹ National Accounts Data, National Statistical Office, Ministry of Statistics and Program Implementation (MOSPI).

² National Accounts Data, National Statistical Office, MOSPI.

³ National Accounts Data, National Statistical Office, MOSPI.

⁴ Union budget 2021, 2022, Ministry of Finance.

⁵ World Bank Global Economic Prospects, July 2021.

⁶ World Bank projections. The Government of India (GoI) has deployed significant resources for social assistance, including toward urban poor households and migrants.

⁷ Consumption Expenditure Survey 2011–12, National Sample Survey Office (NSSO), GoI.

⁸ World Bank estimates. *Source:* Poverty and Shared Prosperity Report, 2020.

⁹ World Bank estimates. *Source:* Macro Poverty Outlook, 2020.

¹⁰ <http://documents.worldbank.org/curated/en/706921504251904391/pdf/119341-BRI-P157572-West-Bengal-Jobs.pdf>.



thereafter. According to the state's own revised estimates for FY20/21, the fiscal deficit is expected to increase sharply to 3.9 percent of GSDP owing to faster growth in spending than receipts. While the state's own revenues are estimated to have declined due to the economic contraction, receipts have been bolstered by an increase in central government grants (in the form of the revenue deficit grant recommended by the 15th Finance Commission). Although the state's debt-to-GSDP ratio had declined from 38.7 percent in FY16/17 to 34.6 percent in FY19/20, it is now expected to increase again to 35.9 percent of GSDP in FY20/21. The fiscal deficit is projected to return below 3 percent of GSDP in FY21/22, but the recent resurgence in COVID-19 infections and the reimposition of mobility restrictions have increased the possibility of further widening in the fiscal deficit, notwithstanding continued budget support from the central government (in the form of revenue deficit grants).

B. Sectoral and Institutional Context

4. **India's rapid economic development and growing population require a power system that can meet the demand for higher quality and cleaner electricity services.** Over the past decade, India's economic performance drove average annual growth of peak power demand and energy demand to 4.2 percent and 4.1 percent, respectively.¹¹ India is the third largest consumer of electricity globally, yet per capita electricity consumption of 1,208 kiloWatt-hour (kWh) for FY20 is only slightly above one-third of the global average. Energy demand is expected to grow rapidly with rising incomes, industrialization of the economy, and urbanization, which drives adoption of modern appliance use and cooling demand. India is expected to be the largest source of primary energy growth globally through 2040.¹²

5. **The Government of India (GoI) considers India's low per capita electricity consumption a constraint to meeting its inclusive economic development objectives.** Therefore, the supply and reliability of electricity services are a national priority. Through major national programs (Deendayal Upadhyaya Gram Jyoti Yojana [DDUGJY] and Sahaj Bijli Har Ghar Yojana [Saubhagya]), electricity access has been expanded to nearly every household, from 67.2 percent of households in 2011. While the installed generation capacity stood at 388 GW at the end of September 2021, there is steady growth in the quantity and competitiveness of renewable energy in the generation mix, especially power from wind and solar renewable energy, excluding large hydropower, currently representing 26.1 percent of installed generation capacity.¹³ India's nationally determined contribution (NDC) aims to install 175 GW of renewable energy capacity by 2022, with the objective of 40 percent of electricity coming from non-fossil sources by 2030.¹⁴ Going further, the GoI has announced an aspirational target of increasing installed renewable energy capacity to 450 GW by 2030.

6. **Reliable electricity supply remains a major barrier to the development of industry and business.** In 2014, the GoI announced the 24x7 Power for All (PFA) program,¹⁵ in partnership with states, to ensure uninterrupted power for all homes, industries, and commercial establishments. To grow the economy and create jobs, particularly through a strong manufacturing sector, one of the most important tasks is to ensure affordable, reliable electricity. A World Bank Enterprise Survey conducted in 2016 found that

¹¹ Calculated for 2011–2020. Central Electricity Authority. 2020. *Growth of Electricity Sector in India from 1947–2017*.

¹² International Energy Agency. 2018. *World Energy Outlook*. 35 p.

¹³ Central Electricity Authority September 2021.

¹⁴ UNFCCC (UN Framework Convention on Climate Change). 2015. *India's Intended Nationally Determined Contribution: Working towards Climate Justice*. <https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx>.

¹⁵ <https://powermin.gov.in/en/content/power-all>.



almost half of business managers in South Asia identified the lack of reliable electricity as a major constraint to their firm's operation and growth. In fact, they ranked blackout as a bigger barrier than other issues such as regulations and taxes, corruption, and human capital. A World Bank study in FY15/16 estimated the impact of power shortages on downstream rural households and firms at 1.42 percent of GDP a year.¹⁶ Poor quality of electricity supply tends to damage household appliances and machinery of the manufacturing industry. While significant progress has been made in providing electricity access across the country, providing quality and reliable uninterrupted power supply remains a challenge. A significant number of grid-connected consumers still face unreliable electricity supply, and those who can afford it use expensive, inefficient, and polluting backup generation.

7. **The GoI has undertaken programs to strengthen electricity transmission and distribution infrastructure in states, seeing this as a bottleneck for improving reliability.** Central sector funds are provided under three key schemes: Integrated Power Development Scheme - for urban areas; DDUGJY - for rural areas; and Saubhagya - to support downstream electricity connections to all unconnected households.

8. **The COVID-19 crisis in India is affecting infrastructure sectors, including the electricity sector, in many ways.** Energy services are an essential part of maintaining other infrastructure services (such as water, telecom, and so on) and preventing the spread of the current COVID-19 pandemic, by ensuring that the disruption in the quality and reliability of electricity supply does not affect the effective functioning of hospitals and health care facilities and social support services. The COVID-19 crisis had led to a decrease in electricity demand, mainly from the commercial and industrial sector—proportionally the largest sources of revenue for the sector and a source of significant cross-subsidies to low paying residential and agricultural consumers. This has affected the financial health of the distribution companies (Discoms) and in turn the financial health of the upstream generation companies. The GoI is providing short-term support to the sector to ensure continued supply. The crisis has also reinforced the need for Discoms to embrace new technologies and digitalization in a bigger way to enable smooth running of operations and maintain cash flow.

9. **While well-performing utilities across the globe have transitioned to automated platforms, the chronic insolvency of India's public Discoms prevents them from taking advantage of information and communication technologies (ICTs) that can significantly improve service and efficiency.** The complex and evolving nature of such technologies, up-front costs, and the lack of right skill mix inhibit financially insecure Discoms from taking advantage of the value proposition of ICT, in spite of knowledge and skills being available within the country. In 2015, the GoI announced a program for financial and operational turnaround of the Discoms, called Ujjwal Discom Assurance Yojana (UDAY), which sought to restructure debt of Discoms, requiring state governments to take responsibility for part of this debt in return for improvements in service delivery and commercial performance by the Discoms.

10. **West Bengal undertook restructuring of the power sector in 2007.** Under the restructuring, the West Bengal State Electricity Board's distribution and hydroelectric generation businesses were transferred to the newly incorporated West Bengal State Electricity Distribution Company Limited (WBSEDCL), while the transmission and load dispatch businesses were transferred to the newly incorporated West Bengal State Electricity Transmission Company Limited (WBSETCL). The West Bengal

¹⁶ <https://openknowledge.worldbank.org/handle/10986/30923>.



Power Development Corporation Limited (WBPDC) existed previously and is responsible for thermal power generation in the state. WBSEDCL covers nearly the entire state, except Kolkata and other small pockets that are covered by private distribution licensees. All these utilities are regulated by the West Bengal Electricity Regulatory Commission (WBERC).

11. **The rapid economic growth in West Bengal has resulted in a growing electricity demand at a compound annual growth rate (CAGR) of 4.5 percent during the last five years.** The electricity supply has kept pace, resulting in the state's energy deficit being within a low margin of 0.3–0.4 percent during the same period. The state is endowed with strategic geographical standing—being the corridor to the Northeast and Southeast Asia—and has an important role in facilitating and promoting regional power trade. The state is already facilitating electricity trade with Bangladesh.

12. **While West Bengal has extended grid connectivity to almost all consumers across the state, the large consumer base of low paying and low-consumption households puts a strain on Discom finances.** The number of consumers served by WBSEDCL has more than doubled in the last six years to almost 20 million consumers with the main increase coming from rural areas and the state reaching close to universal electricity access. WBSEDCL's consumer mix is characterized by a high proportion of low paying domestic consumers (around 90 percent of WBSEDCL's total consumer base), contributing to only around 39 percent of WBSEDCL's total retail sale in million units.

13. **In the last decade, West Bengal witnessed a declining presence of women in the workforce.** Despite high education and low fertility, West Bengal's women's labor force participation is 16 percent compared to the Indian average of 23 percent.¹⁷ Women workers and job seekers are overrepresented in the informal workforce and have limited access to job roles in high growth/infrastructure sectors. As the economy has transitioned away from small-scale agriculture, traditional sources of female employment have dried up and new sources have not emerged.¹⁸ Recent research¹⁹ confirms that improving female labor force participation in West Bengal will require multipronged efforts to facilitate access to employment in new sectors and upend traditional norms that saddle women with a disproportionate share of household duties. Mirroring state-level trends, the share of female employees at WBSEDCL is around 12.4 percent.

14. **West Bengal's priority has now shifted from basic access to providing improved quality and reliability of electricity supply and ensuring the financial sustainability of the state Discom.** Although the state has adequate power capacity, the intrastate transmission and distribution network will need to be strengthened to ensure that quality power supply is adequately supplied to the large consumer base, especially in rural Bengal. The doubling of the consumer base has led to multiple operational and financial challenges that will need to be addressed:

- (a) **Reducing aggregate technical and commercial (AT&C) losses.** As the distribution network expanded rapidly to cover a huge number of low voltage consumers across a wide geographical area, including rural Bengal, AT&C losses steadily grew to reach around 30

¹⁷ Periodic Labor Force Survey, 2017–2018, Ministry of Statistics and Programme Implementation, National Statistical Office, Govt.

¹⁸ <https://openknowledge.worldbank.org/handle/10986/22668>.

¹⁹ Deshpande, Ashwini, and Naila Kabeer. 2019. "Visibility, Care and Cultural Barriers: The Size and Shape of Women's Work in India." <https://dp.ashoka.edu.in/ash/wpaper/paper10.pdf>.



percent in FY15. WBSEDCL has been taking several initiatives to reduce the losses, and these have come down to around 20 percent in FY20 but have again increased to 21.3 percent in FY21 because of COVID-19.

- (b) **Improving quality and reliability of power.** Owing to the vast spread of the low voltage distribution network, including to remote rural areas, WBSEDCL is facing a challenge in maintaining quality and reliable supply. The network suffers from frequent outages with the distribution transformer failure rate varying between 4 and 10 percent. Improvement of the quality and reliability of supply, by strengthening infrastructure and incorporating self-healing capability in the network through automation, will be important for retaining the existing large consumers.
- (c) **Integrating advanced operation technologies (OTs) and automation of internal business operations.** Globally, the business environment of Discoms is seeing a paradigm shift with the deployment of new technologies such as electric vehicles and increase of distributed energy resources such as solar rooftops. WBSEDCL is also faced with similar challenges around upgrading its ICT and OT systems to automate network operations to facilitate integration of renewable energy and handle the growing impact of increasing number of prosumers, electric vehicles, and other distributed energy resource applications. Automation of operations is also important for WBSEDCL to monitor the reliability of supply, identify and restore network disruptions, and track consumer complaints efficiently, thus leading to improved customer satisfaction.
- (d) **Building resilience against extreme climate events.** Due to its proximity to the Bay of Bengal, West Bengal is frequently affected by cyclones and strong winds, especially in the monsoon season. While the occurrence of tropical cyclones may be declining, the frequency of severe cyclonic storms is increasing noticeably. In May 2020, Super Cyclone ‘Amphan’ caused significant damage to the electricity infrastructure in West Bengal. A United Nations study estimates that India is one of the top five countries in terms of economic losses due to disasters with a loss of US\$80 billion during 1998–2017.²⁰ Given this context, it is important for WBSEDCL to consider climate and disaster risks in system expansion and modernization, such as through hardening of the network using aerial bunched cables (ABCs) and underground cabling and communications capabilities that can withstand the impact of extreme weather events or quickly recognize and address disruption after the event has passed.
- (e) **Reskilling to build workforce capacity.** With the expansion of the power system in the state and a rapidly changing business environment, the maintenance and operation of the distribution network has to become more technology driven. The utility employees now need to learn integrated ICT-power system skills, and the utility needs to invest quickly in workforce reskilling in a major way. An exposure to advanced utilities, through a World Bank partnership, is likely to result in the transition that may enable WBSEDCL to move to the next technological level and set an example to other publicly owned Discoms in India.

²⁰ <https://www.undrr.org/publication/economic-losses-poverty-disasters-1998-2017>.



- (f) **Securing financial sustainability.** While WBSEDCL is one of the few publicly owned Discoms in India that have generated profits over several years in the past, its financial performance has deteriorated in the last three years due to high AT&C losses and lack of regular tariff revisions. To support the low-paying consumers, in the state budget for 2020, the state government started providing subsidies for consumers with quarterly consumption of less than 75 kWh.

C. Relevance to Higher Level Objectives

15. **The project is consistent with the World Bank Group (WBG) Country Partnership Framework (CPF) FY18–FY22 discussed at the Board on September 20, 2018 (Report No. 126667-IN), particularly the focus on promoting resource-efficient growth through increasing access to sustainable energy.** Furthermore, the project is also aligned with the implementation strategy of ‘engaging a Federal India’ and ‘strengthening public sector institutions’ as outlined in the CPF. The CPF specifically focuses on the World Bank’s efforts to support state-owned transmission and distribution utility reforms, and institutional strengthening to ensure increased access to reliable power - in alignment with the Gol’s 24x7 PFA Program. This project, through its focus on modernizing electricity distribution grid infrastructure, increasing climate resilience of infrastructure, and supporting institutional development of the state distribution utility, will facilitate increase in access to reliable electricity supply to the citizens in the state of West Bengal.

16. **The operation supports the economic recovery efforts from the COVID-19 pandemic and is consistent with the WBG’s COVID-19 Crisis Response Approach.**²¹ The pandemic has disrupted economic activity, raised macroeconomic risks, and reduced growth in FY21. The immediate focus of the Government has rightly been on public health imperatives. However, as the pandemic curve is brought to a manageable level, economic recovery is one of the top priorities of the Government, as well as the preparation and capacity to deal with similar emergencies in future. The WBG program in India has been adjusted to respond to pandemics, which is further described in annex 1. The proposed project can make notable contributions to mitigate the financial impacts of the pandemic by supporting investment in infrastructure, which in turn will act as a stimulus toward supporting creation of jobs and revival of economy, and increasing the use of smart technologies to help build the capacity of the electricity distribution utility.

17. **The project forms part of the World Bank’s broader Program of Support to India’s Electricity Distribution Sector.** Electricity distribution continues to be the Achilles’ heel of the power sector in India, and a key reason for the deep fiscal burden under which the sector is currently reeling is the poor commercial performance of the state-level public electricity distribution utilities. Each state has its own challenges and requires a different approach to the improvement of Discom commercial performance. Recognizing the criticality of engaging in reform of India’s electricity distribution sector at the state level, as part of its support to the Gol’s 24x7 PFA Program, the World Bank is following a programmatic approach focused on developing a platform of state-by-state engagements—working with different Discoms with different challenges to come up with appropriate solutions in different contexts and use that to inform the national-level dialogue. The World Bank is currently working on improvements to distribution sector

²¹ World Bank. 2020. *Saving Lives, Scaling-up Impact, and Getting Back on Track: World Bank Group COVID-19 Crisis Response Approach Paper*. Annex 1 provides details on the WBG support for responding to the crisis in India.



performance in the states of Andhra Pradesh, Jharkhand, and Rajasthan (closed in October 2019). Each of these engagements is anchored in an Investment Project Financing (IPF) or Development Policy Loan (DPL) and is complemented by technical assistance focusing on improvement of governance, business process, organizational structure and personnel management, and technology within the Discom, as a means for overall improvement in commercial performance and service delivery. The learnings of the World Bank from these different state-level engagements are helping the World Bank have a broad platform of solutions, which is informing the national dialogue on new electricity distribution sector reform program that the GoI has announced in the national budget 2021. This project will form part of this programmatic approach to improve the commercial performance of the electricity distribution sector across India.

18. The project forms part of the World Bank's broader program to address climate change in the power sector. The World Bank's approach to address climate change in the power sector in India is focused around three pillars: (a) energy transitions covering support for renewable energy, battery storage technologies, hydropower, and new technologies such as green hydrogen; (b) supply-side efficiency, covering transmission and distribution and particularly aimed at supporting technical and commercial loss reduction in distribution (of which this project is a part); and (c) demand-side energy efficiency, which is being supported through a national-level engagement with Energy Efficiency Services Ltd.

19. The project will contribute to the climate adaptation and mitigation efforts of the Government of West Bengal (GoWB). The project investments will adapt to present and future climate change-related risks and impacts—particularly heavy rainfall and cyclones—by introducing hardening measures in infrastructure investments to build climate resilience. Infrastructure hardening interventions such as use of ABCs, underground cabling, and smart grid technologies will facilitate reduction in distribution losses, which translates into reduced emissions from the power sector and additional climate resilience benefits through better adaptation to cyclones and heavy rainfalls.

20. The project contributes toward improving the creditworthiness of the state Discom. The project aims to lay the foundation for private capital mobilization or mobilizing commercial financing by the state Discom in medium to long term i.e., in the next five to eight years with the improvement in financial situation of the Discom in the positive direction. Although the project will not directly mobilize private capital (it does leverage co-financing from the Asian Infrastructure Investment Bank [AIIB] for the proposed investments), it will facilitate positioning WBSEDCL for increased creditworthiness and therefore increase the viability of private capital mobilization in the sector.

21. This project, with WBSEDCL's strong corporate governance practices²² and potential to further improve technical and financial performance, could serve as an example for other public distribution utilities across India. This project will contribute a new and different set of solutions for improvement in distribution sector performance, with particular focus on technology adoption. WBSEDCL is one of the better performing and more capable publicly owned Discoms in India, where marginal performance improvement will be addressed through adoption of smart grid technology for increased efficiency, reliability, and climate resilience of operations. This project will therefore offer different solutions to those

²² Pargal, Sheoli, and Kristy Mayer. 2014. *Governance of Indian State Power Utilities*. World Bank Group.



already being developed under other state-level engagements, thereby further contributing to the World Bank's broader national dialogue on distribution sector reform.

22. **Overall, the project will serve to improve the reliability and quality of electricity access.** Various studies have shown that improving access to electricity has a positive impact on the lives of women and girls and their empowerment. In households with reliable electricity, women spend less time on household chores and are more likely to participate in income-generating activities, and girls have higher educational attainment. Access to electricity makes women more empowered as it is associated with greater job participation, education, health, safety outside homes, and exposure to electronic media, all of which are enabling factors for improved autonomy and social participation among women. Improvement in reliability of electricity supply, to which the project contributes, will only add positively to these aspects. Furthermore, the project will contribute to creating more and better jobs for women in the power sector.

23. **The choice of instrument—IPF—reflects both the client's demand for learning-by-doing approach for bringing in modern technologies and practices and to gain knowledge for building capacity.** This approach allows to go deep into technical, fiduciary, and safeguard aspects of the client and facilitate strengthening of the same through a 'learning-by-doing' approach under World Bank-financed investments. This becomes particularly important for procurement and deployment of modern technologies.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

24. The Project Development Objective (PDO) is to improve the operational efficiency and reliability of electricity supply in selected areas of West Bengal.

PDO Level Indicators

25. PDO-level results indicators proposed for the project are (a) Reduction in Aggregate Technical and Commercial (AT&C) losses in selected districts (percentage) - five districts; (b) Reduction in SAIDI (System Average Interruption Duration Index) in selected towns - two towns; and (c) Reduction in SAIFI (System Average Interruption Frequency Index) in selected towns - two towns. For results indicators, a representative sample of districts with AT&C losses across different brackets and towns with major footprints under the project has been selected. However, during project implementation, the PDO level indicators will be monitored across all the districts and towns where interventions under the project will be supported.

26. The intermediate outcome indicators will be

- (a) Distribution lines constructed (in kilometers or km);
- (b) Increase in distribution transformation capacity (kilovolt-Ampere or kVA);



- (c) Distribution lines retrofitted to reduce energy use (km);
- (d) Distribution lines moved under the ground to reduce exposure to storm and tree damage (km);
- (e) Consumers put on advanced metering infrastructure (AMI) meters (for efficient and reduced energy consumption) (number);
- (f) Sub-stations integrated with Supervisory Control and Data Acquisition (SCADA) system (number);
- (g) Percentage increase in total technical/ICT staff (females) in WBSEDCL;
- (h) Person-days of training provided to WBSEDCL staff - Total;
- (i) Person-days of ICT/OT technical trainings/capacity building activities (females) in WBSEDCL;
- (j) Person-days of internship/training for students in ICT/OT/technical areas (females) provided by WBSEDCL; and
- (k) Grievances received that are addressed within two months of receipt (percentage).

B. Project Components

27. **The proposed project would support the implementation of the 24x7 PFA Program in the state of West Bengal and support WBSEDCL in transitioning toward a leading public sector utility in India** by providing financial and technical support for investments to modernize its electricity distribution network and institutional development resulting in improved operational efficiency in the sector and reliable supply to the consumers.

28. The project is proposed to have the following components (more details are provided in annex 2).

Component 1: Distribution System Strengthening (US\$315.45 million, of which IBRD US\$110.41 million)

29. This component would support strengthening and augmentation of the distribution network in select districts/towns through investments inter alia in (i) high-voltage distribution system and aerial bunched cabling, (ii) investments in 33/11 kV gas insulated substations; and (iii) underground cabling to replace overhead networks.

Component 2: Smart Grid Development in Urban Areas (US\$63.57 million, of which IBRD US\$22.25 million)

30. This component would support investments in smart-grid technologies through investments in (i) the ICT systems of the WBSEDCL through technology and capacity upgrades; (ii) deployment of distribution automation technologies and integration of communicable control devices with SCADA including investments in GIS upgradation and integration; and (iii) deployment of smart consumer meters in select urban geographies.

Component 3: Technical Assistance for institutional development and capacity building of WBSEDCL (US\$6.0 million, of which IBRD US\$2.0 million)



31. This component would support (i) strengthening of ICT-OT systems of WBSEDCL for integration of its various technologies including its upgradation and (ii) strengthening the capacity building of WBSEDCL through personnel planning, business process reengineering, the hiring of PMCs, and provision of Training and Workshops and knowledge exchange visits.

Component 4: Contingent Emergency Response Part (to be capitalized in the event of an emergency)

32. This component would support provision of immediate response to an eligible crisis or emergency.

C. Project Cost and Financing

33. The project will be financed by the GoWB and loans from the World Bank (IBRD) and Asian Infrastructure Investment Bank (AIIB). The World Bank and AIIB will provide loans in 50:50 ratio in every component of the project. The World Bank will finance through the IPF instrument. The GoI and GoWB have chosen to denominate the loan in US dollars. The Loan Agreement will be signed with the GoI, and the World Bank/AIIB funds will be passed on to the GoWB on similar terms and on-lent to the project implementing agency (IA), that is, WBSEDCL. Further, there will be a Project Agreement among the GoWB and the IA and the World Bank/AIIB, and a subsidiary agreement will be signed between the GoWB and the IA for passing World Bank/AIIB loans to the IA on time.

Table 1. Project Components, Costs and Financing sources

Project Components	Total Project Cost (US\$, millions)	IBRD Financing (US\$, millions)	AIIB Financing (US\$, millions)	Counterpart Financing (US\$, millions)
Component 1: Distribution System Strengthening	315.45	110.41	110.41	94.63
Component 2: Smart Grid Development in Urban Areas	63.57	22.25	22.25	19.07
Component 3: Technical Assistance for institutional development and capacity building of WBSEDCL	6.00	2.00	2.00	2.00
Component 4: Contingent Emergency Response Part	0.00	0.00	0.00	0.00
Front-end fee	0.675	0.3375	0.3375	—
Total	385.70	135.00	135.00	115.70

D. Project Beneficiaries

34. The direct beneficiaries of the project are the (existing and new) customers of WBSEDCL in selected areas in the state of West Bengal, who will benefit from an improvement in the reliability of grid-based electricity, resulting from the augmentation and strengthening of the distribution network.

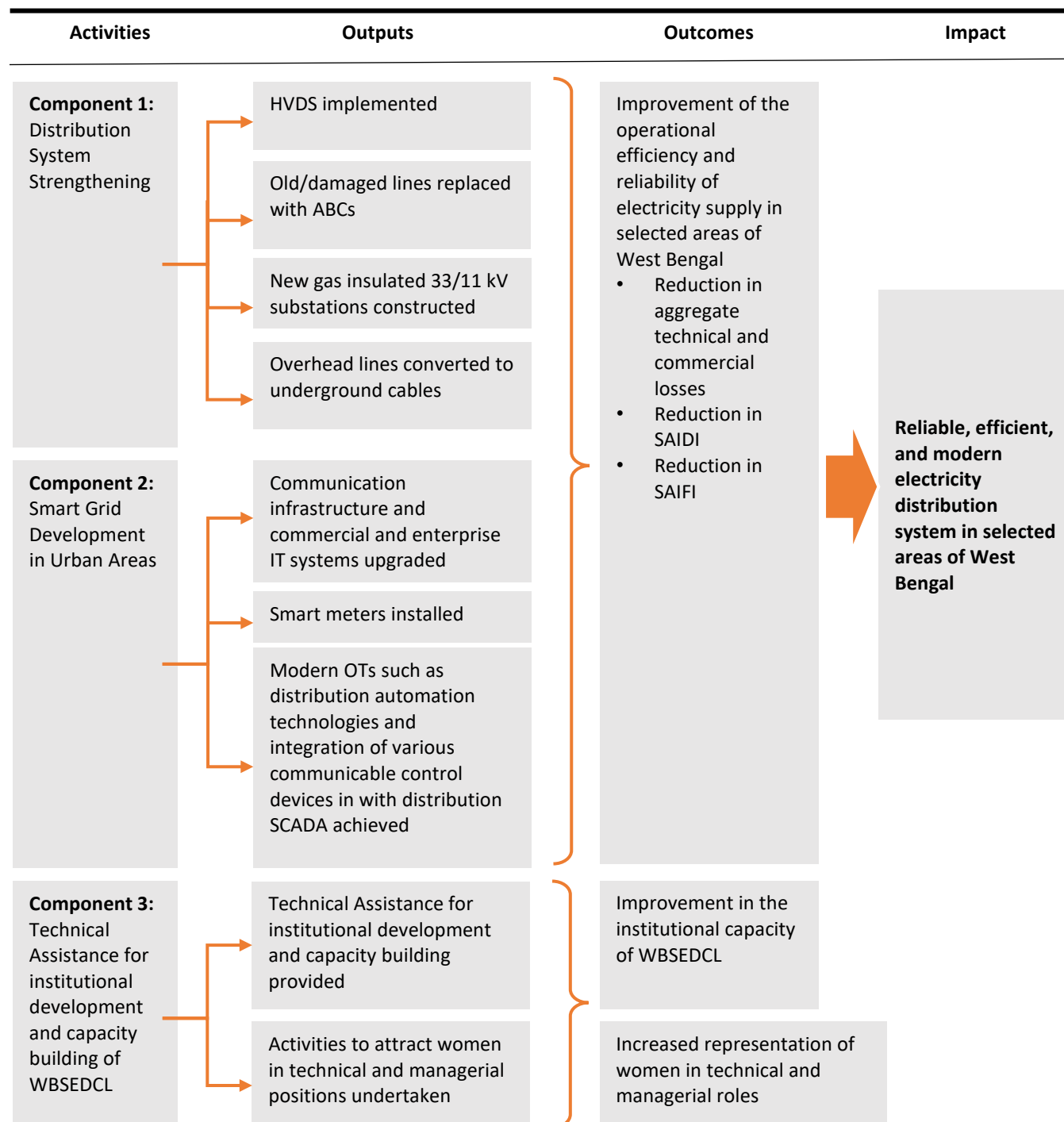
35. By increasing the supply of reliable electricity to households, industries, businesses, and various other productive sectors, the project will also contribute to economic development, poverty alleviation, and inclusive growth in West Bengal.

E. Results Chain



36. The theory of change, shown in figure 1, sets out the causal chain affecting both the intermediate outcomes and the project development outcomes.

Figure 1. Project's Results Chain





F. Rationale for Bank Involvement and Role of Partners

37. West Bengal has provided distribution licenses to private utilities operating in the state capital and industrial belts, where strong commercial drivers for power delivery exist. As the state distribution utility, WBSEDCL has been tasked with providing power to the rest of the state, which is mostly semi-urban and rural, and where the challenge of extending access to low-consumption customers has been most acute. While the financial strength of WBSEDCL has improved relative to its Discom peers in other states, its footing remains tenuous. Public investment is still required for the Discom to modernize its network for all customer groups and develop financial, technical, and human capacity for further innovation.

38. The key value additions that the World Bank is expected to bring are focused on support for operational reform and performance improvement and include the following:

- (a) Support for including storage in distribution system planning and exploring its benefits, such as capital expenditure (Capex) deferral, reduction in deviation settlement mechanism charges, and managing of the impact of electric vehicles on grid
- (b) Continuation of integrated distribution system planning (integrated planning was introduced through a World Bank-executed technical assistance project in 2015) across state-, Gol-, and MDB²³-funded schemes, leading to more efficient resource utilization while meeting the requirements of the 24x7 PFA Program
- (c) Institutionalization of best practices in contract management
- (d) Support for deploying advanced ICT-based technologies for improved system reliability and commercial performance of WBSEDCL
- (e) Introduction of international best practices in smart grid development and operation, through smart technologies, including deployment of advanced ICT systems, AMI, and battery electricity storage
- (f) Provision of international best practice in distribution utility management and Management Information System (MIS).

G. Lessons Learned and Reflected in the Project Design

39. The project builds on the lessons learned from the World Bank's long-term engagement with POWERGRID and from state-level projects in India in Andhra Pradesh, Haryana, the Northeast Region, Rajasthan, Maharashtra, and Jharkhand. It also considers lessons from the Gol's R-APDRP²⁴ and the World Bank's earlier experience under a non-lending technical assistance (NLTA) in West Bengal.

40. The project will build upon the earlier NLTA support by the World Bank on restructuring and corporatization reforms in West Bengal's power sector. The World Bank, in partnership with the United

²³ MDB = Multilateral development bank.

²⁴ Restructured Accelerated Power Development and Reform Program (R-APDRP) is a centrally sponsored program for IT enablement of the distribution sector and strengthening of the distribution network.



Kingdom's then Department for International Development,²⁵ supported the GoWB during 2005–2009 in restructuring and corporatization of the power sector, under an NLTA program. The NLTA leveraged the existing high level of political commitment to the power sector arising out of a recognition by the state that economic development would not be possible without a sustainable power sector. It provided West Bengal access to best practices followed by successful international utilities. The state went beyond the mandate of the Company Law to induct well-established practices of corporate governance and transparency, including the appointment of capable independent directors to the boards of the transmission and distribution companies. The restructured utilities were given autonomy on personnel recruitment and procurement. Robust financial management (FM) and governance practices were set up. The state and WBSEDCL have continued to follow a professional approach toward power sector management, and the project aims to support this further by particularly helping WBSEDCL toward institution strengthening around processes and technology aspects.

41. The proposed World Bank engagement would focus on interventions to improve the institutional capacity of WBSEDCL focusing on two pillars of processes and technologies, developed through previous World Bank engagements in other states and projects outside the region. Leading private sector Discoms in India, such as Tata Power and Calcutta Electric Supply Corporation (CESC), offer lessons in successfully addressing challenges in power distribution through technology and good governance. Given WBSEDCL's vision and potential to operate as a modern and efficient utility, the project design has drawn on these lessons. The proposed project includes deployment of technologies to enable automation of internal business processes (Enterprise Resource Planning [ERP]) and network operations (smart metering, GIS mapping of assets, SCADA-enabled distribution control center, and advanced customer care centers [CCCs]). This would be complemented by technical assistance on interventions to reskill staff; improve processes for assessing, adopting, implementing, and using technical solutions; and improve governance.

42. **Learning from the implementation of the Gol's R-APDRP for states.** It is generally agreed by stakeholders that the investments made under the program on ICT systems are not being fully used by the utilities. Further, the utilities are dependent on a third party for maintaining up-to-date systems and data. It is now agreed that it is necessary to also focus on the institutional aspects of running successful ICT systems such as training key personnel; building a core in-house IT team; and most importantly, developing and following a phased IT road map based on business needs.

43. The project design has also benefitted from lessons from other World Bank projects outside of South Asia. The key lessons incorporated into the project design are (a) advanced project preparation, including bidding documents for procurement of goods and works; (b) social and environmental requirements incorporated into contract design; (c) adequate monitoring and evaluation (M&E) systems to keep the project on track; and (d) adequate flexibility in the project design to allow resources to be moved across subprojects.

²⁵ It is now the Foreign, Commonwealth and Development Office (FCDO).



III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

44. The project will be implemented by WBSEDCL, acting as the Implementing Agency (IA) in the state of West Bengal. The IA will implement the project based on the Loan Agreement to be signed for the project between the GoI and World Bank and the Project Agreement between GoWB, WBSEDCL, and the World Bank.

45. The IA has set up a dedicated Project Implementation Unit (PIU) to implement the project. This does not imply that the project would be ring-fenced from the IA's broader organization. Within the existing corporate structure (procurement, finance, and so on), the IA has designated individuals with clear responsibilities for all issues related to the project.

46. All the subprojects envisaged under Components 1, 2, and 3 are being designed, procured, and implemented by WBSEDCL. Contractors engaged through national or international competitive bidding will carry out the supply and installation works. To support WBSEDCL in proper implementation and monitoring of the investments, PMC(s) will be engaged during project implementation.

B. Results Monitoring and Evaluation Arrangements

47. M&E mechanisms will be established at the project and entity level. As mentioned earlier, PMCs would be appointed to supervise and monitor contract progress. The PMC and the PIU 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. Contracts will be primarily awarded under turnkey for supply and installation. Several activities will be monitored automatically upon completion of milestones such as delivery of material, erection, commissioning, and so on.

48. WBSEDCL will also prepare a Project Operations Manual, where a group of monitoring indicators will be put in place to track progress of the project such as information on (a) results indicators and (b) additional monitoring indicators related to sub-steps according to 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

49. There is strong ownership of the project at the level of the state government and the IA, as the project supports investments identified under the PFA plan of the state.

50. Environmental and social sustainability is facilitated through the adoption of an Environmental and Social Management Framework (ESMF) by WBSEDCL for the project that guides WBSEDCL's handling of environmental and social issues. WBSEDCL has experience in the operations of the assets and the operations and maintenance (O&M) practices, particularly around adoption of technology, and this would be further strengthened under the technical assistance component of the project.



IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic, and Financial Analysis

51. Investments under the subprojects in underground cabling, AMI, HVDS, GIS, SCADA control center infrastructure, and automation have been considered for the economic analysis. Economic and financial returns of the investments are significant and robust to sensitivity to changes in key input variables such as delay in project implementation, under-attainment of the anticipated improvements, and the sustainability of achieved benefits through modernization.

52. **The assessed investments are economically viable against a counterfactual where the distribution system continues to serve rising demand but without modernization efforts.** The economic rate of return (ERR) of the 'with project' scenario is 34.3 percent and the net present value (NPV) is US\$831 million over a 20-year duration of the project. The investment results in a reduction in the utility's purchases of electricity by 62 Tera Watt-Hour (TWh) over 20 years (an amount roughly equivalent to reducing the need for one 600 Mega Watts (MW) coal-fired power plant over the same period). The benefits are predominantly achieved through substantial reduction in AT&C losses, of which non-technical losses total 4.7 TWh through improved bill collections and theft prevention. Improvements in SAIDI/SAIFI mitigate the substantial economic consequences of power outages (54 Giga Watt-hour or GWh) and reduce the use of diesel self-generation (35 GWh). Through the use of SCADA and automation, WBSEDCL expects to be able to reallocate personnel to save US\$15.8 million (NPV) over 20 years. Because conservative investment requirements were assumed in the analysis, the project may be able to achieve additional savings that further increase the magnitude of benefits.

53. **These investments exceed the ERR hurdle rate of 10 percent with or without the inclusion of local and global externalities.** The project is expected to reduce emissions by 44 million tons of CO₂ through 2041, mostly by reducing purchases of coal-intensive power from the grid. The marginal abatement cost of the project is US\$3.7 per ton of CO₂, which is below the social cost of carbon, and implies that the project would be an efficient mitigation investment. When distribution capacity augmentation to serve rising demand is considered within the scope of the analysis, the ERR increases due to meeting additional demand, though the local and global emissions benefits decline slightly as more grid generation is associated with the project.

54. **Sensitivity and risk.** The project's ERR is robust to changes and uncertainties in key input variables, analyzed through switching values. AT&C loss reductions would have to fall significantly short of expectations (25 percent attainment of anticipated AT&C loss reductions, or 63 percent if externalities are excluded) before the project fails to achieve its ERR target. While a lag of two years is anticipated before the project yields results, the expected benefits are substantial enough for the project to remain viable even with extraordinary delays up to 15 years. The ERR target is attainable if the efforts to modernize the distribution system are sustained beyond the first 12 years from start of implementation. The analysis has assumed load growth in each of the analyzed districts, though the project is viable even if demand stagnates. Reductions in electricity theft through the project investments recover power that can be sold for more economically productive purposes. The value of such electricity would have to be 34 times the value of the retail tariff before there is an impact on the project's broader economic merits.



55. **Financial analysis.** In financial terms, the investment program by WBSEDCL yields an internal rate of return of 19 percent. A detailed entity-level financial analysis has also been undertaken for WBSEDCL by the World Bank (details of which are presented in annex 4). According to the existing tariff regulations in West Bengal, WBSEDCL recovers the expenditure incurred, under a typical cost-plus regime, through the tariff collected from the consumers for supply of electricity and gets a return on equity of 16.5 percent, for the equity contribution related to distribution assets. However, the tariffs that WBSEDCL is allowed to charge to its customers by the state regulator, WBERC, are not sufficient to cover the costs of WBSEDCL. This tariff deficit, along with continued AT&C losses, has led to increasing cash losses for WBSEDCL. While WBSEDCL has created regulatory assets in its annual financial statements to account for these ‘missed’ tariff revisions, it had to resort to short-term borrowing (INR 59 billion or US\$813 million at the end of FY21) to fund the cash deficit.

56. The COVID-19 pandemic has further affected the financial situation of the company negatively, and the company has incurred losses of INR 42.5 billion or US\$585 million in FY21 (excluding notional income from movement in regulatory deferral account and other comprehensive income²⁶) due to (a) lower sales to better remunerating consumer categories, that is, commercial (lower by 16 percent) and industrial consumers (lower by 9 percent), due to COVID-19-related lockdowns and (b) increase in AT&C losses due to reduced measures to contain commercial losses and slightly lower collection efficiencies during the pandemic. For financial recovery, WBSEDCL will have to continue to lower its AT&C losses, require consumer tariffs that reflect its cost of supply, and require possible financial support from the state government to absorb some portion of short-term debt on its books. The financial model assumes a 3 percent increase in tariffs each year starting from FY23, continuous reduction in AT&C losses (1 percent each year from FY22 onward), and some reductions in power purchase costs,²⁷ which would enable the company to reach breakeven over the next five years (that is, in FY27). A faster turnaround may be possible if the state government absorbs some of the existing short-term debt on the books of WBSEDCL as mentioned earlier. Given this context and lack of internal accruals, the state government is already providing financial support to the company for implementing capital projects.

B. Technical

57. The project design follows well-proven designs and technologies and replicates established and efficient practices. WBSEDCL has designed the project’s investments under Components 1 and 2 based on comprehensive planning using expert agencies. While the implementation capacity of WBSEDCL is adequate, it has engaged consultants (firms) to assist in project preparation activities and later plans to use loan funds to engage PMCs for assisting in smooth and efficient implementation.

C. Financial Management

58. **FM assessment.** An FM assessment, including corporate governance, was conducted in accordance with the World Bank guidelines to determine whether WBSEDCL has acceptable FM arrangements including systems for planning and budgeting; funds flow; accounting; financial reporting; internal controls, including internal audit and auditing; and corporate governance.²⁸ The assessment

²⁶ Regulatory deferral income refers to notional income that WBSEDCL accounts for due to non-issuance of tariff orders by the regulator; other comprehensive income refers to extraordinary income adjusted for taxes.

²⁷ The state expects cheaper fuel availability for its own generation.

²⁸ A detailed corporate governance and FM assessment report is filed in the FM system.



indicates that WBSEDCL has FM systems that can meet essential project fiduciary requirements, identify project expenditures, and adequately report on the end use of funds. The guiding principle is that the project FM arrangements would be predicated on existing systems followed by WBSEDCL, supplemented by the World Bank's reporting and auditing arrangements. Further details are provided in annex 3.

59. WBSEDCL is governed by the Electricity Act, 2003, and the Indian Companies Act, 2013, which have elaborate provisions on corporate governance, accounting, financial reporting, and internal/external audits and largely determine its governance and FM framework. WBSEDCL has adopted the double entry accrual-based system of accounting following the Indian Accounting Standards, implemented an ERP application, and established an internal audit mechanism. Annual financial statements of WBSEDCL are subject to audit by an independent private audit firm appointed by the Comptroller and Auditor General of India, and there is no backlog in audit (unlike other state utilities) as audit up to FY19/20 has been completed. WBSEDCL has experience in implementing large-scale projects and has experience in a World Bank-supported project.

60. WBSEDCL will provide assurance over the use of project funds through the PIU, and an officer of the rank of assistant general manager has been designated as the nodal for project FM matters. Project funds will be provided in the state budget (provision made for FY21 and FY22) and will be released to WBSEDCL in a dedicated project bank account. Project accounting and internal controls will follow extant systems in WBSEDCL, including the use of an ERP application, and will be centralized in the PIU. Project financial reporting will be through quarterly unaudited interim financial reports (IFRs), the format of which has been agreed, and project transactions will be subject to periodic internal audit. An annual external audit of the project financial statements (PFSs) will be carried out on terms of reference (ToR) agreed with the World Bank by private audit firms and the audit report will be shared with the World Bank/AIIB within nine months from close of the financial year. The agreed FM arrangements have been detailed in the Project Operations Manual, which is being finalized. Intensive support, including field visits and desk reviews, in the initial years by World Bank staff is envisaged to ensure implementation of agreed FM arrangements. Audit reports and IFRs will be reviewed and mitigation measures agreed with WBSEDCL for any issues identified.

61. WBSEDCL could further strengthen its FM systems. Finance manuals of the entity are dated and need to be redeveloped in line with current practices, and internal controls in areas, such as fixed assets and inventory, need strengthening. The audit report on the annual financial statements of WBSEDCL has reported weaknesses in these areas and WBSEDCL has an action plan to strengthen these areas. The internal audit could be made more effective and relevant with increased focus on audit of contracts and billing systems and risk-based audit. On corporate governance, the vacant positions in its board of directors could be filled up expeditiously and the risk management framework in WBSEDCL could be reactivated by providing adequate staffing and instituting a system of periodic reporting on risks and mitigation measures. Based on the requirements from WBSEDCL, the project could support further strengthening of FM systems and corporate governance.

62. Disbursement will be through the reimbursement method based on eligible project expenditure reported in the IFRs. The project will be eligible for retroactive financing in accordance with World Bank guidelines.



D. Procurement

63. The project is being funded jointly by the World Bank and AIIB. The AIIB has agreed that procurement for the project will be carried out in accordance with the World Bank's Procurement Regulations for IPF Borrowers, dated July 2016 and revised August 2018 and in November 2020, and the provisions stipulated in the Legal Agreement. Further, the project would be subject to the World Bank's Anti-Corruption Guidelines, dated October 15, 2006, and revised in January 2011 and July 2016. Unless otherwise agreed with the World Bank, the World Bank's standard procurement documents will be used. This is a procurement-intensive project and many large-value complex procurements are envisaged. Based on the assessment of the IA, requirements, and other factors affecting the procurement process and contract management, the overall 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. The project's implementation arrangements in terms of procurement aspects will be clearly reflected in the Project Operations Manual. More details are provided in annex 2.

E. Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No

F. Environmental and Social

64. Considering the nature of project activities and also based on the 14 Environmental and Social Impact Assessment (ESIA) studies undertaken for the overall project, the potential environmental and social impacts arise out of construction-related activities and some out of siting, construction, and operation of substations as well as installation of underground cables are not so widespread and are mostly restricted/confined to limited areas and in the width of right-of-way (RoW). The environmental issues include water and soil contamination from wastewater generated from construction/workers camps and municipal solid waste; spillage and handling of chemicals and hazardous materials at substation sites; loss of some vegetation in new alignments; and possibilities of limited air pollution due to fugitive dust from earthwork and emissions from vehicle operation, equipment, and plants. With careful route selection, already identified elephant corridors in certain project districts—Purulia, Bankura, Jalpaiguri, Alipurduar, and Cooch Behar—will be/have been avoided. If inevitable, in light of the changes in the situation on the ground, proper timing of construction to minimize conflict, provisions of undergrounding of line, or using of ABCs or insulated conductors according to the Ministry of Environment, Forests, and Climate Change's direction have been made in the ESMF to handle such eventuality. Similarly, to minimize impact on avian fauna, provisions of bird guards and installation of bird diverters/reflectors have also been included in the ESMF in case alignment needs to pass close to bird habitats, such as water bodies. No archaeological monuments or important historic sites are likely to be affected due to the project activities. The overall project risk rating is currently Moderate, based on the studies undertaken for the development of the ESMF for the overall project and ESIA for 14 subprojects.



65. The social issues are assessed to be minimal as the project requires small quantities of land, and these are mostly being arranged through government lands with no or minimal informal settler issues, using the flexibility options in the site location. Among all civil work components, construction of distribution substations requires small quantities of lands, and other components such as underground cabling and laying of distribution lines do not require lands except involving temporary disturbances during civil works such as access restrictions to adjacent properties. The assessment of the 14 ESIs prepared for 10 project districts informs that land requirements are as low as 0.15 acre and as high as 1.2 acres, and these are all government lands with four squatters. To avoid, minimize, and mitigate the impacts, the project has prepared a Resettlement Policy Framework (RPF), a Tribal People Planning Framework (TPPF), Labor Management Procedures (LMP), a Gender Development Plan, and a Stakeholder Engagement Plan (SEP)—guiding the project to address issues through compensation and assistance, arising out of any involuntary resettlement and/or temporary displacement. Consolidated ESIs consisting of Resettlement Action Plans (RAPs), where required, are prepared for subprojects. All the implementation stakeholders will be trained in the required Environment and Social Framework (ESF) provisions. The social risk, therefore, is rated Moderate.

66. The project will contract agencies to undertake civil works, agencies/firms to support core functions, primary suppliers and installers of material/equipment, and other implementation support partners. All categories of project workers—direct workers; contracted workers, including migrant labor; primary supply workers (quarry owners and labor contractors); and community workers—at certain places may be involved. The possible risks include nonpayment of wages/benefits by employer, possibility of gender-based violence (GBV) arising from influx of migrant workers, health risks of labors relating to HIV/AIDS and other sexually transmitted diseases, and conflict among workers and between workers and local community.

67. The occupational risk related to the construction of electricity distribution networks is primarily due to fall from heights, which might cause serious injuries. However, it may not be a substantial risk because of the comparatively low height of poles (ranging from 8 m to 11 m), about 1.2 m deep trenches for underground cabling, and provisions of due safety norms.

68. Subprojects' construction may induce some temporary and intermittent air and noise pollution due to fugitive and exhaust air pollution from the movement of vehicles carrying construction material and machinery. Water requirement is substantial as it is needed for almost all civil constructions. However, to reduce/optimize the impact on this important natural resource, provision for using treated/used water for construction activities has been preferred, particularly in city areas where its availability can be ensured.

69. For access to pole locations or electricity distribution systems, the contractor would use the existing road, that is, existing national/state highways or village roads. During the construction phase, due to the movement of construction-related vehicles and machinery some of the roads, especially village roads, may get damaged. However, on the positive side, augmentation and strengthening of the existing roads to enable movement of heavy equipment shall be a boon for villagers/commuters who use such roads for daily commuting. During the underground cabling and stringing operations, when the electricity distribution network crosses any road/railway line, temporary hindrances may be caused because of the movement of traffic. Such situations will be managed by preparing and implementing a traffic



management plan and using warning lights and barricading by reflective tapes in consultation with local authorities and users to minimize the inconvenience.

70. Some loss of vegetation may occur due to trimming/felling of trees within the RoW to maintain the required electric clearance between tree and conductor (applicable mostly in areas where a bare conductor is used). The current estimate from the 14 ESIs completed is that no trees are likely to be cut, though some may require trimming of branches due to project activities. The provisions of obtaining prior permission according to the existing state regulation for felling of designated trees shall also help in reducing the unwanted felling of trees.

71. The ESMF requires that WBSEDCL explore all options during the design phase of subprojects to avoid intrusion of the electricity distribution network into ecological-sensitive areas/wildlife habitats through optimization of route alignment. The ESMF lays out the overall guidance for ESIs to be undertaken for the subprojects still not fully developed and has developed a generic Environmental and Social Management Plan (ESMP), which can be modified to suit conditions of each subproject. Bid documents for construction have listed out the requirements of applicable national/state labor laws and provisions and the metrics for periodic reporting by contractors. Each ESMP outlines various measures that need to be considered in the contractor's ESMP (C-ESMP) with a focus on occupational health and safety (OHS), waste management, workers' camp management, community traffic management, site restoration, and so on.

72. WBSEDCL has experience in handling one World Bank-supported underground cabling activity. However, given the extensive nature of the project, its capacity to handle environmental and social risks and impacts would need to be augmented in line with recommendations in the ESMF to ensure that the project implementation maintains its current risk profile. The monitoring of mitigation measures' execution shall be carried out both by WBSEDCL and contractor's environmental and social officials.

73. The World Bank will review the first few contractors' OHS plans to ensure consistent application of agreed measures. LMP with well-defined code of conduct of workforce will be developed before mobilization of the works contractor. The integration of relevant provisions of specific ESMPs in bidding documents for subprojects is also incorporated in the Environmental and Social Commitment Plan (ESCP).

74. During the operation phase, the impacts of generation of electromagnetic field from 11/33 kV lines are likely to be insignificant. Further, transformer oil would require to be changed to maintain the desired viscosity at every 10 to 15 years. According to the national regulation used, transformer oil is categorized as hazardous wastes and requirements for its proper handling and disposal to registered recyclers to avoid contamination of groundwater are included in the ESMF and ESMPs for subprojects.

75. The strengthening and development of the distribution network through construction of substations and placing of electrical poles and stringing of distribution lines, along with laying of underground cabling, is assessed to result in minimal social impacts with less overall land intake, crop and tree losses, and access constraints for business and properties that include both private and community. The impacts are largely minimal and temporary in nature and scope. The impacts on vulnerable populations will be avoided to the possible extent by altering the site locations.



76. **Citizen engagement.** As part of citizen engagement, an SEP has been prepared for the project in accordance with the World Bank's Environmental and Social Standards (ESS) 10, considering the nature and scale of subprojects and potential risks and impacts. Through the process of consultation and disclosures, WBSEDCL would envisage building participation of stakeholders at each stage of project planning and implementation. WBSEDCL would be responsible not only for ensuring participation of the community in the consultation process but also for making it effective to ensure integration of feedback received from stakeholders into the project plans, where it deems fit. The SEP will be updated based on level of implementation and revisions in stakeholder aspects and WBSEDCL will disclose the updated SEP. The various tools that citizen engagement currently uses are the following: (a) public meetings, with separate meetings for women and vulnerable groups during preparation and implementation, as required; (b) face-to-face individual/focus group meetings; (c) mass/social media communication (as needed); (d) brochures, posters, flyers, and websites; (e) information boards or desks (in regional offices); (f) grievance mechanism channels; and (g) WBSEDCL monthly newsletter.

77. A three-tiered grievance mechanism already exists in WBSEDCL. Tier 1 is at the CCC level, where any consumer can lodge a complaint either through WBSEDCL's web portal or a toll-free number or directly at CCC. If the consumer is not satisfied at the CCC level or the CCC is not empowered to take decision, it can go/refer to Tier 2, that is, Regional Grievance Redressal Officer (RGRO). If the grievance is not settled even at this tier, then the consumer/RGRO may refer it to Tier 3, that is, the corporate level. At this level, the grievance is overseen by the Customer Relationship Management Cell. To strengthen it to effectively address grievances related to ESMP implementation under the project, two additional bodies are proposed to be established: a Project Steering Committee at the corporate level and District Grievance Redressal Committees at the district level for subprojects. The established Project Steering Committee for this project, under the chairmanship of the Additional Chief Engineer (distribution) of WBSEDCL, shall be used to monitor and review the progress of implementation of ESMP of each subproject. The Additional Chief Engineer (Distribution) of WBSEDCL will be convener of this committee. The District Grievance Redressal Committee will be established under the chairmanship of the Divisional/Regional Manager, WBSEDCL, for redressal of grievances of the affected people. The designated Divisional Manager of the concerned region shall be the convener of this committee.

78. **Climate.** The operation has been screened for climate and disaster risks using the World Bank's Climate and Disaster Risk Screening Tool. Based on the screening, the project area may be exposed to climate and disaster risks, resulting in a 'moderate' exposure rating. The operation aims to support investments in hardening of the network and capacity building of WBSEDCL to mitigate and better manage the climate change-induced extreme weather events. The investments under Component 1 will help in reducing the AT&C losses, improve reliability, and augment the capacity of the electricity distribution system in providing good quality electricity to the growing demand and are well aligned with the MDB list of eligible climate mitigation activities.²⁹ The activities on conversion of overhead lines to underground cables and replacing with ABCs would also help in preparedness of the utility in adapting extreme climate events such as cyclone storms. The investments in activities toward deployment of smart meters, improvement in the ICT systems, and deployment of modern operational technologies will help in improving the reliability of the electricity distribution system and further benefit the Discom in AT&C loss

²⁹ Category 2.1 'Lower carbon and efficient energy generation - Transmission and Distribution Systems - Retrofit of transmission lines or substations and/or distribution systems to reduce energy use and/or technical losses including improving grid stability/reliability'.



reduction. The activities in this component are well aligned with the MDB list of eligible climate mitigation activities under Category 2.1. During extreme climate events/disasters, the physical movement of personnel and equipment can get severely restricted; however, smart grids can support the electricity distribution utility in maintaining supply or early restoration through automated and remote operations.

79. **Gender.** The share of female employees at WBSEDCL is around 12.4 percent (1,540 female employees out of 12,439 employees). The baseline assessment of the energy sector in India also points to the lack of technical training and career advancement opportunities for women in the power utilities.³⁰ As a corporate best practice, WBSEDCL reserves a post of woman director on its board of directors, which is filled.³¹ However, only 8.7 percent (2 out of 23) of senior management (chief engineer and above) at WBSEDCL are women. For the technical (including ICT/OT) positions, women account for 4.2 percent (326 out of 7,727) of total technical staff. If only ICT/OT positions are considered, women account for around 17 percent (9 out of 54) of total staff. To address these gaps, the component will support the utility to adopt measures that improve women's access to technical knowledge and career advancement opportunities.

80. As a preliminary step, an organizational gender assessment/diagnostic for WBSEDCL will be completed. The study will capture gender gaps in skills development and career growth experienced by women staff. This assessment will inform the human resource staffing needs to identify entry points for women. The findings will further inform implementation of WBSEDCL's overall strategy to undertake steps for

- Improving women's representation in the senior management and technical roles, especially under ICT/OT departments trained under the technical assistance component of the project;
- Building capacity of staff, including encouraging women staff to engage in emerging business needs of operating a climate-resilient electricity distribution network; and
- Strengthening human resource policies and facilities for women as required.

81. WBSEDCL will implement a range of activities to attract the interest of women students and professionals, including targeted jobs outreach; informational outreach sessions for Science, technology, engineering and mathematics (STEM) programs to raise awareness of jobs in the power sector, particularly in ICT/OT areas; site visits and internship opportunities; and training for students. In parallel, WBSEDCL will explore the option of becoming a WePOWER³² partner.

82. To monitor the outcome of these gender-related actions, the following will be included in the Results Framework: Percentage increase in total technical/ICT staff (females) in WBSEDCL; person-days of

³⁰ A World Bank assessment, 'Pathways to Power: South Asia Region Baseline Assessment for Women Engineers in the Power Sector', carried out in 2018, revealed that in 10 power utilities women were about 8 percent of the total staff. Similarly, data from 18 utilities showed representation of women in leadership positions (such as directors and chief engineers) to be approximately 9 percent.

³¹ As of February 2021, WBSEDCL has one woman director on a board of seven directors, which is compliant with the Companies Act, 2013.

³² The World Bank's South Asia Energy and Social Development Units, with support from Energy Sector Management Assistance Program (ESMAP), established the South Asia Women in Power Sector Professional Network (WePOWER) to promote female practitioners in the energy and power sector.



ICT/OT technical trainings/capacity building activities (females) in WBSEDCL; and person-days of internship/training for students in ICT/OT/technical areas (females) provided by WBSEDCL. Additionally, the number of total women staff in WBSEDCL and number of women staff in mid and senior management positions will be monitored in the annual progress reports.

V. GRIEVANCE REDRESS SERVICES

83. 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 in order 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, as a result 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.

VI. KEY RISKS

84. Even though the interventions proposed under the project are not reform intensive, the first lending engagement with West Bengal in the complex political economy of the electricity distribution sector suggests that the overall risk of the project be rated 'Substantial.' During project implementation, regular dialogue with the state government will be undertaken to address any such issues.

85. The macroeconomic risk is 'Substantial'. The economic contraction brought about by the COVID-19 pandemic has significantly affected state finances (through a combination of reduced revenues and heightened expenditure needs). However, the state's overall revenues in FY20/21 increased due to a sharp increase in grants from the central government, as recommended by the 15th Finance Commission. For FY21/22, the state budget has projected a sharp increase (about 34 percent y-o-y) in revenue receipts, which besides the assumption of higher own tax and non-tax revenues primarily reflects the considerable increase in the state's share of central taxes. This maybe an ambitious target to achieve given the heightened economic uncertainties at both national and subnational levels. The GoWB needs to pay attention to keeping deficits under control through higher revenue mobilization and greater expenditure controls/efficiency. The World Bank's technical assistance is to develop a customized subnational Fiscal Sustainability Analysis model and staff training, planned for the next fiscal year, which will help the GoWB undertake medium-term fiscal projections and sensitivity analysis to mitigate macroeconomic risks. However, as the state emerges from the COVID-19 pandemic, the uncertainties and vulnerabilities to the macro-fiscal situation are likely to prevail over the short to medium term.



86. The 'political and governance risk' is rated Substantial, as financial viability of the sector is associated with a complex issue of political economy and governance. Because the proposed engagement will primarily target investments in distribution to improve the quality of supply and operational efficiency to better serve consumers, it is expected that this will help mitigate these risks to some extent for the project and the utility. For the deeper sector reform-related aspects, the ongoing dialogue at the national level will be used to mitigate the risk.

87. The overall fiduciary (FM and procurement) risk for this project is rated 'Substantial'. Within FM, internal controls carry a higher risk because of weaknesses reported by auditors in areas, such as fixed assets and inventory, which are relevant to the project, and there is a need to update the finance manuals. The position of a full-time Director (Finance) needs to be filled (selection of a candidate for this position is under way). Due to the COVID-19 crisis, the GoWB's fiscal space may be constrained to timely provide funding to the project. This will be discussed with the Government and, if agreed, provision for drawing an advance from the IBRD/AIIB loan may be considered. WBSEDCL has no experience of procurement in World Bank-funded projects. This is a procurement-intensive project and many large-value procurements are envisaged, which may be complex from a tendering and contract management perspective. The project staff carry out the procurements, and there is no separate cadre of officials for procurement. A Project Procurement Strategy for Development (PPSD) has been developed for the project based on detailed requirements, capacity assessment, and market analysis. Further regular training is planned to be provided to WBSEDCL officials on procurement aspects.



VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: India

West Bengal Electricity Distribution Grid Modernization Project

Project Development Objectives(s)

The project's development objective (DO) is to improve the operational efficiency and reliability of electricity supply in selected areas of West Bengal.

Project Development Objective Indicators

Indicator Name	PBC	Baseline	End Target
Improvement in Operational Efficiency			
Reduction in Aggregate Technical and Commercial (AT&C) losses in select districts - Bankura district (Percentage)		37.94	20.00
Reduction in Aggregate Technical & Commercial (AT&C) loss in select districts - Nadia district (Percentage)		26.22	18.00
Reduction in Aggregate Technical and Commercial (AT&C) losses in select districts - East Medinapur district (Percentage)		23.13	17.50
Reduction in Aggregate Technical and Commercial (AT&C) losses in select districts - Alipurduar district (Percentage)		20.41	16.00
Reduction in Aggregate Technical and Commercial (AT&C) losses in select districts - Dakshin Dinajpur district (Percentage)		42.75	20.00
Improvement in reliability of electricity supply			
Reduction in SAIDI (System Average Interruption Duration Index) in select towns - Asansol town (Hours)		187.43	95.00
Reduction in SAIDI (System Average Interruption Duration Index)		249.78	125.00



Indicator Name	PBC	Baseline	End Target
in select towns - Kharagpur town (Hours)			
Reduction in SAIFI (System Average Interruption Frequency Index) in select towns - Asansol town (Number)		117.28	85.00
Reduction in SAIFI (System Average Interruption Frequency Index) in select towns - Kharagpur town (Number)		114.92	80.00

Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	End Target
Distribution System Strengthening			
Distribution Lines constructed (Kilometers)		0.00	1,900.00
Increase in Distribution Transformation Capacity (Kilovolt-Amphere(KVA))		0.00	85,300.00
Distribution lines retrofitted to reduce energy use (Kilometers)		0.00	12,100.00
Smart Grid Development in Urban Areas			
Distribution lines moved under the ground to reduce exposure to storm and tree damage (Kilometers)		0.00	1,700.00
Consumers put on advanced metering infrastructure (AMI) meters (for efficient and reduced energy consumption) (Number)		0.00	200,000.00
Sub-stations integrated with Supervisory Control and Data Acquisition (SCADA) system (Number)		0.00	50.00
Technical Assistance for institutional development and capacity building of WBSEDCL			
Person Days of Training Provided to WBSEDCL staff - Total (Number)		0.00	5,000.00
Person-days of ICT/OT technical trainings/capacity building activities (females) in WBSEDCL (Number)		0.00	1,000.00



Indicator Name	PBC	Baseline	End Target
Grievances received that are addressed within two months of receipt (Percentage)		0.00	90.00
Percentage increase in total technical/ICT staff (females) in WBSEDCL (Percentage)		0.00	7.50
Person-days of internship/ training for students in ICT/OT/ technical areas (females) provided by WBSEDCL (Number)		0.00	10,000.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Reduction in Aggregate Technical and Commercial (AT&C) losses in select districts - Bankura district	This will measure the reduction in AT&C loss, from the baseline, across the Bankura district.	Annual	MIS and/ or Energy Audit reports	AT&C loss calculated based on energy input at feeder level and units realised. Any arrear collection related to previous years not considered for AT&C loss computation.	Corporate Monitoring Cell, WBSEDCL
Reduction in Aggregate Technical & Commercial (AT&C) loss in select districts - Nadia district	This will measure the reduction in AT&C loss, from the baseline, across the Nadia district.	Annual	MIS and/ or Energy Audit reports	AT&C loss calculated based on energy input at feeder level and units realised. Any arrear collection related to previous	Corporate Monitoring Cell, WBSEDCL



				years not considered for AT&C loss computation.	
Reduction in Aggregate Technical and Commercial (AT&C) losses in select districts - East Medinapur district	This will measure the reduction in AT&C loss, from the baseline, across the East Medinapur district.	Annual	MIS and/ or Energy Audit reports	AT&C loss calculated based on energy input at feeder level and units realised. Any arrear collection related to previous years not considered for AT&C loss computation.	Corporate Monitoring Cell, WBSEDCL
Reduction in Aggregate Technical and Commercial (AT&C) losses in select districts - Alipurduar district	This will measure the reduction in AT&C loss, from the baseline, across the Alipurduar district.	Annual	MIS and/ or Energy Audit reports	AT&C loss calculated based on energy input at feeder level and units realised. Any arrear collection related to previous years not considered for AT&C loss computation.	Corporate Monitoring Cell, WBSEDCL
Reduction in Aggregate Technical and Commercial (AT&C) losses in select districts - Dakshin Dinajpur district	This will measure the reduction in AT&C loss, from the baseline, across the Dakshin Dinajpur district.	Annual	MIS and/ or Energy Audit reports	AT&C loss calculated based on energy input at feeder level and units realised. Any arrear collection related to previous years not considered for AT&C loss computation.	Corporate Monitoring Cell, WBSEDCL



Reduction in SAIDI (System Average Interruption Duration Index) in select towns - Asansol town	This will measure the reduction in SAIDI in Asansol town. The figure is per consumer in that year.	Annual	MIS reports	MIS reports of WBSEDCL	WBSEDCL
Reduction in SAIDI (System Average Interruption Duration Index) in select towns - Kharagpur town	This will measure the reduction in SAIDI from the baseline in Kharagpur town. The figure is per consumer in that year.	Annual	MIS reports	MIS reports	WBSEDCL
Reduction in SAIFI (System Average Interruption Frequency Index) in select towns - Asansol town	This will measure the reduction in SAIFI from the baseline in Asansol town. The figure is per consumer in that year.	Annual	MIS reports	MIS reports	WBSEDCL
Reduction in SAIFI (System Average Interruption Frequency Index) in select towns - Kharagpur town	This will measure the reduction in SAIFI from the baseline in Kharagpur town. The figure is per consumer in that year.	Annual	MIS reports	MIS reports	WBSEDCL

Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Distribution Lines constructed	This will measure the line length of new HT distribution lines of HVDS network constructed under the project	Quarterly	MIS/ Progress reports	MIS/ Progress reports	WBSEDCL



Increase in Distribution Transformation Capacity	This will measure the net increase in transformation capacity at 33/11 kV and 11/0.4 kV, across the districts and towns with investments (HVDS and UG Cable) under the project, taking into account capacity of new transformers installed less the capacity of old transformers replaced	Quarterly	MIS/ Progress reports	MIS/ Progress reports	WBSEDCL
Distribution lines retrofitted to reduce energy use	This will measure the line length of the distribution lines that have been retrofitted (AB cable conversion at LT and HT level under HVDS and UG cable works) across the districts and towns with investments under the project	Quarterly	MIS reports	MIS reports	WBSEDCL
Distribution lines moved under the ground to reduce exposure to storm and tree damage	This will measure the line length of the distribution lines (LT and HT under UG cabling work but excluding LT AB cable works under UG) that have been moved underground across the towns with investments under the project	Quarterly	MIS/ Progress reports	MIS/ Progress reports	WBSEDCL
Consumers put on advanced metering infrastructure (AMI) meters (for efficient and reduced energy consumption)	This will measure the number of consumers that have been put on AMI,	Quarterly	MIS/ Progress reports	MIS/ Progress reports	WBSEDCL



	across the towns with investments under the project.				
Sub-stations integrated with Supervisory Control and Data Acquisition (SCADA) system	This will measure the additional number of sub-stations that are integrated with distribution level SCADA system of WBSEDCL with investments under the project	Quarterly	MIS/ Progress reports	MIS/ Progress reports	WBSEDCL
Person Days of Training Provided to WBSEDCL staff - Total	This will measure the person-days of WBSEDCL staff (males and females) trained across different areas under the technical assistance component of the project	Quarterly	Progress reports	Progress reports	WBSEDCL
Person-days of ICT/OT technical trainings/capacity building activities (females) in WBSEDCL	This will measure the person-days of WBSEDCL staff (females) trained across different areas under the technical assistance component of the project	Quarterly	Progress reports	Progress reports	WBSEDCL
Grievances received that are addressed within two months of receipt	This will measure the percentage of grievances/ complaints received on the activities related to the project that are addressed within a period of two months from date of receipt	Annual	Progress reports	Progress reports	WBSEDCL
Percentage increase in total technical/ICT staff (females) in WBSEDCL	This will measure the percentage increase in number of technical/ICT	Annual	Progress reports	Progress reports	WBSEDCL



	female staff (in WBSEDCL) w.r.t. to baseline of 326 female staff in such areas.				
Person-days of internship/ training for students in ICT/OT/ technical areas (females) provided by WBSEDCL	This will measure the person-days of students (females) trained by WBSEDCL across different areas	Quarterly	Progress reports	Progress reports	WBSEDCL



ANNEX 1: Adjustments to the Country Program in Response to COVID-19

COUNTRY: India

West Bengal Electricity Distribution Grid Modernization Project

1. **The COVID-19 pandemic affected economic activity significantly.** In response to the pandemic, the GoI implemented a strict nationwide lockdown between April and June 2020 to prevent the spread of infections. As a result, supply chains and economic activity were disrupted. The lockdown was lifted gradually, from June 2020 onward. This allowed economic activity to resume from the second quarter (July to September 2020) onward.
2. **Real GDP growth contracted by 7.3 percent in FY20/21—mainly due to restrictions on economic activity and mobility leading to large contractions in private consumption and investment.**³³ Growth is expected to rebound in FY21/22 (within a range of 7.5–12.5 percent), but there is considerable uncertainty around the trajectory of future waves of COVID-19. The expected recovery will put India among the world's fastest-growing economies. India's GDP grew at 20.1 percent y-o-y during the April to June quarter of 2021. The financing needs of the GoI are expected to rise significantly. The sharp economic slowdown has affected revenues disproportionately with general government revenues declining by over 10 percent in FY20/21. At the same time, expenditure needs have risen. The bulk of the required financing is expected to be sourced from domestic markets which have enough liquidity, with minor contribution from international borrowing.³⁴ With the easing of COVID-19 restrictions, GST collections for July, August, and September 2021 have crossed INR 1 trillion mark. The robust GST revenues are expected to continue as the economic recovery gathers momentum.
3. **The COVID-19 pandemic has exacerbated the vulnerabilities for traditionally excluded groups, such as youth and women.** The lockdown, in the first quarter of FY20/21, appears to have had a major impact on household consumption. Mean per capita consumption is estimated to have dropped by 36 percent over April–July 2020 y-o-y. Available household survey data indicate that relative to the 'traditional poor' the most affected population were relatively younger, more urban, and educated. With the end of the lockdown, however, household consumption seems to have recovered to almost pre-pandemic levels. In addition, interstate migrants are at risk of increased poverty and destitution. Estimates from the Economic Survey highlight that the magnitude of interstate labor migration in India was close to 9 million annually between 2011 and 2016 and migrant remittances in lower-income states such as Bihar accounted for 35.6 percent of GSDP in 2011–12. Micro, small, and medium enterprises (MSMEs) that account for the largest non-farm employment (30 percent) with about 20 percent female participation are considered to have been affected the most due to lockdown.
4. **Fiscal and monetary policies aimed at managing the impact of the pandemic, together accounted for more than 10 percent of GDP in FY20/21:**
 - (a) **Pradhan Mantri Garib Kalyan Yojana (PMGKY)** to protect the poor and vulnerable affected by coronavirus containment measures is expected to cost approximately US\$23 billion.

³³ National Statistics Office, MOSPI.

³⁴ Union budget 2021, 2022, Ministry of Finance.



- (b) **MSME support** includes Emergency Credit Line Guarantee Scheme of INR 3 trillion,³⁵ INR 200 billion subordinate debt for stressed MSMEs, INR 100 billion to provide equity funding for MSMEs with growth potential and change in the definition of MSMEs, by increasing investment limits and firm turnover, to help incentivize firms to grow.
 - (c) **Agriculture infrastructure fund** proposed financing facility of INR 1 trillion (to be funded by National Bank for Agriculture and Rural Development [NABARD]) to promote post-harvest management infrastructure and **micro-food enterprise** of INR 100 billion for technical upgrade and promotion of clusters of local products.
 - (d) **Outlay of Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)**, a universal employment guarantee program, is increased by INR 400 billion.
 - (e) **Increased state government borrowing limit**, from 3 percent to 5 percent of GSDP (additional INR 4.28 trillion).
 - (f) **Long- Term Repo Operations (LTROs) and Special Liquidity window** to alleviate cash flow pressures. The Reserve Bank of India has conducted LTROs and targeted LTROs for a total of INR 9.6 trillion (about 4.5 percent of GDP) since February 2020. Moreover, a special liquidity facility for mutual funds of INR 500 billion was opened on April 27, 2020, to ease liquidity pressures on mutual funds.
5. **Fiscal support of INR 6.3 trillion was provided after the second wave of COVID-19.** Of 17 measures, a few are listed as follows:
- (a) The Reform-Based Result-Linked Power Distribution scheme worth INR 3 trillion was announced to provide financial assistance to Discoms for infrastructure creation, upgradation of system, capacity building, and process improvement.
 - (b) Credit Guarantee Scheme for Micro Finance Institutions (MFIs) to provide guarantee to scheduled commercial banks for loans to new or existing NBFC³⁶-MFIs or MFIs for on-lending up to INR 0.125 million to approximately 2.5 million small borrowers.
 - (c) An INR 1.1 trillion credit loan guarantee scheme was announced for COVID-affected sectors, of which INR 500 billion was for medical infrastructure in underserved areas. Other sectors include working capital/personal loans to people in tourism sector to discharge liabilities and restart businesses affected due to the COVID-19 pandemic.
 - (d) The Emergency Credit Line Guarantee Scheme, as part of Atmanirbhar Bharat Package launched earlier, has been extended till March 31, 2022, or till guarantees for an amount of INR 4.5 trillion are issued under the scheme, whichever is earlier.

WBG support for responding to the crisis

6. **In alignment with its global response, the WBG has been closely supporting the GoI's strategy, which consists of three phases.** In the first phase, the GoI tackled the health aspects, and partnered with the World Bank for a US\$1 billion health project. In the second phase, the GoI invested US\$23 billion in

³⁵ Details: <https://pib.gov.in/PressReleasePage.aspx?PRID=1625306>.

³⁶ Non-banking financial institution.



social protection program to support the poor and vulnerable communities during the lockdown, and the World Bank provided financing of US\$1.65 billion. In the third phase, the GoI focused on economic stabilization and reducing the costs of the lockdown. This includes support to MSMEs and their workers during the lockdown by committing about 1.5 percent of GDP to MSME finance. The World Bank financing of US\$750 million supports this program to provide liquidity for its balance sheets, to mitigate against potential solvency problems and job losses, and to lay the foundations for a stronger MSME financing ecosystem in the recovery phase.

7. **Additionally, the World Bank activated the Contingent Emergency Response Component (CERC) in five projects to support the state governments' COVID-19 relief efforts.** Moreover, many projects made special provisions for COVID-19 assistance packages within their project scope. Going forward, the World Bank will be supporting the GoI as follows:

- (a) **Saving lives.** Other than the ongoing health programs, the World Bank is a potential partner with the GoI on its flagship program of Atmanirbhar Swasth Bharat Yojna which aims at strengthening the health sector in the country by strengthening health care services, health emergency preparedness and response, and strengthen core capacities as per the International Health Regulations. In addition, the World Bank is exploring innovative ways of support to the state and central governments through upcoming operations in the education and health sectors.
- (b) **Protecting poor and vulnerable people.** The third phase of the social protection program is aimed at strengthening the capability of the state and national governments in India to respond to the needs of informal workers through a resilient and coordinated social protection system. Some upcoming projects have specific COVID-19 components supporting this pillar, for example, Fisheries Sector COVID-19 Response and Recovery and Resilient Kerala Program for Results.
- (c) **Sustainable growth and job creation.** The World Bank is preparing a project on raising and accelerating MSME productivity which will focus on strengthening institutions and markets. Job creation is a special focus under the infrastructure projects as well.
- (d) **Strengthening policies, institutions, and investments for rebuilding better.** This is an all-encompassing theme under the India CPF and is integrated in most of the projects. The upcoming engagement with the National Disaster Management Agency on Seismic Risk Mitigation Project is one such example.

8. **The International Monetary Fund (IMF) does not have an active lending program in India.** However, it undertakes regular macroeconomic supervision and Article IV consultations twice yearly. The World Bank and IMF teams regularly exchange views and information. The partnership with other donors was brought to fruition in both the Social Protection and MSME COVID-9 response DPLs. Within the Social Protection DPL, the World Bank has worked in collaboration with the Asian Development Bank (ADB), *Agence Française de Développement* (AFD), and *Kreditanstalt fuer Wiederaufbau* (KfW). The Japanese International Cooperation Agency (JICA), AIIB, the New Development Bank (NDB), and International Fund for Agriculture (IFAD) are also exploring potential parallel financing in upcoming operations. Discussions are ongoing to expand the World Bank's technical assistance through additional funds from the Bill and Melinda Gates Foundation (BMGF) and the United Kingdom's FCDO.



ANNEX 2: Project Details

1. **Institutional structure of West Bengal's power sector.** The distribution and hydel generation businesses of the state are managed by WBSEDCL while the transmission and load dispatch businesses are managed by WBSETCL. WBPDCCL is responsible for thermal power generation in the state. WBSEDCL covers nearly the entire state, except Kolkata and other small pockets that are covered by private distribution licensees. These include CESC, a private distribution licensee supplying power to Kolkata and Howrah; Damodar Valley Corporation (DVC), a central public sector undertaking supplying power mainly to industrial consumers in the DVC command area;³⁷ Durgapur Projects Limited, a state-owned utility supplying power mainly in the limited geography of industrial township of Durgapur and is now being merged with WBSEDCL; and Dishergarh Power Supply Company, a privately owned utility supplying power to the Asansol-Raniganj industrial area. WBSEDCL supplies electricity to around 84.7 percent consumers in West Bengal but contributes to only around 56 percent retail sale in terms of million units sold in the state. CESC supplies electricity to around 15 percent consumers in West Bengal and contributes to around 20 percent retail sale in terms of million units sold in the state. DVC contributes to around 17 percent retail sale in terms of million units sold in the state and Durgapur Projects Limited contributes to around 5 percent. All these utilities are regulated by WBERC.
2. **Consumer profile of WBSEDCL.** The number of consumers served by WBSEDCL has more than doubled in the last six years to almost 20 million. WBSEDCL's consumer mix is characterized by a high proportion of low-paying domestic consumers (around 90 percent of WBSEDCL's total consumer strength), contributing to only around 39 percent of WBSEDCL's total retail sale in million units. Industrial consumers contribute to around 32 percent of WBSEDCL's total retail sale in million units and commercial consumers contribute to around 15 percent. Agriculture consumers contribute to around 4 percent of WBSEDCL's total retail sale in million units.
3. **WBSEDCL power system details.** WBSEDCL serves its more than 20 million consumers through a service network spanning five zones, 20 regional offices, 76 distribution divisions, and 535 CCCs. It has 17,279 circuit-km of 33 kV lines, 176,098 circuit-km of 11 kV lines, 348,560 circuit-km of low tension (LT) (440 V) lines, 700 33/11 kV substations with 12,064 MVA capacity, and 284,002 distribution transformers with 14,006 MVA capacity. Apart from its own hydel and solar generating stations, WBSEDCL purchases power from different agencies: WBPDCCL, central generating plants, independent power producers, traders, and so on. WBSEDCL has a mature commercial management system (SAP Industry Solutions - Utilities) in place, which runs on top of SAP ERP with fairly robust internal commercial processes.
4. **The proposed project would support the implementation of the 24x7 PFA Program in the state of West Bengal and support WBSEDCL in transitioning toward a leading public sector utility in India.** The project is proposed to have the following components.

Component 1: Distribution System Strengthening

5. This component would support strengthening and augmentation of the distribution network in select districts/towns through investments, among others, in (a) HVDSsystem and aerial bunched cabling,

³⁷ Industrial consumers in five districts (Bardhaman, Hoogly, Howrah, Bankura, Purulia).



(ii) investments in 33/11 kV gas insulated substations; and (iii) underground cabling to replace overhead networks.

6. The proposed investments will entail reducing distribution system losses, increasing the capacity of the distribution network to meet the growing load demand, improving the overall reliability of the system, and making the network climate disaster resilient. The investments that will be made under this component include the following:

- (a) **HVDS and aerial bunched cabling.** The AT&C losses in some large districts continue to be high. Under this subcomponent, in around 13 highest loss-making districts (with 8 districts having AT&C losses higher than 25 percent), parts of the existing low voltage network will be converted to high voltage (11 kV) networks with aerial bunched cabling, and the existing large distribution transformers will be replaced with smaller transformers, located closer to load centers. This will improve the high tension (HT):low tension (LT) ratio and prevent unauthorized access to the network and thus reduce losses and bring down network disruptions, thereby improving reliability. This hardening of network will also contribute toward making the network resilient to extreme weather events as the investments will cover the districts such as Bankura, Cooch Behar, Dakshin Dinajpur, Darjeeling, Howrah, Jalpaiguri, Malda, Murshidabad, Nadia, Purba Medinipur, and Uttar Dinajpur, which are located in very high to high damage risk zones with respect to cyclones.³⁸ Aerial bundled cables/conductors can help reduce outages during storms and offer better resistance to winds and growing trees and shrubs compared to exposed conductors.
- (b) **Distribution network augmentation.** This includes investments in 33/11 kV gas insulated substations to augment and strengthen the distribution infrastructure in densely populated urban areas in the above identified 13 districts. These investments will reduce losses and improve the quality of supply to consumers.
- (c) **Underground cables.** To improve system reliability and network resilience toward extreme weather events (especially cyclones and strong winds), this subcomponent would include investment in underground cables to replace the overhead network in around five select towns. The towns to be covered under this subcomponent fall in the districts of South 24 Parganas, North 24 Parganas, Burdwan, and Paschim Medinipur, which are located in very high to high damage risk zones with respect to cyclones. This system (together with its communication devices) would also be integrated with the existing SCADA system. This will also include incorporation of new equipment for fault detection and repair. Moving the network underground will also help improve climate and disaster resilience of the grid, as the lines are shielded from the elements of nature.

Component 2: Smart Grid Development in Urban Areas

7. This component would support investments in smart-grid technologies through investments in (i) the ICT systems of the WBSEDCL through technology and capacity upgrades; (ii) deployment of distribution automation technologies and integration of communicable control devices with SCADA

³⁸ <http://wbmdm.gov.in/pages/cyclone.aspx>.



including investments in GIS upgradation and integration; and (iii) deployment of smart consumer meters in select urban geographies.

8. The ICT tools to be incorporated under this component will be effectively used to improve efficiency, transparency, and accountability in the operations of WBSEDCL. The investments will support the integration of Geographic Information System (architecture design of which is under way at present) with different operation technologies (OTs), which should help WBSEDCL in quick fault detection and restoration, particularly in case of disasters/extreme climate events. The investments that will be made under this component include the following interventions, all of which would be complemented with suitably modifying the business processes, wherever required.

- (a) **ICT systems.** This subcomponent would include investments to improve WBSEDCL's communication infrastructure through technology and capacity upgrades and improve the existing commercial and enterprise information technology (IT) solutions. Investments in communication infrastructure would include upgrading the communication media and technology and upgrading the terminal equipment and related software solutions. IT solution upgrade would include deployment of advanced data management systems (such as deployment of Meter Data Management Systems on cloud and improving of the data analytics/management information system [MIS] functions) and improving of the capability of existing ERP solutions by bringing more services within ERP's domain and integrating/deploying more solutions (such as office automation, and so on).
- (b) **Modern OTs.** This subcomponent would include deployment of distribution automation technologies and integration of various communicable control devices in select towns with distribution SCADA (already existing in three towns). As a precursor, this subcomponent would also include upgrade and integration of the GIS application with SCADA system and other existing IT/OT systems. This subcomponent would also support deployment of an outage management system (OMS) in addition to the existing SCADA solution in one or more of the three identified towns.
- (c) **Deployment of smart meters.** To reduce AT&C losses and improve revenue realization, smart consumer meters, with two-way communication, are proposed to be deployed for high-value consumers in selected urban geographies (Asansol, Kharagpur, and so on). These meters will also improve peak load management and help in better integration of distributed energy resources (such as solar rooftops) in the grid. It is also expected that the meters will support demand-side management by providing consumers with access to their consumption data and hence encourage them to reduce their electricity consumption. The consumer data would also be used to bring more granularity to reliability figures and reduce manual intervention to estimate SAIDI/SAIFI figures.

Component 3: Technical Assistance for institutional development and capacity building of WBSEDCL

9. This component would support (i) strengthening of ICT-OT systems of WBSEDCL for integration of its various technologies including its upgradation and (ii) strengthening the capacity building of WBSEDCL through personnel planning, business process reengineering, the hiring of PMCs, and provision of Training and Workshops and knowledge exchange visits.



10. WBSEDCL has, over a period of several years, implemented several IT applications mostly to address specific issues. As a result, the utility currently has multiple legacy IT applications, which are not fully integrated with each other. Further, the existing ICT infrastructure needs to be upgraded to accommodate the deployment of smart grid technologies such as OMS. Such technologies will help WBSEDCL improve its capability to generate early warning signals and communication with its customers. Besides deploying the technology, WBSEDCL would need to plan and reskill manpower to work on modern systems. Lastly, the business processes in the utility would also require a change to ingrain the use of technology in daily operations. The indicative list of activities to be supported under this component includes the following:

- (a) **Support for strengthening ICT/OT systems.** This subcomponent would support the design of IT/OT architectures for improved integration of various technologies and appointment of PMCs for deployment of systems under Component 2.
- (b) **Support to undertake personnel planning** to prepare for the changing business environment because of deployment of new technologies.
- (c) **Business process reengineering to institutionalize the use of smart grids** in the utility's daily operations and ensure that the functionalities provided by the ICT tools are able to offer necessary benefits.
- (d) **PMCs to assist in supervising** and monitoring contracts awarded under Component 1 of the project.
- (e) **Building/strengthening staff capacity** through trainings; workshops; and knowledge exchange visits in areas, such as improved maintenance practices, good practices on climate change and disaster risk management, FM, corporate governance, and so on.

Component 4: Contingent Emergency Response Part (to be capitalized in the event of an emergency)

11. This component would support provision of immediate response to an eligible crisis or emergency.

12. The objective of this component is to support the GoWB's response in the event of an eligible emergency. This responds to a request by the GoWB that the World Bank's portfolio enhances West Bengal's capability to respond to emergencies with major adverse economic and/or social impact. The component will be governed by paragraph 12 of the World Bank Policy on Investment Policy Financing (Rapid Response to Crises and Emergencies). In the event of an eligible emergency being declared, the GoWB may request the World Bank to reallocate project funds to support the response effort. The component would be capitalized by drawing on uncommitted funds under Components 1 to 3. The component could also be used for processing additional financing should funding for this become available due to an eligible emergency.



13. The cost-wise breakup of the investment to be undertaken under the project is provided in table 2.1.

Table 2.1. Project Components and Costs

Project Components and Activities	Total Project Cost (US\$, millions)	IBRD Financing (US\$, millions)	AIIB Financing (US\$, millions)	Counterpart Financing (US\$, millions)
Component 1: Distribution System Strengthening	315.45	110.41	110.41	94.63
HVDS and aerial bunched cabling	148.81	52.08	52.08	44.65
Distribution network augmentation	24.79	8.68	8.68	7.43
Underground cabling	141.85	49.65	49.65	42.55
Component 2: Smart Grid Development in Urban Areas	63.57	22.25	22.25	19.07
ICT systems and smart meters	41.31	14.46	14.46	12.39
Modern OTs	22.26	7.79	7.79	6.68
Component 3: Technical Assistance for institutional development and capacity building of WBSEDCL	6.00	2.00	2.00	2.00
Component 4: Contingent Emergency Response Part	0.00	0.00	0.00	0.00
Front-end fee	0.675	0.3375	0.3375	0.00
Total	385.70	135.00	135.00	115.70



ANNEX 3: Implementation Arrangements

Project Institutional and Implementation Arrangements

1. The project will be implemented in the state of West Bengal by WBSEDCL or the IA. The IA has set up a dedicated PIU to implement the project. This does not imply that the project would be ring-fenced from the IA's broader organization. Within the existing corporate structure (procurement, finance, and so on), the IA has designated individuals with clear responsibilities for dealing with all issues related to the proposed project.
2. To support WBSEDCL to smoothly implement and monitor the investments under this project, PMCs will be engaged. The PIU, with support from PMCs, will provide quarterly progress reports, IFRs, audited financial statements, and other such information as the World Bank may reasonably require.
3. For activities under Component 2, which involve deployment of technology solutions that are highly specialized in nature, WBSEDCL will engage PMC firms for technical design, bid process management, and implementation supervision.
4. Lastly, the WBSEDCL PIU has prepared a Project Operations Manual, where a group of monitoring indicators will be put in place to track progress of the project. The manual also defines clear procedures on FM, procurement, contract management, and implementation of environment and social safeguard management. Further, the manual contains the details to use Component 4, including the process of activation, implementation, and successful closure. The draft Project Operations Manual has been reviewed by the World Bank and is being finalized.

Financial Management

5. **Implementation arrangements.** An officer of the rank of Assistant General Manager is designated as the nodal officer for the project finance and accounts in the PIU and will be responsible for providing overall assurance on the use of project funds, preparing and disseminating progress and financial reports, and facilitating internal audit and audit of Project Financial Statements (PFSs). Overall, the project's FM arrangements will be predicated on WBSEDCL's own systems and will be included in the Project Operations Manual.
6. **Corporate governance.** WBSEDCL has a functioning board of directors and an audit committee with a mix of functional, nominee, and independent directors. There is a system of annual evaluation of the board, its committees, and the independent directors, and the key outcomes are mentioned in the annual report of WBSEDCL. An annual secretarial audit is conducted by an independent company secretary and the report is part of the published annual report of WBSEDCL. WBSEDCL has instituted policies to prevent fraud and corruption including a Whistle Blowing Policy, Code of Conduct of Business, and Ethics and Policy of Related Party Transactions. It has established a risk management function, which can be further strengthened.
7. **Budgeting.** The World Bank/AIIB-supported project has been included in the board-approved annual budget for FY21 and will be included in the budget for subsequent years. The GoWB will act as a pass-through for the World Bank/AIIB funds to WBSEDCL for which distinct budget lines have been opened by the GoWB in the demand for grants of the Power Department and provisions for project funds



(including counterpart funds) have been made under these heads for FY21 and FY22. Yearly budget provisions for the project will be made for subsequent years in accordance with the state's extant budgeting system.

8. **Counterpart funding.** The project will be funded in the ratio of 70:30 by the World Bank AIIB and GoWB/WBSEDCL, respectively. According to the budgetary provisions, the GoWB will provide the state (counterpart) share and the World Bank/AIIB loans will be provided as equity contribution to WBSEDCL, implying that the loan will be on the books of the GoWB, and WBSEDCL's capital will be strengthened. The GoWB will ensure timely release of the project funds to WBSEDCL.

9. **Funds flow.** The office of the Comptroller of Aid, Accounts, and Audit (CAAA) will submit withdrawal applications to the World Bank for processing disbursement for IBRD and AIIB loans based on a single IFR. The World Bank/AIIB funds will be disbursed to the GoI, which will pass on these funds to the GoWB, in accordance with its standard arrangements for development assistance to the state, in the consolidated fund of the state. Project funds (counterpart contribution and World Bank/AIIB loans) will be drawn from the state's consolidated fund in accordance with the existing treasury systems and will be provided in a project dedicated bank account on a need basis. A project dedicated bank account will be opened at the level of the nodal section designated by WBSEDCL, operated through specified joint signatories, and supported with a need-based zero balance subsidiary account (under the parent-child mechanism). Payments for project expenditures will be made from the project dedicated bank account in accordance with WBSEDCL's own systems.

10. **Accounting and internal controls including internal audit.** WBSEDCL will use its extant accounting and internal control systems to account for project transactions. Accounting will be centralized, and the project will be configured in SAP ERP so that the transactions are easily identified. Detailed protocols relating to contract management, including verification and approval of bills, payments of approved bills, and the related accounting and control systems, are covered in the Project Operations Manual. Internal audit will be conducted by one of the firms on the panel of WBSEDCL on ToRs presently used by WBSEDCL and supplemented by additional terms as agreed with the World Bank. The internal audit reports pertaining to the project will be presented before the audit committee and shared with the World Bank. Timely and adequate compliance with the audit observations would be essential and will be followed up by the World Bank.

11. **Project financial reporting.** The reporting arrangements for the project will be through (a) quarterly IFRs submitted to the World Bank within 45 days from the close of the quarter and (b) annual PFSs, which will separately identify each component under the project and the funding sources and will be submitted to the World Bank within nine months from the close of the financial year. The format and contents of the IFR have been agreed between the World Bank and WBSEDCL and are included in the Project Operations Manual. The same IFR will be used for disbursement of the loan for both IBRD and AIIB.

12. **Audit of annual PFSs.** External audit of the annual PFS will be conducted by a firm of chartered accountants, acceptable to the World Bank and selected and appointed by WBSEDCL, and it could also be conducted by the statutory auditors of WBSEDCL appointed by the Comptroller and Auditor General of India. The ToRs have been agreed with the World Bank and included in the Project Operations Manual. The World Bank will review the entity audit report and audited annual financial statements. Under the



Access to Information Policy of the World Bank, the audit report and the audited PFS will be disclosed on the website of the World Bank and WBSEDCL.

Disbursements

13. WBSEDCL will submit the claim to CAAA, along with the IFR and a covering letter, indicating the respective loan share of IBRD and AIIB. CAAA will simultaneously submit back-to-back applications through Client Connection separately for IBRD and AIIB. IBRD will process the application and inform AIIB through a disbursement note for releasing AIIB's share of the loan. Supporting documents required for World Bank disbursement will be according to the World Bank's Disbursement Handbook and will be documented in the Disbursement and Financial Information Letter.

Table 3.1. Loan Proceeds

Category	Amount of Loan Allocated (US\$)		Percentage of Eligible Expenditure to Be Financed (inclusive of taxes)	
	IBRD	AIIB	IBRD (%)	AIIB (%)
Goods, works, non-consulting services, consulting services, and training and workshops for the project	134,662,500	134,662,500	35	35
Emergency expenditures under CERC Part	—	—	—	—
Front-end fee	337,500	337,500	50	50
Interest rate cap or interest rate collar premium	—	—	—	—
Total Amount	135,000,000	135,000,000		

14. **Ineligible expenditure.** The following expenditures incurred by the project will be financed exclusively from the GoWB/WBSEDCL's own resources and will not be eligible for financing from the World Bank/AIIB:

- (a) all land acquisition required for the purpose of the Project
- (b) any compensation, resettlement and rehabilitation payment to Affected Persons in accordance with the provision of the RAP(s) and TDPs
- (c) any compensatory afforestation payments, including as required by the ESMF
- (d) any interest during construction
- (e) any retention money deducted from contract payments, and not released by Closing Date
- (f) Incremental Operating Costs
- (g) any expenditures objected or considered ineligible by the World Bank, internal auditors, or the independent auditors in the Project's Financial Statements prepared pursuant to Section 5.09 of the General Condition.

15. **Retroactive financing.** The project will be eligible for retroactive financing. All eligible project expenditures meeting the agreed procurement procedures for the project and for which payment is made



on or after December 31, 2020, can be claimed from the World Bank/AIIB. This will be restricted to 20 percent of the World Bank/AIIB financing, that is, US\$27 million each. The project will submit a stand-alone IFR detailing the expenditures incurred during retroactive financing, which will be subject to audit by the project's external auditors.

Procurement

16. **Procurement Regulations.** The World Bank and AIIB have agreed that the procurement for the project will be carried out in accordance with the World Bank's Procurement Regulations for IPF Borrowers dated July 2016, and revised in August 2018 and November 2020, and the provisions stipulated in the Legal Agreement. Further, the project would be subject to the World Bank's Anti-Corruption Guidelines, dated October 15, 2006, and revised in January 2011 and July 2016. Unless otherwise agreed with the World Bank, the World Bank's standard procurement documents will be used.

17. **Implementation arrangements for procurement.** The PIU will undertake procurements under the project through a National Informatics Centre (NIC) based e-Procurement portal, which has been already used in the IA, and the same system with some minor modifications has been cleared by the World Bank for use in this project.

18. **Project procurement strategy.** Major items to be procured under this project are supply and installation of HVDS, underground cabling, GIS, smart metering, and IT-based control and monitoring systems. A few consultancy assignments are also envisaged. A PPSP has been developed for the project based on detailed requirements, capacity assessment, and market analysis. Emphasis has been given for the complex procurements planned under the project. Based on the findings, decisions on packages and lots are being finalized to ensure adequate participation of bidders. Based on the PPSP, a Procurement Plan has also been prepared for first 18 months. The same shall be augmented and modified based on changing requirements during project implementation.

19. **Procurement risk assessment.** The risk ratings have been decided based on both the probability of occurrence of various events and their likely impact. Assessment parameters, include, among others, procurement capacity and experience of the IA, complex nature of the procuring items, prevailing situation of uncertainties due to COVID-19, and possibilities of fraud and corruption/transparency-related risks. Also, this is a procurement-intensive project and many large-value procurements are envisaged, which may be complex from a tendering and contract management perspective. Based on the assessment, the overall 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 3.2 describes major procurement-related risks and the mitigation plan with responsibility matrix/timeline.

Table 3.2. Key Procurement-Related Risks and Mitigation Plan

Risks Identified	Mitigation Measures Proposed	Responsibility
Institutional capacity as no previous experience in World Bank procurement	<ul style="list-style-type: none"> Organizing regular training programs on procurement to enhance capacity Project Operations Manual (which will include chapter on procurement) 	IA/World Bank
Complex and high-value procurement	<ul style="list-style-type: none"> Use of appropriate market approach based on recommendations of the PPSP Monitoring through the Procurement Plan and quarterly 	IA/World Bank



Risks Identified	Mitigation Measures Proposed	Responsibility
	reports	
Risk of inadequate budget or delay in budget from the Government due to COVID	<ul style="list-style-type: none"> Budget planning would be kept streamlined with advance provisions 	IA
External interference in the procurement process, transparency, and fraud and corruption issues	<ul style="list-style-type: none"> Use of e-Procurement Fair complaint handling mechanism Disclosure of procurement-related information External/internal procurement audits 	IA

20. **Procurement readiness.** Procurement packages amounting to US\$170 million for the HVDS and underground cable are ready and bids for the same have been invited, which are in the different stages of tendering process.

21. Based on the preliminary assessment, most of the procurement will follow the national market using Request for Bids (RFB). A few RFBs could follow an international approach. There is no proposal to use the best and final offer or negotiations.

Table 3.3. Procurement Category and Method of Selection Process

Category	Description	Selection Method
Works	Including supply-cum-installation works	RFB - International/National; RFQ - National
Goods/non-consultancy services	Vehicles, IT system, computers and accessories, software and related items, and so on	RFB-International/National, RFQ - National including GeM; a few may be DS
Consultancy	PMCs, technical consultancies, internal audit, and so on and research activities and capacity-building activities	QCBS, LCS, FBS, QBS, CQS, a few may be DS

Note: CQS = Selection based on Consultant's Qualifications; DS = Direct Selection; FBS = Selection under a Fixed Budget; GeM = Government eMarketplace; LCS = Least-Cost Selection; QCBS = Quality- and Cost-Based Selection; RFQ = Request for Quotations.

22. **Arrangements under National Competitive Procurement.** National competition for the procurement of goods, works, and non-consulting services according to the established thresholds will be conducted in accordance with paragraphs 5.3–5.6 of Section V of the Regulations and the following provisions:

- (a) Only the model bidding documents for National Competitive Procurement agreed with the GoI task force (and as amended for time to time) shall be used for bidding.
- (b) Invitations to bid shall be advertised on a widely used website or electronic portal with free open access at least 30 days before the deadline for the submission of bids, unless otherwise agreed in the approved Procurement Plan.
- (c) No special preference 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) Except with the prior concurrence of the World Bank, there shall be no negotiation of price with the bidders, even with the lowest evaluated bidder.



- (e) GeM set up by the Ministry of Commerce, GoI, will be acceptable for procurement under the RFQ method.
 - (f) At the borrower's request, the World Bank may agree to the borrower's use, in whole or in part, of its electronic procurement system, provided that the World Bank is satisfied with the adequacy of such system.
 - (g) Procurement will be open to eligible firms from any country. This eligibility shall be as defined under Section III of the Procurement Regulations. Accordingly, no bidder or potential bidder shall be declared ineligible for contracts financed by the World Bank for reasons other than those provided in Section III of the Procurement Regulations.
 - (h) The RFB/Request for Proposals document shall require that bidders/proposers submitting bids/proposals include a signed acceptance in the bid, to be incorporated in any resulting contracts, confirming application of, and compliance with, the World Bank's Anti-Corruption Guidelines, including without limitation the World Bank's right to sanction and the World Bank's inspection and audit rights.
 - (i) The borrower shall use an effective complaints mechanism for handling procurement-related complaints on time.
 - (j) Procurement documents will include provisions, as agreed with the World Bank, intended to adequately mitigate against environmental, social (including sexual exploitation and abuse and GBV), and health and safety risks and impacts.
23. Use of GeM will be allowed instead of RFQ/Shopping according to the following details:
- (a) Up to INR 50,000 in catalog mode (in relation any available item could be selected by the IA without further competition), provided the selected item/supplier meets the requisite quality, specification, and delivery period.
 - (b) Up to INR 3 million from the supplier having the lowest price among at least three suppliers meeting the requisite quality, specification, and delivery period. The tools for online bidding and online reverse auction available on GeM may be used by the purchaser.
 - (c) Up to Indian rupee equivalent of US\$100,000 from the supplier having the lowest price and meeting the requisite quality, specification, and delivery period after mandatorily obtaining bids from at least three suppliers, using online bidding or reverse auction tool provided on GeM.
24. **STEP.** The project will implement Systematic Tracking of Exchanges in Procurement (STEP), a planning and tracking tool, for procurement-related communications with the World Bank. Details of the procurement activities that have been prepared, including the Procurement Plan, will be entered in the STEP tool. A few staff from the IA have already been trained by the World Bank to use STEP, and others will be trained as and when required.
25. **Procurement thresholds.** Table 3.4 lists the procurement thresholds for the various procurement methods.



Table 3.4. Procurement Thresholds for the Various Procurement Methods

Procurement Type	Market Approach method Threshold (US\$, millions)	World Bank's Prior Review Threshold (US\$ millions)
Works (including supply and installation, PPP/HAM ^a)	Open International: More than 40 Open National: up to 40 National RFQ: up to 0.1	All contracts > 10
Goods, IT, and non-consulting services	Open International: More than 10 Open National: up to 10 National RFQ: up to 0.1	Goods and IT: All contracts > 2 Non-consulting services: All contracts > 2
Consulting firms	Open International: More than 0.8 National market approach <0.8 CQS < 0.3 LCS, FBS - in Justified cases QCBS, QBS - in all other packages	All contracts > 1
Individual consultants	No thresholds	All contracts > 0.3
DS	No thresholds	With prior agreement based on justification <ul style="list-style-type: none"> • For goods/works /non-consulting services: According to paragraphs 6.8–6.10 of the Procurement Regulations • For consultants: According to paragraphs 7.13–7.15 of the Procurement Regulations

Note: a. Hybrid Annuity Model (HAM) may be followed for AMI packages. Under the HAM, AMI would be procured under part up-front capex and part deferred capex route. Monthly (annuity like) payments for capex deferred shall be considered eligible expenditure and shall be reimbursed till the loan closing date.

26. **Advance contracting with retroactive financing.** For effective project implementation and effective start-up, the project has initiated advance contracting, which is likely to include, but may not be limited to, critical consultancies envisaged under the project: consultancy for PMC, ESIA, baseline survey, and so on.

27. **Post review.** All contracts not subject to prior review by the World Bank will be subject to post review. Post review of the sampled procurements would be carried out during the project's implementation support missions and/or special post review missions. The World Bank may conduct, at any time, independent procurement reviews of all the contracts financed under the loan.

28. **Complaint handling mechanism.** To address procurement complaints received by the project, a link disclosing details about the complaint handling mechanism for this project will be given on WBSEDCL's website. The mechanism would include a brief on whom to complain to, how it will be resolved, and what will be the estimated timeline. The IA is also required to ensure recording of procurement-related complaints in the STEP tool. Both the World Bank and the borrower will use STEP to track complaints. The borrower will be responsible for performing the following actions in STEP: (a) promptly record all complaints relating to procurement process in IPF operations; (b) for procurement process complaints received on contracts subject to the World Bank's prior review, submit the borrower's proposed response to each complaint before issuing it to the complainant(s); (c) record the borrower's response to the



procurement process complaints upon issuance to the complainant(s); and (d) promptly register requests for debriefings and update STEP with the record of the debriefings to interested parties.

29. **Record keeping.** All records pertaining to award of contracts—including bid notifications; bidding documents; bid opening minutes; bid evaluation reports; signed contracts; and all correspondence pertaining to bid evaluation, communication exchanged with the World Bank and the bidders/consultants in the process, bid securities, and approval of invitation/evaluation of bids—must be retained by the PIU. These will also be uploaded in STEP.

30. **Disclosure.** The minimum documents that will be disclosed on the WBSEDCL websites include (a) RFB/Request for Expressions of Interest and (b) details of contract awards. The following details are published on the United Nations Development Business website through STEP: (a) an invitation for bids for procurement of goods and works using open international procedures and (b) contract award details of all procurement of goods and works using open international procedures.

Environmental and Social (including safeguards)

31. **ESS1: Assessment and Management of Environmental and Social Risks and Impacts.** The project activities under Components 1, 2, and 3 are planned to be executed across 14 districts (Howrah, East Medinipur, Bankura, Purulia, Nadia, Murshidabad, Malda, North Dinajpur, South Dinajpur, Cooch Behar, Alipurduar, Darjeeling, Kalimpong, and Jalpaiguri) of the state of West Bengal that are located in five agro-climatic zones.

32. The project activities are aimed to reduce losses in the system and improve safety while limiting land-take and related impacts. The potential environmental impacts arise out of construction-related activities and some out of siting, construction, and operation of substations as well as installation of underground cables. These include water and soil contamination from wastewater generated from construction/workers camps and municipal solid waste; spillage and handling of chemicals and hazardous materials at substation sites; damage to vegetation in case of changes to existing alignment; air pollution due to fugitive dust from earthwork; emissions from vehicle operation, equipment, and plants; cutting of trees for substation locations; impacts on culturally and socially important common properties and religious properties/sites; and distress of public/community due to disruption of utility services in towns where underground cabling is supported. In addition, potential inducement of landslides, landslips, and erosion from cut surfaces of hill slopes and disposal of spoils from hillside cutting may happen in the northern hilly districts. Depending on the final selection of stretches, some cable replacement subprojects could be in areas known to be elephant corridors in north western and southern districts (Purulia, West Midnapore, Bankura, Jalpaiguri, Alipurduar, and Cooch Behar). No archaeological monuments or important historic sites are likely to be affected due to the project activities. Operational stage impacts could include spillages of chemicals, including oils; fugitive emissions of SF₆³⁹ (a potent greenhouse gas [GHG]); and hazards related to fire, including choking.

33. The strengthening and development of the distribution network through construction of substations and placing of electrical poles and stringing of distribution lines, along with laying of underground cabling, is assessed to result in minimal social impacts with less overall land intake, crop and tree losses, and access constraints for business and properties that include both private and community.

³⁹ SF₆ = Sulphur Hexafluoride.



The impacts are largely minimal and temporary in nature and scope. The impacts on vulnerable populations will be avoided to the possible extent by altering the site locations.

34. Positive impacts to the people and environment are envisaged because the project potentially includes reduced losses (resulting in less requirement of generation for same level of supply); safer and more reliable supply of electricity to the local population; and in cases of underground cabling, improved visual aesthetics.

35. The overall environmental and social risk rating is, therefore, currently Moderate, based on the studies undertaken for the development of the ESMF for the overall project and select ESIAs for 14 subprojects (that include 11 overhead distribution networks and 3 underground cabling activities), because the activities are of small scale and mostly involve existing locations/alignments. The ESMF lays out the overall guidance for ESIAs to be undertaken for the subprojects still not fully developed and has developed a generic ESMP that can be modified to suit conditions of each subproject. WBSEDCL has experience of handling one World Bank-supported underground cabling activity. However, given the extensive nature of the project, its capacity to handle environmental and social risks and impacts would need to be augmented in line with recommendations in the ESMF to ensure that the project implementation maintains its current risk profile.

36. In addition to the ESMF, subproject-specific ESMPs for 10 subprojects have been prepared and draft versions of these have been disclosed. Based on the ESMP, it will be the responsibility of the selected contractor to prepare and submit to WBSEDCL, a contractor's ESMP, which will include the related plans such as OHS plan, waste management plan, workers' camp management plan, community traffic management, health and safety plan, and site restoration plan.

37. Subproject ESMPs will be part of contract and environmental mitigation costs budgeted in the scope of the contractor by including the ESMP items in Bill of Quantity for the respective subproject. The implementation of mitigation measures shall be monitored according to the environmental monitoring plan in that ESMP. The integration of relevant provisions of specific ESMPs in the bidding documents for subprojects is one of WBSEDCL's commitments in the ESCP.

38. The PIU, through the respective region/division offices, would monitor the implementation of the ESF requirements in all the subprojects to ensure conformity to the requirements of the ESMF/ESIA and ESMP. The monitoring would be carried out through the subproject-wise monthly progress reports submitted by the region/division offices of WBSEDCL implementing the subproject. The reporting would capture information from the contractors/IA to region/division offices and a monthly progress report will be sent by the division office to the environmental and social officers at the PIU. The designated environmental and social officers of the PIU would also visit the site regularly for monitoring and supervision.

39. The PIU would review these monthly reports and identify issues pertaining to the compliance of the ESMP provisions. A corrective action plan would be developed by the PIU and debated internally to determine appropriate interventions. These interventions would be conveyed to the WBSEDCL management through a quarterly report for approval and subsequently implemented by the PIU. The PIU would prepare a quarterly progress report with ESMP compliance status and a semiannual monitoring report and present it to the WBSEDCL management, who will share these with the World Bank.



40. The estimated cost of ESMF implementation may vary from 1 to 3 percent of the total project cost depending on the ecological sensitivity of subproject area and required mitigative measures for likely potential adverse environmental and social impacts. The ESIA's already prepared estimate these costs at about 1 percent of the subproject cost.

41. **ESS2: Labor and Working Conditions.** The national legal provisions on labor cover almost all requirements in ESS2 except relating to community workers and a functional grievance redress mechanism for different types of workers. The project will contract agencies to undertake civil works, agencies/firms to support core functions, primary suppliers and installers of material/equipment, and other implementation support partners. Labor would be required for construction of the gas insulated substations and erection of HVDS and underground cabling networks. Unskilled labor would be required for civil works and would be preferably sourced from local areas. However, skilled labor required for erection of poles, commissioning of the gas insulated substations, stringing of electricity distribution networks, micro-tunneling for underground cabling, and so on may involve some migrant laborers.

42. The key project workers envisaged to be involved are direct workers; contracted workers, including migrant labor; and primary supply workers (labor contractors). The possible risks include nonpayment of wages and benefits (compensation, bonus, maternity benefits, and so on) by the employer; discrimination in employment (for example, abrupt termination of the employment, working conditions, wages or benefits, and so on); possibility of GBV arising from influx of migrant workers, particularly in sensitive locations such as hospitals, schools, and so on that are in habitations; and health risks of labor relating to HIV/AIDS and other sexually transmitted diseases. The basic issues related to migrant labor may include conflict among workers and between workers and local community based on cultural, religious, or behavioral practices and discontent among local community on engagement of outsiders and chances of mild outbreaks of certain infectious diseases due to interactions between the local and migrant populations.

43. The occupational risk related to the construction of electricity distribution networks is primarily due to fall from heights, which might cause serious injuries. The electricity distribution network poles would be of different heights, and height of the pole would be 9 m in case of 11/33 kV and 8 m in case of LT line. The depth of trenches will be around 1.2 m below ground, resulting in a low risk of caving/burial.

44. Bid documents for construction have listed out the requirements of applicable national/state labor laws and provisions and the metrics for periodic reporting by contractors. Child labor and forced labor will be prevented through inclusion of required provisions in the bid documents and will take all measures to implement the laws and bid provisions effectively. Each ESMP will outline the various measures that need to be considered to prepare the contractor's OHS plan, which will be part of the contractor's ESMP. The World Bank will review the first few contractor's OHS plans to ensure consistent application of agreed measures. The LMP is developed describing requirements relating to provision of terms and conditions of employment; promotion of nondiscrimination and equal opportunity; and worker's organization and so on, besides a grievance redress mechanism for the direct and contracted workers.

45. **ESS3: Resource Efficiency and Pollution Prevention and Management.** During the construction phase of the project, that is, construction of substations and electricity distribution networks, including underground cabling, insignificant amount of air and noise pollution and contamination of ground from spillage of fuel or oils may be generated due to various construction activities. This would include emission



from fugitive and exhaust air pollution from the movement of vehicles carrying construction material and machinery used during site clearance and leveling of site for gas insulated substations, excavation and filling up of trenches for laying underground cables, and so on. However, this will be temporary and intermittent only during construction phase. During the construction phase of gas insulated substations, pole, and underground cabling network, water would be required for construction works and domestic purposes. Water would also be used for earthwork, levelling, concreting, and curing of concrete.

46. The labor camps might be set up for the construction of the gas insulated substations and fly camps may be developed at different locations for the erection of the distribution transformers/poles and stringing as well as excavation of trenches/micro-tunneling for underground cabling work. These camps may generate solid and liquid waste. These wastes may contaminate the soil and water bodies around the site if not properly handled.

47. During the operation stage, air or noise pollution is not expected from the proposed electricity distribution networks strengthening. SF₆, a physiologically completely harmless gas for humans and animals, is used as an insulating medium in gas insulated substations. It has no ecotoxic potential. It does not deplete ozone. Due to its high global warming (about 23,500 times of CO₂) potential, its leakage may contribute to manmade greenhouse effects if released into the atmosphere. However, in electrical switchgear, the SF₆ gas is always used in gas-tight compartments, greatly minimizing leakage.

48. As part of routine maintenance, transformer oil would be changed every 10–15 years. The used transformer oil is categorized as hazardous wastes according to the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, and its unscientific disposal may lead to contamination of groundwater. Further, transformer oil may contain insignificant concentration of polychlorinated biphenyls.

49. The ESMF provides guidance to manage these impacts and their implementation has been committed by WBSEDCL through the inclusion of the ESMP provisions into the bidding documents. To prevent air pollution, vehicles carrying construction material and machinery would move along the existing access road only. Vehicles that have a valid pollution under control certificate would only be deployed for the purpose with regular checks. Regular maintenance of the micro-tunneling, winching machine, and so on would be carried out to prevent excessive noise. Also, for machineries involved in gas insulated substation construction, maintenance schedules would be prepared and maintained by the contractor. Night-time construction activity would be prohibited in case settlements/habitations are located within 500 m of the construction site.

50. Water usage for construction work would be reduced by adopting various best practices and preference would be given to use of recycled water for construction activity, wherever feasible. The provision to use treated wastewater for construction to the extent feasible, especially for underground cabling subproject, is/will be part of specification through the ESMP.

51. To ensure that these measures are adopted during the implementation of project activities, WBSEDCL will ensure that the contractors prepare and submit the contractor ESMP, which will be monitored as part of the contract monitoring.

52. WBSEDCL would ensure that used transformer oil is disposed of in accordance with the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, and standard operating



procedures. WBSEDCL would follow the procedure for storage, handling, and refilling of SF6 gas cylinders. Every refill would be documented, and any unusual variation in gas volume would be reported.

53. **ESS4: Community Health and Safety.** For access to pole locations or electricity distribution systems, the contractor would use the existing road, that is, existing national/state highways or village roads. During the construction phase, due to the movement of construction-related vehicles and machinery some of the roads, especially village roads, may get damaged. During the underground cabling and stringing operations when the electricity distribution network crosses any road/railways line, hindrances may be caused because of the movement of traffic. In some instances, temporary closure of the road/railway line (access) may be required to facilitate such stringing activities. This disruption in movement would cause inconvenience to the local population as access would be interrupted temporarily. Keeping materials by contractors on the sides of the roads and in open places during execution of works is another issue causing inconvenience to local movements.

54. During the construction of the foundation for the gas insulated substation and trench for underground cabling, and so on the excavation may pose some safety concerns for the inhabitants in the locality. This would be more relevant when the construction is carried out near a settlement or along a foot track or existing village road. During the operation phase, the generation of electromagnetic field from 11/33 kV lines are likely to be insignificant.

55. Majority of these impacts are location specific and could be addressed through management and mitigation measures in the subproject ESMP. For the foundation of gas insulated substations and trenches for underground cabling, the construction areas shall be barricaded, if required. To facilitate easy identification of these areas during the night, warning lights and reflective tapes would be placed on the boundary for enhanced and clear visibility.

56. The generic ESMP outlines contractor responsibilities during project implementation and M&E for which contractor is mandated to prepare a contractor ESMP. The integration of relevant provisions of specific ESMPs in bidding documents for subprojects is one of WBSEDCL's commitments in the ESCP.

57. **ESS5: Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement.** Among all civil work components, construction of distribution substations requires small quantities of lands, and other components such as underground cabling and laying of distribution lines do not require lands except involving temporary disturbances during civil works, such as access restrictions to adjacent properties. The assessment of 14 ESIA's prepared for 10 project districts informs that land requirements are as low as 0.15 acre and as high as 1.2 acres, and these are all government lands with four squatters. There is a possibility that some private land may need to be acquired for subprojects in other districts. If any impacts on vulnerable people—below poverty line, schedule castes, schedule tribes, women-headed households, and differently abled—are identified, they will be mitigated by providing additional measures, more than what are provided to the normal population. Other impacts, which are studied to be more likely, are temporary access restrictions to adjacent properties during execution of underground cabling works. These will be mitigated by providing exclusive temporary ramps to the adjacent properties and prior information to the local population through consultations and using public communication channels on the work schedules and issues. The losses to crops and trees during stringing will be compensated at market rates. All these are prescribed in the RPF, TPPF, LMP, Gender Development Plan, and SEP, which guide the project to address issues arising out of involuntary resettlement and displacement. Consolidated



ESIAs consisting RAPs (where required) are prepared for subprojects. All the implementation stakeholders will be trained in required ESF provisions.

58. **ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.** Major habitat alterations are not expected in the electricity distribution networks strengthening activities due to avoidance forest/ecological-sensitive areas or natural habitats. However, some loss of vegetation may occur due to trimming/felling of trees within the RoW to maintain the required electric clearance between tree and conductor (applicable mostly in areas where bare conductor is used). The current estimate from the 14 ESIAs completed is that no trees are to be cut for these, but some may be affected due to trimming required for project activities.

59. If some portion of the distribution lines passes through national parks, wildlife sanctuaries, and elephant corridors, it can cause disturbance to wildlife habitats/corridors. In the electricity distribution network, bird deaths may be caused from collisions/electrocution. The likelihood of avian collisions can be high when the electricity distribution networks are located close to migratory bird corridors, foraging grounds or nesting and roosting sites, and water bodies. It is to be noted that the current project does not propose any new lines in any such areas. Where such stretches are encountered, bird diverters and/or bird guards, as appropriate, will be provided.

60. WBSEDCL, wherever possible, would use the existing path/access roads for the movement of man and machinery so that vegetation clearance is not required for accessing construction sites. The contract document for the construction of electricity distribution network, including underground cabling and gas insulated substations, would have specific clauses to prevent felling of trees unless it becomes absolutely necessary. Only those trees for which tree felling permission has been obtained from the Forest Department under the West Bengal Trees (Protection and Conservation in Non-Forest Areas) Rules, 2007, would be felled.

61. The ESMF requires that WBSEDCL explore all options during the design phase of subprojects to avoid intrusion of the electricity distribution network into wildlife habitats through optimization of route alignment. If not feasible, a biodiversity assessment, commensurate with the ecological value of such locations, would be undertaken to establish the management measures required for such stretches. In line with the Ministry of Environment, Forests, and Climate Change's guidelines for laying of distribution lines of 33 kV and below, through national parks, wildlife sanctuaries, conservation reserves, community reserves, and wildlife corridors, underground cables or ABCs or insulated conductors have been included in the specification for such locations.

62. Use of ABC or insulated cables with other measures such as providing bird guards on electric poles to avoid perching and installation of bird diverter in identified bird habitats/flyway zones to avoid bird collusion/electrocution should be included in line with the ESMF.

63. The subproject-specific ESMP will have the necessary specifications, quantities, and reporting mechanisms for monitoring and confirming that ESS6 provisions are being implemented.

64. **ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities:** The project works will be implemented in districts where tribal/indigenous population are located, but not found affecting tribal habitations. If works are undertaken in tribal areas, the proposed works would result in temporary disturbances as in other locations but would not result in displacement



and land acquisition. The concentration of tribal population in project districts is 7.46 percent to total population of project districts. Hence, for these groups, additional outreach efforts will be made using culturally appropriate information, education, and communication materials for information dissemination/consultation, particularly during preparation of tribal development plans.

65. A TPPF has been developed as part of the ESMF. The framework details the process to be followed based on the risk categorization, approach to engagement of these groups, implementation arrangements, and monitoring. The framework clearly states that Free, Prior and Informed Consent (FPIC) will be undertaken in subprojects involving impacts on land, livelihood, and cultural heritage and in cases requiring relocation. In the event that FPIC cannot be obtained, the project will not proceed with the activities. The framework has been developed in accordance with provisions of ESS7 and the existing state and national legal and regulatory framework.

66. Based on the findings, if need be, tribal development plans will be developed before commencement of works and included within the ESMPs for low and moderate risk subprojects and as separate plans for subprojects categorized as substantial or high risk. Such plans will be prepared at least one month before commencement of works and will be disclosed on WBSEDCL's website.

67. **ESS8: Cultural Heritage.** Because there are no important archaeological sites or historic monuments identified, no significant impacts are likely on cultural heritage. However, given the nature of activities and project area, it is possible that there could be chance finds when construction begins. These would be handled in line with applicable national regulation.

68. **ESS10: Stakeholder Engagement and Information Disclosure.** An SEP has been prepared for the project in accordance with World Bank's ESS10 considering the nature and scale of subprojects and potential risks and impacts. Through the process of consultation and disclosures, WBSEDCL would envisage to build participation of stakeholders at each stage of project planning and implementation. WBSEDCL would be responsible not only for ensuring participation of the community in the consultation process but also for making it effective to ensure integration of feedback received from stakeholders into the project plans, where it deems fit. If significant changes are made to the SEP during public consultation, WBSEDCL will disclose the updated SEP. The various tools that the SEP currently envisages include the following: (a) public meetings, with separate meetings for women and vulnerable groups during preparation and implementation, as required; (b) face-to-face individual/focus group meetings; (c) mass/social media communication (as needed); (d) brochures, posters, flyers, and websites; (e) information boards or desks (in regional offices); (f) grievance mechanism channels; and (g) WBSEDCL monthly newsletter.

69. The Information Disclosure Procedure would ensure that information concerning the project's activities is made available to the public in the absence of a compelling reason for confidentiality.

Gender-Based Violence

70. To assess potential GBV at-risk groups and hotspots, stakeholder consultations will be carried out. GBV prevention, reporting, and response are outlined as follows: vulnerable at-risk groups include single women and scheduled caste and scheduled tribe women and adolescent girls (travelling to school and/or vocational training centers, primarily from communities close to the construction work and labor camps). Migrant women laborers are also vulnerable if adequate safety and security measures are not



undertaken at work sites and within labor camps. Identified hot spots for GBV within the project include construction work sites and labor camps alongside local communities, schools, vocational training centers, and liquor shops and migrant laborers residing in rented accommodations within the villages. Hence a GBV plan will be prepared, as required, for the overall project, which comprises the following: (a) developing and sharing a code of conduct for GBV with the contractors; (b) mapping of service providers for GBV prevention and response for all the subproject and strengthening institutional links with these service providers for GBV risk mitigation and response; (c) integrating GBV into the existing information, education, and communication strategy/materials, grievance redress mechanisms, safety talks, tool box meetings, and regular trainings including provision of orientation and sensitization training for all project staff and contractors, particularly, safety supervisors and engineers; (d) providing strategies for increasing community consultation and identification of GBV focal points within the community; and (e) monitoring and reporting these actions with a special focus on identified hot spots.

Strategy and Approach for Implementation Support

71. 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. Implementation support will be provided through regular implementation support missions and continuous exchange of correspondence and regular communication and thematic implementation support missions, if required.

72. **Technical.** Implementation support to the utilities will cover technical and institutional development aspects.

73. **Procurement.** Implementation support will include (a) reviewing procurement documents and providing timely 'no objection'; (b) monitoring procurement progress against the detailed Procurement Plan; (c) reviewing contract management activities; and (d) 'providing training to project staff and officials of the utilities on procurement processing, if required.

74. **FM.** Intensive support, including field visits and desk reviews, in the initial years by World Bank staff is envisaged to ensure implementation of agreed FM arrangements. The 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 IFR/audit reports, and follow-up for mitigation of issues and implementation of recommendations.

75. **Environmental and social safeguards.** The support will cover monitoring various activities to ensure full compliance with the World Bank's ESF and the agreed readiness criteria for subprojects related to environment and social safeguards aspects.

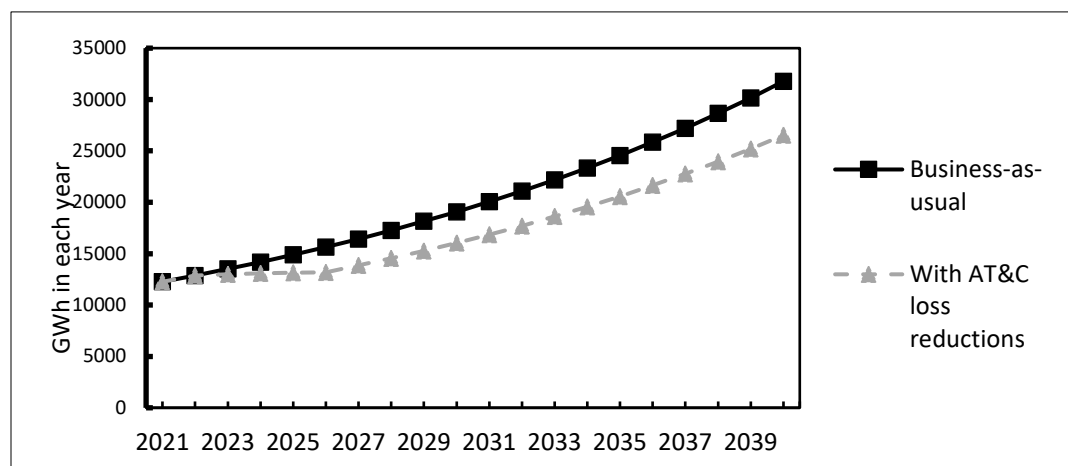


ANNEX 4: Economic Analysis

1. The basis of the economic analysis is detailed project reports prepared by WBSEDCL for districts planning modernization investments. Project investments will bring substantial economic benefits to West Bengal by strengthening the technical, financial, and institutional foundation for efficiently meeting growing power demand.

- (a) **Distribution losses.** An important economic benefit would come from AT&C loss reductions achieved through both technical and commercial improvements. The relative share of technical to commercial improvement is calculated based on reporting from each district. Reducing high AT&C losses mitigates rising generation requirements from the grid even as demand grows. This results in lower purchases of power by the utility for the same volume of sales, translating into cost savings and the potential for lower costs for consumers.

Figure 4.1. Impact of Anticipated AT&C Loss Reductions on the Grid



Source: World Bank analysis

- (b) **Reduction of non-technical losses.** For simplicity, the analysis assumes that the willingness to pay for stolen energy is equivalent to the West Bengal average tariff in 2021. Minimization of non-technical losses is important for the rehabilitation of the utility's financial health and thus for the ability of the electricity sector to provide safe, stable, and affordable service; regardless, it is difficult to quantify the benefits of these losses to society. The share of non-technical reductions that is attributable to theft prevention versus increased collection efficiency is unknown and included as a variable. This share determines how much non-technical loss prevention translates into benefits in terms of increased revenue for the utility from additional sales.
- (c) **Reliability improvement and value of electricity.** Reducing the duration and frequency of power outages serves unmet demand (primarily among residential consumers) and displaces expensive diesel-based self-generation (primarily for industrial, commercial, and agricultural consumers). For nonresidential sectors, the range of willingness to pay is estimated as INR 10–78 per kWh, using different methods, including production loss, captive generation, and willingness to pay, in a survey of industry users in Karnataka, adjusted from



1999 prices.⁴⁰ A more recent survey indicated that residential consumers are willing to pay in the range of 17–132 percent above current grid prices, and commercial users are willing to pay up to 199 percent.⁴¹ For simplicity, the analysis assumes that the value of unserved energy is double the retail tariff for residential customers, with the nonresidential value determined from the costs of operating backup diesel generators.

2. **Unremunerated system benefits.** Modernization increases the flexibility of the power system and reduces vulnerability to shocks, including natural disasters. The improved capabilities of personnel and systems at WBSEDCL are also expected to prepare the utility to adapt to future power system demands from electric vehicles and integration of battery electricity storage on the grid.

3. **Improved energy choices.** There are several value streams that this analysis does not incorporate quantitatively. Economically, low voltage issues in some pockets of the distribution system can suppress demand as customers will not invest in appliances or equipment that could be sensitive to voltage sag or surge. Financially, the improvement in quality is expected to assist WBSEDCL in retaining large customers amid competition from parallel distribution licenses. Further, investments under Components 2 and 3 will enable creation of important foundations for improving the overall accountability and transparency of the company and its ability for effective management, which, in turn, is expected to facilitate the company's ability to raise commercial finance over the medium to long term. The strengthened and modernized WBSEDCL will be more technically and financially capable of supporting increased uptake of solar rooftops among residential, commercial, and industrial customers. In the midterm, WBSEDCL may also have new capabilities to support the use of energy storage, either in front or behind the meter, to reduce peak power demands on the system with commensurate benefits for consumer costs and for optimal use of assets across the power system. These broader benefits of stable electricity, innovation opportunities, and business advantages for WBSEDCL are not considered.

4. **Emissions accounting.** Emissions benefits come from quantification of the investment impacts on variable operations of existing power plants. Emissions associated with land clearing are not considered. Sulfur hexafluoride fugitive emissions are not expected to be any higher under the project compared to a baseline scenario.

Table 4.1. Baseline Economic Analysis Assumptions

	Unit	Baseline
Years of delay in start of results delivery	year	2
Year of investment	year	2021
Value of unserved energy (residential)	INR/kWh	13.78
Value of unserved energy (commercial, industrial)	INR/kWh	19.22
Value of stolen energy to the user	INR/kWh	6.89
Percent attainment of the improvement targets	%	1.00
Asset lifetimes	years	20
Percent realization of target load growth rate	%	0.5
Attribution of increased generation (to service load) to project	%	0.0
Share pilfered power, facing payment, disconnected or reduced	%	0.5

⁴⁰ Bose, Ranjan Kumar, Megha Shukla, Leena Srivastava, and Gil Yaron. 2006. "Cost of Unserved Power in Karnataka, India." *Energy Policy* 34 (12): 1434–1447.

⁴¹ Wartsila/Universal Consulting India Private Limited. 2009. *The Real Cost of Power*. Mumbai.



Table 4.2. Summary of Economic Analysis Relative to Business-As-Usual Distribution Outlook

	Unit	Base Case	Sensitivity
Discount rate	%	10.0	6.0
Economic rate of return	%		
ERR		16.6	16.6
ERR + local externalities		17.6	17.6
ERR + global externalities		34.3	34.3
Benefits/costs associated with the World Bank program			
Additional electricity supplied	TWh	-62	-62
Distribution investments under program	US\$, millions	-289	-327
Distribution O&M cost savings	US\$, millions	16	23
Net generation expenses	US\$, millions	400	626
Additional electricity sales to paying customers due to theft avoidance	US\$, millions	34	54
Additional electricity sales due to diesel replacement	US\$, millions	1	2
Savings of previous diesel generation, now served by the grid (among industrial)	US\$, millions	1	1
Value of previous unserved energy (among residential consumers due to bad reliability)	US\$, millions	1	1
NPV (before environmental benefits)	US\$, millions	163	381
Local environmental benefits: avoided grid generation	US\$, millions	30.5	51.1
NPV (including local environmental benefits)	US\$, millions	194	432
Value of avoided GHG emissions	US\$, millions	637	1025
NPV (including environment benefits)	US\$, millions	831	1457
Lifetime GHG emissions, undiscounted	mtons CO ₂	-43.7	-43.7

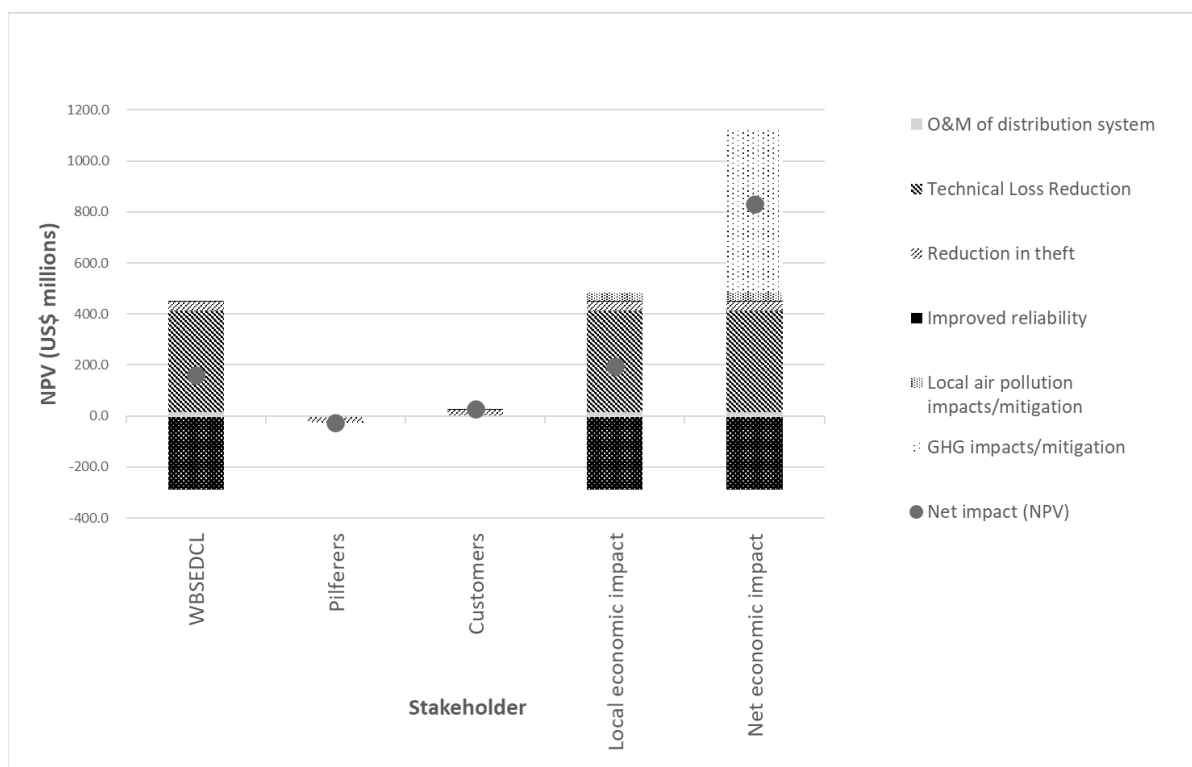
Table 4.3 Sensitivity - Values of Each Key Variable That Would Make the Project ERR Fall below the Target of 10 Percent

Input	Unit	Baseline Value	Switching Value	
			(w/o externality)	(w/ externality)
Percent realization of expected load growth	%	50	0	n.a.
Percent attainment of the improvement targets	%	100	63	25
Delay in results delivery	years	2	7	15
Lifetime of the assets and modernization practices	years	20	12	n.a.
Value of stolen energy to the user	INR/kWh	6.89	52	236
Attribution of increased generation (to service load) to project	%	0	n.a.(ERR increases)	

Note: n.a. = Not applicable, w/ = With, w/o = Without.



Figure 4.2. Distributional Implications of the Project



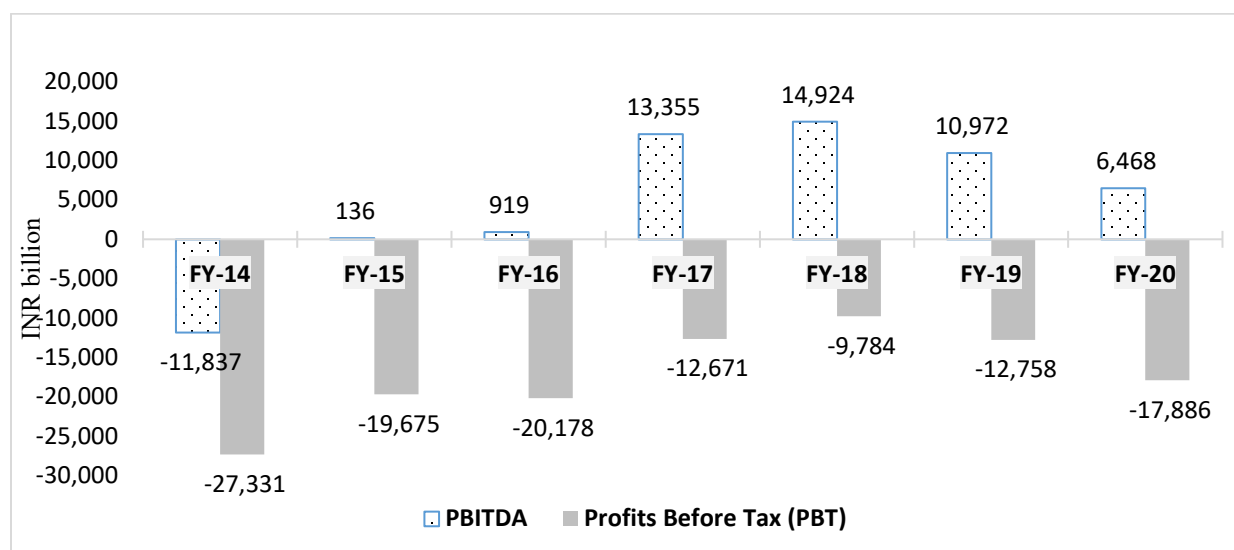
Source: World Bank analysis



ANNEX 5: Operational and Financial Performance of WBSEDCL

1. Despite profit before interest, tax, depreciation, and amortization (PBITDA) of INR 6.4 billion (or US\$88 million) in FY20 (INR 10.9 billion or US\$150 million in FY19), WBSEDCL incurred loss at profit before tax (PBT) level⁴² of INR 17.9 billion (or US\$247 million) in FY20 (INR 12.8 billion or US\$176 million in FY19). The key reason for this has been the lack of tariff increase since October 2016, which has increased the reliance on short-term debt by WBSEDCL and has thus increased the interest costs for the company. FY20 (base year) losses were higher due to implementation of employee pay revision with effect from 2016 and additional provisioning toward funding employee retiral benefits.

Figure 5.1. Profit/Loss Trend of WBSEDCL



Source: Financial Statements.

2. **Regulatory assets.** Irregular tariff revision has led to y-o-y increase in regulatory assets. The total amount of regulatory assets⁴³ according to annual accounts of WBSEDCL has increased from INR 33.2 billion (or US\$457 million) in FY11 to INR 131.4 billion (or US\$1.81 billion) at the end of FY20. However, WBERC has not recognized the total figure of INR 131.4 billion (regulatory asset) in any single order. In the true-up order for FY12/13, it recognized a regulatory asset of only INR 29.9 billion and further recognized additional INR 20 billion in FY14/15 (but pertaining to the same period, that is, FY12/13). For only these amounts WBERC has recognized carrying costs and provided partial liquidation through subsequent tariff orders. In FY16/17, the GoWB also sanctioned a grant of INR 26.5 billion (INR 20.3 billion in FY16/17 and INR 6.1 billion in FY17/18), to be partly adjusted against regulatory asset.

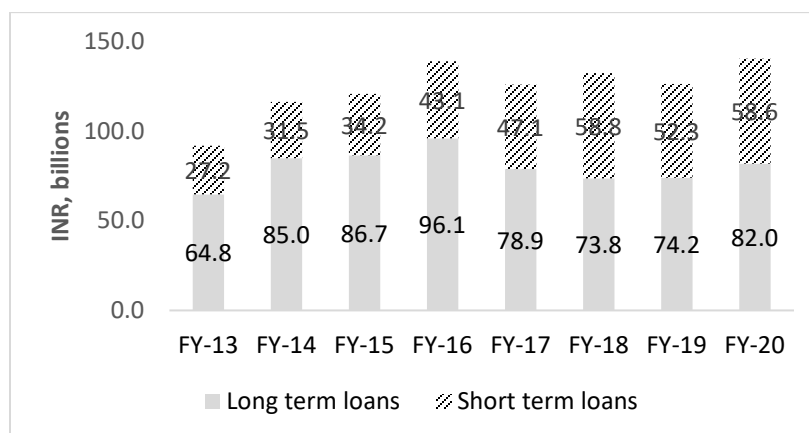
⁴² Excludes extraordinary income such as other comprehensive income, and so on.

⁴³ WBSEDCL transfers the deficit in its cost of supply and revenue realization to a regulatory deferral account with the expectation that the future economic benefits associated with it will flow to the company because of actual or expected actions of WBERC under the applicable regulatory framework and the amount is measured reliably. This amount is expected to be released by WBERC after assessing WBSEDCL's claim in future years. The regulatory asset gets added every year in the book of accounts according to the revenue gaps claimed in the true-up and fuel and power purchase cost adjustment (FPPCA) petitions. WBSEDCL transfers the deficit in its cost of supply and revenue realization to the regulatory deferral account till WBERC releases the amount after assessing WBSEDCL's claims.



3. The increase in regulatory assets has led to increased dependency of WBSEDCL on costly short-term loans which has resulted in deterioration of profitability and credit rating of the company. Short-term loans of WBSEDCL have shot up from INR 34.2 billion (or US\$471 million) in FY15 to INR 58.6 billion (or US\$807 million) in FY20. These loans include borrowings from commercial banks and power sector's non-banking finance companies (Power Finance Corporation Ltd./REC Ltd.). The outstanding total debt of WBSEDCL at the end of FY20 stood at INR 140.6 billion (or US\$1.94 billion). ICRA (a credit rating agency) has downgraded WBSEDCL's bond ratings from BBB to BB+ (moderate risk of default) in the last three years.

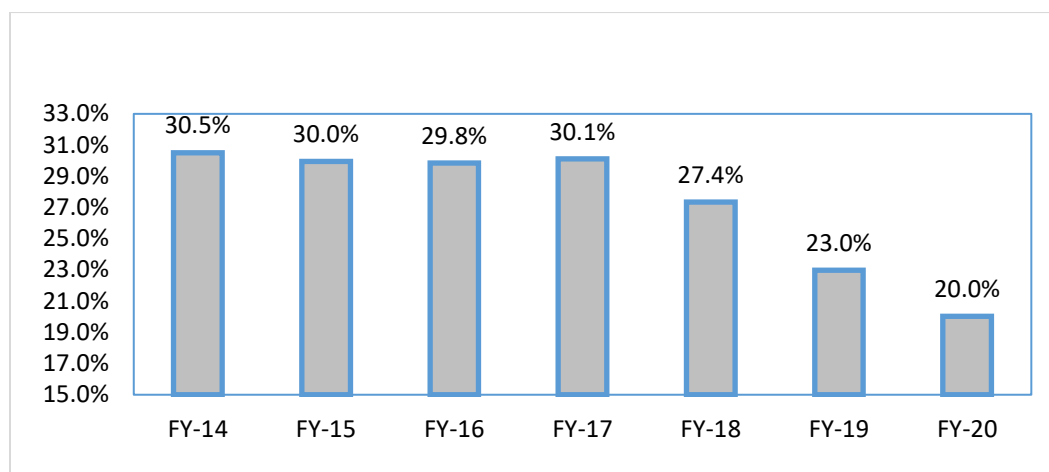
Figure 5.2. Short-Term and Long-Term Borrowings of WBSEDCL



Source: Financial Statements.

4. WBSEDCL has made significant improvement in AT&C losses over the last two years achieving a reduction of more than 10 percent. There is further scope of reducing losses by targeting divisions having high share of low- and medium-voltage consumers, which the current project interventions also focus on.

Figure 5.3. Trend of WBSEDCL's AT&C Losses

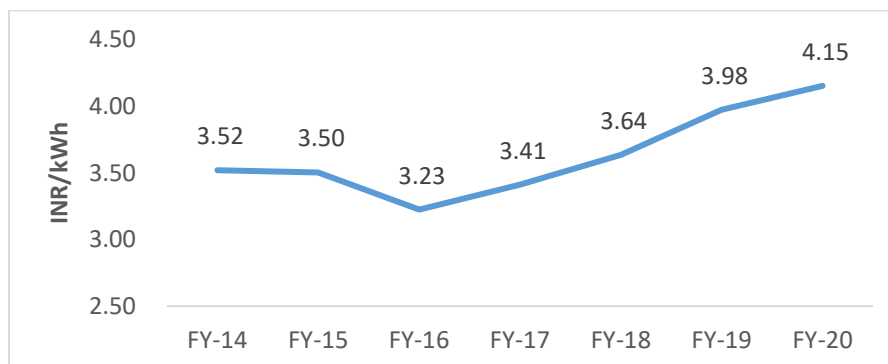


5. Another reason for deterioration in financial performance has been the sharp increase in the average power purchase costs which have increased by a CAGR of 6.5 percent over the past four years.



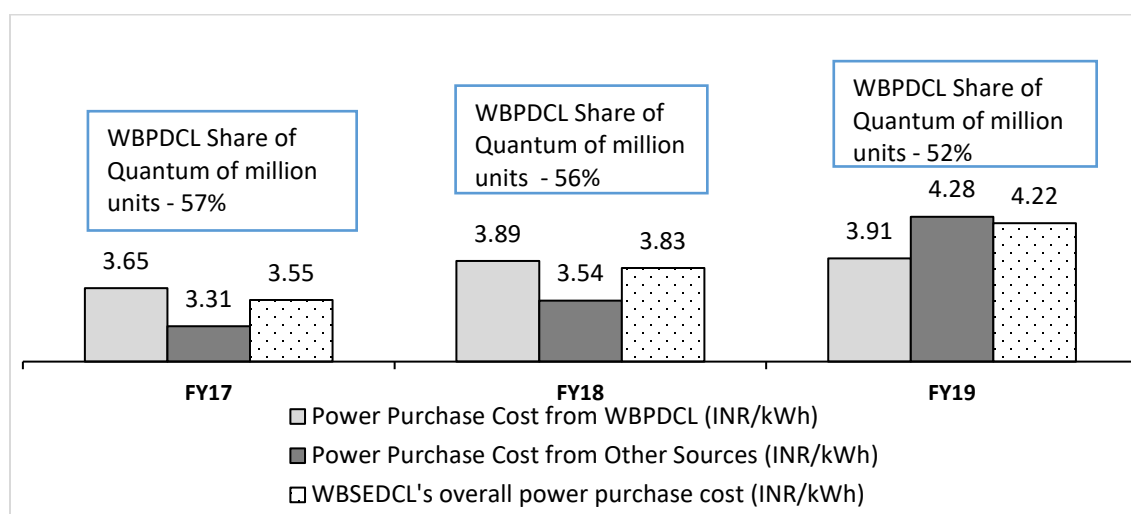
Further, as the power purchase costs account for almost 80 percent of the cost of the Discom, this rise has a significant impact on financials.

Figure 5.4. Trend of Average Power Purchase Cost (excluding transmission costs)



6. WBPDC, the state-owned thermal Genco accounts for over 50 percent of WBSEDCL's power purchase and its costs have been increasing relatively slower at around 4 percent over the last two years. The cost of power from other sources has also been increasing for WBSEDCL. The per unit cost from central sector plants and short-term sources (contributing around 26 percent and around 11 percent in the WBSEDCL power portfolio, respectively) have increased at an average around 9 percent and around 30 percent annually between FY17 and FY19, respectively.

Figure 5.5. WBSEDCL's Power Purchase Portfolio



Financial Projections

7. A detailed financial analysis has been undertaken to understand the business environment expected in future. Some of the model assumptions are as follows.

- (a) **COVID-19 impact.** The COVID-19 pandemic has negatively affected the utility's financials due to reduced sales to commercial and industrial consumers and slight increase in AT&C losses.



However, the impact of COVID-19 is already factored in the FY21 numbers, wherein the company has returned a negative earnings before interest, taxes, depreciation, and amortization (EBITDA) of INR 15.7 billion (or US\$216 million). The company has managed the losses by delaying payments to the generation companies and the trade payables has increased to 196 days in FY21 (versus 144 days in FY20). Given that FY21 was an outlier year, several assumptions, especially in areas of sales growth, loss reduction, and so on, have been adjusted for FY22 as explained in the paragraphs below.

- (b) **Energy sales.** Out of the overall sale of electricity by WBSEDCL, the share of domestic, industrial, commercial, and agricultural consumption is approximately 40 percent, 30 percent, 15 percent, and 5 percent, respectively. Over the past five years till FY20, the overall energy sales increased with a CAGR of 6.7 percent. To account for this outlier year of FY21, higher sales have been assumed in FY22 in commercial and industrial categories. For future years, and from FY23 onward a 6–7 percent growth is assumed in various categories as per the long-term trend.
- (c) **AT&C losses.** The projections are simulated considering a moderate reduction in AT&C losses of 1 percent annually, on the back of improvements in network (leading to lower technical losses) and revenue protection programs (such as smart meters, ABC at LT level, and so on). Further, from FY22 onward, a collection efficiency of 99.5 percent has been considered (based on previous year trends).
- (d) **Power procurement cost.** The power procurement cost projections comprise forecast for (i) quantum of energy purchase and (ii) energy charge and fixed charge for various power plants with which WBSEDCL has power purchase agreements. With regard to power sources, while the power purchased from the state-owned generation company (WBPDCCL) and central sector generating stations has been kept constant as in FY20, additional power is assumed to be purchased from short-term sources. Further, the energy charges have been increased by 4 percent for both state-owned and central sector generating stations sources of power, and fixed cost has been kept the same as in FY20 (in line with long-term trend). The cost of additional short-term power has been assumed at INR 3.38 per kWh in FY22 (that is, equal to average cost of short-term power procurement by WBSEDCL in FY20) and subsequently increased by similar figure of 4 percent from FY23 onward. Lastly, there are some fuel sources that are expected to become operational in the state, which are linked to the state-owned power plants (WBPDCCL plants) and are expected to provide benefits through availability of cheaper fuel. This impact has been modelled as lower energy charge from WBPDCCL plants from FY23 onward.
- (e) **Average billing rate/energy tariffs.** In the model, a modest 3 percent increase in tariff has been considered for all major consumer categories from FY23 onward.

8. **Treatment of regulatory asset and short-term debt.** According to the current practice followed by WBSEDCL, the regulatory asset gets added every year in the book of accounts according to the revenue gaps claimed in the true-up and FPPCA petitions. WBSEDCL transfers the deficit in its cost of supply and revenue realization to a regulatory deferral account till WBERC releases the amount after assessing WBSEDCL's claims. Further, it is assumed that any cash shortfall will be met by short-term debt that would have to be raised by WBSEDCL.



9. **Results of the financial analysis.** The model outputs are shown in table 5.1. The key results are as follows:

- (a) On the back of tariff increases, reductions in AT&C losses, and sales growth, EBITDA is expected to turn positive and increase from FY23 onward.
- (b) The short-term debt increases from the current levels of INR 59 billion (or US\$813 million) in FY21 to almost INR 128 billion (or US\$1.76 billion) in FY25 before the business starts generating enough cash to bring down the short-term debt.
- (c) Losses before taxes (excluding movement in regulatory deferral account and other comprehensive income) are expected to reduce from a high base of INR 42.5 billion (or US\$585 million) in FY21 to profits in FY27.
- (d) A faster turnaround is possible in case financial support is available from the state government for liquidation of regulatory assets (after they have been recognized by the regulator) or higher-than-assumed tariff hikes are provided.



Table 5.1. Summary of Financial Analysis and Projections (INR, millions)

Analysis	FY18 (A)	FY19 (A)	FY20 (A)	FY21 (A)*	FY22 (P)	FY23 (P)	FY24 (P)	FY25 (P)	FY26 (P)	FY27 (P)
Revenue from consumers (adjusted for rebates)	178,593	194,870	216,400	205,010	234,971	258,218	283,766	311,844	342,703	376,617
Revenue from others	10,637	9,969	5,660	9,519	140	140	140	140	140	140
Other income	9,306	11,035	15,807	13,785	14,934	16,179	17,528	18,990	20,573	22,289
Revenues	198,536	215,875	237,866	228,314	250,045	274,537	301,434	330,974	363,416	399,045
Total costs	183,612	204,903	231,398	244,043	254,192	267,274	282,619	299,505	318,292	343,992
Power purchase costs	161,399	182,066	201,484	212,522	223,782	235,713	249,916	265,666	283,268	307,733
Employee costs (including outsourced manpower related)	16,198	16,231	22,917	24,184	21,848	22,482	23,141	23,828	24,543	25,287
O&M and other costs	6,015	6,606	6,997	7,336	8,561	9,079	9,562	10,012	10,481	10,972
EBITDA	14,924	10,972	6,468	-15,729	-4,147	7,263	18,816	31,469	45,124	55,054
Depreciation	9,279	9,264	9,793	10,847	13,417	15,171	16,557	17,943	19,329	20,715
Interest costs	15,428	14,466	14,561	15,940	18,701	21,866	24,261	25,786	26,320	25,815
Energy input (million units)	39,355	40,684	43,093	43,256*	44,442	46,751	49,193	51,774	54,504	57,391
Sales (million units)	27,705	29,624	32,389	32,259*	33,972	36,242	38,663	41,247	44,004	46,946
Average revenue realized (ARR) (INR/kWh)	7.2	7.3	7.3	7.1	7.4	7.6	7.8	8.0	8.3	8.5
Average cost of supply or ACS (INR/kWh)	7.5	7.7	7.9	8.4	8.4	8.4	8.4	8.3	8.3	8.3
Gap between ARR and ACS (INR/kWh)	-0.4	-0.4	-0.6	-1.3	-1.1	-0.8	-0.6	-0.3	0.0	0.2

Note: A = Actuals; P = Projections.

* Some figures for FY21 are estimated as not all figures for FY21 are available.

ARR figure includes other income.



10. **Sensitivity analysis.** A sensitivity analysis has also been carried out on the financial numbers for higher-than-expected AT&C loss reduction by WBSEDCL. The results are presented in table 5.2. As can be seen from the results, each percentage reduction in AT&C loss increases the EBITDA by INR 2 billion (or US\$27.5 million). Further, the model is sensitive to tariff hikes and a lower-than-expected tariff hike of 2 percent (versus the base case assumption of 3 percent) reduces the FY23 EBITDA by INR 2.5 billion (or US\$34.4 million).

Table 5.2. Sensitivity Analysis

INR, billions	Base Case			Sensitivity Analysis					
	FY23	FY24	FY25	FY23	FY24	FY25	FY23	FY24	FY25
AT&C losses (%)	19.3	18.3	17.3	18.3	17.3	16.3	Same as base case		
Tariff increase (%)	3	3	3	Same as base case			2	2	2
EBITDA	7.3	18.8	31.5	9.5	21.3	34.1	4.8	16.1	28.4
Short-term debt	106.8	122.1	128.1	105.8	118.4	121.5	108.7	126.9	136.4

**ANNEX 6: Team Composition**

Name	Role	Title	Unit
Rohit Mittal	Team Leader (ADM Responsible)	Senior Energy Specialist	ISAE1
Sanjeet Kumar	Procurement Specialist (ADM Responsible)	Procurement Specialist	ESARU
Puneet Kapoor	Financial Management Specialist	Senior Financial Management Specialist	ESAG1
Kavita Saraswat	Team Member	Senior Power Engineer	ISAE1
Amol Gupta	Team Member	Senior Energy Specialist	ISAE1
Gaurav D. Joshi	Safeguard Specialist	Senior Environmental Specialist	SSAEN
Venkata Rao Bayana	Safeguard Specialist	Senior Social Development Specialist	SSAS2
Phillip Matthew Hannam	Team Member	Energy Economist	ISAE1
Vidya Venugopal	Lawyer	Counsel	LEGAS
Victor Ordonez	Team Member	Senior Finance Officer	WFACS
Ritika Rodrigues	Team Member	Program Assistant	SACIN
Pamela Patrick	Team Member	Program Assistant	SACIN
Robin Kumar Thakur	Team Member	Procurement Specialist	ESARU
Rangeet Ghosh	Team Member	Senior Economist	ESAMU
Kanika Bhatnagar	Team Member	Economist	ESAMU