ASIAN INFRASTRUCTURE INVESTMENT BANK

P000454-IND
January 20, 2022

Project Document
of the Asian Infrastructure Investment Bank

Sovereign-Backed Financing

Republic of India
West Bengal Electricity Distribution Grid Modernization Project

Currency Equivalents
(As at January 12, 2022)

Currency Unit – Indian Rupee (INR)
INR1.00 = USD0.0134
USD1.00 = INR74.45

Borrower's Fiscal year
April 1-March 31

Abbreviations

AB	aerial bunched
AIIB	Asian Infrastructure Investment Bank
AT&C	aggregate technical and commercial
discom	distribution company
ERP	enterprise resource planning
ES	environmental and social
ESF	Environment and Social Framework
ESIA	Environment and Social Impact Assessment
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESP	Environmental and Social Policy
FM	financial management
FY	fiscal year
GIS	gas insulated substation
GIS	gas insulated substation
HVDS	high voltage distribution system
ICT	information and communication technology
IFRs	Interim Financial Reports
kV	Kilovolt
KWh	Kilowatt Hour
MDB	Multilateral Development Bank
MIS	Management Information Systems
O&M	operations and maintenance
OT	operational technology
PFA	Power for All
PFS	project financial statements
PIU	Project Implementation Unit
PMC	Project Management Consultant
PPP	Policy on Prohibited Practices
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition
TA	Technical Assistance
WB	World Bank
WBSEDCL	West Bengal State Electricity Distribution Company Limited

Contents

1. Summary Sheet

Project No.	000454-IND
Project Name	West Bengal Electricity Distribution Grid Modernization Project
AIIB Member	Republic of India
Borrower	Republic of India
Project Implementing Entity	West Bengal State Electricity Distribution Company Limited, wholly owned by the Government of West Bengal
Sector	Energy
Sub-sector	Power Transmission and Distribution
Project Objective	To improve the operational efficiency and reliability of electricity supply in selected areas of West Bengal.
Project Description	The project aims to modernize West Bengal's electricity distribution system by providing financial and technical support for investments in: (i) High voltage distribution system, aerial bunched cabling, 33/11 kilovolt gas insulated substations and underground cables; (ii) Smart consumer meters, deployment of distribution automation technologies and improving the existing commercial and enterprise information technology solutions; and (iii) Technical assistance for institutional development and capacity building of West Bengal State Electricity Distribution Company Limited.
Implementation Period	Start Date: Jan. 31, 2022 End Date: Jul. 31, 2026
Expected Loan Closing Date	Nov. 30, 2026
Cost and Financing Plan	Project Cost: USD385.70 million <u>Financing Plan</u>: AIIB: USD135.00 million World Bank (Lead Co-financier): USD135.00 million Government of West Bengal: USD115.70 million
Size and Terms of AIIB Loan	USD135 million. Final maturity of 17 years, including a grace period of 7 years, with level repayments at AIIB's standard interest rate for sovereign-backed variable spread loans.
Environmental and Social Category	Category B
Risk (Low/Medium/High)	Medium
Conditions of Effectiveness	(i) World Banks's loan agreement with the client has been executed; (ii) co-lenders' agreement between AIIB and the World Bank has been executed; and (iii) subsidiary agreement between the Government of West Bengal and West Bengal

	State Electricity Distribution Company Limited, in form and substance satisfactory to AIIB has been executed.
Key Covenants	• Appointment of a firm (acceptable to AIIB and WB) to carry out internal audits. • Maintain a team of project management consultants throughout the implementation period. • Preparation of an operations manual defining clear procedures on financial management, procurement, contract management, and implementation of environmental and social safeguard management.
Retroactive Financing (Loan % and dates)	Up to 20 percent of the loan amount, for eligible expenditures incurred and paid for not earlier than 12 months before the signing date of the loan agreement.
Policy Assurance	The Vice President, Policy and Strategy, confirms an overall assurance that the Bank is in compliance with the policies applicable to the project.

President	Jin Liqun
Vice President	D.J. Pandian
Director General	Rajat Misra
Team Leader	Pratyush Mishra, Investment Operations Specialist
Team Members	Abhijit Sengupta, Senior Economist Bernadette Ndeda, Procurement Specialist Calvin Quek, Senior Environmental Specialist Christopher Damandl, Senior Counsel Mengmeng He, Finance Associate Shodi Nazarov, Financial Management Associate

2. Project Description

A. Project Overview

2. **Project Objective.** The objective of the project is to improve the operational efficiency and reliability of electricity supply in selected areas of West Bengal.

3. **Project Description.** West Bengal has extended grid connectivity to almost all consumers across the state. The priority has now shifted from basic access to improved quality and reliability of supply. Although West Bengal has adequate power capacity, the intra-state transmission and distribution network needs to be strengthened to ensure quality power supply to its large consumer base, especially in rural Bengal. The project aims to modernize West Bengal's electricity distribution system by providing financial and technical support for investments in:

(i) High voltage distribution system (HVDS), aerial bunched (AB) cabling, 33/11 kilovolt (kV) gas insulated substations (GIS) and underground cables.

(ii) Smart consumer meters, deployment of distribution automation technologies and improving the existing commercial and enterprise information technology (IT) solutions.

(iii) Technical assistance (TA) for institutional development and capacity building of West Bengal State Electricity Distribution Company Limited (WBSEDCL).

4. The project also includes a contingent emergency response component (with Nil allocation), which would support provision of immediate response to an eligible crisis or emergency by reallocation of undrawn amounts under other components.

5. **Expected Results.** The project is expected to improve the distribution network and reduce losses. The key results will be measured and monitored using the following indicators (Annex 1):

(i) Reduction in Aggregate Technical and Commercial (AT&C) losses in select districts (percentage) – five districts

(ii) Reduction in System Average Interruption Duration Index (SAIDI) in select towns – Two towns

(iii) Reduction in System Average Interruption Frequency Index (SAIFI) in select towns – Two towns

6. **Expected Beneficiaries.** The direct beneficiaries of the project are the (existing and new) customers of WBSEDCL 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.

7. 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.

B. Rationale

8. **Strategic fit for AIIB.** The project aligns with two of AIIB's Thematic Priorities: (i) Green Infrastructure as improving energy efficiency in the distribution system will in turn help reduce greenhouse gas emissions; and (ii) Technology-Enabled Infrastructure as the project involves deployment of technologies to enable automation of internal business processes and network operations.

9. The project also aligns with AIIB's Energy Sector Strategy, which focuses on (a) promoting, directly or indirectly, access to modern energy by those who currently have little or no access; (b) improving the reliability of electricity supply; and (c) loss reduction and utility-driven energy efficiency programs.

10. **Value addition by AIIB.** AIIB's value addition involves mobilizing sufficient financial resources to fill the financing gap in the project as well as contributing to the project preparation and implementation support. AIIB's close engagement in areas such as environmental and social (ES) safeguards during project implementation will facilitate effective monitoring of project activities and achievement of the project objective.

11. AIIB and the World Bank (WB) involvement in the project is also expected to focus on support for operational reform and performance improvement, including:

(i) Continuation of integrated distribution system planning (integrated planning was introduced through a WB executed TA project in 2015) across state, Government of India and Multilateral Development Bank (MDB) funded schemes; leading to efficient resource utilization while meeting the requirements of the 24x7 Power for All (PFA) Program.

(ii) Institutionalization of best practices in contract management.

(iii) Support in deploying advanced information and communication technology (ICT) based technologies for improved system reliability and commercial performance of WBSEDCL.

(iv) Introduction of international best-practices in smart grid development and operation through smart technologies including deployment of advanced ICT systems, advance metering infrastructure, and battery electricity storage.

(v) Provision of international best-practice in distribution utility management, and management information systems (MIS).

12. **Value addition to AIIB.** This project will make use of some of the best electricity distribution grid technologies currently available, which is in alignment with AIIB's commitment to financing Infrastructure for Tomorrow. This project will enable AIIB to learn and replicate the use of these technologies in future projects.

13. The Government of India's ambitious plans to provide reliable and affordable power for all its citizens is expected to result in many such projects in other states. AIIB's engagement in this project will help replicate a similar approach when similar opportunities arise. Through the project, AIIB will further develop its expertise and understanding of India's power sector; and build its capacity to help clients meet

international standards of ES management, financial management (FM) and procurement.

14. **Lessons learned.** The project design has also benefitted from lessons from other AIIB and WB - funded projects such as the Indonesia: PLN East Java & Bali Power Distribution Strengthening Project (AIIB, 2021), Bangladesh: Power System Upgrade and Expansion (AIIB, 2019), Nepal: Power Distribution System Upgrade and Expansion Project (AIIB, 2019), Andhra Pradesh 24x7 – Power For All Project (AIIB and WB, 2017), Jharkhand Power System Improvement Project (WB, 2018), Vietnam Distribution Efficiency Project (WB, 2012) and Electricity Supply Accountability and Reliability Improvement Project in the Kyrgyz Republic (WB, 2014). During the implementation of the West Bengal Major Irrigation and Flood Management Project (AIIB and WB, 2019), the experience has been that the Government of West Bengal has good implementation capacity.

15. The key lessons incorporated into the project design are (i) the importance of advanced project preparation, including bidding documents for procurement of goods and works; (ii) the need to incorporate ES requirements into contract design; (iii) adequate monitoring and evaluation systems to keep the project on track; and (iv) adequate flexibility in the project design to allow resources to be moved across sub-projects.

C. Components

16. The project will be implemented in the state of West Bengal by WBSEDCL, wholly owned by the Government of West Bengal, which serves more than 20 million consumers through a network spanning over 541,937 circuit-kilometers of lines (33kV, 11kV and below), 700 substations (33/11 kV) and 284,002 distribution transformers.

17. The project will support the implementation of the 24x7 PFA plan in West Bengal and support WBSEDCL in transitioning towards a leading public sector utility in India. It will provide financial and technical support for investments to modernize WBSEDCL's electricity distribution network and institutional development. This shall result in improved operational efficiency in the sector and reliable supply to the consumers.

18. The project is proposed to have the following components:

19. **Component 1: Distribution System Strengthening.** This component would support the strengthening and augmentation of the distribution network (33kV and below). 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 investments in the following:

(i) HVDS and AB Cabling in around 13 highest loss-making districts (where 8 districts have AT&C losses higher than 25 percent).

(ii) 33/11 kV GIS in the above identified 13 districts.

(iii) Underground cables to replace the overhead network in around 5 select towns.

20. **Component 2: Smart Grid Development in Urban Areas.** This component would support investments in smart grid technologies, including developing ICT infrastructure. The investments that will be made under this component include (which would be complemented with suitably modifying the business processes, wherever required):

(i) Smart consumer meters, with two-way communication, for high value consumers in selected urban geographies.

(ii) Technology and capacity upgrades in WBSEDCL's communication infrastructure and improving existing commercial and enterprise IT solutions.

(iii) Distribution automation technologies and integration of various control devices in select towns with distribution supervisory control and data acquisition (SCADA).

21. **Component 3: TA for institutional development and capacity building of WBSEDCL.** The activities to be supported under this component include:

(i) Strengthening ICT- Operational Technology (OT) systems.

(ii) Project Management Consultant(s) (PMCs) for systems under component 1 and 2.

(iii) Business process re-engineering to institutionalize the use of smart-grids in WBSEDCL's daily operations.

(iv) Building staff capacity through training, workshops and knowledge exchange visits.

22. **Component 4: Contingent Emergency Response.** In the event of an eligible emergency being declared, re-allocation of project funds to support the response effort may be requested. This component would be capitalized by drawing on uncommitted funds under Components 1 to 3.

D. Cost and Financing Plan

23. The project will be financed by loans from AIIB and WB of USD135 million each, as well as counterpart funding of USD115.7 million.

Table 1. Indicative Cost and Financing Plan (USD millions)

Project Component	**Cost**	**Financing Plan**		
		AIIB	**WB**	**GoWB**
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	6.00	2.00	2.00	2.00
Component 4: Contingent Emergency Response	-	-	-	-
Front end fee	0.68	0.34	0.34	-
Total	**385.70**	**135.00**	**135.00**	**115.70**

GoWB=Government of West Bengal

24. **Co-financing arrangements.** AIIB and WB are proposing to jointly co-finance the project, with WB taking the lead. WB's policies and procedures on ES safeguards, procurement, FM, project monitoring, and reporting will be used for the project.

E. Implementation Arrangements

25. **Implementation period.** The project is expected to be implemented from Jan. 31, 2022 to Jul. 31, 2026.

26. **Implementation Management.** WBSEDCL 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 WBSEDCL's broader organization. Within the existing corporate structure (procurement, finance and others), WBSEDCL has designated individuals with clear responsibility for dealing with all issues related to the project. To support WBSEDCL in proper implementation and monitoring of the investments, PMC(s) will be engaged during project implementation.

27. The PIU has also prepared a draft operation manual for the project, which includes a group of monitoring indicators to track the progress of the project. The draft operations manual defines clear procedures on FM, procurement, contract management, and implementation of ES safeguard management. Further, the draft operations manual includes the process of activation, implementation, and successful closure of Component 4.

28. **Procurement.** WB will play a leading role and cooperate with AIIB for procurement preparation and implementation. All goods, works, non-consulting services and consulting services to be financed under the project will be procured in accordance with the WB Procurement Regulations for Investment Project Financing Borrowers, dated July 2016 and revised August 2018 and in November 2020, which is materially consistent with the Core Procurement Principles and Standards of AIIB's Procurement Policy. Further, the project would be subject to the WB's Anti-Corruption Guidelines, dated October 15, 2006, and revised in January 2011 and July 2016. The procurement and contract management processes will be tracked through WB's Systematic Tracking of Exchanges in Procurement (STEP) system.

29. The PIU will undertake procurement under the project through National Informatics Center (NIC) based e-procurement portal which has been already under use in WBSEDCL and the same system, with some minor modifications, has been cleared by WB for use in this project. The 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.

30. A Project Procurement Strategy for Development (PPSD) has been developed for the project, based on detailed requirements, capacity assessment and market analysis. Based on the PPSD, a procurement plan has also been prepared for the first 18 months of project implementation. The procurement plan shall be modified based on changing requirements during project implementation.

31. **Financial Management.** WSEDCL has established an internal team as the PIU. The established PIU supported by the WSEDCL's finance team would be responsible for the overall project FM and disbursement activities. WSEDCL follows accrual accounting for its ordinary activities and the same practice would be applied for project accounting. Project funds will be disbursed to the Government of India which will pass these funds on to the Consolidated Fund of the Government of West Bengal, which further transfer these funds to WBSEDCL's bank accounts. The disbursement method would be reimbursement. WBSEDCL's finance team will maintain project accounts and have custody of the supporting documents. The financial progress of the project will be reported on a quarterly basis through Interim Financial Reports (IFRs) to be submitted by 45 days from the end of each quarter. The project audited financial statements for each year of project implementation will be submitted within nine months from the end of the fiscal year (FY).

32. **Monitoring and Evaluation.** Monitoring and evaluation mechanisms will be established at the project and entity level. As mentioned earlier, PMCs would be appointed to supervise and monitor contract progress. The PIU will provide quarterly physical progress reports, IFRs, audited financial statements and other such information as AIIB and WB may reasonably require. Because the nature of the contracts awarded under the project will be primarily turnkey supply and installation, several activities will be monitored automatically upon completion of milestones such as delivery of material, erection and commissioning.

33. **AIIB's Implementation Support.** As lead co-financier, WB will serve as the focal point for AIIB vis-à-vis the Borrower. An experienced in-country WB team of energy, operational, and fiduciary specialists will provide day-to-day implementation support to WBSEDCL with additional regular support from staff from other WB offices. Implementation support missions will be carried out by WB on a regular basis and AIIB's team will join WB in such implementation support missions once the prevailing restrictions on inter and intra country travel are relaxed. Proper resources will be made available within AIIB to match the frequency of WB's implementation support missions. This joint WB/AIIB collaborative approach has been successfully implemented in other ongoing projects co-financed with WB

3. Project Assessment

A. Technical

34. The following sections are a summary of a) the assessment carried out by WB during their project preparation, and b) AIIB project team's consultations with WB's project team and the PIU.

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

36. The proposed project includes deployment of technologies to enable automation of internal business processes (Enterprise resource planning system) and network operations (Smart metering, GIS mapping of assets, SCADA enabled distribution control center and advanced customer care centers). This would be complemented by TA support on interventions to re-skill staff, improve processes for assessing, adopting, implementing and using technical solutions, and improving governance.

37. **Operational sustainability.** There is strong ownership of the project at the level of the state government and WBSEDCL, as the project supports investments identified under the 24x7 PFA plan of the state.

38. ES sustainability is facilitated through the adoption of an Environmental and Social Management Framework (ESMF) by WBSEDCL. 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 TA component of the project.

B. Economic and Financial Analysis

39. **Economic Analysis.** The project will generate significant economic benefits by addressing key operational challenges and improving the reliability and quality of electricity access. Reliable access to electricity is expected to bolster income earning activities, help improve education and health outcomes and ensure better safety outside homes. The economic analysis involves a comparison of a 'with project' scenario with a 'without project' setting, with the latter including a counterfactual where the distribution system continues to serve rising demand but without modernization efforts. Components 1 and 2 account for majority of the costs involving distribution system strengthening and smart grid development in urban areas. The overall economic cost of the project is estimated at USD385.70 million.

40. **Economic Benefits.** A key economic benefit arises from reduction in AT&C losses, which mitigates rising generation requirements from the grid, and results in lower purchases of power as demand rises, compared to the without project scenario, translating into cost savings. Moreover, a reduction in AT&C losses is expected to reduce the duration and frequency of power outages and serve previously unmet demand and displace expensive diesel-based self-generation. The project would also help to reduce non-technical losses through improved bill collection and theft prevention, which would help the utility to provide safe, stable, and affordable service. The project would also help to reduce emissions, primarily by reducing purchases of coal-intensive power from the grid.

41. **Economic Internal Rate of Return (EIRR).** Overall, the project yields an EIRR of 16.6%, based on benefits arising from (a) savings of net generation expenses, (b) additional electricity sales and (c) O&M savings. The net present value (NPV) is estimated to be USD163.5 million, when evaluated at 10.0% discount rate. With the baseline EIRR being well above the discount rate, the project is deemed to be economically viable. The EIRR of the project increases significantly to 34.3% when positive environmental externalities are considered with the NPV rising to USD831 million. These estimates are on the conservative side as the project would also yield several unquantifiable benefits. These include (a) consumers being able to use

appliances that are sensitive to voltage fluctuations, (b) improved capabilities of personnel and systems at WBSEDCL will be better prepared for future power system demands and (c) a financially robust WBSEDCL will be able to retain large customers amid competition from parallel distribution licenses.

42. Moreover, the sensitivity analysis indicates that the project remains viable, even without considering large environmental benefits, under adverse situations like (a) costs increasing by 20%, (b) benefits reducing by 20% and (c) both the above. The details are outlined in Annex 3.

43. **Financial Analysis.** The investment program by WBSEDCL yields an internal rate of return of 19 percent. 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, the West Bengal Electricity Regulatory Commission, are not always sufficient to cover the costs of 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 (USD791 million at the end of FY2021) to fund the deficit.

44. The COVID-19 pandemic has resulted in negative earnings before interest, taxes, depreciation, and amortization (EBITDA) of USD168 million in FY2021 due to (a) lower sales to better remunerating consumer categories, that is, commercial and industrial consumers (due to COVID-19-related lockdowns), and (b) lower collection efficiencies in the year leading to increased AT&C losses. To improve its financial position, WBSEDCL will have to continue to lower its AT&C losses, lower the growth of its power procurement costs (which account for over 80 percent of total costs) and require consumer tariffs that reflect its cost of supply of electricity.

C. Fiduciary and Governance

45. **Procurement.** A procurement risk assessment was carried out by WB. Assessment parameters include, among others, procurement capacity and experience of WBSEDCL, complexity of the procured items, prevailing situation of uncertainties due to COVID-19 and possibilities of fraud and corruption/transparency-related risks. The major risks identified are: (i) weak institutional capacity due to no previous experience in WB procurement; (ii) complex and high value procurement; (iii) external interference in the procurement process, transparency and fraud and corruption issues. Based on the assessment of the above factors, WB has determined the overall procurement risk rating for the project as 'Substantial'. AIIB concurs with WB's findings and risk rating, which is equivalent to "medium" for AIIB. Mitigation measures proposed include: (i) capacity building through regular training on procurement; (ii) project operations manual which will include a chapter on procurement; (iii) use of appropriate market approach (based on recommendations of the PPSD) and regular monitoring through the procurement plan and quarterly reports; (iv) use of e-procurement; (v) fair complaint handling mechanism; (vi) disclosure of procurement-related information; (vii) external / internal procurement audits.

46. **Financial Management.** WBSEDCL has established FM systems, that can meet essential project fiduciary requirements, identify project expenditures and adequately report on the end use of funds. FM risk is considered medium as the finance manuals of WBSEDCL need to be updated and internal controls in certain areas (such as fixed assets and inventory) need strengthening. The audit report on the annual financial statements notes some of these weaknesses and that WBSEDCL has an action plan to strengthen these areas.

47. **Staffing.** WSEDCL's finance team will deal with project accounting including recording transactions and processing payments. An officer of the rank of Assistant General Manager has been assigned to the PIU to coordinate project FM arrangements. He shall provide overall assurance on the use of project funds, prepare and disseminate progress and financial reports, facilitate internal audit and audit of project financial statements (PFS).

48. **Budgeting.** The project has been included in the annual plan/budget for FY2022 of WBSEDCL and approved by its Board. The Government of West Bengal will act as a pass through for the AIIB and WB funds to WBSEDCL. Distinct budget lines will be used by the Government of West Bengal and provisions for project funds have been made under these heads for FY2021 and FY2022. Yearly project budget provisions for subsequent years will be made in accordance with the West Bengal's budgeting system.

49. **Funds Flow.** AIIB and WB funds will be disbursed to the Government of India, which will pass on these funds to the consolidated fund of the Government of West Bengal. This is in accordance with the standard arrangements for development assistance to the state, where transfer of external development finance is done on "back-to-back" basis on same terms and conditions as attached to such development finance by external funding agencies. Project funds will be drawn from the state's consolidated fund in accordance with existing treasury systems. State (counterpart) share will be provided in WBSEDCL's corporate bank account and transferred to a dedicated project bank account as needed. AIIB and WB funds will be provided in a project dedicated bank account opened at the level of the nodal section designated by WBSEDCL. Payments will be made from this dedicated account in accordance with WBSEDCL's own systems.

50. **Accounting, Financial Reporting and Internal Controls.** WBSEDCL has adopted the double entry accrual-based system of accounting following the Indian Accounting Standards (Ind AS). It has implemented an Enterprise Resource Planning application and has an established internal audit mechanism. These arrangements will be followed for project accounting as well. Project accounting will be centralized and will utilize WBSEDCL's existing arrangements for financial reporting and auditing. Detailed protocols relating to contract management including verification and approval of bills, payment of approved bills and the related accounting and control systems are included in the draft operations manual. The format and contents of IFRs agreed with WBSEDCL are included in the draft operations manual. Internal audit will be conducted by one of the firms empaneled by WBSEDCL on terms of reference (ToR) presently used by WBSEDCL and supplemented by additional terms as agreed with AIIB and WB. The internal audit reports pertaining to the project will be presented before the audit committee and shared with AIIB and WB.

51. **External Audit.** External audits of the annual PFS will be conducted by a firm of Chartered Accountants, acceptable to AIIB and WB, selected and appointed by WBSEDCL. The ToR has been agreed upon and included in the draft operations manual. The auditors could also be the statutory auditors of WBSEDCL appointed by the Comptroller & Auditor General of India. The project audited financial statements for each year of project implementation will be submitted within nine months from the end of the fiscal year.

52. **Disbursements.** The disbursement of loan proceeds will be mainly made using the reimbursement procedure and based on expenditures in the quarterly IFR. WBSEDCL will submit a claim to the Comptroller of Aid, Accounts, and Audit along with the IFR and a covering letter indicating the respective loan share of AIIB and WB. WB will process the application and inform AIIB through a disbursement note for releasing AIIB's share of the loan. In case of advance, segregated designated accounts will be opened with the Reserve Bank of India for both AIIB and WB. Supporting documents required for disbursement will be according to WB's Disbursement Handbook and will be documented in the Disbursement and Financial Information Letter. If the WB loan starts disbursing prior to AIIB's loan effectiveness, AIIB will disburse at a higher rate (higher than 1:1 between WB and AIIB) until AIIB catches up with WB. Subsequent disbursements will be in the ratio of the respective loan amounts i.e., 1:1.

53. **Retroactive financing.** All eligible project expenditures meeting the agreed procurement procedures for the project and in respect of which payment is made no earlier than 12 months before the expected loan signing date can be claimed from AIIB. This will be restricted to 20 percent of AIIB financing. The project will submit a stand-alone IFR detailing the expenditure incurred during the retroactive financing. This expenditure will also be subject to audit by the project's external auditors.

54. **Governance and Anti-corruption.** AIIB is committed to preventing fraud and corruption in the projects it finances. For this project, WB's Anti-Corruption Guidelines shall apply, which is materially consistent with AIIB's Policy on Prohibited Practices (2016) (PPP). However, AIIB's PPP will apply in regards to the prohibited practices of "Misuse of Resources" and "Theft", which are not covered under the WB's Anti-Corruption Guidelines. AIIB reserves the right to undertake investigations in regards to the Prohibited Practices of "Misuse of Resources" and "Theft", not covered under the WB's Anti-Corruption Guidelines.

D. Environmental and Social

55. **Categorization.** The project will be co-financed with WB, as lead co-financier. To ensure a harmonized approach to addressing ES aspects of the project, as permitted by AIIB's Environmental and Social Policy (ESP), WB's Environment and Social Framework (ESF) and Grievance Redress Service (GRS), will apply to the project in lieu of AIIB's ESP. AIIB has reviewed WB's ESF and is satisfied that (i) WB's ESF is consistent with AIIB's Articles of Agreement and materially consistent with the provisions of AIIB's ESP and the relevant ES Standards; and (ii) the monitoring and reporting procedures that are in place are appropriate for the project. WB has rated both the ES risk as "Moderate" which is equivalent to Category B, if AIIB's policy were applicable.

56. As part of environment and social due diligence, a series of consultations has been carried out with the WB team to discuss the ES risks and impacts due to the project. The project is being implemented in 14 districts of West Bengal. Accordingly, WB has adopted a Framework approach and WBSEDCL has prepared an ESMF which has been disclosed[1].

57. WB has triggered the ESSs in two categories: a) General Assessment and b) Specific Risks and Impacts. Under the General Assessment category, World Bank has triggered ESS 1 (Environmental and Social Assessment and Management) and ESS 10 (Stakeholder Engagement and Information Disclosure). Under Specific Risks and Impacts category, WB has triggered ESS 2 (Labor and Working Conditions), ESS 3 (Resource Efficiency and Pollution Prevention and Management), ESS 4 (Community Health and Safety), ESS 5 (Land Acquisition, Restrictions on Land Use and Involuntary Resettlement), ESS 6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources), ESS 7 (Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities), and ESS 8 (Cultural Heritage).

58. **Environmental and Social Risks.** Considering the nature of project activities and based on the 14 Environmental and Social Impact Assessment (ESIA) studies[2] undertaken for the overall project, the potential ES impacts that arise out of construction-related activities, out of siting, construction, and operation of substations, as well as out of the installation of underground cables are not so widespread and are mostly restricted/confined to limited areas and in width of right-of-way. 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.

59. With careful route selection, already identified elephant corridors in certain project districts—Purulia, Bankura, Jalpaiguri, Alipurduar, and Coochbehar—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 AB Cables 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.

60. During the operation phase, the impacts of generation of electro-magnetic field from 11 or 33 kV lines are likely to be insignificant. Further, transformer oil would require to be changed to maintain desired viscosity at every 10 to 15 years. As per national regulations, used transformer oil is categorized as hazardous waste and requirements for its proper handling and disposal to registered recyclers to avoid contamination of

[1] https://documents1.worldbank.org/curated/en/716311617305109814/pdf/Appendices-to-Environmental-and-Social-Management-Framework-West-Bengal-Electricity-Distribution-Grid-Modernization-Project-P170590.pdf

[2] https://projects.worldbank.org/en/projects-operations/document-detail/P170590?type=projects

ground water is included in the ESMF as well as Environmental and Social Management Plans (ESMP) for subprojects.

61. The social risk is assessed to be moderate 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 land, 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 ESIAs 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)[3], a Tribal People Planning Framework (TPPF)[4], Labor Management Procedures (LMP)[5], a Gender Development Framework[6], and a Stakeholder Engagement Plan (SEP)[7] — guiding the project to address issues through compensation and assistance, arising out of any involuntary resettlement and/or temporary displacement. Consolidated ESIAs consisting of Resettlement Action Plans (RAPs), where required, are prepared for subprojects. All the implementation stakeholders will be trained in the required ESF provisions

62. **Climate Change Risks and Opportunities.** The project is expected to reduce emissions by 44 million tons of CO_2 through 2041, mostly by reducing purchases of coal-intensive power from the grid. The investments under component 1 will help in reducing the aggregate technical and commercial 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 Multilateral Development Bank list of eligible climate mitigation activities. The investments in activities towards deployment of smart meters, improvement in the ICT systems and deployment of modern operational technologies will help in improvement in the reliability of the electricity distribution system and further benefit the discom in AT&C loss reduction. The activities, USD11.55 million of AIIB's financing (8%), in these components are well aligned with the MDB list of eligible climate mitigation activities.

63. The project has also been screened for climate and disaster risks using "Acclimatise Aware". The project's exposure to physical climate risk was found to be high.

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[3] https://documents1.worldbank.org/curated/en/964611617305390919/pdf/Resettlement-Framework-West-Bengal-Electricity-Distribution-Grid-Modernization-Project-P170590.pdf
[4] https://documents1.worldbank.org/curated/en/590951617305275770/pdf/IP-SSAHUTLC-Planning-Framework-West-Bengal-Electricity-Distribution-Grid-Modernization-Project-P170590.pdf
[5] https://documents.worldbank.org/en/publication/documents-reports/documentdetail/168911617305132637/labor-management-procedures-west-bengal-electricity-distribution-grid-modernization-project-p170590
[6] https://documents.worldbank.org/en/publication/documents-reports/documentdetail/652661617305072510/gender-development-framework-west-bengal-electricity-distribution-grid-modernization-project-p170590
[7] https://documents.worldbank.org/en/publication/documents-reports/documentdetail/869651617305335062/stakeholder-engagement-plan-sep-west-bengal-electricity-distribution-grid-modernization-project-p170590

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 activities on conversion of overhead lines to underground cables and replacing with AB cables would also help in preparedness of the utility in adapting towards extreme climate events such as cyclone storms. Based on the joint Multilateral Development Bank methodologies for climate finance tracking, USD31.59 million of AIIB's financing (23%) will be considered as climate adaptation finance.

64. **Gender Aspects.** The Gender Development Framework has identified that the women in the project area may face a variety of issues such as low participation in civil construction related work, restricted decision making and mobility, resettlement issues, security concerns and other issues. To address these issues, a gender action plan will be implemented across all the sub-projects' areas and specific outcomes will be monitored in the results framework.

65. To assess potential Gender-Based Violence (GBV), stakeholder consultations will be carried out and 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.

66. **Project Grievance Redress Mechanism.** A 3-tiered Grievance Mechanism already exists in the WBSEDCL. 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 District Grievance Redressal Committee will be established under the chairmanship of the Divisional/Regional Manager, WBSEDCL, for redressal of grievances of the affected people.

67. **Stakeholder Engagement, Consultation and Information Disclosure.** A SEP has been prepared for the project in accordance with World Banks'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.

68. **Applicable Independent Accountability Mechanism.** As noted above, WB's ESF will apply to this project instead of AIIB's ESP. The WB's corporate GRS and its Independent Accountability Mechanism, the Inspection Panel, which reviews the WB's compliance with its policies and procedures, will handle complaints relating to the WB's compliance with its ESF with respect to the Project. In accordance with AIIB's Policy on the Project affected People's Mechanism (PPM), submissions made to the PPM regarding such complaints under this Project Information will not be eligible for consideration by the PPM. Information on WB Inspection Panel[8] and how to submit complaints to WB's corporate GRS, is available on their website[9].

69. **Monitoring and Supervision Arrangements.** The AIIB safeguards team will collaborate with WB staff on monitoring and review of the implementation process. All monitoring reports will be shared with the AIIB team. Joint supervision missions will be conducted twice a year. To complement the supervision work of the WB team, AIIB may introduce technology-based monitoring methods, in agreement with the WB.

E. Risks and Mitigation Measures

Table 2: Summary of Risks and Mitigating Measures

Risk Description	Assessment (H/M/L)	Mitigation Measures
Procurement: WBSEDCL has no previous experience of procurement under WB policies.	Medium	1. Organizing regular training programs on procurement to enhance capacity 2. Project operations manual (which will include chapter on procurement)
Procurement: Complex and high value procurement	Medium	1. Use of appropriate Market approach based on recommendations of PPSD 2. Monitoring through the Procurement Plan and quarterly reports
Procurement: External interference in the procurement process and transparency	Low	1. Use of e-Procurement 2. Fair complaint handling mechanism. 3. Disclosure of procurement-related information. 4. External/internal procurement audits
FM: Risk of inadequate budget or delay in budget from the	Medium	1. The state's overall revenues in FY2021 increased due to a sharp increase in grants from the central government, as recommended by the

[8] http://www.inspectionpanel.org
[9] http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service

Risk Description	Assessment (H/M/L)	Mitigation Measures
Government due to COVID		15th Finance Commission. 2. For FY2022, the state budget has projected a sharp increase (about 34 percent y-o-y) in revenue receipts, which primarily reflects the considerable increase in the state's share of central taxes. 3. Provision for project funds under a distinct budget line in the state budget for FY2022.
FM: Weakness in internal controls and processes	Medium	1. Following the action plan mentioned in the audit report of the financial statements 2. Strengthening internal audit with increased focus on audit of contracts and billing systems and risk-based audit
ES: ES implementation	Medium	PIU to have dedicated ES specialists to monitor the implementation of ES management plans that are to be agreed with AIIB and WB.

Annex 1: Results Monitoring Framework

Project Objective:	To improve the operational efficiency and reliability of electricity supply in selected areas of West Bengal.										
Indicator Name	**Unit of measure**	**Base-line**	**Cumulative Target Values**						**End Target**	**Frequency**	**Responsibility**
			2021	**2022**	**2023**	**2024**	**2025**	**2026**			
Project Objective Indicators:											
1. Reduction in Aggregate Technical and Commercial (AT&C) losses in select districts - Bankura district	Percentage	37.94	-	-	-	-	-	-	20	Annual	WBSEDCL
2. Reduction in Aggregate Technical and Commercial (AT&C) losses in select districts - Nadia district	Percentage	26.22	-	-	-	-	-	-	18	Annual	WBSEDCL
3. Reduction in Aggregate Technical and Commercial (AT&C) losses in select districts - East Medinapur district	Percentage	23.13	-	-	-	-	-	-	17.50	Annual	WBSEDCL
4. Reduction in Aggregate Technical & Commercial (AT&C) loss in select districts - Alipurduar district	Percentage	20.41	-	-	-	-	-	-	16	Annual	WBSEDCL
5. Reduction in Aggregate Technical and Commercial (AT&C) losses in select districts - Dakshin Dinajpur district	Percentage	42.75	-	-	-	-	-	-	20	Annual	WBSEDCL
6. Reduction in SAIDI (System Average Interruption Duration Index) in select towns - Asansol town	Hours	187.43	-	-	-	-	-	-	95	Annual	WBSEDCL
7. Reduction in SAIDI (System Average Interruption Duration Index) in select towns - Kharagpur town	Hours	249.78	-	-	-	-	-	-	125	Annual	WBSEDCL
8. Reduction in SAIFI (System Average Interruption Frequency Index) in select towns - Asansol town	Number	117.28	-	-	-	-	-	-	85	Annual	WBSEDCL
9. Reduction in SAIFI (System Average Interruption Frequency Index) in select towns - Kharagpur town	Number	114.92	-	-	-	-	-	-	80	Annual	WBSEDCL

Project Objective:	To improve the operational efficiency and reliability of electricity supply in selected areas of West Bengal.										
Indicator Name	**Unit of measure**	**Base-line**	**Cumulative Target Values**						**End Target**	**Frequency**	**Responsibility**
			2021	**2022**	**2023**	**2024**	**2025**	**2026**			
Intermediate Results Indicators:											
1. Distribution Lines constructed	Km	0.00	-	-	-	-	-	-	1,900	Quarterly	WBSEDCL
2. Increase in Distribution Transformation Capacity	KVA	0.00	-	-	-	-	-	-	85,300	Quarterly	WBSEDCL
3. Distribution lines retrofitted to reduce energy use	Km	0.00	-	-	-	-	-	-	12,100	Quarterly	WBSEDCL
4. Distribution lines moved under the ground to reduce exposure to storm and tree damage	Km	0.00	-	-	-	-	-	-	1,700	Quarterly	WBSEDCL
5. Consumers put on advanced metering infrastructure (AMI) meters (for efficient and reduced energy consumption)	Number	0.00	-	-	-	-	-	-	200,000	Quarterly	WBSEDCL
6. Sub-stations integrated with SCADA system	Number	0.00	-	-	-	-	-	-	50	Quarterly	WBSEDCL
7. Person Days of Training Provided to WBSEDCL officials - Total	Number	0.00	-	-	-	-	-	-	5,000	Quarterly	WBSEDCL
8. Person-days of ICT/OT technical trainings/capacity building activities (females) in WBSEDCL	Number	0.00	-	-	-	-	-	-	1,000	Quarterly	WBSEDCL
9. Grievances received that are addressed within two months of receipt	Percentage	0.00	-	-	-	-	-	-	90	Annual	WBSEDCL
10. Percentage increase in total technical/ICT staff (females) in WBSEDCL	Percentage	0.00	-	-	-	-	-	-	7.5	Annual	WBSEDCL
11. Person-days of internship/ training for students in ICT/OT/ technical areas (females) provided by WBSEDCL	Number	0.00	-	-	-	-	-	-	10,000	Quarterly	WBSEDCL

Annex 2: Detailed Project Description

1. **Consumer profile of WBSEDCL.** The number of consumers served by WBSEDCL has more than doubled in the last six years to almost 20 million consumers. 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, while commercial consumers contribute to around 15 percent of WBSEDCL's total retail sale in million units. Agriculture consumers contribute to around 4 percent of WBSEDCL's total retail sale in million units.

2. **WBSEDCL power system details.** WBSEDCL serves more its more than 20 million consumers through a service network spanning five zones, 20 regional offices, 76 distribution divisions, and 535 customer care centres. It has 17,279 circuit-km of 33kV lines, 176,098 circuit-km of 11 kV lines, 348,560 circuit-km of 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 including West Bengal Power Development Corporation Limited (WBPDCL), central generating plants, independent power producers and traders. WBSEDCL has a mature commercial management system (SAP ISU) in place, which runs on top of SAP ERP with fairly robust internal commercial processes.

3. 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:

4. **Component 1: Distribution System Strengthening.** This component would support strengthening and augmentation of the distribution network in select districts/towns through investments in (i) high-voltage distribution system and AB cabling, (ii) investments in 33/11 kV GIS; and (iii) underground cabling to replace overhead networks.

5. 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:

(i) **High Voltage Distribution System and Aerial Bunched Cabling.** The AT&C losses in some large districts continue to be very 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 AB cabling, and the existing large distributed energy resources 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, Uttar Dinajpur, which are located in very high to high damage risk zones with respect to cyclones. 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.

(ii) **Distribution network augmentation.** This includes investments in 33/11 kV GIS 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.

(iii) **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.

6. **Component 2: Smart Grid Development in Urban Areas.** 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.

7. 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, 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:

(i) **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 (including Asansol and Kharagpur). 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.

(ii) **Modern operation technologies.** This component 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 component would also support deployment of an Outage Management System (OMS) as an addition to the existing SCADA solution in one or more of the three identified towns.

(iii) **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 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 functions) and improving of the capability of existing Enterprise Resource Planning solutions by bringing more services within ERP's domain and integrating/deploying more solutions

8. **Component 3: TA for institutional development and capacity building of WBSEDCL.** 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.

9. 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. Together with deploying the technology, WBSEDCL would need to plan and re-skill 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:

(i) **Support for strengthening ICT/OT systems.** This component 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.

(ii) **Support to undertake personnel planning** to prepare for the changing business environment because of deployment of new technologies.

(iii) **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 provide necessary benefits.

(iv) **PMCs to assist in supervising** and monitoring contracts awarded under Component 1 of the project.

(v) **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 and corporate governance, and so on.

10. **Component 4: Contingent Emergency Response.** In the event of an eligible emergency being declared, re-allocation of project funds to support the response effort may be requested. This component would be capitalized by drawing on uncommitted funds under Components 1 to 3.

11. **Cost and Financing Plan.** The project will be financed by debt from AIIB and WB. Both AIIB and WB will provide loans of USD135 million each.

Table 1. Indicative Cost and Financing Plan (USD millions)

Project Component	Cost	Financing Plan		
		AIIB	WB	GoWB
Component 1: Distribution System Strengthening	**315.45**	**110.41**	**110.41**	**94.63**
HVDS and AB 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 operation technologies	22.26	7.79	7.79	6.68
Component 3: Technical assistance for institutional development and capacity building	**6.00**	**2.00**	**2.00**	**2.00**
Component 4: Contingent Emergency Response	**-**	**-**	**-**	**-**
Front end fee	**0.68**	**0.34**	**0.34**	**-**
Total	**385.70**	**135.00**	**135.00**	**115.70**

Annex 3: Economic and Financial Analysis

I. Economic Analysis

A. Background

1. The Economic Analysis was conducted by World Bank, who is the lead financier of the project, based on detailed project reports prepared by WBSEDCL. The project investment will induce significant economic benefits by addressing key operational challenges, and improve the reliability and quality of electricity access. Reliable access to electricity can provide a boost to income earning activities, improved education and health outcomes and better safety outside homes. Improved quality of power on account of the project will also help improve the financial health of WBSEDCL, by assisting it to retain large customers amid competition from parallel distribution licenses. 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.

2. The economic analysis is undertaken with a comparison of a 'with project' scenario with a 'without project' setting. The latter includes a counterfactual where the distribution system continues to serve rising demand but without modernization efforts. The baseline EIRR is estimated at 16.6% while the EIRR increases to 34.3% when environmental externalities are included in the analysis.

Table 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

Source: West Bengal Electricity Distribution Grid Modernization Project, Project Appraisal Document, World Bank

B. Project Costs

3. Majority of the costs is attributed to Components 1 and 2, i.e., costs related to distribution system strengthening and smart grid development in urban areas. The strengthening of the distribution system involves (i) high-voltage distribution system and AB cabling, (ii) investments in 33/11 kV GIS; and (iii) underground cabling to replace overhead networks. The development of smart grid includes investments in smart-grid technologies including (i) technology and capacity upgrading of the ICT systems of the WBSEDCL; (ii) deployment of distribution

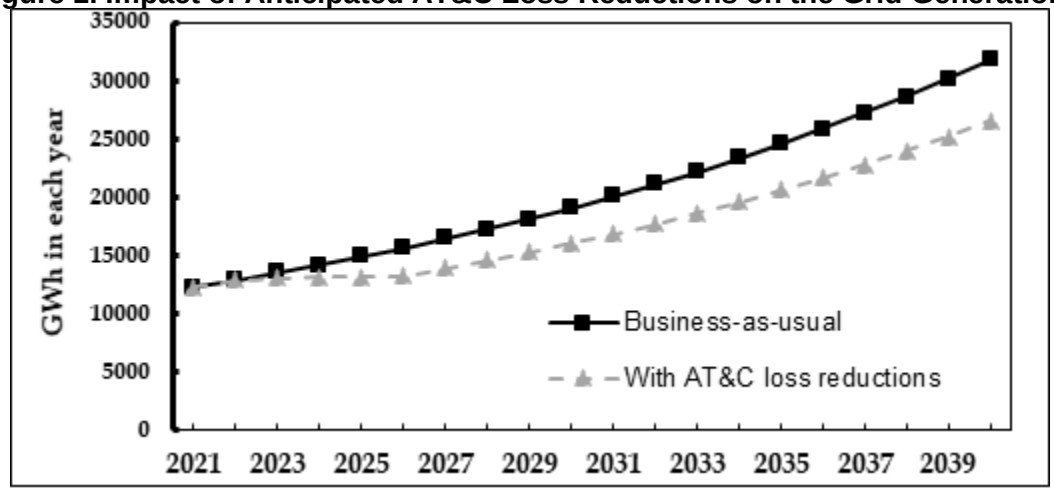
automation technologies and integration of communicable control devices with SCADA including investments in GIS upgradation and integration; and (iii) deployment of smart consumer meters in select urban geographies. The overall economic cost of the project is estimated at USD400 million.

C. Project Benefits

4. The project is expected to yield numerous benefits including savings from generation foregone to meet aggregate demand, additional sales of electricity, savings in O&M expenses and reduced greenhouse gas emissions.

(i) **Savings from distribution losses.** An important economic benefit would come from AT&C loss reductions achieved through both technical and commercial improvements. These AT&C loss reductions are aggregated across the different districts in the state of West Bengal. Reducing these 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. Overall reduction in generation is estimated at 59.31 tWh during the course of the project resulting in savings of USD400 million in NPV terms.

Figure 1. Impact of Anticipated AT&C Loss Reductions on the Grid Generation



(ii) **Reduction of non-technical losses.** The project is also estimated to reduce non-technical losses through improved bill collection and theft prevention. 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. The reduction in non-technical losses is estimated at 4.7 tWh. For simplicity, it has been assumed that the willingness to pay for stolen energy is equivalent to the West Bengal average tariff in 2021 i.e., INR6.89 per kWh. 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. The NPV of additional electricity sales to paying customers due to theft avoidance is estimated to be USD34 million.

(iii) **Reliability improvement and value of electricity.** A reduction in AT&C losses is expected to result in a drop in the duration and frequency of power outages and serve previously unmet demand (primarily among residential consumers). It is also expected to displace expensive diesel-based self-generation (primarily for industrial, commercial, and agricultural consumers). For simplicity, the analysis assumes that the value of unserved energy for the residential consumers is double the retail tariff i.e., INR13.78 per kWh. In contrast, the value of the unserved energy for commercial customers is determined from the costs of operating backup diesel generators, which on average is about INR19.22 per kWh.[1]

(iv) **Reduced greenhouse gas emissions.** The project is expected to reduce emissions by 44 million tons of CO_2 through 2041, mostly by reducing purchases of coal-intensive power from the grid.

5. In addition to the above benefits there are numerous other benefits that cannot be identified owing to lack of precise data. For example, the low voltage in the distribution system can suppress the demand for certain appliances that could be sensitive to voltage sag or surge, and inhibit the improvement in quality of life for the consumers. Modernization of the distribution system increases the flexibility of the power system and reduces vulnerability to shocks, including natural disasters. The improved capabilities of personnel and systems at WBSEDCL is 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. Financially, the improvement in quality is expected to assist WBSEDCL in retaining large customers amid competition from parallel distribution licenses.

Table 2. Summary of Economic Analysis Relative to Business-As-Usual Distribution Outlook

	Base Case
Discount Rate	10.0%
Economic Rate of Return (EIRR)	
EIRR	16.6%
EIRR + local externalities	17.6%
EIRR + global externalities	34.3%
NPV of Costs and Benefits associated with the Project (USD Million)	
Overall costs under the program	289
Benefits under the program	
Savings on account of reduced generation expenses	400

Additional electricity sales to paying customers due to theft avoidance	34
Savings on account of reduced O&M cost	16
Additional electricity sales due to diesel replacement	1
Savings of previous diesel generation, now served by the grid (among industrial)	1
Value of previous unserved energy (among residential consumers due to bad reliability)	1
NPV (before environmental benefits)	**163**
Local environmental benefits: avoided grid generation	30.5
NPV (incl. local environmental benefits)	**194**
Value of avoided greenhouse gas emissions	637
NPV (including environment benefits)	**831**

Source: West Bengal Electricity Distribution Grid Modernization Project, Project Appraisal Document, World Bank

6. 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. Given that these broader benefits are not considered, the estimated EIRR is a conservative estimate.

7. The baseline EIRR, based on benefits arising from (a) savings of net generation expenses, (b) additional electricity sales and (c) O&M savings, is estimated to be 16.6% with an NPV of USD163.5 million, when evaluated at 10.0% discount rate. With the baseline EIRR being well above the discount rate, the project is deemed to be economically viable. The EIRR of the project increases significantly to 34.3% when positive environmental externalities are taken into account with the NPV rising to USD831 million.

D. Sensitivity Analysis

8. The robustness of the Economic Analysis is evaluated by making alternate assumptions about costs and benefits. The analysis covers the scenarios whereby Project is found to be economically viable if (a) costs increase by 20%, (b) benefits decline by 20% and (c) both (a) and (b) occur. We adopt a conservative approach and conduct the sensitivity analysis on the baseline that excludes the large benefits from environment externalities. Across all the scenarios the project yields an EIRR that is above the discount rate of 10%, and hence is deemed economically viable. The results are outlined in Table 3 below:

Table 3: Sensitivity Analysis

	EIRR	NPV (USD Million)
Baseline	16.6%	163.5
Increase Costs by 20%	13.7%	105.7
Decrease Benefits by 20%	13.1%	73.0
Increase Costs by 20% and Decrease Benefits by 20%	10.6%	15.3

9. The project's EIRR is also robust to changes and uncertainties related to key input variables, analyzed through switching values. The AT&C loss reductions would have to decline to 25 percent of the baseline before the project fails to achieve its EIRR target. While a lag of two years is anticipated before the project yields results, the expected benefits are substantial enough that the project remains 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.

II. Financial Analysis

10. The investment program by WBSEDCL yields an internal rate of return of 19 percent. Some of the assumptions are explained in the following paragraphs.

11. **COVID-19 impact.** The impact of COVID-19 is already factored in the FY2021 numbers, wherein the company has returned negative EBIDTA of USD168 million. Given that FY2021 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.

12. **AT&C Losses.** The projections are simulated considering a moderate reduction in AT&C losses of a modest 1 percent annually, on the back of improvements in network (leading to lower technical losses) and revenue protection programs (such as smart meters and AB cabling at LT level. Further, from FY2022 onward a collection efficiency of 99.5 percent has been considered (based on previous year trends).

13. **Energy Sales.** To account for FY2021, higher sales have been assumed in FY2022 in commercial and industrial categories. For future years, and from FY2023, onward a 6 to 7 percent growth is assumed in various categories as per the long-term trend.

14. **Power Purchase Cost.** The power purchase cost projections comprise forecast for (i) the quantum of energy purchased and (ii) the energy charge and fixed charge for various power plants with which WBSEDCL has power purchase agreements. With regards to power sources, while the power purchased from state-owned generation company and central sector generating stations has been kept constant as in FY2020, additional power is assumed 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 FY2020 (in line with long-term trends). The cost of additional short-term power has been assumed at INR 3.38/kWh in FY2022 (that is, equal to average cost of short-term power procurement by WBSEDCL from power exchanges in FY2020), and subsequently increased by 4 percent FY2023 onwards.

15. **Average billing rate/energy tariffs.** A 3 percent increase in tariff has been considered for all major consumer categories from FY2023 onward.

II. Financial Analysis of WBSEDCL

16. Despite EBITDA being positive during the period of FY2018 to FY2021, WBSEDCL incurred loss at Profit before Tax (PBT) level[1]. The one of the key reasons for this has been lack of tariff increase since October 2016, which has increased the reliance on short term debt, thus increasing the interest cost.

17. **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 FY2021 numbers, wherein the company has returned negative EBITDA of USD168 million. The company has managed the losses by elongating payments to generation companies resulting in an increase in trade payables.

18. **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, the overall energy sales increased at a Compound Annual Growth Rate (CAGR) of about five percent. WBSEDCL has made significant improvement in AT&C losses over the past few years achieving a reduction of more than 10 percent, resulting in higher revenues. 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.

19. **Power Purchase Costs.** One of the reasons for the drop in financial performance has been the sharp increase in the average power purchase costs, which have increased by a CAGR of nine percent over the past four years. Further, as the power purchase costs account for over 80 percent of the costs of WBSEDCL, this rise has a significant impact on financials.

20. **Regulatory assets.** Irregular tariff revision has led to year-on-year increase in regulatory assets. The total amount of regulatory assets[2] according to annual accounts of WBSEDCL have increased from USD445 million in FY2011 to USD2.5 billion at the end of FY2021. However, the West Bengal Electricity Regulatory Commission has not recognized the total figure of USD2.5 billion in any single true-up/tariff order. In the true-up order for FY2013, it recognized a regulatory asset of USD401 million. It recognized an additional USD268 million in FY2015 (but pertaining to the previous period of FY2013). For only these amounts WBERC has recognized carrying costs and provided partial liquidation through subsequent tariff orders. Since FY2017, to support WBSEDCL, the Government of West Bengal sanctioned grants of USD356 million (USD273 million in FY2017 and USD82 million in FY2018), to be partly adjusted against the regulatory assets.

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[1] Excludes extraordinary income such as other comprehensive income and regulatory deferred income.

[2] WBSEDCL transfers the deficit in its cost of supply and revenue realization to a regulatory deferral account on 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.

21. **Short-term Debt.** The increase in regulatory assets has led to increased dependency of WBSEDCL on costly short-term loans which has resulted in deterioration of profitability. Short-term loans of WBSEDCL have increased from USD459 million in FY2015 to USD791 million in FY2021. These loans include borrowings from commercial banks and power sector non-banking finance companies (Power Finance Corporation Ltd./ REC Ltd.). The outstanding total debt of WBSEDCL at the end of FY2021 stood at USD2.35 billion.

(USD million)

Analysis	FY2018	FY2019	FY2020	FY2021
	Aud.	Aud.	Aud.	Prov.
Revenue from consumers (adjusted for rebates)	2,541.71	2,751.37	2,982.66	2,881.51
Other income	124.82	148.22	212.31	199.54
Revenues	**2,666.52**	**2,899.60**	**3,194.98**	**3,081.05**
Total costs	**2,466.68**	**2,752.21**	**3,108.10**	**3,248.83**
Power purchase costs	2,167.88	2,445.47	2,706.30	2,825.42
Employee costs (including outsourced manpower related)	141.61	218.01	307.82	234.78
O&M and other costs	157.19	88.73	93.99	188.63
EBITDA	**199.84**	**147.38**	**86.88**	**(167.77)**
Depreciation	124.58	124.43	131.54	145.69
Interest costs	207.23	194.30	195.58	213.62
PBT	(131.97)	(171.36)	(240.24)	(527.09)
Regulatory deferral income + OCI (adjusted for taxes)	137.45	177.80	248.73	533.66
Profit after taxes	**5.49**	**6.44**	**8.48**	**6.57**
Energy input (million units)	39,355	40,684	43,093	N/A
Sales (million units)	27,705	29,624	32,389	N/A
Average revenue realized (ARR) (INR/kWh)	7.2	7.3	7.3	N/A
Average cost of supply (ACS) (INR/kWh)	7.5	7.7	7.9	N/A
Gap between ARR and ACS (INR/kWh)	0.4	0.4	0.6	N/A

Annex 4: Member and Sector Context

A. Country context

22. The Indian economy grew at a healthy rate of 7.4 percent per annum on average between FY2014 and FY2018, but growth has been steadily slowing down in recent years. Disruptions due to the demonetization initiative in November 2016 and teething implementation issues related to the rollout of goods and services tax in July 2017, resulted in growth dropping to 7.0 percent in FY2017 and 6.1 percent in FY2018. Weak economic growth in the rural sector, sluggish external demand, and stresses in corporate and financial sector balance sheet further dented growth to 4.2 percent in FY2019. COVID-19 pandemic and the associated social distancing measures have significantly impacted growth in FY2020, with the economy contracting by 15.7 percent in the first half. Although economic activity is expected to recover in the second half of the fiscal year, the economy is expected to shrink between 7 to 10 percent in FY2020.

23. The contraction in the economy is expected to impact significantly some of the most vulnerable sections of the economy and reverse many of the impressive socioeconomic gains made by India over the last two decades. Between 2004-05 and 2011-12 India is estimated to have pulled 170 million citizens out of poverty, with the poverty rate declining from 39.9 percent of population in 2004-05 to 22.5 percent in 2011-12. Poverty rates are estimated to have further fallen to values ranging between 8.1 to 11.3 percent between 2012 and 2017.[1] More recent household data by the Centre for Monitoring Indian Economy indicate that the job losses due to COVID-19 pandemic is likely to have pushed up poverty rates to levels last seen in 2016, implying around 4 years of setback in its poverty reduction effort.

24. According to the Periodic Labour Force Survey 2017-18 estimates, 77.1 percent of employment in India is non-regular—either self-employed or casual workers with another 13.7 percent in regular jobs that are lacking in social protection. Thus between 364 and 473 million workers face the risk of being adversely affected by the disruptions caused by the pandemic. High frequency employment survey indicates a sharp increase in unemployment rate from 7.9 percent during January to March 2020 i.e., the quarter preceding the lockdown, to 18.5 percent during April to June 2020 when the lockdown policy measures were most stringent. Moreover, there was a sharp drop in the labour force participation rate in mid-2020 compared to the months preceding the lockdown.

25. The Indian economy is expected to recover strongly from the current pandemic growing by over 8.5 percent in FY2021 and averaging 7.5 percent over the next few years.[2] The growth is expected to be assisted by improvement in business climate as evidenced by India's ranking rising from 130 to 63 in recent years in World Bank's Ease of Doing Business. Other factors which are expected to drive growth include rapid urbanization, unified tax regime and favorable demographics. At the same time, achieving high rate of growth will be contingent on addressing

[1] South Asia Economic Focus, Fall 2020: Beaten or Broken? Informality and COVID-19, World Bank
[2] World Economic Outlook Database, October 2020, International Monetary Fund

key bottlenecks and emerging challenges including creating job opportunities by raising the competitiveness, resolving infrastructural bottlenecks, bridging the skill deficit, improving institutional capacities, and addressing environmental degradation.

26. Bridging the infrastructure gap is vital for India to achieve rapid and inclusive growth in a sustainable manner. According to Global Infrastructure Outlook, India needs USD 4.5 trillion investment in infrastructure between 2015 and 2040 with the electricity sector accounting for more than half of the investment requirement.[3] The *Strategy for New India @75* by NITI Aayog, outlines government's objective to (a) make available 24x7 power to all by 2019, (b) achieve 175 GW of renewable energy generation capacity by 2022, (c) reduce imports of oil and gas by 10 per cent by 2022-23 and (d) continue to reduce emission intensity of Gross Domestic Product (GDP) to help India achieve the National Development Council (NDC) target of 2030.[4] Similarly, the Report of the Task Force on National Infrastructure Pipeline has projected total infrastructure investment of about USD 1.4 trillion over the period 2020 to 2025 for India to become a USD 5 trillion economy. Nearly a quarter of this investment is required in the energy sector.[5]

B. Sector and Institutional Context

27. The 24x7 Power for All Program was a joint initiative of the Government of India, and local governments with the objective to make 24 hour per day power available to all households, industry, commercial businesses, public needs, agriculture and any other electricity consuming entities for all by 2019. The program covered power generation, transmission, distribution, financial viability, renewable energy and energy efficiency. Specifically on electricity distribution, the program aimed to provide access to all households along with creation of new distribution network or strengthening of existing infrastructure.[6]

28. The Government of India achieved full electricity of all households in March 2019.[7] According to the International Energy Agency's definition, the electricity access rate in India has moved from 43 percent in 2000, 68 percent in 2010 to 99.6 percent in 2019. Despite the improvement in electricity access, India has one of the lowest electricity consumption per capita electricity consumption among emerging markets. At 1181 kWh in 2018-19, India's per capita electricity consumption is less than half of the global average and 20 percent of Organization for Economic Co-operation and Development (OECD) economies.[8]The focus of the government is now to ensure a secure and reliable supply of electricity by strengthening distribution networks and implementing distributed renewable generation systems in rural areas.[9]

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[3] Global Infrastructure Outlook, Oxford Economics and Global Infrastructure Hub, 2017
[4] Strategy for New India @75, NITI Aayog, 2018
[5] Economic Survey 2019-2020, Ministry of Finance, Government of India
[6] http://www.powerforall.co.in/
[7] The Government of India states that a village is electrified when 10 percent of households and all public buildings are connected to the grid.
[8] Central Electricity Authority, Government of India and US Energy Information Administration.
[9] International Energy Agency, India 2020 – Energy Policy Review, January 2020.

29. The India Power Market is mostly unbundled, with separate entities responsible for generation, transmission and distribution, in accordance with the 2003 Electricity Act. Retail activities such as electricity sales and electricity distribution to consumers is done by discoms.

30. The financial situation of discoms across India is generally poor and has been further exacerbated by the COVID-19 pandemic. Majority of the 67 discoms, which are typically owned by the state governments, face high levels of debt related to high technical and commercial losses, power theft, lack of metering and poor cost recovery. In November 2015, the Government of India, in agreement with states, introduced the Ujwal DISCOM Assurance Yojana (UDAY) scheme to convert 75 percent of discoms' debt into state governments bonds.[10] In return the discoms would have to reduce the cost of power generation, support the development of renewable energy, invest in energy efficiency measures and improve their operational and financial performance. The States of West Bengal and Orissa, and the Union Territory of Delhi did not sign up for UDAY. Despite UDAY, by June 2020, discom debt reached a record high of about USD 61.5 billion resulting in outstanding payments to power generators of about USD 17.3 billion by September 2020.[11,12]

31. West Bengal is India's 2nd most densely populated state, and the fourth most populous with 96 million people. It has an area of 88,752 sq. km. and is the sixth largest contributor to India's net domestic product. Agriculture accounts for the largest share of the labor force with 39 percent share.[13] In the past five years, the West Bengal Gross State Domestic Product (GSDP) has grown at a CAGR of 6.5 percent, primarily driven by growth in trade, hotels, real estate, finance, insurance, transport, communications and other services.[14] This economic growth has resulted in a growing electricity demand at a CAGR of 4.5 percent during the same period. The electricity supply has kept pace, resulting in the state's energy deficit within a low margin of 0.3 - 0.4 percent over the past five years. Electricity sales rose from 36 tWh in FY2013 to 45 tWh in FY2017.[15] The state is endowed with strategic geographical standing - being the corridor to the North East and South East Asia and has an important role in facilitating and promoting regional power trade. The state is already facilitating electricity trade with Bangladesh with 1000 MW transmission capacity transmission line.

32. The West Bengal State Electricity Distribution Company Limited (WBSEDCL) is responsible for electricity distribution and hydropower generation in West Bengal. The West Bengal State Electricity Transmission Company Limited (WBSETCL) covers electricity transmission and load dispatch, while the West Bengal Power Development Corporation Limited (WBPDCL) is responsible for thermal power generation.

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[10] https://www.uday.gov.in/

[11] https://www.crisil.com/en/home/newsroom/press-releases/2020/06/discom-debt-to-hit-all-time-high-of-rs-4point5-lakh-crore-this-fiscal.html#

[12] https://praapti.in/

[13] http://documents1.worldbank.org/curated/en/706921504251904391/pdf/119341-BRI-P157572-West-Bengal-Jobs.pdf

[14] West Bengal Electricity Distribution Grid Modernization Project, Project Information Document, World Bank, Available at: http://documents1.worldbank.org/curated/en/804731564699264584/pdf/Concept-Project-Information-Document-PID-West-Bengal-Electricity-Distribution-Grid-Modernization-Project-P170590.pdf

[15] https://cea.nic.in/dashboard/

33. WBSEDCL covers nearly the entire state, except Kolkata and other very small pockets covered by private distribution licensees. These include Calcutta Electricity Supply Company (CESC), a private distribution licensee supplying power to Kolkata and Howrah; Damodar Valley Corporation (DVC), a Central Public Sector Undertaking (CPSU) supplying power mainly to industrial consumers in the DVC command area[16]; Durgapur Projects Limited (DPL), 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 (DPSC - IPCL), a privately owned utility supplying power to the Asansol-Raniganj industrial area. All these utilities are regulated by West Bengal State Electricity Regulatory Commission (WBSERC).

34. While West Bengal has extended grid connectivity to 99 percent of villages across the state, the large consumer base of low paying and low consumption households puts strain on discoms finances. The number of consumers served by WBSEDCL has more than doubled in the last six years to almost 18 million consumers. WBSEDCL supplies electricity to approximately 85 percent consumers in West Bengal and contributes to about 56 percent retail sale in terms of million units (MUs) sold in the state. WBSEDCL's consumer mix is characterized by very high proportion of low paying domestic consumers (about 90 percent of WBSEDCL's total consumer strength), contributing to only about 40 percent of WBSEDCL's total retail sale in MUs.

35. According to the Ministry of Power's 7th Annual Integrated Rating of State Distribution Utilities (October 2019), WBSEDCL was rated B+, with key strengths being, for example, monthly variable cost adjustment framework, limited dependence on state government subsidy, receivable days remaining consistently below 90 days, healthy cost coverage. Key concerns were high Aggregate Technical and Commercial (AT&C) losses of 26.7 percent in FY2018, high distribution loses above requirements by the West Bengal Electricity Regulatory Commission, amongst others. The proposed key actions were to reduce transmission and distribution losses and timely filing of tariff petition.[17] By September 2020, the total outstanding amount by WBSEDCL to all generators (excluding disputed amount), was approximately 42 million USD. Prior to the start of the COVID-19 pandemic in India, the outstanding amount stood levelled at 5 million USD during January to April 2020 and at zero during October and November 2019.[18]

36. West Bengal's priority has shifted from basic access to improved quality of supply and ensuring the financial sustainability of the state discom. Although the state has adequate power capacity, challenges remain in commensurate strengthening of the intra-state transmission and distribution network to widely disperse quality power supply amongst the large consumer base, especially in rural Bengal. The doubling of the consumer base has led to multiple operational and financial challenges that must be addressed.

(i) Reducing AT&C losses: As the distribution network extended rapidly over a large area with addition of huge number of low voltage consumers, there was a steady

[16] Industrial consumers in 5 districts (Bardhhaman, Hoogly, Howrah, Bankura, Purulia)
[17] https://pfcindia.com/DocumentRepository/ckfinder/files/GoI_Initiatives/Annual_Integrated_Ratings_of_State_DISCOMs/7th_Rating_Booklet_Final_13-10-2019.pdf
[18] https://praapti.in/state-dashboard/west-bengal

increase in losses with AT&C loss levels reaching around 30 percent in FY2015. WBSEDCL has been taking several initiatives to reduce the losses but these continue to remain high at around 27 percent in FY2018.

(ii) Improving quality and reliability of power: Owing to the vast spread of low voltage distribution network including remote areas, the utility is facing a challenge in maintaining quality and reliable supply and the network suffers from frequent outages [Distribution Transformer failure rate varies between 4 to 10 percent across different districts]. The improvement in quality and reliability by strengthening infrastructure and incorporating self-healing capability in the network is also important for retaining the existing large consumers.

(iii) Integrating advanced operation technologies (OT) and automation of internal business operations: Globally, the business environment of discoms is seeing a paradigm shift with deployment of disruptive technologies like Electric Vehicles (EVs) and increase in Distributed Energy Resources (DER). Rising consumer aspirations and large-scale use of ICT in most sectors, is forcing utilities to transform themselves into fully automated entities providing an enhanced consumer experience. This challenge is more pronounced in case of developing economies with a rapidly growing consumer base where discoms handle a vast amount of consumer data and automation of metering, network operations and internal business processes, becomes a necessity rather than an option. WBSEDCL is also faced with similar challenges around upgrading its Information Communication Technology (ICT) and Operational Technology (OT) systems to automate network operations to facilitate integration of renewable energy and handle the growing impact of large number of prosumers, EVs and other DER applications. Automation of operations is also important for WBSEDCL to monitor reliability of supply, identify and restore network disruptions and track consumer complaints efficiently, thus leading to improved customer satisfaction.

(iv) Re-skilling 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 become more technology driven. The utility employees are used to conventional, manually operated networks and business operations. They now need to learn integrated ICT-Power System skills and the utility needs to invest quickly in work-force skilling in a major way. WBSEDCL's employees have a strong commitment to work and the capacity to learn and absorb new technologies.

(v) Securing financial sustainability: While WBSEDCL is one of the very few publicly owned discoms in India that have generated profits over several years in the past, its financial performance has deteriorated in last couple of years due to delayed tariff revisions and accumulation of a considerable amount of receivables (regulatory assets) because of non-pass through of full costs in the

tariff for a few years and the same being financed through short term debt. The Government of West Bengal also provides subsidy to domestic consumers with limited consumption and agriculture consumers, which amounted to around INR 10.24 billion in FY2018. While this is considerably less than the subsidy being provided by other states that have high agriculture loads (like Andhra Pradesh, Punjab, Rajasthan), the financial pressure on WBSEDCL shall continue to increase because of a higher mix of low value consumers, increasing interest burden and the perceived political ramifications of any revisions in tariffs.

Annex 5: Sovereign Credit Fact Sheet

A. Recent Economic Development

India is a lower-middle-income country, with a GDP per capita at USD 1900.7 and a population of 1.38 billion in 2020.[19] It is the world's third largest economy by purchasing power parity. India's economy grew at an average annual rate of 7.4 percent between FY2014 and FY2018 but has slowed down in recent years following disruptions due to the demonetization initiative in November 2016 and the teething issues associated with the rollout of goods and services tax in July 2017.[2021] Growth slowed down to 4.0 percent in FY2019 due to weakness in private consumption, investment and exports, owing to rural distress, stress in the financial sector, and sluggish global demand. The Indian economy contracted by 7.3 percent in FY2020 as a result of the COVID-19 pandemic and resulting lockdown.[22] The economy showed signs of revival in the last two quarters of FY2020 as the lockdown measures were gradually eased. Growth in the first half of FY2021 surged to 13.7 percent, mainly due to base effects.

2. Inflation averaged 6.2 percent in the FY2020, above the target band of 2-6 percent, primarily driven by food inflation due to supply side disruptions. The central bank reduced the repo and reverse repo rates by 115 and 155 basis points to 4.0 and 3.35 percent respectively, to stimulate aggregate demand, which had declined due to the lockdown. The central bank introduced several measures to reduce the borrowing cost, bolster liquidity, and improve credit flow to the productive sectors. Inflation moderated slightly to average 5.5 percent in the first nine months of FY2021 due to decline in food inflation even as core inflation remained sticky. Key policy rates were left unchanged in with the central bank maintaining an accommodative stance.

3. General government fiscal deficit is estimated to have risen to 12.8 percent of GDP in FY2020. A downturn in revenue due to economic slowdown and higher spending on the stimulus package resulted in the fiscal deficit widening significantly. Buoyant revenue collection by the central government have constrained the fiscal deficit during April to November to 46.2 percent of the budgeted deficit, well below the pre-pandemic average during FY2016 to FY2019. Capital expenditure has grown by 13.5 percent during this period lower than budget estimates. The sharp increase in fiscal deficit and a contraction in GDP in FY2020 resulted in the public debt rising to close to 90 percent of GDP in FY2020.

4. The current account posted a surplus in FY2020, for the first time since 2002, due to a greater decline in imports as compared to exports. While the current account remained in surplus in the first quarter of FY2021 on account of contraction in the trade deficit, it reverted to a deficit

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[19] The income group classification for fiscal year 2019 is based on World Bank criteria.
[20] Data are based on fiscal years. Fiscal year 2020 (FY2020) begins on 1 April 2020 and ends on 31 March 2021.
[21] On Nov. 8, 2016, India's government announced withdrawal of the legal tender of INR500 and INR1,000 notes, which accounted for 86 percent of the value of currency in circulation, and introduction of new INR500 and INR2,000 notes.
[22] On March 24, the government announced a nationwide lockdown till April 14, subsequently extended to May 30. Lockdown was eased beginning June 1.

in the second quarter as merchandise imports surged while services exports remained stagnant. Overall the current account recorded a deficit of 0.2 percent of GDP in the first half of FY2021. Workers' remittances remained strong with net inflow of USD 25 billion in the first half of FY2021 as economic prospects improved globally. The trend of robust FDI inflows continued with net FDI inflow of USD 21.5 billion. India's external debt stood at USD 593.1 billion or 20.1 percent of GDP in September 2021.

5. In June 2020, Moody's downgraded India's rating to Baa3 with a negative outlook, but revised the outlook to stable in its October 2021 update while retaining the Baa3 rating. In April 2021, Fitch revised India's outlook to negative while retaining BBB- rating, due to slow reform momentum and challenging economic environment, limited fiscal space and stress in the financial sector and affirmed this in November 2021. In July 2021, S&P retained India's rating at BBB- with a stable outlook.

B. Economic Indicators

Selected Macroeconomic indicators (2018-2022)

Economic Indicators	FY2018	FY2019	FY2020	FY2021*	FY2022*
Real GDP growth	6.5	4.0	-7.3	9.5	8.5
Consumer Price Index Inflation (average, % change)	3.4	4.8	6.2	5.6	4.9
Current account balance (% of GDP)	-2.1	-0.9	0.9	-1.0	-1.4
General government overall balance (% of GDP)	-6.4	-7.4	-12.8	-11.3	-9.7
General government gross debt (% of GDP)	70.4	74.1	89.6	90.7	88.9
Public gross financing needs (% of GDP)	10.5	11.6	17.2	16.5	15.2
External debt (% of GDP)	20.1	19.5	21.4	21.8	21.7
Gross external financing need (% of GDP) 1/	10.4	10	10.6	10.9	10.8
Gross international reserves (USD billions) 2/	411.9	475.6	579.3	633.6	
Exchange rate (INR/USD, EOP) 2/	69.2	75.4	73.5	74.3	

Note: FY 2020 ran from April 1, 2020 to March 31, 2021
* denotes projected figures
1/Data for 2021-22 are AIIB Staff Projections based on IMF
2/Reserves and exchange rate for FY2021 are sourced from RBI and pertain to mid-October 2021.
Source: IMF World Economic Outlook April 2021, October 2021 Reserve Bank of India, and IMF Country Report 21/230 .

C. Economic Outlook and Risks

6. India is expected to grow at 9.5 percent in FY2021 aided by low base and the effects of the fiscal stimulus kicking in. Growth projections for FY2021 were revised downwards by the IMF from April due to the severe second COVID wave from April to May and associated localized lockdown impacting economic activity. High frequency indicators like purchasing managers index, electronic waybills and freight traffic indicate a dissipating impact from the second wave and a return to normal economic activity. Going forward, government expenditure is expected to be a major pillar for recovery. The National Monetization Plan for brownfield assets is expected to free resources worth USD 81 billion over the next three years to finance infrastructure. Private

consumption is expected to inch up although it may be constrained by rising household debt levels in the pandemic. Similarly, private investment is expected to pick up amidst improving business sentiment and credit conditions. Exports are likely to bolster growth as global demand picks up.

7. Overall inflation is expected to decrease to 5.3 percent in FY2021, as supply chains recover and agriculture output increases. However, an increase in oil prices could lead to resurgence of inflationary pressures. The central bank is likely to continue its accommodative stance till the end of 2021 and support the economy through liquidity pressures.

8. Fiscal deficit in FY2021 is expected to moderate to a bit 11.3 percent of GDP as tax revenue increases on the back of improved economic activity. However, the pace of fiscal consolidation will be slower than originally outlined in the Fiscal Responsibility and Budget Management Review Committee. The federal government proposes to invest heavily in infrastructure in FY2021 with capital expenditure scheduled to increase by more than 26.0 percent focusing on housing, roads, railways and telecom.

9. Public debt, which was estimated to rise sharply to 89.4 percent of GDP in FY2020, levels last witnessed in early 2000s, is expected to inch up to 90.7 percent in FY2021. Despite being high, India's public debt remains sustainable given favorable debt dynamics and the projected increasing economic growth trend in the medium term. Furthermore, with public debt having a long and medium maturity, being denominated in domestic currency, and primarily held by residents, the debt profile is favorable. India's external debt is expected to remain stable.

10. The current account balance is projected return to deficit in FY2021 as import growth is expected to outpace export growth. Increase in oil prices is expected to exacerbate the trade deficit. Remittances are also expected to pick up as Middle East economies recover and spread of the COVID-19 pandemic in advanced economies is contained.