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Report No: PAD2036

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US\$425 MILLION

TO THE

ISLAMIC REPUBLIC OF PAKISTAN

FOR THE

NATIONAL TRANSMISSION MODERNIZATION I PROJECT

NOVEMBER 27, 2017

Energy and Extractives Global Practice
South Asia Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective as of October 31, 2017)

Currency Unit = Pakistan Rupee (PKR)
PKR 105.34 = US\$1

FISCAL YEAR
July 1 – June 30

ABBREVIATIONS AND ACRONYMS

| | | | |
|-----------|---|------------|---|
| ADB | Asian Development Bank | IT | Information technology |
| ADM | Asset Development and Management | IUFR | Interim unaudited financial report |
| CASA | Central Asia-South Asia Regional Electricity Transmission and Trade Project | IWS | Islamabad West substation |
| CFO | Chief Financial Officer | JICA | Japan International Cooperation Agency |
| CIO | Chief Information Officer | K-Electric | Karachi Electricity Supply Company |
| CPPA-G | Central Power Purchasing Agency-Guarantee | KfW | German Reconstruction Credit Institute (<i>Kreditanstalt für Wiederaufbau</i>) |
| CPS | Country Partnership Strategy | LARF | Land Acquisition and Resettlement Framework |
| DA | Designated Account | LNG | Liquefied natural gas |
| DISCO | Distribution company | MD | Managing Director |
| DMD | Deputy Managing Director | PMU | Program Management Unit |
| DTLP | Dasu Transmission Line Project | MoE | Ministry of Energy |
| EIRR | Economic internal rate of return | MoF | Ministry of Finance |
| ERP | Enterprise Resource Planning | NEPRA | National Electric Power Regulatory Authority |
| ESIA | Environmental and Social Impact Assessment | NTDC | National Transmission and Despatch Company |
| ESIC | Environmental and Social Impact Cell | NTMP-I | National Transmission Modernization I Project |
| ESIC DTLP | Environmental and Social Impact Cell of DTLP | PAP | Project affected person |
| ESMF | Environmental and Social Management Framework | PC-1 | Pro-Forma Concept Document 1 |
| ESMP | Environmental and Social Management Plan | PCR | Physical cultural resource |
| FM | Financial Management | PD | NTMP-I Program Director |
| FMIS | Financial Management Information System | PDEL-N | Project Delivery North |
| GDP | Gross domestic product | PDO | Project Development Objective |
| GENCO | Generation company | PDPC | Project Design and Procurement Consultant |
| GHG | Greenhouse gas | PDEL-S | Project Delivery South |
| GIS | Gas insulated substation | PMQA | Project Management and Quality Assurance |
| GM | General Manager | PMU | Project management unit |
| GoP | Government of Pakistan | PPSD | Project Procurement Strategy for Development |
| GRM | Grievance redress mechanism | PSC | Project Supervision Consultant |
| HPP | Hydropower project | PSDP | Power Sector Development Plan |
| HR | Human Resources | RAP | Resettlement Action Plan |
| HRMIS | Human Resources Management Information System | RoE | Return on equity |
| HVDC | High-voltage direct current | ROW | Right of way |
| ICR | Implementation completion and results report | RU | Resettlement Unit |
| ICT | Information and communication technology | SCADA | Supervisory control and data acquisition |
| IFC | International Finance Corporation | SMF | Social Management Framework |
| IPP | Independent power producer | STEP | Systematic tracking of exchanges in procurement |

TA Technical Assistance
TOR Terms of Reference
WAPDA Water and Power Development Authority

| | |
|----------------------------------|------------------------------|
| Regional Vice President: | Annette Dixon |
| Country Director: | Patchamuthu Illangovan |
| Senior Global Practice Director: | Riccardo Puliti |
| Practice Manager: | Demetrios Papathanasiou |
| Task Team Leaders: | Anh Nguyet Pham, Anjum Ahmad |

PAKISTAN
National Transmission Modernization I Project

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PAD DATA SHEET*Pakistan**National Transmission Modernization I Project (P154987)***PROJECT APPRAISAL DOCUMENT***SOUTH ASIA**0000009260*

Report No.: PAD2036

| Basic Information | | | |
|---|--|--|--|
| Project ID P154987 | EA Category B - Partial Assessment | Team Leader(s) Anh Nguyet Pham, Anjum Ahmad | |
| Financing Instrument Investment Project Financing | Fragile and/or Capacity Constraints [] | | |
| | Financial Intermediaries [] | | |
| | Series of Projects [] | | |
| Project Implementation Start Date 12-Jan-2018 | Project Implementation End Date 31-Jul-2023 | | |
| Expected Effectiveness Date 11-Apr-2018 | Expected Closing Date 31-Jan-2024 | | |
| Joint IFC No | | | |
| Practice Manager/Manager Demetrios Papathanasiou | Senior Global Practice Director Riccardo Puliti | Country Director Patchamuthu Illangovan | Regional Vice President Annette Dixon |
| Borrower: Islamic Republic of Pakistan | | | |
| Responsible Agency: National Transmission and Despatch Company (NTDC) | | | |
| Contact: Telephone No.: +923357402000 | Zafar Abbas | Title: Managing Director | Email: md.ntdc@ntdc.com.pk |
| Project Financing Data (in USD Million) | | | |
| <input checked="" type="checkbox"/> Loan | <input type="checkbox"/> IDA Grant | <input type="checkbox"/> Guarantee | |
| <input type="checkbox"/> Credit | <input type="checkbox"/> Grant | <input type="checkbox"/> Other | |
| Total Project Cost: | 536.33 | Total Bank Financing: | 425.00 |
| Financing Gap: | 0.00 | | |

| Financing Source | Amount |
|---|---------------|
| Borrower | 111.33 |
| International Bank for Reconstruction and Development | 425.00 |
| Total | 536.33 |

Expected Disbursements (in USD Million)

| Fiscal Year | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 0000 | 0000 | 0000 | 0000 |
|-------------|------|------|------|------|------|------|------|------|------|------|
| Annual | 14 | 76 | 206 | 69 | 33 | 27 | 0.00 | 0.00 | 0.00 | 0.00 |
| Cumulative | 14 | 90 | 296 | 365 | 398 | 425 | 0.00 | 0.00 | 0.00 | 0.00 |

Institutional Data

Practice Area (Lead)

Energy & Extractives

Contributing Practice Areas

Proposed Development Objective(s)

The Project Development Objective (PDO) of NTMP-I is to increase the capacity and reliability of selected segments of the national transmission system in Pakistan and modernize key business processes of the National Transmission and Despatch Company.

Components

| Component Name | Cost (USD Millions) |
|--|----------------------------|
| Expansion and Upgradation of the Transmission Network | 344.56 |
| Deployment of the Enterprise Resource Planning System | 29.46 |
| Project Management, Technical Assistance and Capacity Building | 20.00 |
| Interest during construction | 29.92 |
| Front-end fees | 1.06 |

Systematic Operations Risk- Rating Tool (SORT)

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

| | | | |
|---|------------------|-----------------------------|------------------|
| 8. Stakeholders | Moderate | | |
| 9. Other | n.a. | | |
| OVERALL | Substantial | | |
| Compliance | | | |
| Policy | | | |
| Does the project depart from the CAS in content or in other significant respects? | Yes [] | No [X] | |
| Does the project require any waivers of Bank policies? | Yes [] | No [X] | |
| Have these been approved by Bank management? | Yes [] | No [X] | |
| Is approval for any policy waiver sought from the Board? | Yes [] | No [X] | |
| Does the project meet the Regional criteria for readiness for implementation? | Yes [X] | No [] | |
| | | | |
| Safeguard Policies Triggered by the Project | Yes | No | |
| Environmental Assessment OP/BP 4.01 | X | | |
| Natural Habitats OP/BP 4.04 | X | | |
| Forests OP/BP 4.36 | X | | |
| Pest Management OP 4.09 | | X | |
| Physical Cultural Resources OP/BP 4.11 | X | | |
| Indigenous Peoples OP/BP 4.10 | | X | |
| Involuntary Resettlement OP/BP 4.12 | X | | |
| Safety of Dams OP/BP 4.37 | | X | |
| Projects on International Waterways OP/BP 7.50 | | X | |
| Projects in Disputed Areas OP/BP 7.60 | | X | |
| Legal Covenants | | | |
| Name | Recurrent | Due Date | Frequency |
| Subsidiary Loan Agreement | No | | N/A |
| Description of Covenant | | | |
| Government of Pakistan (GoP) to enter into a Subsidiary Loan Agreement with NTDC at a re-lending rate not to exceed twelve percent (12%) per annum unless otherwise agreed with the Bank. | | | |
| Name | Recurrent | Due Date | Frequency |
| Notification of Tariff Determinations | Yes | 30 days after determination | Yearly |

| | | | |
|--|------------------|-------------------------------|-----------------------------------|
| Description of Covenant | | | |
| GoP to publish any NEPRA revision/update of NTDC’s transmission changes within thirty days (30) of their final determination by NEPRA. | | | |
| Name | Recurrent | Due Date | Frequency |
| Implementation Units-I (PMU and GM Project Delivery Offices) | Yes | N/A | Throughout Project implementation |
| Description of Covenant | | | |
| NTDC to maintain: (i) a program management unit (the "PMU") to carry out the overall Project coordination and reporting; and (ii) two regional offices (north and south GM Project Delivery Offices) to implement land acquisition and resettlement activities, carry out contract management, perform construction supervision and monitoring activities, and implement, monitor and evaluate the RAP(s) and ESMP(s) within their jurisdictions. | | | |
| Name | Recurrent | Due Date | Frequency |
| PDP Consultant | Yes | 3 months after effectiveness | Throughout Project implementation |
| Description of Covenant | | | |
| NTDC to select and engage the services of a project design and procurement consultant (“PDP Consultant”) to assist the PMU and the GM Project Delivery Offices with the design and procurement of goods and works under the Project | | | |
| Name | Recurrent | Due Date | Frequency |
| PS Consultant | Yes | 12 months after effectiveness | Throughout Project implementation |
| Description of Covenant | | | |
| NTDC to select and engage the services of a project supervision consultant to assist the PMU and GM Project Delivery Offices with monitoring and supervision of Project activities | | | |
| Name | Recurrent | Due Date | Frequency |
| Implementation Units II (Steering Committee and ERP-PMU) | Yes | 3 months after effectiveness | Throughout Project implementation |
| Description of Covenant | | | |
| NTDC to establish and thereafter maintain: (i) a high-level enterprise resource planning Steering Committee in order to oversee the overall implementation of the activities under Component 2 of the Project (ERP component), ensure coordination among corporate unites, and provide policy guidance and directives to the ERP-PMU; and (ii) an enterprise resource planning project management unit (“ERP-PMU”) responsible for the implementation of the enterprise resource planning activities (Component 2 of the Project). | | | |
| Name | Recurrent | Due Date | Frequency |
| | | | |

| | | | |
|---|------------------|------------------------------|-----------------------------------|
| PMQA Consultant | Yes | 9 months after effectiveness | Throughout Project implementation |
| Description of Covenant NTDC to select and engage the services of a project management and quality assurance consultant (PMQA Consultant) to assist the ERP-PMU with the planning procurement and implementation of activities under Component 2 of the Project. | | | |
| Name | Recurrent | Due Date | Frequency |
| Procurement Review Committee | Yes | 3 months after effectiveness | Throughout Project implementation |
| Description of Covenant NTDC to establish and thereafter maintain a Procurement Review Committee to serve as single review body for the evaluation of bidding documents and procurement reports. | | | |
| Name | Recurrent | Due Date | Frequency |
| Internal Auditor | Yes | 6 months after effectiveness | Semi-annual |
| Description of Covenant NTDC to select and engage and thereafter maintain the services of a firm of chartered accountants to conduct semi-annual internal audits of Project activities. | | | |
| Name | Recurrent | Due Date | Frequency |
| Independent Auditor | Yes | 6 months after effectiveness | Annual |
| Description of Covenant NTDC to select and engage, and thereafter maintain, the services of a firm of chartered accountants to conduct the audit of the NTDC's annual Financial Statements. | | | |
| Name | Recurrent | Due Date | Frequency |
| Annual Work Plan & Budget | Yes | March 31 of each year | Annual |
| Description of Covenant NTDC to: (i) furnish to the Borrower and the Bank for approval, annual work plan and budget (cash plan) for the Project, covering the activities proposed for the subsequent fiscal year of Project implementation; and (ii) thereafter executed such plan as agreed with the Bank. | | | |
| Name | Recurrent | Due Date | Frequency |
| Procurement and Contract Management Protocol | Yes | N/A | Throughout Project implementation |
| Description of Covenant NTDC to implement the Project in accordance with the Procurement and Contract Management protocol. | | | |
| Name | Recurrent | Due Date | Frequency |
| Group II Investments | Yes | N/A | Throughout Project implementation |

| | | | |
|---|------------------|--------------------------|-----------------------------------|
| Description of Covenant | | | |
| NTDC to refrain from implementing/financing under the Project the Group II investments until and unless such investments have been jointly reviewed and appraised following the criteria agreed with the Bank, including consistency with PDO, meeting technical, administrative environmental and social standards, having obtained all required governmental approvals, constituting the least-costs option compared with alternative investments; etc. | | | |
| Name | Recurrent | Due Date | Frequency |
| Rolling Investment Plan | Yes | January 15 of each year | Annually |
| Description of Covenant | | | |
| NTDC to provide the Bank with the rolling investment plan for the following fiscal year segregating Group I and Group II investments. | | | |
| Name | Recurrent | Due Date | Frequency |
| Tariff Review Petitions | Yes | February 28 of each year | Annually |
| Description of Covenant | | | |
| NTDC to submit to NEPRA an annual tariff petition for the following fiscal year, complete in all respects, including the approved investment programs, for the updating of NTDC's transmission charges. | | | |
| Name | Recurrent | Due Date | Frequency |
| Safeguards (general) | Yes | N/A | Throughout Project implementation |
| Description of Covenant | | | |
| NTDC to carry out the project in accordance with: (i) the ESMF and the LARF; and (ii) the ESIA(s), EMP(s) and RAP(s) prepared and/or to be prepared as per the ESMF and LARF. | | | |
| Name | Recurrent | Due Date | Frequency |
| Environmental and Social Screening | Yes | N/A | Throughout Project implementation |
| Description of Covenant | | | |
| NTDC to refrain from awarding any civil works to contractors and/or undertaking any activities under the Project until and unless: (a) those civils works/activities have been screened as per the ESMF and LARF; (b) the respective ESIA(s) and, as the case may be, EMP(s) and RAP(s) have been prepared and reviewed by the Bank; and (c) the respective safeguard documents have been disclosed for at least sixty (60) days in the respective Project sites. | | | |
| Name | Recurrent | Due Date | Frequency |
| Governmental Permits | Yes | N/A | Throughout Project implementation |
| Description of Covenant | | | |
| NTDCS to ensure that, prior to commencing any civil works, all necessary governmental permits and clearances have been obtained, all pre-construction conditions have been met/fulfilled, and all resettlement measures (including full payment of compensation prior to displacement) have been fully executed. | | | |

| Name | Recurrent | Due Date | Frequency |
|---|--|------------------------------|-----------------------------------|
| Contractors Adherence to Safeguard Documents. | Yes | N/A | Throughout Project implementation |
| Description of Covenant | | | |
| NTDC to ensure that each contract for civil works under the Project includes the obligation of the contractor to comply with the relevant safeguard documents. | | | |
| Name | Recurrent | Due Date | Frequency |
| Technical Assistance Compliance with Bank Policies | Yes | N/A | Throughout Project implementation |
| Description of Covenant | | | |
| NTDC to ensure that all terms of reference for technical assistance or studies carry out under the Project are consistent with the Bank's safeguard policies. | | | |
| Name | Recurrent | Due Date | Frequency |
| Safeguards Monitoring & Reporting | Yes | N/A | Semi-annually |
| Description of Covenant | | | |
| NTDC to: (a) maintain monitoring and evaluation protocols and record keeping procedures to enable the Borrower and the Bank supervise and assess compliance with the safeguard documents; and (b) furnish the Bank semi-annual reports on general compliance with the safeguard documents, and the social and environmental impact of Project activities. | | | |
| Name | Recurrent | Due Date | Frequency |
| Grievance Redress Mechanism | Yes | 3 months after effectiveness | Throughout Project implementation |
| Description of Covenant | | | |
| NTDC to establish and thereafter maintain and operate a grievance redress mechanism for the handling of any stakeholder complaints arising out of the implementation of Project activities. | | | |
| Conditions | | | |
| Source of Fund | Name | | Type |
| IBRD | Subsidiary Agreement (Article V, Section 5.01 (a) of the Loan Agreement) | | Effectiveness |
| Description of Condition | | | |
| GoP and NTDC to have executed the Subsidiary Loan Agreement for the on-lending of the Loan. | | | |
| Source of Fund | Name | | Type |
| IBRD | Procurement and contract management Protocol (Article V, Section 5.01(b), of the Loan Agreement) | | Effectiveness |
| Description of Condition | | | |
| NTDC to have obtained the internal approvals for the Procurement and Contract Management Protocol. | | | |

| Team Composition | | | | |
|-------------------------|--|--------------------------------------|--|-------------|
| Bank Staff | | | | |
| Name | Role | Title | Specialization | Unit |
| Anh Nguyet Pham | Team Leader (ADM Responsible) | Senior Energy Specialist | Project Management | GEE06 |
| Anjum Ahmad | Team Leader | Senior Energy Specialist | Operations | GEE06 |
| Michael Graeme Osborne | Procurement Specialist (ADM Responsible) | Senior Procurement Specialist | Procurement | GGO06 |
| Qurat ul Ain Hadi | Financial Management Specialist | Financial Management Specialist | Financial Management | GGO24 |
| Abid Hussain Chaudhry | Team Member | Program Assistant | Team Assistance | SACPK |
| Ahmad Imran Aslam | Environmental Safeguards Specialist | Environmental Specialist | Environment safeguard | GEN06 |
| Aisha Fariel Salahuddin | Team Member | Energy Specialist | Operations | GEE06 |
| Imran-ul Haq | Social Safeguards Specialist | Senior Social Development Specialist | Senior Social Safeguards Specialist | GSU06 |
| Joseph Mwelwa Kapika | Peer Reviewer | Senior Energy Specialist | Energy Specialist | GEE08 |
| Koji Nishida | Peer Reviewer | Senior Energy Specialist | Energy Specialist | GEE03 |
| Marcelo Hector Acerbi | Environmental Safeguards Specialist | Senior Environmental Specialist | Senior Environmental Safeguards Specialist | GEN06 |
| Martin M. Serrano | Counsel | Senior Counsel | Lawyer | LEGES |
| Masood Ahmad | Team Member | Lead Hydropower Specialist | Policy Adviser | GEE06 |
| Mishka Zaman | Team Member | Senior Operations Officer | Social Safeguards | GSU06 |
| Mohammad Azhar UI Haq | Team Member | Program Assistant | Procurement | SACPK |
| Peter Johansen | Peer Reviewer | Senior Energy Specialist | Energy Specialist | GEE09 |
| Qingtao Yang | Team Member | Program Assistant | Administration | GEE06 |
| Richard Jeremy Spencer | Team Member | Program Leader | Policy Adviser | AFCE3 |

| | | | | | |
|---|--|--------------------------------------|-------------------------------------|-----------------|---|
| Salma Omar | Social Safeguards Specialist | Senior Social Development Specialist | Senior Social Safeguards Specialist | GSU06 | |
| Shaukat Javed | Team Member | Program Assistant | Operations | GEE06 | |
| Uzma Quresh | Team Member | Social Development Specialist | Gender Specialist | GSU06 | |
| Victor Manuel Ordonez Conde | Team Member | Senior Finance Officer | Disbursement Management | WFALA | |
| Extended Team | | | | | |
| Name | Title | Office Phone | | Location | |
| Gulgoren Cansiz | Power Engineer | | | | |
| Yan Li | Economist and Financial Specialist | | | Washington, DC | |
| Locations | | | | | |
| Country | First Administrative Division | Location | Planned | Actual | Comments |
| Pakistan | Balochistan Province Khyber Pakhtunkhwa Province Punjab Province Sindh Province | | | | Subprojects are scattered in all four provinces of Pakistan |
| Consultants (Will be disclosed in the Monthly Operational Summary) | | | | | |
| Consultants Required? Consultants will be required | | | | | |

I. STRATEGIC CONTEXT

A. Country Context

1. **Pakistan’s overarching socioeconomic objective is to raise the country’s human development indicators in line with Vision 2025.**¹ Pakistan, with a provisional census result population of over 207 million people, is the world’s sixth most populous country. In recent years, it has achieved continued GDP growth and substantially reduced poverty. GDP growth was 5.3 percent in FY16-17 and is expected to continue accelerating, reaching 5.8 percent in FY19. Growing fiscal and external imbalances may, however, erode these gains if not addressed. The national poverty headcount declined from 64.3 percent in FY02 to 29.5 percent in FY14. Nevertheless, inequality persists and the country continues to rank low on the human development index, at 147th out of 188 countries. Macroeconomic, political, and security conditions, natural disasters, and enduring unreliable power supply continue to constrain the country’s achievement of poverty reduction and shared prosperity goals.

2. **Pakistan’s economic growth, which is critical to improving human development indicators, was relatively high in 2016 but lower than planned.** In FY17, Pakistan’s economy grew at the highest growth rate in eight years, and significantly higher than the global average growth of 3.5 percent. However, it was well below the average growth of 6.8 percent in South Asia, as well as the target growth of 5.7 percent envisaged in Pakistan’s FY17 economic plan. Located at the crossroads of South Asia, Central Asia, China, and the Middle East, Pakistan is at the fulcrum of a regional market with a vast population, large and diverse resources, and untapped potential for trade, but its economic growth is hindered by security challenges, infrastructure constraints, electricity shortages and load shedding, limited skills, and frequent natural disasters.

3. **A relatively unfavorable business environment has constrained the growth of the private sector, hindering job creation and economic growth.** About 90 percent of Pakistan’s GDP originates in the private sector, and 70 percent of firms are classified as small businesses. Businesses resist expanding because of the costs associated with business formalization. Because many firms operate informally, relatively few are registered in the tax system. Crowded out by large public sector borrowing, they have limited access to financing for expansion. In *Doing Business 2018*, Pakistan ranks 147th out of 190 countries in the ease of doing business. In getting electricity, Pakistan’s ranking for 2018 increased to 167 from 170 in 2017 while the country’s number and duration of power outages were too high to even qualify for a ranking of power reliability.²

¹ The objective of Vision 2025 is to “place Pakistan in the league of Upper Middle Income countries by 2025.” The vision has seven pillars: (a) sustained, indigenous, inclusive growth; (b) energy, food, and water security; (c) democratic governance, institutional reform, and modernization of the public sector; (d) human and social capital; (e) private sector-led growth; (f) development of a competitive knowledge economy; and (g) modernized infrastructure and strengthened regional connectivity. The key enablers in the development of these pillars are a shared vision of the country’s transformation, political stability and continuity of policies, peace and security, rule of law, and social justice.

² If the duration and frequency of power outages figures are over 100, a country is not eligible to score on the reliability and transparency of supply index. The report shows separate figures for Karachi and Lahore. The system average interruption duration index is 861.67 for Karachi and 1,327.67 for Lahore, and the system average interruption frequency index is 387.21 for Karachi and 417.79 for Lahore.

B. Sector and Institutional Context

4. **Pakistan was one of the first countries to reform its power sector, in the early 1990s.** The first stages of reform were aimed at attracting private investment into the generation segment and were initially highly successful. To avoid some of the more pressing conflicts of interest, the Government also unbundled the Power Wing of the Water and Power Development Authority (WAPDA), which had been a publicly owned, vertically integrated monopoly with responsibility for generation, transmission, and distribution. Four thermal generation companies (GENCOs) and eight distribution companies (DISCOs) were formed. The existing large hydropower assets remained with WAPDA, in a specialist unit, WAPDA Hydel. The National Transmission and Despatch Company (NTDC) was also established with a dual role: to act as the single buyer of electricity and to be the transmission network owner and system operator. An independent regulator, the National Electric Power Regulatory Authority (NEPRA), was also set up and is responsible for licensing, determining tariffs, creating standards, and monitoring sector performance.

5. **Despite the promising start, improvements in sector performance remain elusive.** In the intervening two decades, there have been a few further reforms, including the privatization of some generation assets and the Karachi Electricity Supply Company (K-Electric), an integrated power utility serving Karachi and parts of Sindh province. More recently, the single buyer function has been separated from NTDC and is now the responsibility of the Central Power Purchasing Agency-Guaranteee (CPPA-G). The original plan to privatize both GENCOs and DISCOs soon after the restructuring has not been followed through, and they remain largely in public hands. In addition, the competitive market for generation, originally planned to be started by 2012, has not yet been put in place.

6. **The sector lacks commercial discipline, operational effectiveness, and sufficient investment.** Although performance across the DISCOs varies, in aggregate, technical and nontechnical losses remain relatively high at around 18 percent, and collections are relatively low at around 94 percent. These factors, combined with continuing high levels of subsidy to households and to some classes of bulk and commercial consumers, result in a chronic liquidity crisis. The accumulated arrears of payments from DISCOs to their suppliers, commonly called the *circular debt*, reached an estimated PKR 420 billion (US\$4 billion) by the end of FY16, or over 1 percent of GDP. Furthermore, because of the weak institutional setting, company accountabilities are not fully enforced or recognized, and companies continue to operate under centralized control. DISCOs and NTDC are not at arm's length from the Power Division of the Ministry of Energy (MoE)³ and remain entrenched in a bureaucratic culture. The Government recognizes these shortcomings and understands that electricity shortages constrain economic activity and diminish livelihoods. Inadequate power supply and poor-quality electricity service have reduced GDP growth by an estimated two percentage points for the past several years.

7. **Power shortages have resulted from inadequate power system investment.** From the mid-1990s to FY09/10, investment in power infrastructure declined from 26 percent of total investment and 51 percent of public investment to 4 percent and 26 percent, respectively. Also during this period, private sector investment in power essentially came to a halt except for expenditures necessary to complete power plant construction initiated in the 1990s. The decline in investment was due to water

³ Until July 2017, the Ministry of Water and Power had responsibility for the electric power sector. In August 2017, a unified MoE was formed with two divisions: Power Division from the former Ministry of Water and Power, and Petroleum Division from the former Ministry of Petroleum and Natural Resources.

use concerns constraining hydropower development and a power surplus emerging in 2002 because independent power producers (IPPs) installed too much capacity. Consequently, the Government paid insufficient attention to investment and to the long lead times required for new capacity to come on stream.

8. **Generation capacity shortages persist because of limited capacity availability and continued financial liquidity constraints.** The country's electricity system has expanded over the past decade and now covers about 66 percent of all households. This increased coverage, and the normal increases in demand that accompany economic growth, have resulted in a growth in peak demand of an estimated 7 percent a year to about 27,000 MW against a total installed capacity of 25,000 MW, of which about 5,000 MW is available only during the summer when hydropower generation is at its maximum. The actual shortfall remains stubbornly high at an estimated 5,000–7,000 MW, partly because a large proportion of the existing generating fleet is aging and unable to generate at its nameplate capacity. In addition, the shortage of financial liquidity to cover fuel payments obliges the Government to limit generation to typically around 100 TWh per year. This allows the Government to avoid paying for the most expensive and inefficient peaking power plants, but results in load shedding at periods of peak demand. Consequently, households frequently experience load shedding of 6–8 hours a day, and industry 1–2 hours. Since assuming office, the Government has focused strongly on adding new generation capacity.

9. **The plan to expand power generation during 2017–2022 is beginning to bear fruit.** To address the gap between demand for and supply of electricity, the Government plans to increase generation capacity by 30,000 MW by 2022. There has been progress in securing the US\$36 billion required for this expansion, including funds for power system investments planned under the China-Pakistan Economic Corridor. New private investment and expanded investments by existing IPPs will fund an estimated two-thirds of the investment requirements. The least-cost generation plan focuses on the development of hydropower projects in the north and efficient thermal plants in the center and south of the country. The Government has taken steps to import liquefied natural gas (LNG) that will support investment in new gas-fired power generation. The first new generation plant was commissioned in mid-2017, and further additions are expected in the coming years, including the World Bank-financed Tarbela IV hydropower extension and the Dasu hydropower project.

10. **With a substantial volume of new generation now coming online, the strengthening of the transmission and distribution systems is critical.** In FY15, over 40 percent of distribution transformers were overloaded. Two key measures of system reliability—system average interruption duration index and system average interruption frequency index—suggest that the quality of supply is deteriorating in DISCOs. But urgent as the need for expansion and rehabilitation is in the distribution system, it is even more so in the transmission system. Anecdotal evidence suggests that the system has the capacity to dispatch about 15,000–17,000 MW safely, which is substantially below the generation-constrained peak load of over 20,000 MW. System reliability has deteriorated substantially; major systems have collapsed several times in recent years, and such incidents appear to be increasing in frequency and severity. The effect of years of neglect and underinvestment is compounded by poor system expansion planning and weak project execution. As the system faces greater loading, weaker parts will fail with increasing frequency, throwing additional load on the remaining parts and thus creating a vicious circle of unreliability.

C. Higher-Level Objectives to which the Project Contributes

11. **The project supports the Government's program.** In July 2013, within months of assuming office, the Government issued and the Council of Common Interests endorsed the National Power Policy 2013. The policy articulates a deep government commitment to improving energy supplies through a combination of investment and reform in generation, transmission, and distribution. The proposed investments in transmission are central to achieving the much-needed improvements, because they can connect lower-cost resources, enable higher load factors for existing plants, and ensure improved efficiency of dispatch and lower losses in the transmission network. Moreover, the project will contribute to the Government's objective to improve its *Doing Business* ranking, in which getting electricity is a critical component.

12. **The Country Partnership Strategy (CPS) for FY15-20 (No. 84645-PK).** Recognizing the priority that the Government places on energy, the CPS includes an energy pillar. The CPS seeks to support a structural and cost transformation in the energy sector and includes among the expected outcomes reductions in load shedding and in the cost of electricity production, and improved financial sustainability of the sector. The National Transmission Modernization I Project (NTMP-I) aims to remove bottlenecks in the national transmission system and increase its capacity for new generation through capacity additions under construction or planned by the public and private sector, thus contributing directly to the first two CPS outcomes.

13. **Transformational power initiative.** In implementing the CPS, the World Bank Group will aim to mobilize an estimated US\$10 billion over the next five years to support power system expansion, through publicly and privately funded projects. In the context of this initiative, the World Bank is supporting sector reform, public investment in power, and --in particular-- the extension of the Tarbela Hydropower Project (HPP) and the Dasu HPP. The IFC has invested in hydropower, wind generation, and LNG import. In addition, the World Bank and IFC are working jointly to prepare the Central Asia-South Asia Regional Electricity Transmission and Trade Project (CASA), designed to bring power from Central Asia to Pakistan. The proposed project will support these projects by modernizing the transmission network to enable the additional power produced by the Tarbela HPP, the Dasu HPP, and CASA to reach consumers efficiently and reliably. This transformational power initiative supports not only power system growth, but also Pakistan's move to a low greenhouse gas (GHG) emissions path.

II. PROJECT DEVELOPMENT OBJECTIVES

14. The Project Development Objective (PDO) of NTMP-I is to increase the capacity and reliability of selected segments of the national transmission system in Pakistan and modernize key business processes of the National Transmission and Despatch Company.

15. **Project beneficiaries.** The primary beneficiaries of the project will be all segments of Pakistan's population and the NTDC. The population will benefit from an improved power supply, which will reduce unserved demand and the number and duration of power outages. The NTDC will benefit from improved financial and accounting systems, management, and operations, including higher productivity and upgraded staff skills.

16. **PDO-level results indicators.** Key expected results from the project are (a) additional substation capacity of the transmission system, (b) reduction in duration and frequency of forced outages in selected transmission substations (measured through a set of indicators); (c) reduction in audited

financial statements submission time; (d) new integrated budgeting and reporting is being used and (e) reduction of GHG emission.

III. PROJECT DESCRIPTION

A. Project Components

17. **Concept.** NTMP-I is the first of a series of transmission investments the World Bank expects to support. Under the Regulation of Generation, Transmission, and Distribution of Electric Power Act (NEPRA Act), the NTDC has been assigned the responsibility to operate and provide safe, reliable transmission and interconnection services on a nondiscriminatory basis and “to develop, maintain, and publicly make available an investment program for satisfying its service obligations” in all of Pakistan except the service area of K-Electric. NTMP-I will support the NTDC in carrying out its license and legal obligations by strengthening the NTDC grid to accommodate the connection and transmission of new power generation—two-thirds of it by private investors—and to supply the demand of DISCOs, thus contributing to end power shortages. The NEPRA Act allows other transmission licensees in special cases (defined as special-purpose transmission), but this will not be applicable to the general strengthening and upgrading of the existing NTDC grid. Private investment is being targeted for generation and special advanced transmission technologies such as high-voltage direct current (HVDC) where the NTDC does not have expertise. The NTDC is best suited for the investments included in NTMP-I, which correspond to technologies and system needs that the national grid company knows well, from both a planning context and a system operation context.

18. The project will support investments in high-priority transmission infrastructure, information and communication technology (ICT), and technical assistance (TA) for improved management and operations. Infrastructure investments will create new assets or rehabilitate existing parts of the system—transmission substations, transmission lines, or a combination of the two—based on the NTDC’s identification of the highest-priority improvements. The ICT investment will establish a robust ICT infrastructure and roll out an Enterprise Resource Planning (ERP) system to enhance the efficiency of management and operations. The TA will help the NTDC implement the project and will improve the company’s capacity for sustainable system operation. NTMP-I consists of three components, summarized below. The allocation of funds among the components will be flexible, allowing for adjustment during implementation in line with company priorities. Annex 2 provides background information on the power sector and the NTDC in addition to a more detailed project description.

19. **Component A: Expansion and Upgradation of the Transmission Network (estimated cost about US\$455.89 million: a US\$344.56 million IBRD loan and US\$111.33 million in NTDC counterpart funds).** This component consists of (a) expanding, augmenting, and upgrading selected existing 500 kV and 220 kV power substations and associated lines; and (b) constructing new 765 kV, 500 kV, and 220 kV substations and transmission lines. The component will have two groups of subprojects. Group 1 subprojects are those that the NTDC has designated as having the highest priority; feasibility studies and required safeguards documentation have been completed for them. Group 2 subprojects are potential subprojects that the NTDC’s Power Sector Development Plan (PSDP) for 2016–2021 has identified, but whose details are not yet known. To be included in NTMP-I, these subprojects must meet a set of technical, economic, and safeguards criteria. Financing for each subproject will become available when its proposal complies with the eligibility criteria, on a first-come, first-approved basis until all funds allocated to the component have been committed. This design will create an incentive for timely implementation, allowing the shifting of funds between subprojects and recycling of cost savings.

20. **Component B: Deployment of the Enterprise Resource Planning (ERP) System (estimated cost US\$29.46 million- all IBRD loan).** This component will finance the first stage of an ERP program for the NTDC. The component includes modernization of the ICT infrastructure and the development and deployment of an ERP system aimed at strengthening the company’s management capabilities using an integrated ICT system. The component includes the procurement of civil infrastructure such as data centers, provision of local area network outlets, software licenses, hardware for office automation, consulting services for implementation support and change management, and ICT capacity building and strategic sourcing to ensure the sustainability of the ERP system.

21. **Component C: Project Management, Technical Assistance, and Capacity Building (estimated cost US\$20 million-all IBRD loan).** This component will finance (a) project management and implementation support services; (b) strengthening of NTDC’s planning, operations, and maintenance capability to accommodate new thermal and renewable energy generation; (c) modernization of NTDC’s key business processes; (d) preparation of new investments; and (e) other priority TA and capacity building to be agreed between the NTDC and the World Bank.

B. Project Cost and Financing

22. The estimated total financing requirement is US\$536.33 million, which consists of US\$425 million that IBRD will finance and the remaining US\$111.33 million that the NTDC will provide. The Loan Agreement will be between the GoP and IBRD. A variable spread loan with a customized repayment schedule, linked to commitment has been selected. The loan will be amortized in 25 years including a 6-year grace period. The NTDC and the World Bank will sign the Project Agreement, which will govern the implementation of NTMP-I. Table 1 provides a breakdown of the project costs and financing by component.

Table 1. Project Costs and Financing

| Project component | Project costs (US\$ millions) | IBRD | | NTDC financing | |
|---|-------------------------------|---------------|----------------------|----------------|----------------------|
| | | US\$ millions | % share of component | US\$ millions | % share of component |
| Component A: Expansion and Upgradation of the Transmission Network | 455.89 | 344.56 | 76% | 111.33 | 24% |
| <i>Goods, works, and services</i> | 430.69 | 344.56 | 80% | 86.14 | 20% |
| <i>Land acquisition</i> | 25.19 | 0.00 | 0% | 25.19 | 100% |
| Component B: Deployment of the ERP System | 29.46 | 29.46 | 100% | 0.00 | 0% |
| Component C: Project Management, Technical Assistance, and Capacity Building | 20.00 | 20.00 | 100% | 0.00 | 0% |
| Interest during construction | 29.92 | 29.92 | | | |
| Total costs | 535.27 | 423.94 | | 111.33 | |
| Front-End Fee | 1.06 | 1.06 | | | |
| Total financing required | 536.33 | 425 | | 111.33 | |

C. Lessons Learned and Reflected in the Project Design

23. NTMP-I's design process included a review of completed and ongoing World Bank loans to support the power sector in Pakistan and other countries.⁴ The project has incorporated four key lessons from this review.

- If power transmission projects with many subprojects of relatively small size have flexible designs, they can respond more easily to system needs and possibly finance more subprojects than if all funds are limited to subprojects that are ready at appraisal. Therefore, in addition to subprojects ready for implementation by Board approval of the IBRD loan, the proposed project will finance priority subprojects that meet appraisal criteria during project implementation.
- New lending for power projects in Pakistan should include measures aimed at strengthening governance and addressing various market and governance risks experienced in previous World Bank funded projects in the country. Therefore, to inform the procurement strategy, the NTDC has conducted an analysis of its past procurement to determine aspects that require improvement and to develop a better understanding of the market sectors that will participate in the project procurement. Extensive supplier feedback on NTDC's past procurement and market capacity and suggestions for improving future procurement and implementation were used to design the procurement strategy.
- Projects in countries with constrained capacity for implementation perform better with an owner's engineer. Therefore, NTMP-I will have two external consultants who will support the NTDC throughout project implementation and in preparation of new subprojects in Group 2.
- Provision of capacity building, in addition to implementation TA, strengthens project sustainability. Therefore, NTMP-I's implementation support, TA, and capacity-building component will not only support the implementation of project components but also enhance sector regulations and transfer knowledge to appropriate NTDC staff.

24. Experience in ERP projects internationally demonstrates that the design should be flexible enough to allow changes during implementation. This is because the ERP project requires a change in governance, which in turn requires strong ownership of the existing management team from the beginning throughout implementation. The project allows shifting funds between components without formal amendment of the legal documents to enable such a flexibility in adjusting the program design. Another lesson is that if ERP implementation is split into multiple stages, overall costs tend to increase by as much as 50 percent because some of the implementation effort needs to be duplicated for each of the stages—for example, data migration and the effort to configure the ERP modules. Splitting implementation of ERP solutions is also likely to result in increased hardware costs because often the initial hardware procured for the ERP implementation does not have a seamless upgrade path, thus resulting in some duplication of hardware.

⁴ The design has benefited particularly from the recommendations by the Independent Evaluation Group regarding the Electricity Distribution and Transmission Improvement Project (EDTIP- Ln IBRD-75650, Cr. 44630 and Cr. 44640, closed June 30, 2012).

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

25. The NTDC, the proposed project's implementing agency, has experience managing projects funded by the donor community. The company is currently implementing three World Bank-financed⁵ projects in addition to projects of other development partners. In July 2017, to strengthen the NTDC's investment capability, the board of directors launched a company-wide restructuring that was informed by the international experience of transmission companies. The restructuring created the positions of Deputy Managing Director (DMD) for Asset Development and Management (ADM) and Chief Information Officer (CIO). The DMD for ADM now is responsible for project preparation, procurement, and construction management until commissioning. The CIO will lead implementation of the ERP component.

26. The NTDC will implement the proposed project through its departments at headquarters and at the regional project offices. The procurement process will be managed jointly by the Program Management Unit (PMU) and the Procurement and Material Management unit, both of which report directly to the new DMD. Land acquisition and construction management will be managed through the two project management offices, one in the north of the country, Project Delivery North (PDEL-N), and another in the south, Project Delivery South (PDEL-S). In each of these offices, a General Manager (GM), also reporting to the DMD for ADM, will supervise construction through the commissioning of assets acquired.

27. The NTMP-I Program Director (PD) in the PMU will oversee and drive results across multiple World Bank-funded projects in coordination with the GMs in the regional offices to ensure the integration of the projects into the NTDC's organization. This PD will have a technical team and will receive support from the PMU's procurement, financial management (FM), and safeguards units.

28. Given the NTDC's capacity constraints, the project will finance two implementation support consultants for Component A. The Project Design and Procurement Consultant (PDPC) will prepare the design and bidding documents for all subprojects and will assist the NTDC with the procurement of goods, works, and services and the preparation of Group 2 subprojects. The Project Supervision Consultant (PSC) will assist the NTDC on construction supervision until commissioning. To streamline decision-making, a Procurement Review Committee, consisting of members of key NTDC units, will review the bidding documents and evaluation recommendations of the PDPC. In addition, the NTDC's Chief Financial Officer (CFO) will assign a focal manager for the FM of the project supported by staff hired specifically for the project.

29. The NTDC will manage the ERP component through a separate ERP Project Management Unit (ERP PMU), reporting to the CIO. The core team of the ERP PMU has been established, and it includes external specialist consultants. A special management-level ERP Coordinating Committee will coordinate the work across the NTDC functional departments. The NTDC's Managing Director (MD) will chair a high-level ERP Steering Committee to oversee overall implementation of the component. The Project Management and Quality Assurance (PMQA) consultant will support the ERP PMU in the procurement of the ERP module and ICT infrastructure as well as their implementation.

⁵ CASA, the Dasu HPP, and the Additional Financing for Tarbela 4 HPP.

30. The NTDC has a data system that is adequate to monitor project outcomes such as system reliability indicators. The PD, supported by the PDPC and PSC and the regional GMs for the PDEL-N and PDEL-S will monitor the physical progress and overall implementation performance of NTMP-I according to the designated intermediate results indicators, in coordination with other NTDC entities.

B. Sustainability

31. The design of NTMP-I and the strong commitment of key players in the power sector point to the likelihood of project sustainability. NTMP-I will finance top-priority transmission investments to evacuate power from important domestic generation and regional transmission interconnection projects, which are already under implementation. It also will provide substantial relief to the NTDC's overloaded transformer capability to meet Pakistan's present power demand. At the same time, NTMP-I will support the company's effort to modernize its business process and practices by upgrading the ICT infrastructure and adopting an ERP system for the key business domains. The MoE, the NTDC's board of directors, and the company's senior management have shown strong commitment to NTMP-I.

V. KEY RISKS

32. **Overview.** The project team for NTMP-I has evaluated the risks associated with politics and governance, sector strategies, institutional capacity, fiduciary, and environmental and social as Substantial; and macroeconomic, technical design, and stakeholder risks as Moderate. Weighing the various risks, the overall risk rating is Substantial. Table 2 shows the risk ratings by category, and the following paragraphs discuss the risk categories that are rated Substantial.

Table 2. Summary of Project Risks by Category

| Risk Categories | Rating |
|---|--------------------|
| 1. Political and governance | Substantial |
| 2. Macroeconomic | Moderate |
| 3. Sector strategies and policies | Substantial |
| 4. Technical design of the project | Moderate |
| 5. Institutional capacity for implementation and sustainability | Substantial |
| 6. Fiduciary | Substantial |
| 7. Environmental and social | Substantial |
| 8. Stakeholders | Moderate |
| 9. Others | n.a. |
| Overall | Substantial |

33. **Political and governance.** Sector structure and governance arrangements are still evolving, but they remain centralized and subject to political interference. MoE retains day-to-day control over NTDC through its board of directors and management. There is a substantial risk that decision-making at NTDC will be subject to political rather than operational considerations, undermining the achievement of the PDO. Mitigation measures include maintaining a close dialogue with MoE and other concerned government agencies during implementation to make timely adjustments in project management and implementation.

34. **Sector strategies and policies.** Inadequate tariff policy, resulting in chronic sector circular debt, and lack of a GoP strategy and policy to eliminate the problem, could prevent the GoP from providing counterpart funds on time. As a result, the NTDC's financial capability to manage the system could erode, threatening the sustainable operation of project assets. Lack of planning coordination of the

expansion of transmission and distribution systems and underinvestment in distribution networks could undermine attaining NTMP-I's PDO, because they could prevent the improved transmission infrastructure from bringing the intended benefits to the end-users.

35. **Institutional capacity for implementation and sustainability.** The NTDC has been facing serious capacity constraints in meeting its unprecedented five-year expansion plan. In the past, lack of accountability throughout the investment project cycle, poor coordination among departments, suboptimal delegation of decision-making, and frequent changes in senior management have caused project implementation delays. The recent institutional developments and specific provisions of NTMP-I will mitigate the risks of inadequate institutional capacity that could work against the sustainability of the PDO. The corporate restructuring launched in July 2017 aims to enhance accountability and streamline investment decision-making. To ensure a smooth transition to the new structure, the PMU, including a World Bank Program Unit, will oversee and drive results across the NTMP-I and ongoing World Bank projects. Furthermore, the two consultants hired under the project will help build the NTDC's capacity in project design, procurement, and project implementation. Nonetheless, the risk remains substantial because the NTDC is still settling into the new organization structure; with the frequent changes in top management, the restructuring could be derailed or diminished. There is also risk to the development of the ERP, which will substantially change the day-to-day work of the NTDC. The shift from paper-based processes to an electronic documentation system could encounter substantial resistance. Therefore, effective communication of the benefits of the new system, change management, and capacity building—not only for information technology (IT) staff but also for end-users—is crucial. A PMQA consultant and change management and capacity-building consultants will be hired to support implementation throughout the ERP program.

36. **Fiduciary performance.** There is risk of corruption at almost all stages of the bidding process. The Project Procurement Strategy for Development analysis identified systematic deficiencies in procurement capacity and inventory management. Two key deficiencies threaten the achievement of the PDO: (a) inadequate processes for maintaining document confidentiality through the evaluation process, and (b) a complicated procurement decision-making framework with lack of clear responsibility and insufficient delegation of financial decision-making authority. Key risk mitigation measures are (a) adoption of a single-stage supply and installation procurement approach for the works contracts, (b) establishment of a dedicated Procurement Committee as the single review body for procurement documents, and (c) employment of an experienced owner's engineer to supervise procurement and contract management throughout the project. The NTDC is ready to adopt these mitigation measures. Nevertheless, experience from past and ongoing projects financed by the World Bank and other donors shows that procurement remains challenging, and failure to perform well represents a significant risk to the PDO.

37. Because of high on-lending costs, the NTDC's debt service coverage has been low in certain past years. However, this did not pose any liquidity challenge to the company because of the large account receivable from the Government on the CPPA side of the operation, which was used to swap against the interest and foreign exchange premium portion of the debt service on the company's balance sheet. With the separation of the CPPA from the NTDC, the company will lose this cushion and will potentially face hard liquidity constraints with the mounting investment pressure.

38. **Environmental and social aspects.** Land acquisition for substations and especially for the right of way (ROW) of transmission lines has been the main bottleneck for most transmission projects. NTMP-I will require land acquisition and involuntary resettlement, although at a limited scale, which can cause

implementation delays. Early focus on the land acquisition process by the NTDC and close collaboration with all concerned parties for Islamabad West Substation (IWS) and Nowshera is essential to mitigate delays.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

39. This section summarizes the economic and financial analysis in the project files.

Economic Analysis

40. Economic analyses were conducted to compare the projected cost/benefit stream of the “without-project” case (no new project or upgrading/extension despite substation overloading) with that of the “with project” case. For the extension and augmentation investments on the existing substations, standard cost-benefit analyses have been carried out for each subproject.

41. **Returns and sensitivities.** The economic internal rates of return (EIRRs) were calculated for each subproject based on the streams of estimated benefits and costs for a 25-year period, reflecting the useful life of substation equipment with a discount rate of 10 percent.⁶ Sensitivity analyses were carried out to assess the robustness of the result. A switching value is estimated to indicate at what level the investment will cease to be economically viable.

42. The results of the economic analyses show that the planned expansions and augmentations under Group 1 are economically justified and robust, including under sensitivity scenarios. The EIRR is from 36.6 percent to 93.4 percent for the expansion and augmentation and between 15.1 percent and 39.8 per cent for the gas-insulated substation (GIS) conversion. For the rehabilitation of 220 kV substations, the break-even cost overrun is at 750 percent for EIRR and the break-even implementation delay is at 18 years for EIRR. For the 500 kV substations, the break-even cost overrun is at 270 percent for EIRR and the break-even implementation delay is 12 years.

43. For the investment on the 765 kV IWS, load flow studies suggest that without the proposed investment, the existing transmission network will not be able to handle the incremental load from the upcoming Dasu HPP and Tarbela 5 HPP. Thus, the investment should be seen as an integral part of the generation investments, and its economic viability may be assessed alongside the economic viability of either HPP investment. The economic and financial viability of Dasu HPP was confirmed at its appraisal. Here, the analysis will assess the robustness of that conclusion considering the additional transmission investment on the IWS. This approach is conservative, because the IWS also promises additional benefits in providing relief to the existing 500 kV Rewat grid station, reducing system loss, and offering voltage regulation.

44. **The IWS as a part of the Dasu HPP.** A thorough assessment of the economic and financial viability of the Dasu HPP was carried out.⁷ The outcome suggested that when assessed against the next

⁶ For infrastructure projects, the World Bank has recommended an economic discount rate in the range of 6.0–10.0 percent, or a general rule of thumb of two times the rate of GDP growth. To be conservative, the economic discount rate used in the analysis is assumed at 10.0 percent with the GDP growth rate at 4.7 percent in Pakistan.

⁷ P. Meier. 2013. *The Dasu Hydropower Project: Project Justification and Economic and Financial Analysis*.

best alternative, combined-cycle gas turbine power plants running on LNG, the baseline EIRR of the Dasu HPP was 19.5 percent, exceeding the hurdle rate of 12 percent at the time. When the local environmental benefit of avoided NOx emissions is considered, the EIRR increases to 19.8 percent, and when the global environmental benefit of avoided GHG emissions is also considered, the EIRR increases to 21.1 percent. The investment was thus considered to be economically viable. At the time of the assessment, the total cost of the investment was estimated at around US\$4,263 million, including US\$350 million for the transmission line under the NTDC. A risk analysis was carried out to assess the sensitivity of the EIRR to construction cost overruns.⁸ The switching value for capital costs is US\$8.3 billion, or an overrun of approximately US\$4.0 billion over the baseline estimate. The proposed 500 kV IWS will add an estimated US\$86.6 million in total cost, well below the switching value of US\$8.3 billion. Thus, the addition of the IWS investment will not have a material impact on the conclusion previously drawn on the economic validity of the Dasu HPP, and the economic viability of the IWS investment can be justified.

45. A similar analysis was carried out for the economic viability of the IWS investment as an integral part of the Tarbelar 5 HPP investment and it was found that the subproject is economically justified.

46. **500 kV Nowshera substation.** Load flow studies suggest that without the proposed Nowshera substation, the system will not be able to transmit the additional 1,000 MW load from Tajikistan under CASA. Therefore, the Nowshera substation can be considered integral to CASA. Nevertheless, to reconfirm the project economics, a conservative scenario without CASA was simulated to assess the impact of Nowshera on the transmission system. The outcome of the study confirms that Nowshera is economically viable even without CASA. The EIRR was estimated at 18.4 percent. A risk analysis was also carried out to assess the sensitivity of the EIRR to construction cost overruns. The switching value—that is, the value at which the EIRR falls to the hurdle rate of 10 percent—is a cost overrun of 81 percent.

47. **GHG emission reduction.** By displacing oil-based self-generation with cleaner grid-supplied power, the project investments will result in reduced GHG emissions. The emission factor for oil-based self-generation is around 0.60 kg CO₂ per kWh, and the grid emission factor is conservatively assumed to be equivalent to that of a combined-cycle gas turbine power plant at 0.41 kg CO₂ per kWh, or 0.50 kg CO₂ per kWh after transmission and distribution losses. The project investments will result in a GHG reduction of around 52.9 million tons of CO₂, or 2.1 million tons of CO₂ on average per year over the project lifetime.

Project Financial Analysis

48. Project financial analysis was not carried out because the NTDC operates under a cost-plus pricing mechanism that guarantees full cost recovery plus an additional return on equity (RoE) of about 13 percent.

Corporate Financial Analysis

49. **NTDC structure.** When the sector was unbundled in 1994, the NDTC assumed the responsibility of the single buyer for all electricity and with it the functions of the registrar for generation contracts and the administrator of the power exchange. Thus, it had responsibility for all the cash flows between

DISCOs and GENCOs. In 2009, the CPPA was created to take over the single buyer function from the NTDC. Initially the CPPA was part of the NTDC, but on June 4, 2015, the CPPA-G was spun off from the NTDC as an independent entity, taking with it the cash flows for purchase and sale of power. Since then, the NTDC has been able to focus on its roles as transmission network owner and system operator.

50. **NTDC's past performance.** The NTDC is a state-owned entity that is structured to operate on commercial principles. It operates under a nonexclusive transmission license granted by NEPRA. Transmission charge in Pakistan is determined using a cost-plus method that considers the costs of repair and maintenance, general administration, rent and insurance, depreciations, and financing charges. The NTDC also receives a RoE, which serves as the equity capital for the company's investment program. The cost-plus transmission charge means that the NTDC's transmission operation has been and should remain profitable for the foreseeable future.

51. The NTDC continued to remain profitable during FY16 with a net profit of PKR 15.111 billion, compared to a net profit of PKR 9.741 billion in FY15. Its investment plan is financed partly by loans from multilateral financial institutions and partly by its own equity. During 2011–16, the RoE portion of the NTDC's transmission charge receipts amounted to a total of Rs 47.8 billion (US\$455 million). Over the 2011–15, the NTDC made about PKR 39.5 billion (US\$ 347 million) in equity contributions to a capital investment program of PKR 79.9 billion (US\$761 million). The self-financing ratio for the period averaged around 51 percent, a high level rarely seen among utilities undergoing large investment programs.

52. **Project impact on NTDC's financial performance.** The project will contribute to the continuous growth in the NTDC's asset base and improve its operational efficiency. With a five-year grace period, the project loan will have a relatively low impact on the NTDC's debt service level during the projection period (2017–21). However, the impacts will increase considerably when the loan repayment starts. The project investments will have been included in the petition to NEPRA and will thus be covered by the allowed system user charges, with minimal impact on the NTDC's bottom line. Furthermore, the lower transmission loss resulting from the project will benefit the NTDC because NEPRA permits a 2.7 percent transmission loss; the NTDC can capture any savings from losses under this amount as efficiency gain, although this financial gain may turn out to be transient because the transmission loss threshold in the transmission charge scheme is subject to annual evaluation.

53. **NTDC's financial projection.** A financial projection was carried out for FY17–21 based on the method laid out in NEPRA's latest tariff determination. Other assumptions are: (a) capacity service growing at 5 percent a year; (b) fixed operations and maintenance growing at an average annual rate of 10 percent, in line with the historical fixed-cost growth trajectory; (c) investment plan in line with the PSDP from 2017–18 onward;⁹ (d) a 70:30 debt-equity financing mix; (e) accounts receivable at 30 days of revenue; (f) inventory at 3 percent of the fixed assets; (g) current liabilities, excluding the current portion of long-term loans, at two-thirds of the current assets; and (h) maximum cash balance entering the capital base calculation at one-sixth of annual expenses. The NTDC's financial projection for FY17–21 is available in the project files.

54. Using these assumptions, the projection indicates that with the cost-plus pricing mechanism and a RoE in the range of 13–14.6 percent to facilitate its upcoming investment plan, the NTDC will have an ample profit margin, in the range of 40–49 percent, from its operations. In addition, the transmission

⁹ In NEPRA's latest tariff determination, the investment amount for FY16–17 is considerably lower than that in the PSDP. The projection has followed NEPRA's assumption for FY16–17.

charge driven by the growth in the capital and asset base corresponding to the investment program will grow from PKR 136 per kW per month at the beginning of the projection period to an estimated PKR 234 per kW per month by the end of the projection period. Because of the grace periods associated with the loans from international financial institutions, a debt service level over the projection period will grow steadily despite the large borrowing requirement—a factor that, coupled with an ample operating margin, will allow the debt service coverage ratio to stay in a healthy range of 1.19–1.81. However, without the non-cash buffer from the CPPA, the NTDC may face liquidity challenges, especially with respect to serving the high-cost on-lending debt.

55. NTDC’s financial viability depends primarily on the effective and timely implementation of the cost-plus tariff scheme, including NTDC’s timely submission of tariff petitions, NEPRA’s timely determination, and the government’s issuance of the tariff to start the effectiveness of the new transmission charge. Historically, delays on these steps have been common. In 2014, the government issued the National Power Tariff and Subsidy Policy Guidelines indicating a transition to a multiyear tariff regime that will allow NTDC to submit its tariff petitions based on multiyear estimates and investment plans. The multiyear tariff regime also has built-in periodic adjustments during the tariff period to allow faster updates of costs and transmission charges.

56. **Monitoring the NTDC’s financial condition.** The key financial factor in monitoring the NTDC’s financial viability will be its liquidity, which ensures that the company can meet its financial obligations and raise the funds needed for its investments. Therefore, the NTDC’s financial condition will need to be monitored in the next few years to ensure that its financial strategy remains relevant to keep it on a strong financial footing. A detailed analysis of the NTDC’s financial condition is provided in the project files.

57. Given the above considerations, the project proposes the following covenants to enhance the NTDC’s financial viability and sustainability:

- (a) NTDC submits annual tariff petitions—complete in all aspects, including the approved transmission investment plan—not later than February 28 each year, starting from February 28, 2019 or until NEPRA approves the multiyear tariff regime;
- (b) The Government notifies the NTDC tariff in official gazette within 30 days of NEPRA’s issuance of the NTDC tariff determination, including any reconsideration request period needed.

B. Technical

58. Group 1 subprojects have been appraised and are ready for implementation upon Board approval. Group 2 subprojects are expected to be appraised and be ready for implementation within the first 18 months of implementation. The World Bank has reviewed the Pro-Forma Concept Document (PC-1)¹⁰ of the proposed subprojects in Group 1 and found it to be satisfactory. All the proposed subprojects in Group 1 and Group 2 form part of the NTDC’s five-year PSDP (2017–2021). The proposed Group 1 subprojects were verified through regional load-flow analyses to assess the expected utilization of each subproject and to ensure that the transmission network satisfies steady-state reliability requirements during normal and contingent conditions. The World Bank has reviewed the NTDC’s

¹⁰ A technical and economic report for an investment project required by the GoP.

planning methodology and found it acceptable. At the subproject level, NTMP-I does not pose any technical risk, because it will follow well-established technologies. Furthermore, the PDPC will review and update the NTDC’s technical specifications for key equipment based on international best practice and standards.

59. The World Bank has reviewed the draft PC-1 of the ERP component, including the implementation plan, and found it satisfactory. The implementation of nine work packages will be structured into two distinct stages such that initial commitment is made only for activities to be completed in the first stage and limited to less than US\$30 million. While this stage is being implemented, additional funding needs for the second stage will be finalized and associated procurement will be facilitated by the same PMQA engagement, including the extension of the PMQA services for continued assistance during the second stage of implementation. The second-stage investment could be a candidate for additional financing if the project performs well.

60. **Climate co-benefits are calculated at 48% of the total loan amount.** The project will finance Islamabad West and Nowshera substations and the associated transmission lines to facilitate evacuation of hydropower energy from Dasu HPP and CASA into grids. In addition, rehabilitation and augmentation of 27 existing substations under Group 1 will result in reduction of technical losses. In Group 2, the proposed upgrading of the 132 kV Zero-point substation to 220 kV GIS will also reduce technical losses. The mitigation co-benefit finance is calculated at \$206 million as shown in table 3.

Table 3. Climate Change Co-benefit, US\$ million

| Activities | IBRD | Climate Change Methodology Percentage | Climate change estimate |
|--|---------------|---------------------------------------|-------------------------|
| COMPONENT A | 344.56 | | 184.27 |
| Group 1 | 277.55 | | 169.47 |
| <i>Islamabad West Station</i> | 63.49 | 100% | 63.49 |
| <i>Augmentation and expansion of 27 existing substations</i> | 119.46 | 50% | 59.73 |
| <i>Conversion to GIS of 4 substations</i> | 48.35 | 0% | - |
| <i>Nowshera Substation</i> | 46.25 | 100% | 46.25 |
| Group 2 | 67.00 | | 14.80 |
| <i>Upgrading to GIS of Zero Point Substation</i> | 29.60 | 50% | 14.80 |
| <i>Other new substations</i> | 37.40 | 0% | - |
| COMPONENT B: ERP System | 29.46 | 0% | - |
| COMPONENT C: PROJECT MANAGEMENT | 20.00 | Pro-rated | 8.67 |
| Interest during construction & fees | 30.98 | Pro-rated | 13.43 |
| Total | 425.00 | | 206.38 |

C. Financial Management

61. The existing FM staff at the NTDC can account for financial transactions and generate financial reports. However, experience suggests the very real possibility of delay in producing these reports. To strengthen the FM arrangements, the NTDC has agreed to implement an action plan, discussed in Annex 3, and to maintain the improved FM arrangements throughout the life of the project.

D. Procurement

62. Procurement for NTMP-I will follow the World Bank's *Procurement Regulations for IPF Borrowers*, dated July 1, 2016. Also, NTMP-I will be subject to the World Bank's Anticorruption Guidelines, dated October 15, 2006, and revised in January 2011 and July 1, 2016. The NTDC has experience in the procurement and execution of large contracts for goods and civil works, including turnkey contracts. However, the company's limited procurement capacity, along with an increasing volume of procurement activity from donor projects, will put pressure on the NTDC's ability to effectively and efficiently process the increasing procurement volume.

63. NTMP-I will strengthen the NTDC's procurement capacity by providing training to procurement staff under the PMU and other units in the NTDC, and will require key NTDC staff to achieve Procurement Certification from Punjab Public Procurement Regulatory Authority. For NTMP-I, the NTDC will use the World Bank's online procurement management system, Systematic Tracking of Exchanges in Procurement (STEP). The detailed 18-month Procurement Plan, once agreed with the borrower, will be published on the World Bank website through STEP. The procurement risk analysis summary from the Project Procurement Strategy for Development is included in Annex 2.

64. The procurement approach for the main substation works contracts will use an open international, single-stage, two-envelope supply and installation procurement strategy with post-qualification. To maximize competition, package lots will be appropriate to the market capacity. Advance procurement is under way for the PDPC and PSC under Component C.

65. Separate Quality- and Cost-Based Selection procurement will be used for procuring consulting services of an ERP PMQA consultant to develop functional requirements for the ERP system under Component B, develop procurement documents, and manage the procurement of the ERP contractor on behalf of the NTDC. Additional consulting services will be required for change management, communications, and capacity building to assist with the implementation of the system and to ensure that ICT capacity is in place to operationalize and manage the system.

E. Social (including Safeguards)

66. By reinforcing the national transmission system, the project will benefit all segments of the population with improved availability of power supply, reduced unserved demand, and reduced frequency and duration of power outages—thus contributing to economic growth, jobs, and household quality of life. The project will also bring direct temporary benefits for skilled and unskilled workers who will be employed for the construction of the project.

67. Under Component A (Expansion and Upgradation of the Transmission Network), the impacts will consist of temporary or permanent acquisition of land, loss of structures and assets (or access to assets), and the physical relocation of project-affected persons (PAPs). These impacts will result primarily from the construction of new grid stations, transmission lines, and access roads. Therefore, NTMP-I will

trigger OP/BP 4.12, *Involuntary Resettlement*. However, there will be no large-scale involuntary resettlement.

68. NTDC has prepared two Resettlement Action Plans (RAPs) for Group 1 subprojects, notably the IWS and Nowshera substations, which require land acquisition. The two subprojects will affect 436 households, of whom 346 will lose their productive land permanently, including 10 who will also lose their residential structures. Also, 90 households whose land is in the ROW of a transmission line will be affected by temporary impacts on their land during the construction period. The estimated budget for resettlement activities is US\$26.31 million equivalent. The RAPs were reviewed and found satisfactory by the World Bank. Group 1 also includes 31 other subprojects for which no land acquisition is required, because project activities will be carried out within the premises of the existing grid stations.

69. Under Group 2, NTMP-I includes subprojects that have been identified but their exact location has not been determined. The NTDC has adopted for NTMP-I the Land Acquisition and Resettlement Framework (LARF), which the World Bank approved under CASA and other ongoing loans with the NTDC. The LARF will guide the RAPs that will be produced for such subprojects. A Social Management Framework (SMF) as part of an integrated Environmental and Social Management Framework (ESMF) has also been prepared and endorsed by the World Bank and will be applicable to subprojects under Group 2. The NTDC has approved the RAPs, LARF, and ESMF for NTMP-I.

70. The project will not trigger OP/BP 4.10, *Indigenous Peoples*, because no subprojects are planned in Chitral District in Khyber Pakhtunkhwa Province, where the only known indigenous peoples are present. The appraisal of Group 2 subprojects during NTMP-I's implementation will include a review to determine the applicability of OP 4.10.

F. Gender

71. The project is gender-informed through the analysis of relevant gender information, the inclusion of measures to mitigate impacts on women, and an implementation monitoring mechanism. Surveys and analyses on gender issues were carried out during the preparation of the two RAPs and the SMF. NTDC has also prepared a Gender Assessment for NTMP-I. The analyses show a gender disparity in the project areas. Women are particularly vulnerable in the rural areas. For example, women have no recognized role in the authority structure of the villages despite representing 46% of the population. Only around 2-3 percent of women participate in business activities or formal employment, and only 30 percent participate in local representation or political gatherings. Women are rarely engaged in community consultations and compensation matters in different NTDC projects. The assessment of NTDC human resources shows that fewer than 3 percent of the company's employees are women, despite the Government's employment quota of 10 percent women.

72. The project will minimize negative effects on women through the implementation of the RAPs, LARF, and ESMF, with gender actions envisaged at two levels. First, project staff will be trained in effectively reaching out to the communities, and especially women, seeking their involvement in consultations, development and implementation of safeguard plans, and plan monitoring. Second, at the community level, the project will provide a conducive environment for all women, particularly female-headed households, to enable them to participate in consultations and express their requirements. For example, the ESMF includes a requirement for gender-sensitive consultations (men and women consulted separately) and for separate men's and women's PAP committees to assist with consultations, eligibilities, and entitlements and manage grievances in a gender-informed manner.

Women will be surveyed to identify baseline conditions to inform gender-nuanced responses in the RAP. The project's target is to have women from 80 percent of affected households participating in consultation exercises, rather than the current 20 percent. This will be monitored through a progress-level indicator in the Results Framework. The Labor Management Framework (in the ESMF) highlights that working conditions must be fair and equitable and steps must be in place to avoid gender-based violence and harassment. The ESMP requirements will be included in the bidding documents.

73. In addition, the World Bank is supporting the NTDC to develop a gender action plan to promote gender equality at the institutional level. The action plan highlights relevant institutional and project-level gender gaps and proposes strategies to address them. It will elaborate measures to increase the representation of women across NTDC to achieve the government quota, and to improve their retention and promotion. The project will also support the generation of sex-disaggregated data for monitoring progress, and the enhancement of NTDC staff capacity on gender issues.

G. Citizen Engagement

74. Citizen engagement refers to two-way interaction between the NTDC and citizens in NTMP-I, which gives the citizens a stake in decision-making to improve development outcomes. The NTDC is committed to ensuring the engagement of citizens in the management of NTMP-I in the interest of:

- (a) Transparency, accountability, and legitimacy in decision making;
- (b) Design of appropriate interventions;
- (c) Effective institutional and implementation arrangements;
- (d) Greater inclusion, reduction of grievances, and establishment of common platforms for sharing of knowledge and concerns;
- (e) Local-level capacity building, leading to responsible and responsive citizenry;
- (f) Better development outcomes.

75. The primary beneficiaries of the project will be Pakistan's population, who will be better off because of the available and more reliable power supply resulting from the improved transmission infrastructure under NTMP-I. However, there is no direct connection between the population and the NTDC per se as the benefits will be delivered via DISCOs services. Therefore, citizen engagement in NTMP-I will take place primarily through (a) the consultation process for the ESIA/ESMP and RAPs, which will be used to solicit beneficiary feedback and provide input into subproject design, and (b) the establishment of project-level grievance redress mechanisms (GRMs) to improve engagement with PAPs and communities living near these facilities through the life of the project.

- Citizen engagement through stakeholder consultations and participation during various stages of the project will help to improve decision-making and ultimately reduce social conflicts and other risks. Project stakeholders include PAPs, concerned government departments, local administration, and community representatives. Consultations will serve as one avenue to identify ownership, type and magnitude of impact, and eligibility for and entitlement to compensation. Consultations will also include disclosure of information and obtaining feedback through public awareness campaigns, formal or informal meetings, and other activities. Stakeholder consultations will take place throughout the project period—design, preparation, and implementation—to obtain feedback to minimize the adverse impacts of the project. The consultation frameworks are included in the safeguard instruments of the project to guide consultation activities at various stages of the project.

- Citizen engagement will also be instituted by establishing an effective multi-tier GRM to facilitate amicable and timely resolution of complaints and grievances by involving communities and other stakeholders at all levels. For the first step, the GRM will be at the community level (a village or group of villages). Complaints that cannot be resolved at this level will be formally forwarded to GMs PDEL, the second tier. A grievance/complaint that is still not resolved will be forwarded to the PMU (NTDC), the third tier. Finally, a complainant who is still not satisfied may have recourse to the court system (fourth tier). The GRM will be gender-responsive, culturally appropriate, and readily accessible to PAPs at no cost and without retribution.

H. Environment (including Safeguards)

76. The project will result in a more efficient transmission system and increased access of households and businesses to the national grid. It will reduce GHG emissions by displacing self-generation using diesel with cleaner grid-supplied electricity. The GHG emissions reduction is estimated at 52.9 million tons of CO₂ over the project lifetime.

77. The NTMP triggers OP/BP 4.01, *Environmental Assessment*, because it will involve the construction, expansion, or rehabilitation of high-voltage substations and overhead transmission lines under Component A. The scale of potential adverse impacts (on air, land, health, safety, and so on) varies depending on the type of subproject financed. At the minor end of the scale is the impact of substation upgrades and extensions within the property boundaries of the existing substation, which will not involve land acquisition. At the other end of the scale is the conversion of agricultural land for new substations and transmission lines. The potential negative impacts will occur mainly during site preparation and construction and on a lesser scale during operations of the transmission infrastructure. The most significant impacts are the conversion of productive land to industrial land (although the scale is limited), and the visual impacts and “urban drift” that can result. This impact is difficult to mitigate except through a robust analysis of alternatives during site selection. During construction, impacts may include (a) land acquisition and resettlement for the construction of new substations, transmission towers, and ROWs; (b) increased levels of dust, noise, and other emissions from excavation, land clearing, material stockpiles, operation of heavy equipment, and transportation of construction materials and electrical equipment; (c) risk of oil spill and construction site waste; (d) traffic disturbance and road damage due to the transportation of building materials and equipment; and (e) health and safety issues for workers and the community. The potential negative impacts during operation concern exposure to electric and magnetic fields from high-voltage power lines and substations, risk of oil spill, and workforce health and safety. Potential impacts are expected to be small to moderate and site-specific, and they can be readily mitigated through good site selection and design, pollution and emission control measures, and construction-related controls. Therefore, the project is classified as Category B.

78. The project triggers three of the World Bank’s operational policies regarding the environment: OP/BP 4.04, *Natural Habitats*; OP/BP 4.11, *Physical Cultural Resources*; and OP/BP 4.36, *Forests*. The ESAs for Group 1 subprojects and their ESMP have confirmed that NTMP-I will have no known adverse impact on natural habitats. The triggering of the related policy is precautionary, since the impact of

Group 2 subprojects, to be appraised during project implementation, is unknown.¹¹ Similarly, the preparation of NTMP-I has taken a precautionary approach in triggering the policies regarding physical cultural resources (PCRs) and forest resources, even though Group 1 subprojects will not have adverse impacts on these resources.¹² The NTDC has prepared an Environmental Management Framework as part of an integrated ESMF to ensure that projects will not have significant adverse impacts on the local environment and communities, and that measures will be in place to adequately mitigate any residual and unavoidable impacts. The ESMF establishes screening, scoping requirements, and procedures to identify and assess impacts and to prepare the appropriate instruments.¹³ The NTDC has held consultations with people who will be directly affected by Group 1 subprojects as well as nongovernmental organizations and other stakeholders for Group 2 subprojects, incorporating their feedback in the draft final ESIA, ESMP, and ESMF. The Environmental and Social Cells of the NTDC, which will prepare and oversee implementation of ESIA and ESMPs, will receive training to build capacity in environmental management. Annex 3 discusses safeguards implementation arrangements in more detail.

I. Other Safeguard Policies

79. NTMP-I will not trigger any other safeguard policies.

J. World Bank Grievance Redress

80. Communities and individuals who believe that they are adversely affected by a World Bank-supported project may submit complaints to project-level GRMs or the World Bank's Grievance Redress Service. Project-affected communities and individuals may submit complaints to the World Bank's independent Inspection Panel, which determines whether harm has occurred, or could occur, as a result of the World Bank's noncompliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's GRS, please visit <http://www.worldbank.org/GRS>. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

¹¹ The project will not fund any proposed subproject that is in critical natural habitats or that will cause the conversion or degradation of such habitats. Thus, all subproject proposals will be screened for potential adverse impacts on natural habitats and necessary mitigation measures will be prepared as part of the subproject-specific ESIA and ESMP.

¹² It is possible that Group 2 subprojects could affect PCRs. The ESMF includes a screening process aimed at identifying possible PCRs and at consequently restricting investments in areas near important PCRs. The impacts on PCRs will be addressed in the related ESIA/ESMP. Regarding forest resources, subprojects in Group 2 may involve acquisition of forestland for maintaining the ROW of the power transmission lines. Impacts on forests and associated mitigation measures will be included in the subproject ESIA and ESMP.

¹³ The ESMF also provides guidance for noneligible subprojects, including those that may be classified as Category A.

Annex 1: Results Framework and Monitoring

COUNTRY: PAKISTAN

Project Name: National Transmission Modernization I Project (P154987)

Results Framework

Project Development Objectives

PDO Statement

The Project Development Objective (PDO) of NTMP-I is to increase the capacity and reliability of selected segments of the national transmission system in Pakistan and modernize key business processes of the National Transmission and Despatch Company.

These results are at Project Level

Project Development Objective Indicators

| Indicator Name | Baseline | Cumulative Target Values | | | | | |
|--|------------|--------------------------|------|-----------|------------|------------|------------|
| | | YR1 | YR2 | YR3 | YR4 | YR5 | End Target |
| Reduction in duration of forced outages per substation (Minutes) | 1689 | | | | 676 | 676 | 676 |
| Reduction in frequency of forced outages per project substation | 2.56 times | | | | 1.28 times | 1.28 times | 1.28 times |
| Reduction in duration of forced outages per GIS (Minutes) | 10,723 | | | | | 1,082 | 1,082 |
| Reduction in frequency of forced outages per GIS | 34 times | | | | | 5 | 5 |
| Additional substation capacity of the system (kilovolt- ampere) | 0.00 | 0.00 | 0.00 | 5,716,000 | 7,516,000 | 9,016,000 | 12,516,000 |
| Reduction in audited financial statements submission time (Months) | 14.00 | 12.00 | 9.00 | 6.00 | 6.00 | 6.00 | 6.00 |

| | | | | | | | |
|--|------|------|------|------|------|------|------|
| New Integrated budgeting and reporting is being used. (Yes/No) | No | | | | | Yes | Yes |
| Reduction of GHG emission (million tones/year) | 0.00 | 0.00 | 0.00 | 0.00 | 1.77 | 2.11 | 2.11 |

Intermediate Results Indicators

| Indicator Name | Baseline | Cumulative Target Values | | | | | |
|---|----------|--------------------------|-------|-------|-------|-------|------------|
| | | YR1 | YR2 | YR3 | YR4 | YR5 | End Target |
| Reduction of transmission losses (GWh) | 0 | | | | 199 | 236 | 414 |
| Transmission lines constructed or rehabilitated under the Project (Kilometers) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 131.00 |
| Number of new or augmented/expanded substations (including 2 targeted substations in Group 2) | 0.00 | 0.00 | 0.00 | 25.00 | 31.00 | 32.00 | 35.00 |
| Staff of Finance Department using ERP (Yes/No) | No | | | | | Yes | Yes |
| Affected households having women participation in compensation consultations (Percentage) | 20 | 40.00 | 60.00 | 80.00 | 80.00 | 80.00 | 80.00 |
| Number of staff certified in procurement | 0.00 | 5.00 | 10.00 | 15.00 | 20.00 | 25.00 | 25.00 |

Indicator Description

| Project Development Objective Indicators | | | | |
|---|--|-----------|-------------------------------|------------------------------------|
| Indicator Name | Description (indicator definition etc.) | Frequency | Data Source / Methodology | Responsibility for Data Collection |
| Reduction in duration of forced outages per project substation | Reduction in the average duration of forced outage per substation per year due to transformer faults among 27 substations to be augmented or expanded under the project. Baseline is the average duration of forced outages per substation per year in 2014, 2015, 2016. | Yearly | NTDC statistics | NTDC GM Asset Management |
| Reduction in frequency of forced outages per project substation | Reduction in the average number of forced outages per substation per year due to transformers faults among 27 substations to be augmented or expanded under the project. Baseline is the average number of forced outages per substation per year in 2014, 2015, and 2016. | Yearly | NTDC statistics | NTDC GM Asset Management |
| Reduction in duration of forced outages per GIS | Reduction in the average duration of forced outages per substation per year among 4 substations to be converted to GIS under the project. Baseline is the average duration of forced outages per substation per year in 2014, 2015, 2016. | Yearly | NTDC statistics | NTDC GM Asset Management |
| Reduction in frequency of forced outages per GIS | Reduction in the average number of forced outages per substation per year among 4 substations to be converted to GIS under the project. Baseline is the average number of forced outages per substation per year in 2014, 2015, and 2016. | Yearly | NTDC statistics | NTDC GM Asset Management |
| Additional substation capacity of the system | Maximum additional substation capacity in kVA added to the system by the project. | Yearly | Semi- annual progress reports | NTDC GM PD |

| | | | | |
|---|---|--------|------------------------------|---------------------------|
| Reduction in audited financial statements submission time | Reduction of the NTDC's submission time in months of audited financial statements after the year end. | Yearly | Semi-annual progress reports | NTDC Financial Department |
| New integrated budgeting and reporting is being used. | The NTDC will use the new integrated budgeting and reporting tool that will be developed under the project. | Yearly | Semi-annual Progress reports | NTDC Financial Department |
| Reduction of GHG emission | Volume of CO2 emission in tones per year to be reduced by the project as self-generation using diesel-based electricity is replaced by grid electricity after transmission and distribution losses. | At ICR | Project completion report | NTDC GM Planning |

Intermediate Results Indicators

| Indicator Name | Description (indicator definition etc.) | Frequency | Data Source / Methodology | Responsibility for Data Collection |
|--|--|-----------|--|--|
| Reduction of transmission losses | Reduction of the transmission system annual losses in GWh by the project. | At ICR | Project completion report | NTDC GM Planning |
| Transmission lines constructed or rehabilitated under the project | This length (in km) of the transmission lines constructed or rehabilitated under the project. | Yearly | Semi-annual progress reports | NTDC GMs PDEL |
| Number of new or augmented/expanded substations | Number of new or existing 500 kV and 220 kV substations that will be constructed, augmented, or expanded under the project. | Yearly | Semi-annual progress reports | NTDC GMs PDEL |
| Staff of Finance Department using ERP | Complete computerization of financial records at the NTDC Financial Department. | Yearly | Semi-annual progress reports | NTDC Financial Department |
| Affected households having women participating in compensation consultations | The percentage of affected households having women's participating in consultation exercises. This performance indicator will be reviewed and updated by the time of the midterm review mission. | Yearly | Progress reports, Independent monitoring reports | NTDC GMs PDEL |
| Number of staff certified in procurement | Number of NTDC staff who have received procurement training and are certified. | Yearly | Semi-annual progress reports | NTDC Procurement & Material Management |

Annex 2. Detailed Project Description
PAKISTAN: National Transmission Modernization I Project

I. Background

A. NTDC

Corporate Establishment and Licensing

0. The NTDC, incorporated in November 1998, started commercial operation on December 24, 1998. It took over from WAPDA all the properties, rights, assets, and liabilities of the 220 kV and 500 kV power transmission systems in Pakistan, except for the systems operated by K-Electric, a privately owned, vertically integrated utility operating in Sindh province. The Power Division of the MoE supervises the ownership of the GoP in the electricity system. NEPRA granted the NTDC the Transmission License (TL/01//2002) on December 31, 2002, to engage in the transmission business for a term of 30 years. Based on this license, the NTDC has four functions: (a) transmission network owner, (b) system operator, (c) CPPA, and (d) contract registrar and power exchange administrator. In 2009, the CPPA-G was incorporated as a separate company to take over the purchasing and market development functions from the NTDC. Since mid-2015, when NEPRA granted the NTDC a modification of its license, the NTDC has focused exclusively on transmission and system operation.

Power Sector Development Plan (2016–2021)

1. Pakistan’s power sector has been undergoing a major transformation as the GoP and provinces have aligned their priorities with the PSDP to overcome the energy crisis. The Government plans to add nearly 30,000 MW of new generation capacity, increasing the existing installed generation capacity of 22,930 MW to 52,920 MW by 2022. The delivery of this additional generation capacity to end-users through the transmission and distribution networks will require NTDC to substantially increase its managerial capacity to plan, invest, and operate the network. Table 2.1 and Figure 2.1 summarize the NTDC’s ongoing and planned investment in the PSDP during 2016–2021.

2. By 2021, the NTDC plans to add to the national network 5,200 km of new transmission lines and 34,000 MVA of transformer capacity at 220 kV and 500 kV—that is, 36 percent and 75 percent, respectively, of the NTDC’s existing total transmission line length and transformer capacity. The plan also envisages construction by private IPPs of two new HVDC transmission backbones at 660 kV to strengthen the link between the northern and southern parts of the system, in addition to the HVDC interconnection with Tajikistan and Kyrgyzstan through Afghanistan under CASA. The plan estimates an investment of US\$6.22 billion by the NTDC, an unprecedented challenge to the company, which realized less than US\$800 million of investment during 2011–2015 (see Figure 2.1).

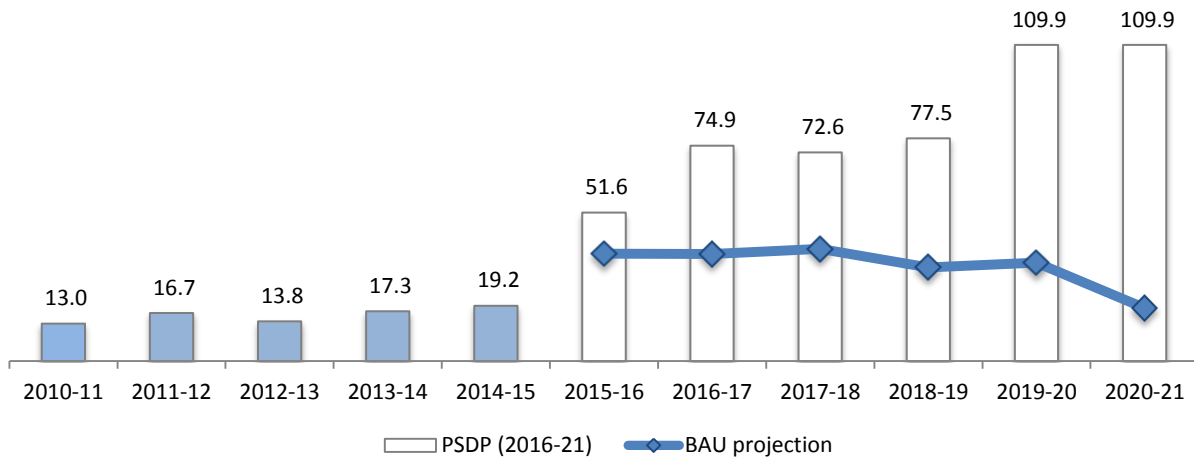
Table 2.1. NTDC’s PSDP (2016–21)

| <i>Capacity</i> | <i>Existing</i> | <i>Ongoing projects</i> | <i>Planned projects</i> | <i>Total addition 2016–21</i> | <i>Increase (%)</i> |
|------------------------------|-----------------|-------------------------|-------------------------|-------------------------------|---------------------|
| Substation, MVA | | | | | |
| 500 kV | 19,824 | 4,800 | 7,950 | 12,750 | 64 |
| 220 kV | 25,833 | 8,040 | 13,556 | 21,596 | 84 |
| Transmission line, km | | | | | |
| 500 kV | 5,278 | 1,853 | 1,828 | 3,681 | 70 |

| Capacity | Existing | Ongoing projects | Planned projects | Total addition 2016–21 | Increase (%) |
|---------------------------------|----------|------------------|------------------|------------------------|--------------|
| 220 kV | 9,191 | 809 | 786 | 1,595 | 17 |
| Investment cost (US\$ millions) | — | 1,809 | 4,413 | 6,222 | — |

Source: NTDC Planning Department, January 2017.

Figure 2.1. NTDC Investment Plan (2016–21) (US\$, millions)



Source: NTDC Planning and Finance Departments.

B. Key Challenges and Priorities

3. The NTDC’s draft strategic business plan,¹⁴ prepared with support from the United States Agency for International Development, has identified several major problems that the NTDC needs to address soon. First is the lack of reliability in the NTDC’s transmission system, which has resulted in unplanned outages, voltage fluctuation, and frequency violations. Second, the 500 kV, 220 kV, and 132 kV transmission systems and transformers are overloaded, with hardly any spare capacity to accept and transport new sources of power. Therefore, transfer capacity must be enhanced rapidly to overcome this status. Third, the NTDC needs to mobilize a large amount of capital to accommodate a doubling in generation capacity in a few years, although part of the needed capital will be provided by the private sector. Fourth, the NTDC’s corporate culture lacks accountability, and there is a large gap between the requirements of the business plan and the in-house skills, expertise, and capacity needed to accomplish objectives.

4. To deal with the priority problems identified, the NTDC’s business plan specifies three areas of action regarding physical infrastructure: (a) the fast-track implementation of transmission expansion investments to avoid delays in evacuating newly committed generation, which can impose significant costs to the whole system; (b) substantial improvement in the reliability of transmission and dispatch services; and (c) the development of better planning practices for the expansion of the transmission system, in response to changes in the level and mix of power generation.

5. In addition to new physical infrastructure, the business plan requires fundamental changes in many of the NTDC’s operating procedures, reporting practices, data systems, and management

¹⁴ NTDC Strategic Business Plan FY2016–2020, Final Draft of December 18, 2015.

practices, which the company considers priorities: (a) corporate restructuring, implementation of commercial governance practices, capacity building, and skills/expertise acquisition; (b) aligning the NTDC's managerial, financial, operations, and reporting functions with modern industrial practices; (c) improving project management at the NTDC, with the board and senior management starting to track the progress of construction projects; (d) implementing a fully functional Supervisory Control and Data Acquisition (SCADA) system; (e) completing neglected maintenance of the transmission network, correcting faulty maintenance practices, and ensuring maintenance; and (f) achieving Grid Code compliance in key reliability metrics: frequency response, voltage control, operating reserve margin, and unplanned load shedding.

6. NTMP-I will help the NTDC implement its strategic business plan by financing its priority physical infrastructure, including a backlog of postponed investment. The proposed project also supports the modernization of corporate operations and management practice¹⁵ through upgrading the NTDC's ICT infrastructure; deploying an ERP system (described below); and providing project management support, TA for project implementation, and capacity building. NTMP-I is the first phase of a planned long-term engagement by the World Bank in support of the NTDC's modernization and development.

C. Enterprise Resource Planning

7. **Overview.** To successfully implement the NTDC's substantial investment program and manage its operations with increasing efficiency, NTDC management must have a well-informed decision-making process based on accurate and timely information about the company's vast investments and operations. However, an assessment of the NTDC's financial and material management system has revealed several major deficiencies, including (a) reliance on out-of-date manuals for the budget process and inadequate financial reporting, (b) lack of modern human resources (HR) management practices, and (c) shortcomings in corporate controls and inadequate capacity for decision-making.

8. **Priority areas and options for management strengthening.** The NTDC's management has designated financial, material, and HR management as priority areas for institutional strengthening. A comprehensive overhaul of the NTDC's management practices requires addressing the company's out-of-date procedures and upgrading its ICT infrastructure. The NTDC also has to address the management's and staff's lack of familiarity with the proposed integrated computerization. The NTDC has considered two basic options for implementing the necessary changes: (a) piecemeal improvement of individual business processes, linking existing systems and business units, as appropriate, to centralize information retrieval, and (b) the acquisition of ready-made commercial software following international best practice for power utilities, adapted to the NTDC's needs. Modernization of the existing system would not be practical because of the large number of outdated, fragmented, and varied practices. Therefore, the NTDC proposes upgrading its ICT infrastructure system by purchasing ready-made commercial software for ERP and tailoring it to the company's specific needs.

II. Project Description

9. The proposed project consists of three components.

¹⁵ Except investment in the SCADA system, which is financed under the Asian Development Bank (ADB) loan to the NTDC.

10. **Component A: Expansion and Upgradation of the Transmission Network.** This component will finance subprojects for augmentation, expansion, and rehabilitation of existing power grid stations and associated lines as well as the construction of new grid stations and associated transmission lines at the 750 kV, 500 kV, or 220 kV levels. *Expansion* means adding one or more new transformers and associated equipment at each substation. *Augmentation* refers to replacing one or more existing transformers with new transformers and associated equipment that has higher capacity. *Upgrading* concerns converting a grid station with air-insulated switchyard to a GIS,¹⁶ or replacing existing equipment with new equipment. The purpose of the investment in this component is to provide immediate relief to the overall NTDC transmission system, which is under stress because of inadequate transformation capacity, as well as to facilitate the evacuation of electricity entering the system from new generation facilities or regional power trading.

11. Each subproject will require the procurement of equipment and the construction, installation, and commissioning of newly procured goods. Expansion, augmentation, and rehabilitation subprojects will generally use the existing premises, but in some cases, small amounts of additional land may be required. New construction will require land acquisition, clearance of sites, construction of foundations and a control house, and installation of transformers, control and protection equipment, and outgoing 500 kV and 220 kV feeders and associated transmission lines. A new substation may require associated transmission lines at 500 kV and 220 kV to connect the substation to the existing network.

12. For each subproject, the World Bank will finance the supply of goods, works, and installation and main engineering services. The NTDC will finance other costs such as land acquisition and administration. NTDC has the option to use the Bank loan to pay for taxes and duties, interest during construction and the loan's front-end fees.

13. The component will consist of two groups of subprojects that the NTDC will implement consecutively. Group 1 will consist of subprojects that the World Bank has fully appraised and that are ready for implementation once the World Bank's Board of Executive Directors approves NTMP-I. Group 2 consists of subprojects that the NTDC will propose for funding when their preparation is complete. The World Bank's project team for NTMP-I will appraise each Group 2 subproject using an agreed set of eligibility criteria:

- (a) the subproject will contribute to the achievement of the PDO;
- (b) the subproject is consistent with the relevant technical, administrative, environmental, and social standards and national sector policies;
- (c) all relevant approvals have been obtained for the purposes of the subproject, including those related to the feasibility study and any environmental requirements;
- (d) the subproject is the least-cost option, as compared to alternative investments in the area;
- (e) the subproject has an economic rate of return of at least 10 percent (10%), calculated on the basis of a methodology acceptable to the Bank;

¹⁶ A high-voltage substation in which the major structures are contained in a sealed environment with sulfur hexafluoride gas as the insulating medium.

- (f) an ESMP or ESIA and a RAP (where required by the terms of the LARF) have each been prepared according to the proposed project's safeguards frameworks, in form and substance acceptable to the World Bank, adopted by NTDC, and disclosed;
- (g) financing, procurement, and implementation plans in form and substance satisfactory to the Bank have been prepared and adopted for the purposes of the subproject.

14. Subproject proposals will include a feasibility study, economic analysis, and safeguards plans. Only subprojects that meet these criteria will be eligible for financing. The financing of subprojects will take place on a first-come, first-appraised basis until all IBRD funds allocated to the component (and savings from the project activities that are recommitted to the component) are committed.

15. **Overview of Group 1 subprojects.** The 33 subprojects in Group 1 are described in the following paragraphs. Implementation of Group I will add 11,266 MVA of transformation capacity to the system and restore the reliable operation of additional 2,787 MVA.

16. **Islamabad West 765/500 kV substation (IWS).** This substation will evacuate power from new hydropower plants in the north of Pakistan, notably, the first phase of the Dasu HPP, with an installed capacity of 1,080 MW, and the Tarbela 5 HPP, with an installed capacity of 1,410 MW. It will also provide relief to the existing overloaded 500 kV and 220 kV network in the greater Islamabad area to meet demand, improve the voltage profile, and reduce transmission losses. The IWS consists of two 750 MVA 500/220 kV transformers, three 250 MVA 220/132 kV transformers, two 500 kV double-circuit transmission lines of 12–15 km each, and three 220 kV double-circuit transmission lines of 15 km each, which will connect IWS to the existing 500 kV and 220 kV network. The NTDC has decided to adopt a new voltage level of 765 kV for evacuation of power from the Dasu HPP, which will add the 765 kV level to the IWS.

17. **Nowshera 500 kV substation.** This new substation will evacuate imported power from CASA to the national transmission system. The substation, located next to the 500 kV HVDC converter station, consists of two 500/200 kV transformers of 750 MVA, 9.5 km of 500 kV transmission lines, and two 220 kV loop-in, loop-out double-circuit transmission connections of 2 km, which will connect the grid station to the existing network.

18. **Expansion, augmentation, and rehabilitation of the existing 31 substations at 500 kV and 220 kV.** This investment will provide immediate relief to the overloaded transformers across the NTDC. The subproject will increase the transformer capacity by adding one to three new transformers and associated equipment or replacing up to three existing transformers with transformers of higher capacity within the premises of 27 existing substations. The NTDC has selected these substations, which serve 10 DISCOs across four regions of Pakistan, from a priority list of substations with equipment under stress, some with overloading at 100–110 percent in normal conditions during summer in 2014–2015.¹⁷ The four substations proposed for conversion to GIS were constructed in the 1960s–1970s. Their equipment has deteriorated through normal aging and because of pollution caused by chemical facilities or wastewater systems in the immediate vicinity. By conversion to GIS switchyards, NTMP-I will enable the reliable operation of these substations and reduce their operations and maintenance expenditure. NTMP-I will also install additional transformers for one substation. The conversion will take place within the existing premises of these substations. In total, this subcomponent will install 50 new transformers

¹⁷ NEPRA report of 2015.

at 500 kV and 220 kV to the network, add 7516 MVA transformer capacity, and improve the operations of 2,787 MVA, serving 10 DISCOs.

19. **Candidate subprojects for Group 2.** For this group, the NTDC has proposed five new grid stations, including associated transmission lines. However, their selection for inclusion in NTMP-I has not taken place. Changing priorities and availability of alternative sources of financing during implementation may result in changes to the list of Group 2 subprojects.

20. **Component B: Deployment of the Enterprise Resource Planning (ERP) System.** This component is the first stage of a two-stage full ERP deployment for the NTDC. The cost for the second stage is currently estimated as approximately US\$50 million, based on the NTDC's business priorities, and this figure will be refined during the implementation of the component as the NTDC reviews and adjusts its business priorities and strategic plans. This component consists of nine work packages; some of them can be aggregated together, while others need to be sequenced. The nine work packages are as follows:

- (a) *ICT-Civil Infrastructure (CI)*: improvements to or building of essential civil infrastructure such as data centers, provision of local area network outlets, and ensuring availability of power supply outlets at target workstations.
- (b) *ICT-Office Automation*: delivery of an office automation environment and shared ICT infrastructure consisting of a corporate email solution, internal telephony and scanning/printing services, local and wide area networking, and systems/security administration infrastructure.
- (c) *ICT-Help Desk*: provision of a centralized help desk (call center) as a level-1 issue resolution mechanism, which can be extended to encompass the ERP solution when it is delivered.
- (d) *ICT-ERP*: the implementation of modules of Financial Management Information Systems (FMIS), Human Resources Management Information Systems (HRMIS), Payroll, and Supply Chain Management.
- (e) *A capacity-building and training initiative* that will help the client carry out its operations in a structured and disciplined manner by developing and implementing an overarching ICT governance framework of principles, policies, standards, procedures, tools, and techniques.
- (f) *A capacity-building and training initiative* to prepare end-users in key computer interface skills and institutionalize key security controls such as username/password management, biometric access routines, and two-factor authentication.
- (g) *Change management and communications* to assist the NTDC in the implementation of new solutions and ensure that target organization units are ready and prepared to work with new technologies and automated systems.
- (h) *A business process improvement and mapping initiative* that will document the desired Future Process Model for the key business areas of FMIS, HRMIS, Payroll, and Supply Chain Management within the NTDC, which will then be used for gap analysis with a commercial off-the-shelf solution for ERP to determine its configuration parameters and need for any enhancement.

- (i) *A PMQA consultant* who will assist the NTDC with all aspects of procurement, project management, quality assurance, issue and risk management, structured and standardized methods, and record-keeping for the duration of the project.

21. It is expected that the PMQA consultant and the ICT-CI work packages will be the first to be procured, so that the PMQA consultant can assist the NTDC with the procurement of the other work packages and the necessary civil infrastructure will be ready in time to support the ICT assets to be procured. The NTDC, assisted by the PMQA consultant, will also complete the detailed planning of subsequent stages of the project on the basis of business imperatives and the feasibility of aggregating some of the work packages together or staging their implementation within planned cost limits.

22. **Component C: Project Management, Technical Assistance, and Capacity Building.** This component will finance project management and implementation support, preparation of new investments, and priority TA and capacity building. The overall objectives are successful implementation of Components A and B; enhancing the NTDC's capability to plan, invest in, and operate the expanded transmission system; and modernizing the NTDC business processes. Three consulting assignments—the PDPC, PSC, and Demand Forecast Assessment—have been under advanced procurement. The following other activities have been identified:

- (a) Updating of the 2005 National Grid Code to accommodate new institutional, commercial, and technological development in Pakistan's power systems;
- (b) Feasibility study to enhance transmission system capacity using a Flexible Alternating Current Transmission System;
- (c) Building capacity in project management and operation of HVDC transmission systems;
- (d) Development of a new internal audit methodology, manual, and plan; and
- (e) Building capability of the National Power Control Center on operational planning and economic dispatch for new thermal and renewable energy generation.

Additional consulting services and capacity-building programs will be defined during implementation.

Annex 3. Implementation Arrangements

PAKISTAN: National Transmission Modernization I Project (NTMP-I)

Restructuring of the Implementing Agency

1. The implementing agency for NTMP-I will be the NTDC. The company is governed by a Board of Directors consisting of 10 members appointed by the MoE. The Board of Directors has the power to appoint or dismiss the company MD after getting clearance from the MoE. In May 2017, the Board approved the company's new organizational structure, which was officially launched in July 2017. An important change in the new structure relevant to NTMP-I are the positions of DMD for ADM, who will oversee all investment projects as well as the system dispatch and operation, and of CIO, who will lead efforts to modernize the NTDC's ICT.

Implementation Arrangements

2. Table 3.1 describes the implementation arrangements and responsibility allocation among the NTDC units for NTMP-I.

Table 3.1. Implementation Arrangements and Responsibilities

| Unit | Key Responsibilities |
|---|--|
| NTMP-I Program Director of PMU | Responsible for: <ul style="list-style-type: none"> • Overall project coordination between the World Bank and other departments of NTDC, and preparation of progress reports. • Reviewing technical aspects of design and procurement documents submitted by the PDPC under Component A. • Overall procurement of consultants and training under Component C. Coordinate with ERP PMU on procurement of Component B. • Overall preparation of subprojects proposed for Group 2 until these subprojects are approved by the World Bank for inclusion in the NTMP-I. |
| Chief Engineer for procurement and material management | Responsible for commercial aspects and logistics of procurement process until contract signing. Support custom clearances and contract management. |
| Procurement Review Committee | Review and recommend, for approval, large procurement decisions such as bidding documents and bid evaluation reports. |
| GMs PDEL-N and PDEL-S | Responsible for implementation of subprojects in their respective areas, including contractors' contract management, land acquisition, implementation of safeguards plans, construction supervision, and monitoring until commissioning. Manage the GRM of the subprojects. |
| DTLP PMU^a | Responsible for implementation of the IWS, including procurement of goods, works, and services; land acquisition; implementation of safeguards plans; and construction supervision and monitoring until commissioning. Manage the GRM of IWS. Manage the contract for the design and supervision consultant, who is being recruited to support the PMU in implementation of the IWS and Dasu 765 kV transmission line. |
| CASA PMU^b | Responsible for implementation of Nowshera substation, including technical review of the project design and procurement documents submitted by PDPC. Responsible for land acquisition, implementation of safeguards plans, construction supervision, and monitoring until commissioning. Manage the GRM of Nowshera substation. |

| Unit | Key Responsibilities |
|---|---|
| Environmental and Social Impact Cell (ESIC) of PMU | Responsible for: <ul style="list-style-type: none"> • Screening Group 2 subprojects and draft terms of reference (TOR) for the safeguards instruments; • Ensuring the quality of the ESIA, ESMPs, and RAPs for Group 2 subprojects, which will be prepared by the PDPC, and ensuring that these documents are approved by relevant government authorities; • Supervising the implementation of ESMPs of all subprojects but the IWS and Nowshera; however, the direct supervision of the contractor's ESMP will be done by the PSC; and • Supervising implementation of the RAP of Group 2 subprojects. |
| ESIC DTLP | <ul style="list-style-type: none"> • Supervise the implementation of ESMPs for the IWS and Nowshera; however, the direct supervision of the contractor's ESMP will be done by the PSC; and • Supervise implementation of the RAP for the IWS and Nowshera; |
| GM, power system planning | Prepare system studies and compile a PC-1 for each subproject under Group 2 and obtain approval of the PC-1 by the relevant government authorities. |
| CFO/Financial Department | Manage budgeting, the opening of Letters of Credit, payment processing and financial records, and reporting for the project. ^c The CFO is a leading member of the Steering Committee for the ICT/ERP component. |
| PDPC | Prepare design and bidding documents for Component A. Assist the NTDC during the procurement process, including bid evaluation and contract negotiations. Review PC-1 and prepare safeguards instruments for Group 2 subprojects. |
| PSC | Assist supervision and monitoring of project construction, installation, and commissioning. Support overall contract management and reporting. Supervise implementation of the contractor's ESMP. |
| ERP PMU | Responsible for overall implementation of the ICT/ERP component, including procurement of consulting services, hardware, software, and other goods and works under the component, and supervision and monitoring of all activities in coordination with other departments. |
| ERP PMQA | Assist the NTDC with the implementation of the ERP. Provide managerial assistance and TA to ensure that projects are procured, structured, managed, and executed following international standards for PMQA. |

Note: ^a The DTLP PMU was established at the NTDC to manage the preparation and construction of the Dasu transmission line under the Dasu HPP and IWS. The PMU is headed by a Chief Engineer and has a full functioning body with technical, procurement, and FM staff and an ESIC. ^b The CASA PMU will be established to manage the Pakistan part of CASA and the Nowshera substation. ^c The CFO is committed to assign a dedicated focal manager within the department to be responsible for FM and disbursement of all World Bank projects in the NTDC.

3. **Project coordination and monitoring.** The PMU supervises projects financed by development partners. This unit has three subunits with a total of 16 staff members. The World Bank subunit has a Manager and six technical staff responsible for projects financed by the World Bank, the German Reconstruction Credit Institute (*Kreditanstalt für Wiederaufbau*, KfW), and Japan International Cooperation Agency (JICA). The ADB subunit oversees projects financed by the ADB. A third subunit provides cross-support on safeguards and FM. To enhance the accountability of the project results, the NTDC has appointed the Chief Engineer, who leads the PMU- as the Program Director of NTMP-I to drive the project activities..

4. **Regional administration of Group 1 and Group 2 investment subprojects.** Each of the NTDC's two regional offices—PDEL-N and PDEL-S—is chaired by a GM. The GM PDEL-N is responsible for

implementing all subprojects in the north of Pakistan. The PDEL-N has two subregional offices, in Lahore (PD Lahore) and Islamabad (PD Islamabad), and a Resettlement Unit (RU). The GM PDEL-S is responsible for subprojects in the south of Pakistan and has two subregional offices, in Multan (PD Multan) and Hyderabad (PD Hyderabad), and an RU.

5. **ESICs.** The ESIC under PMU is staffed with a Manager (environment and social safeguards), a Deputy Manager (environment), and two Assistant Managers. The ESIC keeps its companywide portfolio, except special projects such as Dasu and CASA, which will be managed by the ESIC DTLP. This second ESIC reports to the Director of DTLP PMU and is staffed with a Manager (environment and social safeguards), a Deputy (social), and an Assistant Manager (environment). The NTDC is committed to recruit additional staff (one environmental and one social specialist) for each of the ESICs to manage their work program.

6. **Procurement Review Committee.** The NTDC will establish a dedicated Procurement Review Committee to review procurement documents and bid evaluation recommendations developed by the PDPC. The focus of this committee, which will consist of members of the key NTDC units, will be to streamline decision-making and minimize document distribution.

Financial Management and Disbursements

7. The World Bank has given a Substantial risk rating to FM arrangements. The existing FM staff at the NTDC can account for the financial transactions and generate financial reports. However, experience indicates a high risk that the production of financial reports will not be timely. To strengthen the FM arrangements, the NTDC has agreed to implement an action plan for improved FM that includes meeting budget preparation milestones during each financial year (Table 3.2). The NTDC has committed to maintain the improved FM arrangements throughout the life of the project. The mitigating measures at the institutional level will be addressed through a TA and capacity-building activity under Component C.

Table 3.2. Budget Preparation Milestone for Each Financial Year

| Milestone | Due Date | Responsibility |
|---|-------------|--|
| Preparation of work plan and cash plan for the next financial year based on the approved activities plan. | January 31 | Assistant Manager - Budget and Manager - Finance in consultation with technical team |
| Approval of work plan and cash plan | February 28 | PD and CFO |
| Approval of the project budget | March 31 | PD |

Implementation Arrangements

8. **FM staffing.** For NTMP-I, the MD of the NTDC, in consultation with the CFO, will assign a focal person in the Finance Department—on at least the managerial level—with overall responsibility for the project’s FM arrangements. The FM Manager will receive support from the incremental staff hired under the project.

9. **Budgeting and planning.** NTMP-I and its subprojects will become part of the Annual Development Program and are reflected in the federal Government’s budget. The Assistant Manager - Budget, an incremental project staff, will prepare the annual budget for all the subprojects on the basis

of planned activities identified in the Procurement Plan. The annual budget will be communicated to the FM Manager on time for the allocation of resources for counterpart funding and annual budget of the project. The FM Manager will submit the budget to the CFO, who will review the annual budget and share it with the line ministry for onward submission to the MoF. The FM Manager will prepare reports on budgeted versus actual expenditures, providing justification for variances over 15 percent, and will submit them to the Finance Director and PD each month and to the World Bank every six months.

10. **Accounting and financial reporting.** The NTDC will maintain NTMP’s accounts on interim financial reports in accordance with the NTDC’s existing accounting policies and procedures and using the existing Chart of Accounts, which is comprehensive. Payment vouchers will be prepared for each transaction, and each will cite the relevant accounting codes, disbursement categories, and project components.

11. For each semester, the NTDC will prepare an interim unaudited financial report (IUFR) that it will furnish to the World Bank within 45 days after the close of the semester. The report will cover the receipt and utilization of funds during the semester, by project component and disbursement category. The World Bank and the NTDC have agreed on the format and content of IUFRs. In addition, the NTDC will prepare annual entity financial statements and will submit its audited financial statements within 12 months after the close of the financial year, commencing with the fiscal year in which the first withdrawal was made (first period); and then not later than nine (9) months for the second year; and from the third year to the closing date not later than six (6) months after the end of each year.

12. **Internal controls.** Table 3.3 summarizes the key financial control arrangements for NTMP-I.

Table 3.3. Key Financial Control Arrangements for NTMP-I

| | |
|------------------------------------|---|
| Authorization and approvals | The PD, as delegated by the MD, NDTC, will have the authority to approve payments. |
| Verifications | For each payment, the FM section will perform a “reasonableness check” that the payment claim is appropriately supported by documents, is in compliance with approved policies, and has been approved by a competent authority. |
| Segregation of duties | The FM function will be independent of procurement and administration. NTMP-I will have dual bank signatories, one of whom will be the PD. |
| Physical controls | The NTDC will maintain a fixed asset register for assets procured from credit proceeds. All assets will be tagged and periodically verified. |
| Periodic reporting | The NTDC will prepare IUFRs and progress reports on a semester basis, and financial statements on an annual basis. The IUFRs will include budgeted versus actual expenses. |
| Reconciliation | The project FM Manager will prepare a monthly reconciliation of the Designated Account (DA). The project team will also submit a monthly expenditure statement to the Accountant General of Pakistan to ensure that the expenditure is accurately recorded in the country system. |
| Internal audit | A private chartered accounting firm will conduct the internal audit of the project activities annually. |
| External audit | NTDC financial statements will be audited in accordance with international standards on auditing by a reputable firm of chartered accountants acceptable as auditors for the World Bank’s fiduciary purposes. The NTDC will submit its audited financial statements to the World Bank, within the time frame described in par. 11 above after the close of each financial year, ^a which will be June 30. The NTDC currently has no overdue audit reports on the World Bank-financed projects it is managing. |

Note: ^a The World Bank will clear the TORs for the hiring of audit firms. Under the Access to Information Policy of the World Bank, the annual project audit report and the audited project financial statements will be disclosed on the World Bank’s website.

13. The hiring of the internal audit firm should be completed within six months after loan effectiveness. The audit will cover integrated procurement, FM, and contract management. The TORs for the firm will include development of an internal audit manual; provision of training to internal audit staff of the NTDC based on this manual; familiarization of the NTDC’s employees with the use of modern audit techniques, standards issued by the Institute of Internal Auditors, and methodologies adopted for special assignments; and quality assurance review of the internal audit reports prepared by the NTDC’s Internal Audit Department. On the basis of the results of the audit, the auditor will provide suggestions for any needed improvements

Loan Disbursements

14. The World Bank may follow four procedures in disbursing funds for NTMP-I: (a) reimbursement for expenditures eligible for financing pursuant to the Loan Agreement (“eligible expenditures”) that the borrower has pre-financed from its own resources; (b) an advance of loan proceeds to an account designated by the borrower, to finance development expenditures as they are incurred, for which the implementing agency provides supporting documents at a later date; (c) direct payment, at the borrower’s request, to a third party (for example, supplier, contractor, or consultant) for eligible expenditures; and (d) direct payment to a third party for eligible expenditures under special commitments entered into, in writing, at the borrower’s request, and on terms and conditions agreed between the World Bank and the borrower.

Table 3.4. Disbursement Table

| Category | Amount of the loan allocated (US\$ millions) | Percentage of expenditures to be financed (Inclusive of Taxes) |
|---|--|--|
| Goods, works, non-consulting services, consulting services, Incremental Operating Costs, and Training and Workshops, Commitment Charge and Interest During Construction for Component A, B and C of the Project | 423.94 | 100 |
| Front-end Fee | 1.06 | 100 |

15. **Planned flow of funds.** NTMP-I will mainly use the Advance and Direct Payment methods of disbursements. For receipt of funds, the implementing agency (NTDC) will open and operate a segregated DA in U.S. dollars at the National Bank of Pakistan. The DA will operate in accordance with the provisions of “Revised Accounting Procedure for Revolving Fund Account (Foreign Aid Assignment Account),” dated August 2, 2013, and issued by the Finance Division, MoF.

16. **The World Bank will front-load funds into the DA based on a six-month cash forecast.** Subsequent advances will be based on forecasts for the following semester and the balance available with the NTDC as reported in the IUFs prepared each semester. The World Bank will, in its own system, document expenditures incurred each semester against advances based on the IUFs and monthly

reporting by the Office of the Accountant General. The Disbursement Letter for NTMP-I will provide further details about disbursements. At project closing, the NTDC will refund to the World Bank any unspent funds in the DA.

17. **Retroactive financing.** The implementing agency may withdraw, from the DA, an aggregate amount up to US\$85,000,000 for payments made before the signature date of the Loan Agreement and on or after January 1, 2018, for eligible expenditures under the Loan Agreement. There will be no withdrawals for any other expenditures incurred before this date.

Procurement

18. For Component A, NTMP-I is adopting a phased implementation approach and is dividing the procurement lots into two distinct implementation groups. Group 1 will be implemented in the first year of the project, and Group 2 will be implemented with any remaining funds as subprojects are approved.

19. Group 1 is divided into six distinct packages with a total value of US\$234 million. Each package includes between two and six lots, with cost estimates per lot ranging from US\$4 million to US\$34 million. Packages are designed to include lots across proximate geographic zones to allow for easier project management for firms bidding on multiple lots. Lot sizes are intended to be of a size that is both accessible and attractive to domestic and international firms. Procurement packaging for goods and works under IWS is under preparation and will be added during implementation. Firms can bid on individual lots or complete packages commensurate with their size and experience in being able to technically and financially manage multiple projects. Group 2 is still under project evaluation by the NTDC Planning Department and will be addressed as those projects are approved. It is assumed that Group 2 will follow a similar procurement contract approach to Group 1.

20. **Risk mitigation measures.** Table 3.5 summarizes the procurement risks and the mitigation measures that the World Bank and the NTDC will take to address them.

Table 3.5. Evaluated Risks and Related Mitigation Measures

| Risk description | Description of mitigation | Action By |
|--|--|-----------|
| Systemic inadequacies in procurement capacity and inventory management, particularly in relation to a “loose procurement” approach. | The procurement strategy strengthens the system by minimizing the contract workload on NTDC and strengthening the inventory management system for their usual business needs. The contract workload on NTDC will be minimized through Project Design and Procurement Consultant to be hired by NTDC and through procurement training. | NTDC |
| Previous issues with document confidentiality through the evaluation process: documentation was distributed to a large number of people across numerous NTDC units | As a precaution against breach of confidentiality, the project will establish a dedicated Procurement Review Committee to review procurement documents and bid evaluation recommendations developed by the owner’s engineer. The Procurement Committee will consist of members of the key NTDC units to streamline decision-making and minimize document distribution. | NTDC |
| A complicated procurement decision-making framework coupled with an ongoing organizational restructure and reassignment of key staff | A World Bank Program Director role, to be established at the NTDC to oversee and drive results across the numerous World Bank projects (Dasu, Tarbela 5, CASA, NTMP-I), will help streamline decision-making. The PD will have multidisciplinary support from procurement, FM, and safeguards specialists on staff, as well as consultant support. | NTDC |

| Risk description | Description of mitigation | Action By |
|---|--|------------|
| Low thresholds for financial delegations from the Board of Directors to the NTDC Management | The Board of Directors will increase financial delegations to management to enable more streamlined decision-making at the management level throughout the project. | NTDC |
| Historic quality issues with primary and secondary substation equipment supplied by some contractors | To ensure quality, the NTDC will issue instructions to the owner's engineer to appropriately set qualification criteria and reiterate, to potential bidders, the requirements in relation to type testing. Type testing costs are to be separately identified in the bid and covered by the NTDC. | NTDC |
| The inability of some local contractors that are subsidiaries to meet qualification criteria | The NTDC will reiterate to potential bidders, during the pre-bid conference, the World Bank's requirements in relation to subsidiary companies relying on qualifications of the parent company rather than their own. | NTDC |
| Perceived security risks at some sites acting as a deterrent to some bidders | The NTDC will explain to suppliers, in the pre-bid conference, that adequate security arrangements are in place at each of the sites, specifying any sites that may have a higher security risk and detailing enhanced measures that will be in place at those sites. | NTDC |
| Delays in contract effectiveness due to foreign bidders being unable to make local currency transactions until they have established a local bank account | The contract will be amended to enable advanced payment in the currency of the bid rather than local currency. Also, the NTDC will make use of the TA provided under Component C of NTMP-I to investigate reasons for time delays, cost overruns, and poor-quality outputs by contractors in the ongoing national transmission modernization projects, to incorporate lessons learned into NTMP-I and future projects. | NTDC |
| Lack of awareness of World Bank's procurement framework | The World Bank is providing training on procurement framework to relevant NTDC staff – three such training programs have already been delivered during project preparation. | World Bank |

Environmental and Social Aspects of NTMP-I (including safeguards)

21. **Environmental aspects.** For the 31 substation upgrades and extensions identified in Group 1 subprojects, the safeguards will be managed under an ESMP prepared for Group 1 subprojects. The key risks concern oil spills, poor waste management, and workforce health and safety. Mitigation solutions will focus on pollution, waste and emission control, the management of nuisances (noise, dust), and workforce accommodation and conduct. Disruption to the community living in the areas of the subprojects should be minimal because all work will take place within the existing substation compounds. Nevertheless, the ESMP states that the community will be consulted and informed of the construction activities, and the GRM process will be used to manage and resolve complaints.

22. **Options for safeguards instruments for Group 2 subprojects include** (a) updating the Group 1 ESMP for subprojects that only require extension or augmentation, or (b) preparing project-specific ESAs and ESMPs for new substations and transmission lines. The ESMF provides procedures and guidelines for screening proposed subprojects and confirming the most appropriate type of safeguard instrument. Each subproject's safeguard instrument will require clearance by the World Bank before funding approval. The ESMF also includes a screening checklist to exclude all investment proposals that may cause significant or irreversible environmental and social impacts. A subproject will not be eligible for funding if it (a) causes the significant conversion or degradation of critical natural habitats or of

critical forest areas, (b) contravenes applicable international environmental agreements, or (c) is located in a PCR site recognized at the national or provincial level.

23. The NTDC has prepared ESIA and ESMPs for the new IWS and Nowshera substation and associated transmission lines. The key environmental issue these substations raise is the conversion of agricultural land to industrial land use: 225 acres¹⁸ for IWS and 145 acres for Nowshera. Linked to this conversion are concerns about the management of water supply and sanitation in the residential colony, noise and electromagnetic radiation from the equipment, and construction-related impacts (noise, dust, traffic, aggregate quarrying, worker and community health, and safety). There will be no impacts on natural habitats, forests, or PCRs. The landscape impacts at the IWS site cannot be mitigated as the site is located at the edge of Islamabad, and the ESIA notes that urban development will continue in this area with or without the substation. The ESIA evaluated three alternative sites and selected one site because of its better technical feasibility and fewer social impacts. For Nowshera, the selected site is located on agricultural land far from residential areas and has no impacts on private or public infrastructure. Construction-related impacts are manageable using controls on timing of works, traffic management, and dust management, along with the ongoing community consultations. Routine site operations will include checking and maintenance with regard to sanitation, water supply, and storm water treatment and discharges.

24. **Social aspects.** Implementation of the IWS will have an impact on an estimated 260 households. Nearly all the land to be acquired is currently being used for agriculture. Of the PAPs, some 25 percent will lose land larger than three acres, and the rest will lose smaller parcels of land. The subprojects will affect the livelihoods of 58 families who will lose all their land. Twelve families are considered to be “vulnerable,”¹⁹ and 10 families will have to be relocated. There will be no land acquisition from households headed by women.

25. The work at the Nowshera substation and associated transmission lines will affect 176 households. The substation will affect 59 families: 51 titleholders and 8 sharecroppers. Among them, 11 households (18.5 percent) will lose all their agricultural land. The other 48 households (81.5 percent) will lose 40–50 percent of the land they own. Therefore, all PAPs will face significant impacts, which include loss of land, crops, structures, trees, other assets, and livelihoods, although none of them has to be relocated. The planned associated transmission line of 9.5 km at Nowshera, consisting of 29 towers, will have an impact on 117 households. Among them, 27 families will lose land for tower foundations and 90 others have their lands in the transmission line ROW. They will receive compensation for loss of land, structures, crops, and livelihoods. A total of 45 families who live under the poverty line were identified; they will be eligible for additional payments.

26. NTMP-I has adopted the LARF that the NTDC prepared and that the World Bank approved under CASA. The NTDC is taking a two-pronged approach to social safeguards. For subprojects under Group 1, RAPs have been prepared to cover developments in the IWS and Nowshera substation and transmission lines. Additionally, an ESMP has been prepared for the substations to be augmented/expanded or

¹⁸ 1 acre is equivalent to 0.405 hectare

¹⁹ *Vulnerable* means any people who might suffer disproportionately or face the risk of being marginalized from the effects of resettlement, that is, (a) female-headed households with dependents, (b) disabled household heads, (c) poor households, (d) landless elderly households with no means of support, (e) households without security of tenure, and (f) ethnic minorities.

converted, which includes mitigation measures for adverse social impacts that do not require resettlement.

27. For Group 2 subprojects, the LARF will guide the preparation and implementation of any RAPs required. An SMF as a part of the ESMF has been prepared for Group 2 subprojects. It includes a Gender and Labor Framework. The Labor Framework will guide the project on the conditions of labor employment, working conditions, and labor management issues, particularly on interaction with local communities. A GRM has also been designed that will provide redress for any complaints from the public. The SMF includes a Public Consultation Framework to ensure that the public is meaningfully consulted in all subprojects.

28. **Safeguards implementation, monitoring, and capacity building.** Two ESICs are responsible for the overall quality and supervision of all ESIAs, ESMPs, and RAPs. The ESICs will ensure that the bid documents include the ESMP and that the contractor prepares an acceptable contractor's ESMP before works begin. The PSC will employ environmental and social safeguards specialists to supervise the implementation of the contractor's ESMP, provide on-the-job training, and report regularly to the ESICs and the NTMP PD. The regional GMs PDEL-N, GM PDEL-S and GM Asset Management will receive training and capacity building on relevant safeguard instruments applied to NTMP-I. The NTDC will submit quarterly progress reports to the World Bank on the ESMP and RAP implementation.

29. The RU in each GM PDEL includes, among other members, the Social Development/Resettlement Officer as a focal member, social mobilization staff, a land acquisition collector, and a construction supervision consultant. The RU will have overall responsibility for updating, implementing, and monitoring land acquisition and resettlement plans in coordination with the District Administration, Revenue Department, and other line departments. The NTDC will hire a team of individual experts to conduct independent monitoring for the implementation of the RAPs. An independent consultant will review progress throughout the RAP implementation, as reported by the NTDC; evaluate the status of achieving the RAPs' objectives; identify any gaps and propose remedial measures for implementation; and assess the process of the RAP implementation and its compliance with World Bank procedures.














30. **Public consultation and information disclosure.** The affected people and communities, along with other relevant stakeholders, have been consulted on the ESIAs and ESMP of Group 1 subprojects. Also, consultation on the ESMF has taken place with the relevant nongovernmental organizations and stakeholders. The feedback from the consultations has been incorporated into the design of NTMP-I and into the final draft ESIAs, ESMP, and ESMF. The ESIAs, ESMP, and ESMF in English and the executive summaries in local languages (Urdu and Pashto) have been disclosed on the NTDC's website. The documents, in English, have been disclosed on the World Bank website.

Monitoring and Evaluation

31. The NTDC will monitor overall project implementation against the performance indicators for NTMP-I. The GMs of PDEL-N and PDEL-S are responsible for collecting data on the performance indicators of the project and for monitoring contractor performance in their respective areas. The NTMP PD will be primarily responsible for coordinating with other units in the NTDC for collection of data on project outputs and outcomes, which will be included in the semi-annual reports to be submitted to the World Bank.

- FINANCED UNDER THE PROJECT:**
- ④ NEW 500kV GRID STATIONS
 - ⑤ EXISTING 500kV GRID STATIONS
 - ⑥ EXISTING 220kV GRID STATIONS
- SUB PROJECTS:**
- 1 500kV Islamabad West Substation
 - 2 500kV Lahore (Sheikhupura) Substation
 - 3 220kV New Kotlakhpot (NULP) Substation
 - 4 220kV Wapda Town Substation
 - 5 220kV Barana Substation
 - 6 220kV Daud Khel Substation
 - 7 500kV Peshawar (Sheikh Muhammad) Substation
 - 8 220kV Islamabad University Substation
 - 9 220kV Sangjani Substation
 - 10 220kV Ludewala Substation
 - 11 500kV Gujranwala (Galkhhar) Substation
 - 12 220kV Ghakar Substation
 - 13 220kV Samandani Road Substation
 - 14 220kV Piranghail Substation (NGPS Multan)
 - 15 220kV Bahawalpur Substation
 - 16 500kV Multan New Substation
 - 17 220kV Vehari Substation
 - 18 220kV Loralai Substation
 - 19 220kV Sibi Substation
 - 20 220kV Quetta Industrial Substation
 - 21 220kV Shikarpur New Substation
 - 22 220kV Rohri Substation
 - 23 220kV Khuzdar Substation
 - 24 500kV Gaddu Substation
 - 25 220kV Daharki
 - 26 220kV Jamshoro Substation
 - 27 220kV TM Khan Road Substation
 - 28 220kV Hala Road Substation
 - 29 Conversion of 220kV AIS Bund Road to GIS Substation
 - 30 Conversion of 220kV Nishatabad AIS Substations to GIS
 - 31 Conversion of 220kV Kala Shah Kaku Substation to GIS
 - 32 Conversion of 220kV Ravi Road AIS Substation to GIS
 - 33 500kV Nowshera Grid Station

PAKISTAN
NATIONAL TRANSMISSION MODERNIZATION I PROJECT
 EXISTING AND PLANNED NTDC NETWORK 2021-2022

| | | | |
|---|--|---|---------------------------------|
|  | GRID STATIONS/TRANSMISSION LINES: |  | THERMAL POWER STATIONS: |
|  | 500kV GRID STATIONS/LINES |  | 500kV |
|  | 220kV GRID STATIONS/LINES |  | 220kV |
|  | HYDROELECTRIC POWER STATIONS: |  | POWER STATIONS - IPP |
|  | 500kV |  | DISCO |
|  | 220kV |  | DISTRIBUTION COMPANY NAME |
| | |  | DISTRIBUTION COMPANY BOUNDARIES |

