

# Facility Administration Manual

MFF Number: XXXX  
Loan Number: XXXX  
October 2015

## Pakistan: Second Power Distribution Enhancement Investment Program

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## APPENDIXES

### **Facility Administration Manual Purpose and Process**

1. The facility administration manual (FAM) describes the essential administrative and management requirements to implement the multitranche financing facility on time, within budget, and in accordance with Government and Asian Development Bank (ADB) policies and procedures. The FAM should include references to all available templates and instructions either through linkages to relevant URLs or directly incorporated in the FAM.
2. The power distribution companies are wholly responsible for the implementation of ADB financed projects, as agreed jointly between the borrower and ADB, and in accordance with Government and ADB's policies and procedures. ADB staff is responsible to support implementation including compliance by the power distribution companies of their obligations and responsibilities for project implementation in accordance with ADB's policies and procedures.
3. At Loan Negotiations, the borrower and ADB shall agree to the FAM and ensure consistency with the Framework Financing Agreement (FFA) and Loan agreement. Such agreement shall be reflected in the minutes of the FFA and Loan Negotiations. In the event of any discrepancy or contradiction between the FAM and the Loan Agreement, the provisions of the Loan Agreement shall prevail.
4. After ADB Board approval of the report and recommendations of the President (RRP) and periodic financing request, changes in implementation arrangements are subject to agreement and approval pursuant to relevant Government and ADB administrative procedures (including the Project Administration Instructions) and upon such approval they will be subsequently incorporated in the FAM.

## ABBREVIATIONS

ADB	=	Asian Development Bank
ADF	=	Asian Development Fund
AFS	=	audited financial statements
AMI	=	advanced metering infrastructure
CQS	=	consultant qualification selection
DISCO	=	distribution company
DMF	=	design and monitoring framework
EARF	=	environmental assessment and review framework
EIA	=	environmental impact assessment
EMP	=	environmental management plan
ERP	=	Enterprise Resource Planning
ESMS	=	environmental and social management system
GACAP	=	governance and anticorruption action plan
GDP	=	gross domestic product
ICB	=	international competitive bidding
IEE	=	initial environmental examination
IPP	=	indigenous people plan
IPPF	=	indigenous people planning framework
LAR	=	land acquisition and resettlement
LIBOR	=	London interbank offered rate
MFF	=	multitranche financing facility
NCB	=	national competitive bidding
NGO	=	nongovernment organization
PAI	=	project administration instruction
PMU	=	project management unit
QBS	=	quality based selection
QCBS	=	quality- and cost-based selection
RRP	=	report and recommendation of the President
SBD	=	standard bidding document
SOE	=	statement of expenditure
SPS	=	Safeguard Policy Statement
SPRSS	=	summary poverty reduction and social strategy
TOR	=	terms of reference

## I. PROGRAM AND PROJECT DESCRIPTION

### A. Impact, Outcome, and Outputs

#### 1. Investment Program

1. The investment program aims to improve the financial viability of Pakistan's power distribution sector. By introducing advanced metering infrastructure (AMI)<sup>1</sup> to power distribution companies (DISCOs) throughout Pakistan, the investment program would (i) reduce power distribution losses, and improve revenue collection; (ii) reduce power outages by enhancing load control and load management; (iii) provide automated power consumption data; (iv) modernize the electricity metering and billing system; and (v) improve customer services by installation of customer information system (CIS). Funds under the investment program will be provided for metering, data management and communication systems, and CIS and billing systems, including installation and supporting infrastructure. AMI will be implemented in several phases to cover Pakistan's major cities, industrial and commercial hubs.<sup>2</sup> A multitranche financing facility (MFF) instead of stand-alone projects is proposed for the investment because introduction of AMI requires a long-term partnership between the government and ADB, and being a large-scale and complex intervention, the government intends to rollout in phases.

2. The impact will be increased financial viability of the power distribution sector in Pakistan. The outcome will be increased electricity revenues in the targeted regions.

3. The investment program will have four outputs: (i) smart meters and communication equipment installed and functional, (ii) meter data management system (MDMS) implemented and operational, (iii) billing and CIS implemented and operational, and (iv) operation manuals updated and monitoring procedure improved. The program will improve: (i) metering accuracy and reliability, anti-tampering and fault detection; (ii) tariff collection and billing efficiency; and (iii) load monitoring and management. Tranche 1 will have the same outputs as the investment program, but only in respect of the Islamabad Electric Supply Company (IESCO) and Lahore Electric Supply Company (LESCO).

4. Tranche 1 of the investment program is expected to cover up to 2.0 million customers in the regions of IESCO and LESCO.

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<sup>1</sup> AMI comprises systems that measure, collect, and analyze energy usage, and communicate with the metering devices either on request or on a schedule. These systems include hardware, software, communication systems, customer energy displays and controllers, customer associated systems, meter data management software, and supplier business systems.

<sup>2</sup> The Asian Development Bank provided project preparatory technical assistance for developing the Proposed Second Power Distribution Enhancement Investment Program (TA 8410).

## B. Program and Project Readiness Activities

**Table 1: Processing Schedule**

Indicative Activities	2014	2015												Responsible Party	
	D	J	F	M	A	M	J	J	A	S	O	N	D		
Advance contracting actions															ADB, IESCO, LESCO
Retroactive financing actions															
Establish implementation arrangements	x														
Negotiations and FFA signing			x												ADB, EAD
ADB Board approval of Investment Program													x		ADB
ADB Management Approval of Tranche 1													x		
Loan signing of Tranche 1														x	
Government legal opinion provided														x	EAD, MOL, IESCO, LESCO
Government budget inclusion															EAD
Loan effectiveness for Tranche 1														x	ADB, EAD, IESCO, LESCO

ADB = Asian Development Bank, EAD = Economic Affairs Division of the Ministry of Finance, FFA = framework financing agreement, IESCO = Islamabad Electric Supply Company, LESCO = Lahore Electric Supply Company, MOL = Ministry of Law.

## C. Overall Program and Project Implementation Plans

5. The implementation schedules for the investment program and Tranche 1 are in Tables 2 and 3 respectively. Details are in Appendix 3.

**Table 2: Investment Program**

Tranche	Year									
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
1	[Program support (ADF loan)]									
2	[project preparation]									
3	[project implementation]									
4	[project implementation]									

Program support (ADF loan)
  project preparation
  project implementation

**Table 3: Tranche 1**

Activities	2015	2016	2017	2018
	'15	'16	'17	'18
☑ Outputs	[Timeline bar]			
☑ 1. Smart Meters and communication equipment installed, and functional.	[Timeline bar]			
AMI system procured by January 2016.	[Timeline bar]			
Project implementation consultant recruited by September 2015.	[Timeline bar]			
Installation works started by December 2015.	[Timeline bar]			
Tranche 1 implementation completed by December 2018.	[Timeline bar]			

## II. PROGRAM AND PROJECT MANAGEMENT ARRANGEMENTS

### A. Program and Project Implementation Organizations – Roles and Responsibilities

Organization	Management Roles and Responsibilities
Executing agency	Ministry of Water and Power will monitor the implementation of the investment program following the Framework Financing Agreement.
Implementing agencies (DISCOs)	IESCO, LESCO, MEPCO, PESCO, HESCO, GEPCO, FESCO, QESCO, and SEPCO One PIU under the existing PMU in each distribution company (pre-existing under ADB's first Power Distribution Enhancement Investment Program) will be responsible for day-to-day project implementation under each tranche, including compliance with the design and monitoring framework, loan covenants, and safeguards requirements. The project implementation consultants will support the PMUs for procurement, disbursements, and progress reporting.
Project oversight body	Oversight body will be responsible for monitoring of the progress of the investment program Ministry of Water and Power: Secretary (chair), Joint Secretary (distribution companies), Joint Secretary (Projects), (members) EAD: Joint Secretary, (member) DISCO: Chief Executive Officer (concerned DISCO) (members)
ADB	Financier
Islamic Republic of Pakistan	Borrower

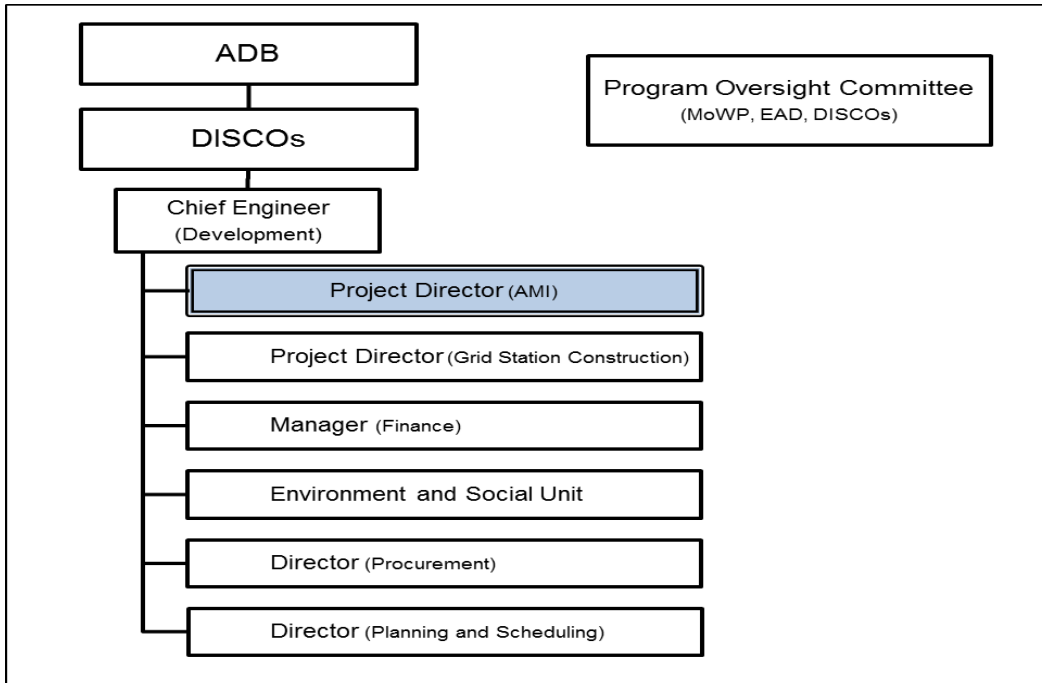
ADB = Asian Development Bank, DISCOs = power distribution companies, EAD = Economic Affairs Division of the Ministry of Finance, FESCO = Faisalabad Electric Supply Company, GEPCO = Gujranwala Electric Supply Company, HESCO = Hyderabad Electric Supply Company, IESCO = Islamabad Electric Supply Company, LESCO = Lahore Electric Supply Company, MEPCO = Multan Electric Supply Company, PESCO = Peshawar Electric Supply Company, PIU = project implementation unit, PMU = project management unit, QESCO = Quetta Electric Supply Company, SEPCO = Sukkur Electric Power Company.

### B. Key Persons Involved in Implementation

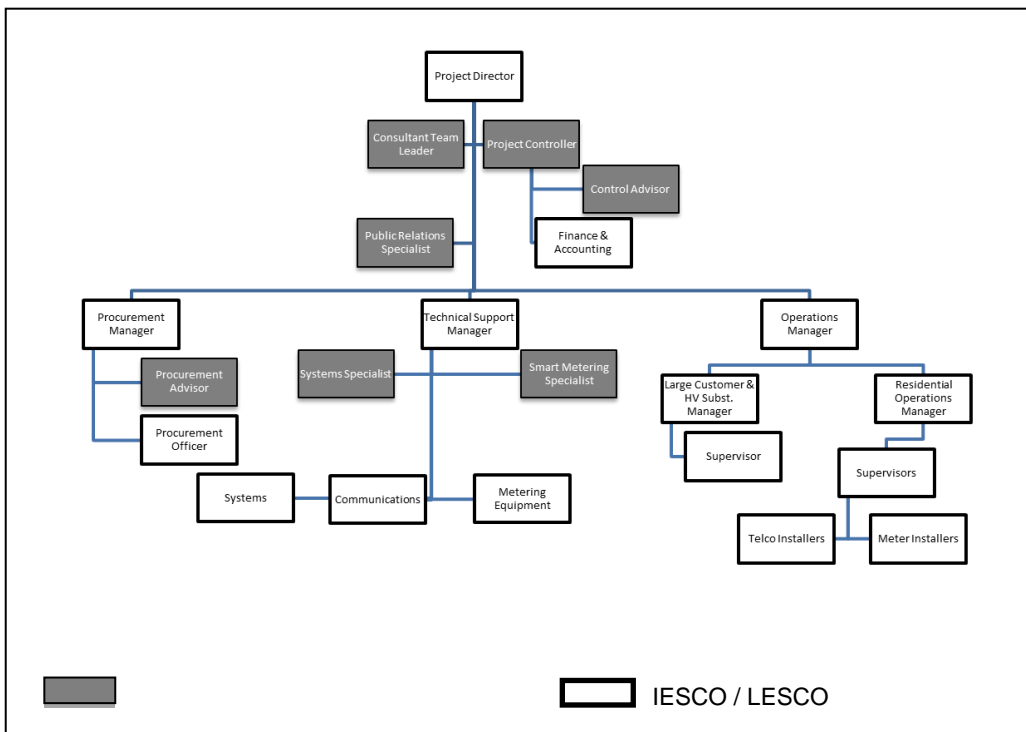
Implementing Agencies	
IESCO	LESCO
Officer's Name: Riaz Ali Shah Position: Chief Engineer (Development) Telephone: 0092519252978 Email: iescopmu@hotmail.com Office Address: Street No.40, G-7/4, IESCO Head Office Islamabad	Naseem Akhtar Chief Engineer (Development) 00924299214410 <a href="mailto:cedev@lesco.gov.pk">cedev@lesco.gov.pk</a> Near Qartaba Chowk, Bahawalpur Road, Mozang, Lahore, Pakistan
Officer's Name: Muhammad Yousaf Awan Position: Chief Executive Officer Telephone: Email: Office Address:	Qaiser Zaman Chief Executive Officer
ADB - Energy Division, Central and West Asia Department	
Director	Mission Leader
F. Cleo Kawawaki Director Telephone: (63-2) 632-6113 Email: <a href="mailto:fkawawaki@adb.org">fkawawaki@adb.org</a> Office Address: 6 ADB Avenue, Mandaluyong City, Manila	Adnan Tareen Energy Specialist Tel +63-2-632-6925 <a href="mailto:atareen@adb.org">atareen@adb.org</a> 6 ADB Avenue, Mandaluyong City 1550, Manila

**C. Program and Project Organization Structure**

**1. Investment Program**



**2. Tranche 1**





### III. COSTS AND FINANCING

#### A. Investment Program

6. The overall financing needs for the installation of AMI throughout the country is \$4.9 billion. The MFF will finance a portion of this investment program totaling \$1.25 billion. The MFF is projected to have four tranches from year 2015–2024. Proceeds of the loan, under each tranche, will be on-lent by the government to respective DISCOs. Tranche 1 is expected to be executed in year 2015. The portion of the investment program to be financed by the MFF is detailed in Table 4.

**Table 4: Investment Program**  
(\$ million)

Item	MFF	Tranche 1
	Amount <sup>a</sup>	
<b>A. Base Cost<sup>b</sup></b>		
1. AMI development and distribution system improvement	1,062.3	428.1
2. Project preparatory and capacity development consultants	1.5	1.5
3. Project monitoring consultants	18.3	18.3
<b>Subtotal (A)</b>	<b>1,082.1</b>	<b>447.9</b>
<b>B. Contingencies<sup>c</sup></b>	<b>141.4</b>	<b>52.9</b>
<b>C. Financing Charges During Implementation<sup>d</sup></b>	<b>24.5</b>	<b>9.7</b>
<b>Total (A+B+C)</b>	<b>1,248.0</b>	<b>510.5</b>

DISCOS = distribution companies, AMI = advanced metering infrastructure, MFF = multitranche financing facility.

<sup>a</sup> Includes taxes and duties of \$206.4 million to be financed from government resources for MFF. Includes taxes and duties of \$87.2 million to be financed from government resources for Tranche 1.

<sup>b</sup> In mid-2014 prices.

<sup>c</sup> Physical contingencies computed at 5% for equipment. Price contingencies computed at 1.4% on foreign exchange costs and 7.7% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

<sup>d</sup> Includes interest and commitment charges. Interest during construction for ADB's ordinary capital resources (OCR) loan has been computed at the 5-year forward London interbank offered rate plus a spread of 0.5% and 0.1% of maturity premium. ADB's special fund resources loan has been computed at 2% per annum. Commitment charges for ADB's OCR loan are 0.15% per year to be charged on the undisbursed loan amount.

Source: Asian Development Bank staff estimates.

7. The government has requested an MFF in an amount up to \$990 million from ADB's ordinary capital resources and Special Funds resources to help finance a part of the investment program. The MFF will consist of 4 tranches, subject to the government's submission of related periodic financing requests, execution of the related loan and project agreements for each tranche, and fulfillment of terms and conditions and undertakings set forth in the framework financing agreement.

8. The MFF combines ordinary capital resources (OCR) and Special Funds resources, i.e., Asian Development Fund (ADF) resources, up to the aggregate MFF amount. The provision of any ADF resources will be balanced by a corresponding reduction in available OCR financing (and vice versa), with total financing provided under the MFF not to exceed the aggregate MFF total of \$990 million. Any ADF allocation will be subject to (i) the availability of ADF resources; (ii) Pakistan's access to such resources pursuant to ADB's then applicable Graduation Policy<sup>3</sup>

<sup>3</sup> ADB. 2008. Review of the 1998 Graduation Policy of the Asian Development Bank. Manila.

and the requirements of ADF donors, and (iii) the availability of such resources to Pakistan given ADB's then applicable policy on performance-based allocation of ADF resources.<sup>4</sup>

9. For the first tranche of the MFF, the government has requested the following loans to help finance the project:

- (i) A loan of \$380 million from ADB's ordinary capital resources. The loan will have a 22-year term, including a grace period of 5 years, custom-tailored repayment schedule, an annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility, a commitment charge of 0.15% per year (the interest and other charges during construction to be capitalized in the loan), and such other terms and conditions set forth in the draft loan and project agreements.
- (ii) A loan in various currencies equivalent to SDR14,208,000 from ADB's Special Fund Resources. The loan will have a 25-year term, including a grace period of 5 years, an interest rate of 2.0% per annum during the grace period and thereafter, and such other terms and conditions set forth in the draft loan and project agreements.

10. The financing plan is in Table 5. A part of the Special Funds resources loan for the first tranche of the MFF will be used for project implementation consultants and project preparation consultants for tranches 2 to 4. ADB financing constitutes 79.3% of the cost of the portion of the investment program that will be supported by the MFF.

**Table 5: Financing Plan**  
(\$ million)

Source	Tranche 1	Tranche 2	Tranche 3	Tranche 4	MFF	Share of Total (%)
	Amount (\$ million)	Amount (\$ million)	Amount (\$ million)	Amount (\$ million)	Amount (\$ million)	
Asian Development Bank	400.0	200.0	270.0	120.0	990.0	79.3
Ordinary capital resources (loan)	380.0	200.0	270.0	120.0	970.0	77.7
Special Funds resources (loan)	20.0	-	-	-	20.0	1.6
Cofinancier	-	-	-	-	-	-
Discos	110.5	50.0	67.5	30.0	258.0	20.7
<b>Total</b>	<b>510.5</b>	<b>250.0</b>	<b>337.5</b>	<b>150.0</b>	<b>1,248.0</b>	<b>100.0</b>

MFF = multitranche financing facility

Source: Asian Development Bank staff estimates.

11. The project costs are described in succeeding paragraphs.

12. **Turnkey contracts.** The turnkey contracts for AMI include: (i) supply of metering equipment, (ii) supply of communication equipment, (iii) development of management systems such as head-end system (HES) and meter data management system (MDMS), (iv) billing system and CIS, (v) insurance, and (vi) installation. Installation of meters will be under DISCOs' responsibility. The turnkey contracts will be financed out of the ADB OCR loan proceeds.

<sup>4</sup> ADB. 2004. Review of the Asian Development Bank's Policy on the Performance-Based Allocation of Asian Development Fund Resources. Manila; and ADB. 2008. Refining the Performance-Based Allocation of Asian Development Fund Resources. Manila

13. **Warehousing and Installation.** DISCOs will provide necessary staff and resources for installation of metering equipment and associated communication systems. The cost will mainly be covered by DISCOs as their share of the project costs. A small portion of installation works will be carried out by the material and equipment contractor, which will be financed out of the ADB OCR loan proceeds.

14. **Project implementation consultants.** Project implementation consultants (firms) will be recruited to assist the project management units (PMUs) of the DISCOs. The consultants' tasks will include: (i) supervision of project implementation; (ii) training for DISCOs; and (iii) a social information program about the project. This will be under DISCOs' responsibility. The consultants will be financed out of the ADB ADF loan proceeds.

15. **Project management units.** PMUs will be established within each of the DISCOs to implement and manage the contracts and consultants, and the overall projects. This will be covered by DISCOs as their share of the project costs.

16. **Taxes and duties.** Taxes and duties will be covered by DISCOs as their share of the project costs.

17. **Project preparation consultants.** Project preparation consultants (firms) will be recruited to support DISCOs in conducting project preparatory activities for future tranches. The consultants' tasks will include: (a) confirmation of feasibility for an AMI project for each DISCO, and (b) facilitation of financing preparation with ADB. This will be under DISCOs' responsibility. The consultants will be financed out of the ADB ADF loan proceeds.

## **B. Tranche 1**

18. The Tranche 1 project covers the AMI subprojects in selected distribution circles within IESCO and LESCO, and consulting services for the subsequent tranches. The total estimated project cost is \$510.5 million, of which IESCO's AMI subproject is \$165.6 million and LESCO's subproject is \$272.0 million, and \$20 million for monitoring the implementation of all tranches and for preparing the subsequent tranches.

19. The government has requested a loan of \$380 million from ADB's OCR and a loan of \$20 million equivalent from ADF to help finance the project. The project will have indicatively a 22-year term, including a 5-year grace period, custom-tailored repayment schedule, an annual interest rate determined in accordance with ADB's London interbank offered rate (LIBOR)-based lending facility,<sup>5</sup> a commitment charge of 0.15% per year for OCR loan, and a 25-year term, including a grace period of 5 years, an interest rate of 2% per annum throughout for ADF loan, (the interest and other charges during construction to be capitalized in the loan) and such other terms and conditions set forth in the draft loan and project agreements. The loan proceeds will be re-lent from the borrower to respective DISCOs pursuant to subsidiary loan agreements with the same repayment and grace periods as the respective loans and at 15% per annum. The borrower will assume the foreign exchange risk.

20. The IESCO subproject will be financed by a loan of \$139.6 million from OCR, and a loan of \$4 million from ADF. IESCO from its internal resources, will arrange counterpart financing (\$41.9 million) to cover the cost of (i) taxes and duties, (ii) warehousing and installation, and (iii)

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<sup>5</sup> The interest includes a maturity premium of 10 basis points. This is based on the above loan terms and the government's choice of repayment option and dates.

a part of contingencies. The LESCO subproject will be financed by a loan of \$232.2 million from OCR, and a loan of \$4.2 million from ADF. LESCO, from its internal resources, will arrange counterpart financing (\$68.5 million) to cover the cost of (i) taxes and duties, (ii) warehousing and installation, and (iii) a part of contingencies.

21. The ADF loan will finance the cost of project implementation consultants, and project preparation consultants for other DISCOs to be covered under subsequent tranches (\$18.5 million). The project preparation consultant costs are estimated to be \$1.5 million, and the project implementation consultant costs \$8.8 million, totaling \$10.3 million. 100% of these costs, excluding taxes and duties, are expected to be financed by the ADF loan.

**Table 6: Allocation and Withdrawal of Loan Proceeds – Loan XXXX (OCR)**

<b>ALLOCATION AND WITHDRAWAL OF LOAN PROCEEDS - Loan XXXY-PAK (OCR)</b> (Second Power Distribution Enhancement Investment Program - Tranche 1 )				
<b>CATEGORY</b>				<b>ADB FINANCING BASIS</b>
<b>Number</b>	<b>Item</b>	<b>Total Amount Allocated for ADB Financing (\$)</b>		<b>Percentage of ADB Financing from the Loan Account</b>
		<b>Category</b>	<b>Subcategory</b>	
1	IESCO	139,600,000		
1A	Turnkey Contract		120,800,000	100 percent of total expenditure claimed
1B	Unallocated		18,800,000	
2	LESCO	232,200,000		
2A	Turnkey Contract		201,200,000	100 percent of total expenditure claimed
2B	Unallocated		31,000,000	
3	Interest and Commitment Charges	8,200,000		100 percent of total amount due
	Total	380,000,000		

\* Exclusive of taxes and duties imposed within the territory of the borrower

**Table 7: Allocation and Withdrawal of Loan Proceeds – Loan XXXX (ADF)**

<b>CATEGORY</b>				<b>ADB FINANCING BASIS</b>
<b>Number</b>	<b>Item</b>	<b>Total Amount Allocated for ADB Financing (\$) {to be converted into SDR}</b>		<b>Percentage of ADB Financing from the Loan Account</b>
		<b>Category</b>	<b>Subcategory</b>	
1	FESCO	1,670,000		

1A	Project preparatory consultant		170,000	100 percent of total expenditure claimed *
1B	Project implementation consultant		1,500,000	100 percent of total expenditure claimed *
2	HESCO	1,660,000		
2A	Project preparatory consultant		160,000	100 percent of total expenditure claimed *
2B	Project implementation consultant		1,500,000	100 percent of total expenditure claimed *
3	IESCO	4,000,000		100 percent of total expenditure claimed *
4	GEPCO	1,670,000		
4A	Project preparatory consultant		170,000	100 percent of total expenditure claimed *
4B	Project implementation consultant		1,500,000	100 percent of total expenditure claimed *
5	LESCO	4,200,000		100 percent of total expenditure claimed *
6	MEPCO	1,750,000		
6A	Project preparatory consultant		250,000	100 percent of total expenditure claimed *
6B	Project implementation consultant		1,500,000	100 percent of total expenditure claimed *
7	PESCO	1,750,000		
7A	Project preparatory consultant		250,000	100 percent of total expenditure claimed *
7B	Project implementation consultant		1,500,000	100 percent of total expenditure claimed *
8	QESCO	950,000		
8A	Project preparatory consultant		250,000	100 percent of total expenditure claimed *
8B	Project implementation consultant		700,000	100 percent of total expenditure claimed *
9	SEPCO	850,000		
9A	Project preparatory consultant		250,000	100 percent of total expenditure claimed *
9B	Project implementation consultant		600,000	100 percent of total expenditure claimed *
10	Interest Charges	1,500,000		100 percent of total amount due*
	Total	20,000,000		

\* Exclusive of taxes and duties imposed within the territory of the borrower

**Table 8: Detailed Cost Estimates by Expenditure Category**  
(\$ million)

	Item	Foreign Exchange	Local Currency	Total Cost
<b>A.</b>	<b>Base Cost <sup>a</sup></b>			
1	IESCO			
	Turnkey	120.8	-	120.8
	Metering Equipment	81.7	-	81.7
	Communication Equipment	16.3	-	16.3
	Systems	21.9	-	21.9
	Insurance	0.7	-	0.7
	Installation	0.2	-	0.2
	Project Implementation Consultants	4.0	-	4.0
	Supervision work	3.3	-	3.3
	Training Costs	0.2	-	0.2
	Social Information Program	0.5	-	0.5
	Warehouse and Installation	-	6.6	6.6
	Project Management Unit	-	1.3	1.3
	Taxes and Duties	-	32.9	32.9
	<b>Subtotal (1)</b>	<b>124.8</b>	<b>40.8</b>	<b>165.6</b>
2	LESCO			
	Turnkey	201.2	-	201.2
	Metering Equipment	144.2	-	144.2
	Communication Equipment	25.9	-	25.9
	Systems	29.8	-	29.8
	Insurance	1.1	-	1.1
	Installation	0.2	-	0.2
	Project Implementation Consultants	4.2	-	4.2
	Supervision work	3.5	-	3.5
	Training Costs	0.2	-	0.2
	Social Information Program	0.5	-	0.5
	Warehouse and Installation	-	10.1	10.1
	Project Management Unit	-	2.2	2.2
	Taxes and Duties	-	54.3	54.3
	<b>Subtotal (2)</b>	<b>205.4</b>	<b>66.6</b>	<b>272.0</b>
3	Project Implementation Consultants for other DISCOs	8.8	-	<b>8.8</b>
4	Project Preparation Consultants	1.5	-	<b>1.5</b>
	<b>Subtotal (A) : (1 + 2 + 3 + 4)</b>	<b>340.5</b>	<b>107.4</b>	<b>447.9</b>
<b>B.</b>	<b>Contingencies <sup>b</sup></b>			
1	Physical			
	IESCO	6.4	-	6.4
	LESCO	10.6	-	10.6
	<b>Subtotal</b>	<b>17.0</b>	<b>-</b>	<b>17.0</b>
2	Price			
	IESCO	13.5	-	13.5
	LESCO	22.4	-	22.4
	<b>Subtotal</b>	<b>35.9</b>	<b>-</b>	<b>35.9</b>
	<b>Subtotal (B)</b>	<b>52.9</b>	<b>-</b>	<b>52.9</b>

**C. Financing Charges During Implementation <sup>c</sup>**

1	Interest	9.1	-	9.1
2	Commitment Charges	0.6	-	0.6
	<b>Subtotal (C)</b>	<b>9.7</b>	<b>-</b>	<b>9.7</b>

<b>Total (A+B+C)</b>	<b>403.1</b>	<b>107.4</b>	<b>510.5</b>
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DISCOs = Power Distribution Companies, IESCO = Islamabad Electric Supply Company, LESCO = Lahore Electric Supply Company.

<sup>a</sup> In 2014 prices.

<sup>b</sup> Physical contingencies computed at 5% for equipment. Price contingencies computed at 1.4% on foreign exchange costs and 7.7% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

<sup>c</sup> Includes interest and commitment charges. Interest during construction for ADB's ordinary capital resources (OCR) loan has been computed at the 5-year forward London interbank offered rate plus a spread of 0.5% and 0.1% of maturity premium. ADB's special fund resources loan has been computed at 2% per annum. Commitment charges for ADB's OCR loan are 0.15% per year to be charged on the undisbursed loan amount.

Source: Asian Development Bank staff estimates.

**Table 9: Detailed Cost Estimates by Financier**  
(\$ million)

Item	ADB		DISCOs	Total Cost (D)
	OCR Amount (A)	ADF Amount (B)	Amount (C)	
<b>A. Base Cost <sup>a</sup></b>				
1 IESCO				
Turnkey	120.8	-	-	120.8
Metering Equipment	81.7	-	-	81.7
Communication Equipment	16.3	-	-	16.3
Systems	21.9	-	-	21.9
Insurance	0.7	-	-	0.7
Installation	0.2	-	-	0.2
Project Implementation Consultants	-	4.0	-	4.0
Supervision work	-	3.3	-	3.3
Training Costs	-	0.2	-	0.2
Social Information Program	-	0.5	-	0.5
Warehouse and Installation	-	-	6.6	6.6
Project Management Unit	-	-	1.3	1.3
Taxes and Duties	-	-	32.9	32.9
<b>Subtotal (1)</b>	<b>120.8</b>	<b>4.0</b>	<b>40.8</b>	<b>165.6</b>
2 LESCO				
Turnkey	201.2	-	-	201.2
Metering Equipment	144.2	-	-	144.2
Communication Equipment	25.9	-	-	25.9
Systems	29.8	-	-	29.8
Insurance	1.1	-	-	1.1
Installation	0.2	-	-	0.2
Project Implementation Consultants	-	4.2	-	4.2
Supervision work	-	3.5	-	3.5
Training Costs	-	0.2	-	0.2
Social Information Program	-	0.5	-	0.5
Warehouse and Installation	-	-	10.1	10.1
Project Management Unit	-	-	2.2	2.2
Taxes and Duties	-	-	54.3	54.3
<b>Subtotal (2)</b>	<b>201.2</b>	<b>4.2</b>	<b>66.6</b>	<b>272.0</b>
3 Project Implementation Consultants for other DISCOs	-	8.8	-	8.8

4	Project Preparation Consultants	-	1.5	-	1.5
<b>Subtotal (A) : (1 + 2 + 3 + 4)</b>		<b>322.0</b>	<b>18.5</b>	<b>107.3</b>	<b>447.9</b>
<b>B.</b>	<b>Contingencies <sup>b</sup></b>				
1	Physical				
	IESCO	6.0	-	0.4	6.4
	LESCO	10.0	-	0.6	10.6
	<b>Subtotal (10)</b>	<b>16.0</b>	<b>-</b>	<b>1.0</b>	<b>17.0</b>
2	Price				
	IESCO	12.7	-	0.8	13.5
	LESCO	21.1	-	1.3	22.4
	<b>Subtotal (10)</b>	<b>33.8</b>	<b>-</b>	<b>2.1</b>	<b>35.9</b>
	<b>Subtotal (B)</b>	<b>49.8</b>	<b>-</b>	<b>3.1</b>	<b>52.9</b>
<b>C.</b>	<b>Financing Charges During Implementation <sup>c</sup></b>				
1	Interest	7.6	1.5	-	9.1
2	Commitment Charges	0.6	-	-	0.6
	<b>Subtotal (C)</b>	<b>8.2</b>	<b>1.5</b>	<b>-</b>	<b>9.7</b>
	<b>Total (A+B+C)</b>	<b>380.0</b>	<b>20.0</b>	<b>110.5</b>	<b>510.5</b>

DISCOs = Power Distribution Companies, IESCO = Islamabad Electric Supply Company, LESCO = Lahore Electric Supply Company.

<sup>a</sup> In 2014 prices.

<sup>b</sup> Physical contingencies computed at 5% for equipment. Price contingencies computed at 1.4% on foreign exchange costs and 7.7% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

<sup>c</sup> Includes interest and commitment charges. Interest during construction for ADB's ordinary capital resources (OCR) loan has been computed at the 5-year forward London interbank offered rate plus a spread of 0.5% and 0.1% of maturity premium. ADB's special fund resources loan has been computed at 2% per annum. Commitment charges for ADB's OCR loan are 0.15% per year to be charged on the undisbursed loan amount.

Source: Asian Development Bank estimates.



**Table 10: Detailed Cost Estimates by Outputs/Components**  
(\$ million)

Item	Total	Advanced Meter Infrastructure		Project Monitoring Consultants		Project Preparation	
		Amount	% of cost category	Amount	% of cost category	Amount	% of cost category
<b>A. Base Cost<sup>a</sup></b>							
1 IESCO							
Turnkey	120.8	120.8	100.0%	-	0.0%	-	0.0%
Metering Equipment	81.7	81.7	100.0%	-	0.0%	-	0.0%
Communication Equipment	16.3	16.3	100.0%	-	0.0%	-	0.0%
Systems	21.9	21.9	100.0%	-	0.0%	-	0.0%
Insurance	0.7	0.7	100.0%	-	0.0%	-	0.0%
Installation	0.2	0.2	100.0%	-	0.0%	-	0.0%
Project Implementation Consultants	4.0	-	0.0%	4.0	100.0%	-	0.0%
Supervision work	3.3	-	0.0%	3.3	100.0%	-	0.0%
Training Costs	0.2	-	0.0%	0.2	100.0%	-	0.0%
Social Information Program	0.5	-	0.0%	0.5	100.0%	-	0.0%
Warehouse and Installation	6.6	6.6	100.0%	-	0.0%	-	0.0%
Project Management Unit	1.3	1.3	100.0%	-	0.0%	-	0.0%
Taxes and Duties	32.9	32.3	98.0%	0.6	2.0%	-	0.0%
<b>Subtotal (1)</b>	<b>165.6</b>	<b>161.0</b>	<b>97.2%</b>	<b>4.6</b>	<b>2.8%</b>	-	<b>0.0%</b>
2 LESCO							
Turnkey	201.2	201.2	100.0%	-	0.0%	-	0.0%
Metering Equipment	144.2	144.2	100.0%	-	0.0%	-	0.0%
Communication Equipment	25.9	25.9	100.0%	-	0.0%	-	0.0%
Systems	29.8	29.8	100.0%	-	0.0%	-	0.0%
Insurance	1.1	1.1	100.0%	-	0.0%	-	0.0%
Installation	0.2	0.2	100.0%	-	0.0%	-	0.0%
Project Implementation Consultants	4.2	-	0.0%	4.2	100.0%	-	0.0%
Supervision work	3.5	-	0.0%	3.5	100.0%	-	0.0%
Training Costs	0.2	-	0.0%	0.2	100.0%	-	0.0%
Social Information Program	0.5	-	0.0%	0.5	100.0%	-	0.0%
Warehouse and Installation	10.1	10.1	100.0%	-	0.0%	-	0.0%
Project Management Unit	2.2	2.2	100.0%	-	0.0%	-	0.0%
Taxes and Duties	54.3	53.6	98.7%	0.7	1.3%	-	0.0%
<b>Subtotal (2)</b>	<b>272.0</b>	<b>267.1</b>	<b>98.2%</b>	<b>4.9</b>	<b>1.8%</b>	-	<b>0.0%</b>
Project Implementation Consultants for other							
3 DISCOs	8.8	-	0.0%	8.8	100.0%	-	0.0%
4 Project Preparation Consultants	1.5	-	0.0%	-	0.0%	1.5	100.0%
<b>Subtotal (A) : (1 + 2 + 3 + 4)</b>	<b>447.9</b>	<b>428.1</b>	<b>95.6%</b>	<b>18.3</b>	<b>4.1%</b>	<b>1.5</b>	<b>0.3%</b>
<b>B. Contingencies<sup>b</sup></b>							
1 Physical							

	IESCO	6.4	6.4	100.0%	-	0.0%	-	0.0%
	LESCO	10.6	10.6	100.0%	-	0.0%	-	0.0%
	Subtotal	17.0	17.0	100.0%	-	0.0%	-	0.0%
2	Price							
	IESCO	13.5	13.5	100.0%	-	0.0%	-	0.0%
	LESCO	22.4	22.4	100.0%	-	0.0%	-	0.0%
	Subtotal	35.9	35.9	100.0%	-	0.0%	-	0.0%
	<b>Subtotal (B)</b>	<b>52.9</b>	<b>52.9</b>	<b>100.0%</b>	<b>-</b>	<b>0.0%</b>	<b>-</b>	<b>0.0%</b>
<b>C.</b>	<b>Financing Charges During Implementation <sup>c</sup></b>							
1	Interest	9.1	7.6	84.0%	1.5	16.3%	-	0.0%
2	Commitment Charges	0.6	0.6	100.0%	-	0.0%	-	0.0%
	<b>Subtotal (C)</b>	<b>9.7</b>	<b>8.2</b>	<b>85.0%</b>	<b>1.5</b>	<b>15.3%</b>	<b>-</b>	<b>0.0%</b>
	<b>Total (A+B+C)</b>	<b>510.5</b>	<b>489.2</b>	<b>95.8%</b>	<b>19.8</b>	<b>3.9%</b>	<b>1.5</b>	<b>0.3%</b>

DISCOs = Power Distribution Companies, IESCO = Islamabad Electric Supply Company, LESCO = Lahore Electric Supply Company.

<sup>a</sup> In 2014 prices.

<sup>b</sup> Physical contingencies computed at 5% for equipment. Price contingencies computed at 1.4% on foreign exchange costs and 7.7% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

<sup>c</sup> Includes interest and commitment charges. Interest during construction for ADB's ordinary capital resources (OCR) loan has been computed at the 5-year forward London interbank offered rate plus a spread of 0.5% and 0.1% of maturity premium. ADB's special fund resources loan has been computed at 2% per annum. Commitment charges for ADB's OCR loan are 0.15% per year to be charged on the undisbursed loan amount.

**Table 11: Detailed Cost Estimates by Year (\$ million)**

Item	Total Cost	Year 1 2016	Year 2 2017	Year 3 2018	Year 4 2019	Year 5 2020	Year 6 2021	Year 7 2022	Year 8 2023	Year 9 2024
<b>A. Base Cost<sup>a</sup></b>										
1 IESCO										
Turnkey	120.8	17.6	37.9	47.5	17.8	-	-	-	-	-
Metering Equipment	81.7	11.9	25.6	32.1	12.1	-	-	-	-	-
Communication Equipment	16.3	2.4	5.1	6.4	2.4	-	-	-	-	-
Systems	21.9	3.2	6.9	8.6	3.2	-	-	-	-	-
Insurance	0.7	0.1	0.2	0.3	0.1	-	-	-	-	-
Installation	0.2	-	0.1	0.1	-	-	-	-	-	-
Project Implementation	4.0	2.1	1.0	0.7	0.2	-	-	-	-	-
Consultants										
Supervision work	3.3	1.7	0.8	0.6	0.2	-	-	-	-	-
Training Costs	0.2	0.1	0.1	-	-	-	-	-	-	-
Social Information Program	0.5	0.3	0.1	0.1	-	-	-	-	-	-
Warehouse and Installation	6.6	1.0	2.0	2.6	1.0	-	-	-	-	-
Project Management Unit	1.3	0.6	0.3	0.2	0.2	-	-	-	-	-
Taxes and Duties	32.9	5.0	10.3	12.8	4.8	-	-	-	-	-
<b>Subtotal (1)</b>	<b>165.6</b>	<b>26.3</b>	<b>51.5</b>	<b>63.8</b>	<b>24.0</b>	-	-	-	-	-
2 LESCO										
Turnkey	201.2	23.4	52.7	71.3	53.8	-	-	-	-	-
Metering Equipment	144.2	16.8	37.7	51.1	38.6	-	-	-	-	-
Communication Equipment	25.9	3.0	6.8	9.2	6.9	-	-	-	-	-
Systems	29.8	3.5	7.8	10.5	8.0	-	-	-	-	-
Insurance	1.1	0.1	0.3	0.4	0.3	-	-	-	-	-
Installation	0.2	-	0.1	0.1	-	-	-	-	-	-
Project Implementation	4.2	2.2	1.1	0.8	0.1	-	-	-	-	-
Consultants										
Supervision work	3.5	1.8	0.9	0.7	0.1	-	-	-	-	-
Training Costs	0.2	0.1	0.1	-	-	-	-	-	-	-
Social Information Program	0.5	0.3	0.1	0.1	-	-	-	-	-	-
Warehouse and Installation	10.1	1.2	2.6	3.6	2.7	-	-	-	-	-
Project Management Unit	2.2	1.1	0.5	0.4	0.2	-	-	-	-	-
Taxes and Duties	54.3	6.6	14.2	19.1	14.4	-	-	-	-	-

<b>Subtotal (2)</b>	<b>272.0</b>	<b>34.5</b>	<b>71.1</b>	<b>95.2</b>	<b>71.2</b>	-	-	-	-	-
Project Implementation	8.8	0.3	0.9	1.2	1.4	2.4	1.8	0.2	0.2	0.4
3 Consultants for other DISCOs										
4 Project Preparation Consultants	1.5	0.6	0.4	0.1	0.4	-	-	-	-	-
<b>Subtotal (A) : (1 + 2 + 3 + 4)</b>	<b>447.9</b>	<b>61.7</b>	<b>123.9</b>	<b>160.3</b>	<b>97.0</b>	<b>2.4</b>	<b>1.8</b>	<b>0.2</b>	<b>0.2</b>	<b>0.4</b>
<b>B. Contingencies<sup>b</sup></b>										
1 Physical										
IESCO	6.4	-	-	-	6.4	-	-	-	-	-
LESCO	10.6	-	-	-	10.6	-	-	-	-	-
Subtotal	17.0	-	-	-	17.0	-	-	-	-	-
2 Price										
IESCO	13.5	-	-	-	13.5	-	-	-	-	-
LESCO	22.4	-	-	-	22.4	-	-	-	-	-
Subtotal	35.9	-	-	-	35.9	-	-	-	-	-
<b>Subtotal (B)</b>	<b>52.9</b>	-	-	-	<b>52.9</b>	-	-	-	-	-
<b>Financing Charges During Implementation<sup>c</sup></b>										
1 Interest	9.1	0.8	2.5	4.7	0.2	0.1	0.2	0.2	0.2	0.2
2 Commitment Charges	0.6	0.1	0.2	0.3	-	-	-	-	-	-
<b>Subtotal (C)</b>	<b>9.7</b>	<b>0.9</b>	<b>2.7</b>	<b>5.0</b>	<b>0.2</b>	<b>0.1</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>
<b>Total (A+B+C)</b>	<b>510.5</b>	<b>62.6</b>	<b>126.6</b>	<b>165.3</b>	<b>150.1</b>	<b>2.5</b>	<b>2.0</b>	<b>0.4</b>	<b>0.4</b>	<b>0.6</b>

DISCOs = Power Distribution Companies, IESCO = Islamabad Electric Supply Company, LESCO = Lahore Electric Supply Company.

<sup>a</sup> In 2014 prices

<sup>b</sup> Physical contingencies computed at 5% for equipment. Price contingencies computed at 1.4% on foreign exchange costs and 7.7% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.

<sup>c</sup> Includes interest and commitment charges. Interest during construction for ADB's ordinary capital resources (OCR) loan has been computed at the 5-year forward London interbank offered rate plus a spread of 0.5% and 0.1% of maturity premium. ADB's special fund resources loan has been computed at 2% per annum. Commitment charges for ADB's OCR loan are 0.15% per year to be charged on the undisbursed loan amount.



## ADF

## Contract Awards

	Q1	Q2	Q3	Q4	Total
2015	0.0	0.0	0.0	0.0	0.0
2016	0.0	8.7	0.5	3.0	12.2
2017	0.0	0.0	4.5	0.0	4.5
2018	0.0	0.0	0.5	0.0	0.5
2019	0.0	0.0	1.3	0.0	1.3
2020	0.0	0.0	0.0	0.0	0.0
2021	0.0	0.0	0.0	0.0	0.0
2022	0.0	0.0	0.0	0.0	0.0
2023	0.0	0.0	0.0	0.0	0.0
2024	0.0	0.0	0.0	0.0	0.0

**Total: 18.5**

## Disbursements

	Q1	Q2	Q3	Q4	Total
2015	0.0	0.0	0.0	0.0	0.0
2016	0.0	1.0	3.2	1.0	5.2
2017	1.2	0.8	0.7	0.9	3.6
2018	0.7	0.8	0.8	0.9	3.1
2019	0.8	0.4	0.4	0.6	2.2
2020	0.5	0.5	0.5	1.0	2.5
2021	0.4	0.4	0.4	0.8	2.0
2022	0.0	0.1	0.0	0.2	0.4
2023	0.0	0.1	0.0	0.2	0.4
2024	0.1	0.2	0.1	0.3	0.6

**Total: 20.0**

## OCR + ADF

## Contract Awards

	Q1	Q2	Q3	Q4	Total
2015	0.0	0.0	0.0	0.0	0.0
2016	0.0	8.7	121.3	204.2	334.2
2017	0.0	0.0	4.5	0.0	4.5
2018	0.0	0.0	0.5	0.0	0.5
2019	0.0	49.8	1.3	0.0	51.1

**Total: 390.3**

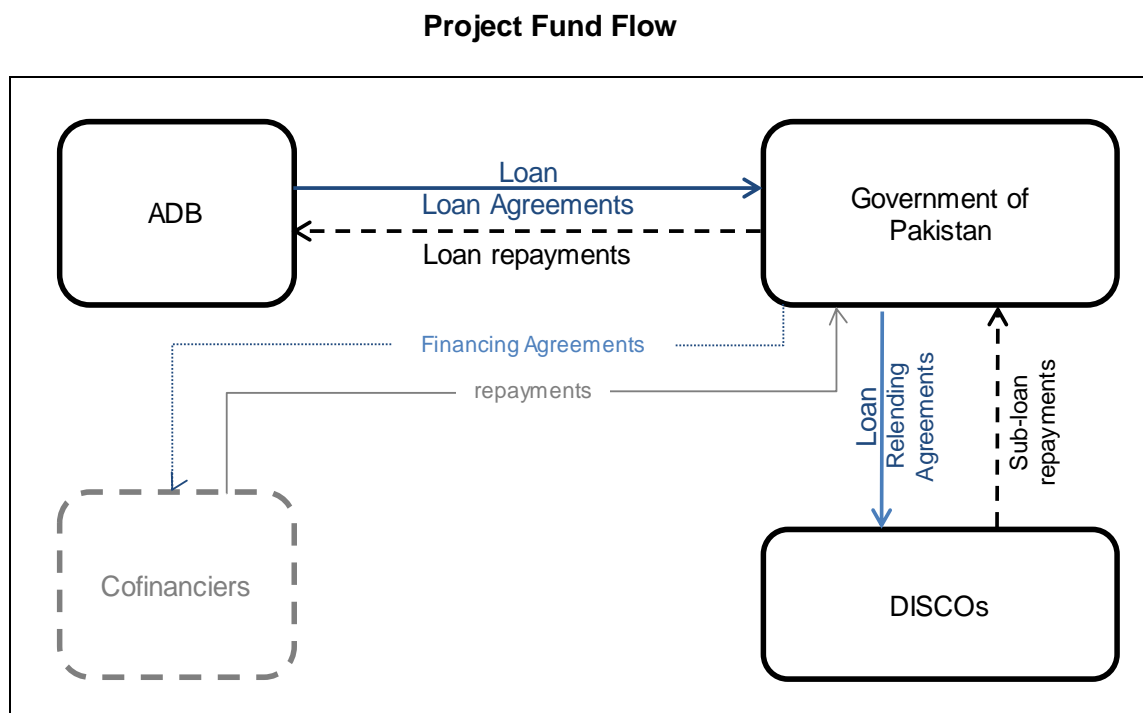
## Disbursements

	Q1	Q2	Q3	Q4	Total
2015	0.0	0.0	0.0	0.0	0.0
2016	0.0	1.0	17.6	32.0	50.6
2017	5.2	20.7	39.9	38.9	104.7
2018	33.2	35.6	33.2	35.7	137.7
2019	20.9	21.3	28.4	30.6	101.2

**Total: 394.2**

## 2. Fund Flow Diagram

22. Under the project, funds shall be lent by the ADB to the Government of Pakistan, and will be re-lent to the DISCOs through the Ministry of Finance and Economic Affairs Division. The remaining costs will be funded by the DISCOs or the government as the DISCOs may not be able to generate the required funding. The foreign exchange risk shall be covered by the government.



## IV. FINANCIAL MANAGEMENT

### A. Financial Management Assessment

23. The financial management assessment (FMA) was conducted in November 2014 in accordance with ADB's Guidelines for the Financial Management and Analysis of Projects and Financial Due Diligence: a Methodology Note. The FMA considered the financial management capacity of the IESCO and LESCO as implementing agencies of the project which included the funds-flow arrangements, staffing, accounting and financial reporting systems, internal and external auditing arrangements, and financial information systems.

24. The assessment identified no major risks in financial management. Action plans are outlined as (i) following up on the development and adoption of its new Enterprise Resource Planning information database, (ii) recruiting a reputable accounting firm for external auditing, (iii) training of PMU and other staff on accounting issues and new information systems for IESCO, (iv) recruiting a reputable accounting firm for external auditing, and (ii) training of PMU and other staff on accounting issues.

## 1. Islamabad Electric Supply Company (IESCO)

25. A FMA questionnaire was provided for IESCO management to fill out. Based on their response and analysis, and subsequent discussions with key management staff, the key findings are in the succeeding paras.

26. IESCO is a public limited company, incorporated in Pakistan on 25 April 1988 with a registered office in Islamabad. It has been granted a license by the National Electric Power Regulatory Authority for electricity distribution within its service territory. The main activities of the company are distribution, supply and selling of electricity.

27. IESCO's incorporation in 1988 coincided with sector restructuring, but it only received full business transfer in 2009 subject to the terms of the Business Transfer Agreement following its revaluation of assets in that year.

28. The AML project will be run through the existing PMU within IESCO, whose structure was considered appropriate for earlier ADB-funded projects. The PMU is structured into three groups: Project Development Finance, Procurement and Planning, and Scheduling.

29. **Fund flow arrangements.** The IESCO PMU has experience of ADB procedures from earlier tranches of the Power Distribution Enhancement Investment Program (PDEIP). IESCO will not need to manage foreign exchange risk as this is handled by government, who takes on currency risk in exchange for a mark-up to IESCO on the loan amount (of around 15%). Counterpart funds will be accessed partly from the distribution margin, which is included in the utility's annual submission to NEPRA, with part of the allowed funds under typical donor projects provided in kind, for example, use of internal labour and office space.

30. **Staffing.** IESCO has more than 200 staff in finance positions, including in the Finance Department and the PMU. The Finance Department has the vast majority of these staff members, with 125 personnel in a total of around 50 business units (all of whom report to the company headquarters) and 80-85 finance staff at the headquarters itself. The current structure of the IESCO Finance Department reflects the human resources structure set up in 2002, which remains in place to date. While a revision is awaiting Board approval, IESCO estimates that the number of staff is around 70-75% of that required under the 2002 structure, with the shortage of expertise potentially even greater if assessed on current needs.

31. IESCO's Finance Department has eight divisions: Corporate Planning and Tariff Setting, Banking, Taxation, Payroll, Payables, Finalization of Accounts (including consolidation of statements), and Administration. There are also staff in finance positions in the PMU that deal with the administration of donor-funded projects. IESCO advises that all have at least three to four years' experience in ADB processes.

32. In terms of training needs, IESCO advises of a necessity for more professionals, particularly with experience in preparing cost/management accounts, and specifically with respect to the tariff setting process.

33. **Accounting policies and procedures, and financial reporting and monitoring.** IESCO has implemented previous ADB projects through its PMU, and hence is familiar with and has experience of ADB financial procedures. IESCO adopts its entity financial statements in compliance with the national accounting standards which are in line with the International Financial Reporting Standards. IESCO has also recently adopted a new Accounting Process



Organization procedural manual as developed by USAID under its Power Distribution Programme (PDP) in Pakistan. The USAID states that aim of this document is to enhance accounting practices through a number of means:<sup>6</sup>

- (i) Bring transparency into the financial reporting system;
- (ii) Facilitate record keeping of every accounting process;
- (iii) Ensure that books of accounts are prepared according to sound accounting policies;
- (iv) Enable management to access accurate financial reports on monthly, quarterly and yearly basis;
- (v) Help to organize and manage the assets and liabilities of DISCOs;
- (vi) Support coordination of accurate financial reports and adequate financial disclosures;
- (vii) Promote compliance with applicable reporting frameworks, laws and regulations;
- (viii) Promote efficient financial management through the provision of useful reference materials; and
- (ix) Provide standardized document workflows, including Enterprise Resource Planning (ERP) implementation in financial functions.

34. IESCO's Internal Audit group is staffed by 75 persons and reports to the Audit Committee. The head of the Audit Committee is an ex-banker with necessary financial qualifications. An Internal Audit manual was prepared in July 2012 under USAID funding, which replaced the previous manual dating from 1982.

35. Ernst & Young is the company's external auditors, having replaced KPMG for the audit of the 2012-13 financial statements. The external auditors will be required to audit compliance against the Corporate Governance Code on an annual basis, starting from the annual accounts of the current financial year, i.e., 2013-14. External audit is conducted based on the International Standards on Auditing.

36. IESCO is subject to up to four sets of audits throughout the year by the following entities: (i) statutory auditor (currently Ernst & Young)—audits company's financial statements on an annual basis; (ii) Auditor General of Pakistan—annual audit of company's financial performance; (iii) internal auditor on an ongoing basis; and (iv) Federal Board of Revenue—which can request various audits on an ad hoc basis, particularly on sales tax on revenue, income tax, and withholding tax.

37. IESCO prepares a budget each year for tariff setting purposes. The principle is 'zero-based' budgeting, under which the budget for each division is prepared from scratch and is not dependent on the previous year's allocation. Each division head has to justify the amount to be spent and, once approved by the Board, the budget is sent to NEPRA for its approval. The move from an annual budgetary basis to a multi-year approach will raise a number of accounting issues in the first year, which are in the process of being resolved. The budgetary process is illustrated in IESCO's Accounting Manual as shown below.

38. Based on this review, there appears to be generally adequate financial capability within IESCO to manage the AMI project. Areas where specific intervention might be useful include: (i) training in the development of a new information database, (ii) realigning financial processes to better capture the impending regulatory move to a multi-year tariff setting process, (iii)

<sup>6</sup> <http://www.pdip.pk/recent-activities/usaids-revamping-financial-structure-of-power-distribution-companies>.

developing accounting expertise in tariff setting issues, and (iv) recruiting experts in cost accounting and management practices.

39. **Financial management risk analysis.** The financial management risks of the project, together with corresponding mitigation measures, are highlighted in Table 12.

**Table 12: Financial Management Risks for IESCO**

<b>Risk</b>	<b>Assessment without Mitigation</b>	<b>Management Plan or Mitigation Measures</b>
Inherent risks	Moderate	On-going training on ADB procedures is necessary, in particular for the PMU
Fund flow arrangements	Moderate	The envisaged use of 'letters of credit' arrangements for suppliers will reduce risks
Staffing	Moderate	Enhancing accounting skills to be more consistent with the changed regulatory environment, and greater flexibility to recruit new staff, will reduce risks
Accounting policies, procedures, and systems	Substantial	On-going training on the new accounting manuals and systems will need to be maintained for the project to minimize financial risks IESCO's plans to adopt a new database accounting system will need to be monitored periodically.
Internal audits	Low	No changes proposed, but on-going training on specific requirements of internal auditing can help reduce risks
External audits	Moderate	No major audit issues have been raised in recent audit opinions. A proactive role in monitoring changed corporate governance requirements will reduce risks
Reporting and monitoring	Moderate	No changes proposed
Information systems	Moderate	Training is required to facilitate desired benefits from the introduction of new information systems
<b>Overall</b>	<b>Substantial</b>	

40. **Action plan.** Overall, there is generally adequate financial capability within IESCO to manage this project, and financial management analysis outlined an action plan, including:

<b>Action</b>	<b>Responsibility</b>	<b>Resources</b>	<b>Timing</b>
Implement an ERP database system for accounting purposes.	IESCO	Internal IESCO funds	Within [2 years]
Financial management training to be provided to IESCO staff to clarify ADB requirements including disbursement requirements and financial covenants calculation	Accounts Department	National Budget and Foreign assistance	From the beginning of the project on regular basis
Auditor Terms of Reference will be reviewed to confirm audit scope and deliverables	Finance Department	Finance Director, IESCO	6 months
Engage consultants to provide project supervision and monitoring	IESCO	ADB Loan	9 months

Action	Responsibility	Resources	Timing
Ensure adequate staff are appointed to the finance department of IESCO	IESCO	IESCO	2 years of project effectivity

## 2. Lahore Electric Supply Company (LESCO)

41. A FMA questionnaire was provided to LESCO management to fill out. Based on their response and analysis, and subsequent discussions with key management staff, key findings are in the succeeding paras.

42. LESCO is an unlisted public limited company, 100% owned by the Government of Pakistan. LESCO has experience with previous donor-funded projects, including those of the IBRD and ADB.

43. The AMI project will be run through the existing PMU within LESCO, whose structure was considered appropriate for earlier ADB-funded projects. The PMU is structured into three groups: Project Development Finance, Procurement and Planning, and Scheduling.

44. **Fund flow arrangements.** The LESCO PMU has experience of ADB procedures from earlier tranches of the Power Distribution Enhancement Investment Program (PDEIP). LESCO will not need to manage foreign exchange risk as this is handled by Government, who takes on currency risk in exchange for a markup to LESCO on the loan amount (of around 15%). Counterpart funds will be accessed partly from the distribution margin, which is included in the utility's annual submission to NEPRA, with part of the allowed funds under typical donor projects provided in kind, for example, use of internal labour and office space.

45. **Staffing.** Project accounting will be organised through the PMU. The accounting function in the PMU is performed through the Project Development Finance Section, in which there are around 8 to 10 staff members, including the Head of Finance, Deputy Head, two Assistant Managers, three officers and other support staff. There is one ACMA-qualified accountant filling one Assistant Manager role. Other key staff have qualifications in commerce and business administration (Head), commerce (Deputy Head), and business administration (other Assistant Manager). One of these staff will be shortly designated as a dedicated accountant within the PMU, as required by ADB. LESCO advises that PMU staff are generally adequately trained. However, training on ADB procedures will be necessary for new staff.

46. The Finance Department has more than 600 people, with staff distributed across 79 accounting units, including the company headquarters. Staff are employed on permanent contracts. LESCO advises that the total number of finance staff is broadly sufficient for its needs. The Finance Department has three key managers reporting to the CFO for (i) Corporate Planning dealing with corporate planning, and budgetary and regulatory affairs; (ii) Corporate Accounts dealing primarily with accounts consolidation; and (iii) Corporate Finance dealing primarily with projects for development (donor funding) and the PMU.

47. **Accounting policies and procedures, and financial reporting and monitoring.** LESCO has implemented previous ADB projects through its PMU and hence is familiar with and has experience of ADB financial procedures. LESCO has also recently adopted a new Accounting Process Organization procedural manual as developed by USAID under its Power

Distribution Programme (PDP) in Pakistan. The USAID states that aim of this document is to enhance accounting practices through a number of means (para 32).

48. The head of LESCO's Internal Audit unit is the Deputy Chief Auditor of the company and is a qualified auditor. There are around 50 staff in the unit, some with audit qualifications. The internal auditor reports directly to the Board. As per company procedure, justifications have to be provided for any findings reported by the Internal Auditor. If not, the issue has to be raised with the Public Accounts Committee.

49. KPMG has been engaged as the company's external auditor for the past 6 years. During this period, the Engagement Partner has changed, and hence LESCO complies with the necessity to change the auditor at least every 5 years. The only audit qualification raised in recent years has been regarding the way LESCO had implemented fuel price adjustment following an *ad hoc* adjustment by NEPRA and a direction from the courts in Islamabad. External audit is conducted based on the International Standards on Auditing.

50. Under the company's internal procedures, initial accounts are developed by the 25th day after the end of a financial year. These data are subsequently passed on to the external auditors, who submit their report to the Audit Committee by the end of September. Following review by the Audit Committee, the accounts are provided to the full Board by the end of October. LESCO reports limited delays in this process, due to actions of the external auditors, with delays in recent years having been due to the unavailability of Board members.

51. Financial statements are prepared in accordance with Pakistani accounting standards, which are compliant with IFRS. Financial statements are also prepared for the PMU. Monthly, six-monthly and annual consolidated financial statements are prepared. Moreover, monthly reconciliation of budgets with actual expenditure is undertaken. Financial reports are prepared using the Oracle-based ERP system in place within LESCO.

52. Based on this review, there appears to be generally adequate financial capability within LESCO to manage the AMI project. Areas where specific intervention might be useful include (i) training of PMU staff in ADB procedures, (ii) realigning financial processes to better capture the impending regulatory move to a multi-year tariff setting process, and (iii) developing accounting expertise in tariff setting issues.

53. **Financial management risk analysis.** The financial management risks of the project, together with corresponding mitigation measures, are highlighted in Table 13.

**Table 13: Financial Management Risks for LESCO**

<b>Risk</b>	<b>Assessment without Mitigation</b>	<b>Management Plan or Mitigation Measures</b>
Inherent risks	Moderate	On-going training on ADB procedures is necessary, in particular for the PMU
Flow funds arrangements	Moderate	The envisaged use of 'letters of credit' arrangements for suppliers will reduce risks
Staffing	Moderate	Enhancing accounting skills to be more consistent with the changed regulatory environment will reduce risks

Accounting policies, procedures, and systems	Moderate	No changes proposed, but on-going training on specific requirements of internal auditing can help reduce risks.
Internal audits	Low	No changes proposed but on-going training on specific requirements of internal auditing can help reduce risk.
External audits	Moderate	No major audit issues have been raised in recent audit opinions. A proactive role in monitoring changed corporate governance requirements will reduce risks
Reporting and monitoring	Moderate	No changes proposed.
Information systems	Moderate /Low	No changes proposed.
<b>Overall</b>	<b>Moderate</b>	

54. **Action plan.** Overall, there is generally adequate financial capability within LESCO to manage this project, and financial management analysis outlined an action plan, including:

Action	Responsibility	Resources	Timing
Financial management training to be provided to LESCO staff to clarify ADB requirements including disbursement requirements and financial covenants calculation	Accounts Department	National Budget and Foreign assistance	From the beginning of the project on regular basis
Auditor Terms of Reference will be reviewed to confirm audit scope and deliverables	Finance Department	Finance Director, LESCO	6 months
Engage consultants to provide project supervision and monitoring	LESCO	ADB Loan	9 months

## B. Disbursement

55. Disbursements may be made for eligible expenditures incurred by the loan closing date of 30 June 2019 for the OCR loan, and 30 June 2024 for the ADF loan closing date. Expenditures incurred beyond loan closing will not be financed by ADB. Disbursement procedures will follow ADB's *Loan Disbursement Handbook* (2015, as amended from time to time),<sup>7</sup> and detailed arrangements agreed upon between the government and ADB.

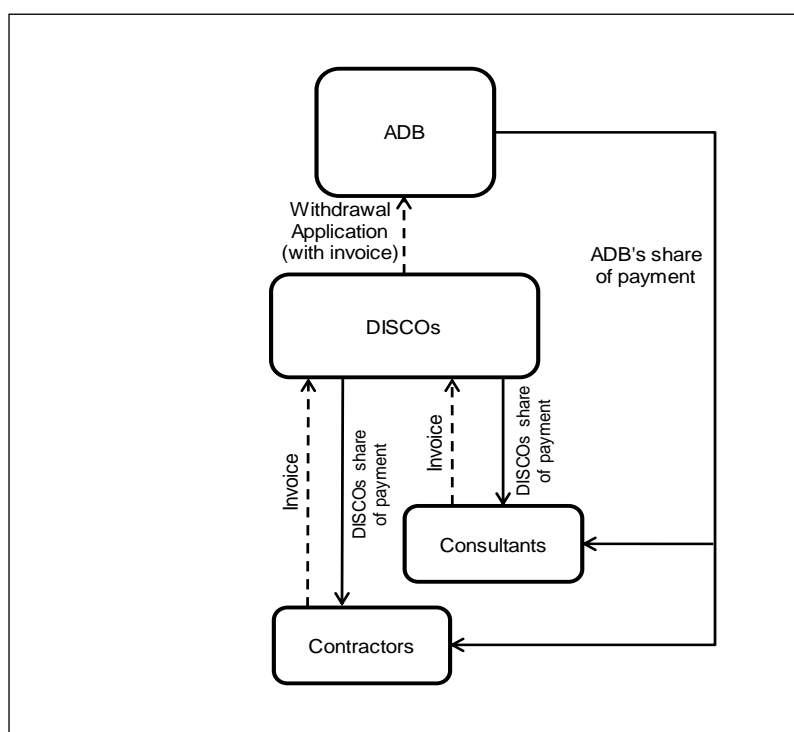
56. Before submitting the first withdrawal application, the government should submit to ADB sufficient evidence of the authority and authenticated specimen signature(s) of the person(s) who will sign the withdrawal applications on their behalf.

57. minimum value per withdrawal application is US\$100,000 equivalent. Individual payments below this amount should be paid by the government or DISCOs and subsequently claimed to ADB through reimbursement, unless otherwise accepted by ADB.

<sup>7</sup> Available at <http://www.adb.org/documents/loan-disbursement-handbook>

58. No disbursement or withdrawal may be made under the OCR loan until ADB has received the relending agreement between the government and IESCO or the relending agreement between the government and LESCO, as the case may be with terms and conditions satisfactory to ADB. Similarly, no disbursement or withdrawal may be made under the ADF loan until ADB has received the relending agreement between the government and the relevant DISCO with terms and conditions satisfactory to ADB.

### Disbursement Flow



### C. Accounting

59. The PMUs of IESCO and LESCO will maintain separate project accounts and records by funding source for all expenditures incurred on the AMI Project. Project accounts will be prepared in accordance with approved accounting standards as applicable in Pakistan. Approved accounting standards comprise of such International Financial Reporting Standards issued by the International Accounting Standards Board as are notified under the Companies Ordinance 1984, and provisions of and directives issued under the Companies Ordinance, 1984.

### D. Auditing

60. **Requirements.** Both IESCO and LESCO will cause the detailed project financial statements to be audited in accordance with the auditing standards as applicable in Pakistan, which complies with the International Standards on Auditing, by an independent auditor acceptable to ADB. The audited project financial statements (APFS), together with the auditor's opinion and the management letter, will be submitted in the English language to ADB within 6 months from the end of IESCO and LESCO's fiscal year (FY). Other DISCOs will be subject to the same requirement, for the ADF loan, when they start the use of ADF funding for consulting services.

61. IESCO and LESCO will also have its entity financial statements audited in accordance with the auditing standards as applicable in Pakistan, which complies with the International Standards on Auditing, by an independent external auditor acceptable to ADB. The AFS, together with the auditor's opinion, will be submitted in the English language to ADB within 1 month after their approval by the relevant authority.

62. The annual audit report for the project accounts will include an audit management letter and audit opinions which cover (i) whether the project financial statements present a true and fair view or are presented fairly, in all material respects, in accordance with the applicable financial reporting framework; (ii) whether loan proceeds were used only for the purposes of the project or not; and (iii) the level of compliance for each financial covenant contained in the legal agreements for the project.

63. **Monitoring.** Compliance with financial reporting and auditing requirements will be monitored by review missions and during normal program supervision, and followed up regularly with all concerned, including the independent auditor.

64. The government, IESCO, and LESCO have been made aware of ADB's approach to delayed submission, and the requirements for satisfactory and acceptable quality of the APFS and AFS.<sup>8</sup> ADB reserves the right to require changing the auditor (consistent with the government's constitution), or provide additional support to the auditor, if the audit reports are not satisfactory to ADB, or substantially delayed. ADB also reserves the right to verify the project's financial accounts to confirm whether ADB's financing follows ADB's policies and procedures.

65. **Disclosure.** Public disclosure of the project financial statements, including the audit report on the project financial statements, will be guided by ADB's Public Communications Policy (2011)<sup>9</sup>. After review, ADB will disclose the project financial statements for the project and the opinion of the auditors on the financial statements within 30 days of the date of their receipt by posting them on ADB's website. The Audit Management Letter will not be disclosed.

## V. PROCUREMENT AND CONSULTING SERVICES

### A. Advance Contracting and Retroactive Financing

66. ADB approved advanced contracting for procurement of goods and works for all tranches under the MFF. ADB also approved retroactive financing for expenditures incurred during the 12-month period immediately prior to the signing of the loan agreement, not exceeding 20% of the loan amount. Such approvals do not commit ADB to finance any project. Advance contracting will follow ADB's Procurement Guidelines (2015, as amended from time to time).<sup>10</sup> The issuance of invitations to bid will be subject to ADB approval.

<sup>8</sup> When APFS are not received (i) by the due date, ADB will write to the executing agency advising that (a) the audit documents are overdue; and (b) within the next six months, requests for new contract award and disbursement; (ii) within 6 months after the due date, ADB will withhold processing of requests for new contract awards and disbursement such as new replenishment of imprest accounts, processing of new reimbursement, and issuance of new commitment letters; and (iii) within 12 months after the due date, ADB may suspend the loan.

<sup>9</sup> Available from <http://www.adb.org/documents/pcp-2011?ref=site/disclosure/publications>

<sup>10</sup> Available at: <http://www.adb.org/Documents/Guidelines/Procurement/Guidelines-Procurement.pdf>

## **B. Procurement of Goods, Works and Consulting Services**

67. Turnkey contracts will be procured for the (i) supply and installation of metering and communication equipment; and (ii) development of management systems, such as head-end and meter data management systems. International competitive bidding will follow ADB's Procurement Guidelines using single-stage, two-envelope bidding procedure and the ADB Standard Bidding Document for Information Technology Products and/or Services. The approved bidding document for the turnkey contract for IESCO/LESCO under Tranche 1 will be used as the master bidding document for the other turnkey contract to be procured under the Tranche.

68. Project implementation consultants (PICs) will be recruited to assist each PMU in the DISCOs throughout the program. The consultants will (i) help supervise project implementation, (ii) train the DISCOs on meter operations, (iii) develop and implement a social information program to educate the public on AMI, (iv) update commercial procedures, and (v) develop load reduction strategy. Project preparation consultants will also be recruited to prepare the feasibility studies for tranches 2 to 4. All the consultants for Tranche 1 will be recruited through the Quality-and-Cost-Based Selection method following ADB's Guidelines on the Use of Consultants.<sup>11</sup> The draft terms of reference for the PICs and project preparation consultants are in Appendixes 2 and 3, respectively.

69. Below is an 18-month procurement plan for Tranche 1 indicating threshold and review procedures, and contract estimates. The detailed procurement and contract implementation schedules are in Appendix 1.

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<sup>11</sup> Checklists for actions required to contract consultants by method available in e-Handbook on Project Implementation at: <http://www.adb.org/documents/handbooks/project-implementation/>



## PROCUREMENT PLAN FOR TRANCHE 1

### Basic Data

<b>Project Name:</b> MFF Second Power Distribution Enhancement Investment Program, Tranche 1	
<b>Project Number:</b> 47190-003	<b>Approval Number:</b>
<b>Country:</b> Pakistan	<b>Executing Agency:</b> Ministry of Water and Power
<b>Project Financing Amount:</b> US\$ 510,500,000 <b>ADB Financing:</b> US\$ 400,000,000 <b>Cofinancing (ADB Administered):</b> <b>Non-ADB Financing:</b> US\$ 110,500,000	<b>Implementing Agency:</b> Faisalabad Electric Supply Company Limited, Gujranwala Electric Power Company, Hyderabad Electric Supply Company, Islamabad Electric Supply Company, Sukkur Electric Supply Company, Lahore Electric Supply Company, Multan Electric Power Company, Peshawar electric Supply Company, Quetta Electric Supply Company
<b>Date of First Procurement Plan:</b> 25 November 2014	<b>Date of this Procurement Plan:</b> 25 November 2014

### A. Methods, Thresholds, Review and 18-Month Procurement Plan

#### 1. Procurement and Consulting Methods and Thresholds

Except as ADB may otherwise agree, the following process thresholds shall apply to procurement of goods and works.

Procurement of Goods and Works		
Method	Threshold	Comments
International Competitive Bidding for Works	US\$ 15,000,000 and Above	

Consulting Services	
Method	Comments
Quality- and Cost-Based Selection for Consulting Firm	

#### 2. Goods and Works Contracts Estimated to Cost \$1 Million or More

The following table lists goods and works contracts for which the procurement activity is either ongoing or expected to commence within the next 18 months.

Package Number	General Description	Estimated Value	Procurement Method	Review (Prior/ Post)	Bidding Procedure	Advertisement Date (quarter/year)	Comments
1.1	Advanced metering systems, IESCO	120,800,000.00	ICB	Prior	1S2E	Q4 / 2015	Prequalification of Bidders: N Domestic Preference Applicable: Y Bidding Document: Others Comments: IT products / services; estimated value excludes taxes and

Package Number	General Description	Estimated Value	Procurement Method	Review (Prior/ Post)	Bidding Procedure	Advertisement Date (quarter/year)	Comments
							duties
1.2	Advanced metering systems, LESCO	201,200,000.00	ICB	Prior	1S2E	Q4 / 2015	Prequalification of Bidders: N Domestic Preference Applicable: Y Bidding Document: Others Comments: IT products / services; estimated value excludes taxes and duties

### 3. Consulting Services Contracts Estimated to Cost \$100,000 or More

The following table lists consulting services contracts for which the recruitment activity is either ongoing or expected to commence within the next 18 months.

Package Number	General Description	Estimated Value	Recruitment Method	Review (Prior/ Post)	Advertisement Date (quarter/year)	Type of Proposal	Comments
1.3	Project implementation consultant, IESCO	4,000,000.00	QCBS	Prior	Q4 / 2015	FTP	Assignment: International Comments: Estimated value excludes taxes and duties.
1.4	Project implementation consultant, LESCO	4,200,000.00	QCBS	Prior	Q4 / 2015	FTP	Assignment: International Comments: Estimated value excludes taxes and duties.
2.1	Project preparation consultant, Tranche 2	500,000.00	QCBS	Prior	Q4 / 2015	STP	Assignment: International Quality-Cost Ratio: 80:20 Comments: Estimated value excludes taxes and duties.
2.2	Project implementation consultant/s, Tranche 2	3,000,000.00	QCBS	Prior	Q4 / 2016	FTP	Assignment: International Quality-Cost Ratio: 80:20 Comments: Estimated value for 2 contracts, excludes taxes and duties.

## B. Indicative List of Packages Required Under the Project

The following table provides an indicative list of goods, works and consulting services contracts over the life of the project, other than those mentioned in previous sections (i.e., those expected beyond the current period).

Goods and Works							
Package Number	General Description	Estimated Value (cumulative)	Estimated Number of Contracts	Procurement Method	Review (Prior/P ost)	Bidding Procedure	Comments
None							

Consulting Services							
Package Number	General Description	Estimated Value (cumulative)	Estimated Number of Contracts	Recruitment Method	Review (Prior/P ost)	Type of Proposal	Comments
3.1	Project preparation consultant, Tranche 3	500,000.00	1	QCBS	Prior	STP	Assignment: International Quality-Cost Ratio: 80:20 Comments: Estimated value excludes taxes and duties.
3.2	Project implementation consultant/s, Tranche 3	4,500,000.00	3	QCBS	Prior	FTP	Assignment: International Quality-Cost Ratio: 80:20 Comments: Estimated value excludes taxes and duties.
4.1	Project preparation consultant, Tranche 4	500,000.00	1	QCBS	Prior	STP	Assignment: International Quality-Cost Ratio: 80:20 Comments: Estimated value excludes taxes and duties.
4.2	Project implementation consultant/s, Tranche 4	1,300,000.00	2	QCBS	Prior	FTP	Assignment: International Quality-Cost Ratio: 80:20 Comments: Estimated value excludes taxes and duties.

## C. Non-ADB Financing

The following table lists goods, works and consulting services contracts over the life of the project, financed by Non-ADB sources:

Goods and Works				
General Description	Estimated Value (cumulative)	Estimated Number of Contracts	Procurement Method	Comments
Warehousing and installation services, IESCO	6,600,000.00	1	ICB	To be financed by IESCO; estimated value excludes taxes and duties
Warehousing and	10,100,000.00	1	ICB	To be financed by LESCO;

installation services, LESCO				estimated value excludes taxes and duties
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Consulting Services				
General Description	Estimated Value (cumulative)	Estimated Number of Contracts	Recruitment Method	Comments
None				

### C. Non-ADB Financing

The following table lists goods, works and consulting services contracts over the life of the project, financed by Non-ADB sources

Goods and Works				
General Description	Estimated Value (cumulative)	Estimated Number of Contracts	Procurement Method	Comments
Warehousing and installation services, IESCO	6,600,000.00	1	ICB	To be financed by IESCO; estimated value excludes taxes and duties
Warehousing and installation services, LESCO	10,100,000.00	1	ICB	To be financed by LESCO; estimated value excludes taxes and duties

Consulting Services				
General Description	Estimated Value (cumulative)	Estimated Number of Contracts	Recruitment Method	Comments
None				

## VI. SAFEGUARDS

70. **Environment.** The investment program is expected to have minimal environmental impacts. Tranche 1 is classified as category C. However, should any environment category B projects arise in the future, the implementation arrangements as identified in the Environmental Assessment and Review Framework (EARF, RRP Linked Document 11) are to be followed. The DISCOs will also be solely responsible for implementing the entire procedures in the EARF for selecting future subprojects. This will include, but not be limited to, ensuring that the subproject selection criteria are strictly adhered to. They will submit the categorization checklist, and then, if required, the appropriate level of environmental assessment reports and periodic monitoring reports to ADB for review.

71. Safeguards management in the DISCOs is primarily mandated to the Environment and Social Cell, which will have overall responsibility for environmental management and supervision during the AMI installation and operation phase of the projects. The Environment and Social Cell should be staffed with a Manager (Environment and Social), and a Deputy Manager (Environment).

72. For any category B projects, the DISCOs will ensure that IEEs are prepared and carried out in a timely and adequate manner, environmental monitoring, monitoring report submission and institutional requirements are fully met, and meaningful public consultations are carried out satisfactorily with the affected communities. In case category B is triggered, grievance redressal mechanism will also be required.

73. **Involuntary resettlement.** The investment program is expected to have no involuntary resettlement impacts. Tranche 1 is classified as category C. As there will be no civil works required under any of the outputs, the procurement and installation of AMI is not anticipated to involve permanent or temporary land acquisition, or impact on any assets or livelihoods. However, to be prepared to address any unanticipated impacts that may arise during implementation of all tranches, a Resettlement Framework (RF) was prepared (RRP Linked Document 12).

74. The DISCOs' Environment and Social Cells have the capacity for satisfactory RF implementation. The Deputy Manager (Social and Resettlement) will be responsible for handling all social and resettlement related issues, if any, during implementation of all tranches. This includes identifying any land acquisition and resettlement impacts, and taking steps to mitigate them; communicating with affected persons, and responding to their concerns and providing assistance as required; and participating in the grievance redress mechanism process as described in the RF.

75. **Indigenous peoples.** The investment program is not expected to disturb indigenous peoples (IPs) as defined in the ADB's Safeguard Policy Statement. Tranche 1 is classified as category C. No indigenous peoples framework has been prepared as the project is not expected to impact IPs.

76. Pursuant to ADB's Safeguard Policy Statement (2009, SPS), ADB funds may not be applied to the activities described on the ADB Prohibited Investment Activities List set forth at Appendix 5 of the SPS.

## VII. GENDER AND SOCIAL DIMENSIONS

77. Based on the Summary Reduction and Social Strategy (SPRSS, RRP Linked Document 10), the investment program will be indirectly addressing social and poverty issues. Hence dedicated action plans will not be required. The stakeholder communication strategy (para 85) for the projects will be developed to ensure customers' awareness and access to information about the new metering and billing systems of AMI. DISCOs will hire public relations specialists, through the project implementation consultants, to develop the communication strategies.

78. Project performance in terms of social and gender impacts will be part of the reporting and evaluation processes. The PMUs will monitor the social and gender impacts of the projects. Given the scope and nature of the investment program the project has been categorized as "No Gender Elements" which does not require a gender action plan. However, with the new computerized billing and metering systems, the project will encourage women's recruitment and capacity building as part of the DISCOs HR policies and hiring procedures.

## VIII. PERFORMANCE MONITORING, EVALUATION, REPORTING AND COMMUNICATION

### A. Design and Monitoring Frameworks

79. The design and monitoring frameworks (DMFs) for the investment program and Tranche 1 are presented as Tables 16 and 17, respectively.

**Table 14: Design and Monitoring Framework for Investment Program**

<b>Impact the Program is Aligned with:</b>			
Financial viability of the power distribution sector improved. <sup>12</sup>			
<b>Results Chain</b>	<b>Performance Indicators with Targets and Baselines</b>	<b>Data Sources and Reporting</b>	<b>Risks</b>
<b>Outcome</b> Electricity revenues increased in the targeted regions	a. Nationwide distribution of network losses reduced from 18.9% in 2013 to 11% in 2024.  b. Revenue collection increased in the targeted DISCOs from 89.6% in 2013 to 95% in 2024.  c. Load shedding (power blackouts) eliminated in the targeted regions of DISCOs from year 2024 onward (2013 baseline: up to 12 hours a day in urban areas and 18–20 hours a day in rural areas)	a. DISCOs' annual report  b. DISCOs' annual report  c. National Electric Power Regulatory Authority's State of Industry Report	Customers of DISCOs resist subsidy reduction and tariff increase and stop payments for consumption.
<b>Outputs</b> 1. Smart meters and communication equipment installed and functional  2. Meter data management system implemented and operational	1a. About 6 million customers and all substations in the targeted regions of DISCOs are operating with smart meters by 2024 (2013 baseline: zero of similar type)  1b. Communication infrastructure commissioned in the targeted regions of DISCOs by 2024 (2014 baseline: None).  2a. Database and data management system developed and operational in the targeted regions by 2024 (2014 baseline: None)  2b. 700 personnel trained on data collection and data management	1a. Targeted distribution centers' customer data  1b. Commissioning certificate by DISCOs  2a. Commissioning certificate by DISCOs  2b. Executing agency's project	Proposed communication technology may not work as required by AMI. Non-integrated solutions may require homemade interfaces. DISCO resources and capacity may not be enough to implement and operate the system. Deployment process may be underestimated, and not be well supported by information technology.  Weak procurement capacity of DISCO staff compromises

<sup>12</sup> Government of Pakistan. 2013. *National Power Policy*. Islamabad.

Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
<p>3. New billing system and CIS implemented and operational</p> <p>4. Operations manual updated and monitoring procedure improved</p>	<p>system by 2024 (2014 baseline: None)</p> <p>3a. Billing and CIS implemented and operational in the targeted regions by 2022 (2014 baseline: None)</p> <p>3b. 3000 personnel trained on billing system and CIS by 2022 (2014 baseline: None)</p> <p>4a. Manual for theft detection updated by 2017 (2014 baseline: Old and outdated manual)</p> <p>4b. Operational procedures for M&amp;I unit updated, testing laboratories upgraded, and staff capacity on AMI developed in various DISCOs by 2022 (2014 baseline: None or outdated)</p>	<p>training report</p> <p>3a. Commissioning certificate by DISCOs</p> <p>3b. Executing agency's project training report</p> <p>4a-b. DISCOs' project progress reports</p>	<p>adherence to ADB's ICB 1S2E bidding procedure.</p>
<b>Key Activities with Milestones</b>			
<p>1. Outputs 1–3</p> <p>1.1 Complete bidding process for tranche 1 by September 2016.</p> <p>1.2 Start installation works by January 2017.</p> <p>1.3 Complete tranche 1 implementation by December 2018.</p> <p>1.4 Complete tranche 2 implementation by December 2019.</p> <p>1.5 Complete tranche 3 implementation by December 2022.</p> <p>1.6 Complete tranche 4 implementation by December 2023.</p> <p>2. Output 4</p> <p>2.1 Consultant hired by September 2016.</p> <p>2.2 Work on operational manual started by January 2017.</p> <p>2.3 Capacity building program started by June 2017.</p> <p>2.4 Complete tranche 1 (support component) by June 2024.</p>			
<b>Inputs</b>			
<p>Multitranches financing facility</p> <p>ADB: \$970.0 million (OCR Loan)</p> <p>ADB: \$20.0 million (ADF Loan)</p> <p>DISCOs: \$258.0 million</p> <p>Tranche 1</p> <p>ADB: \$380.0 million (OCR Loan)</p> <p>ADB: \$20.0 million (ADF Loan)</p> <p>DISCOs: \$110.5 million</p>			
<b>Assumptions for Partner Financing</b>			
Not Applicable			

ADB = Asian Development Bank, ADF = Asian Development Fund, AMI = advanced metering infrastructure, CIS = customer information system, DISCO = distribution company, ICB 1S2E = international competitive bidding single-stage, two-envelope, kWh = kilowatt-hour, M&I = monitoring and inspection, OCR = ordinary capital resources.

**Table 15: Design and Monitoring Framework for Tranche 1**

<b>Impact the Project is Aligned with:</b>			
Financial viability of the power distribution sector improved (project-defined).			
<b>Results Chain</b>	<b>Performance Indicators with Targets and Baselines</b>	<b>Data Sources and Reporting</b>	<b>Risks</b>
<b>Outcome</b> Electricity revenues increased in the targeted regions of IESCO and LESCO	a. IESCO's Rawalpindi circle's distribution network losses reduced from 8.83% in 2013 to 6% in 2019.  b. LESCO's Central and Southern circles' distribution network losses reduced from 13.2% in 2013 to 8% in 2019.  c. Revenue collection maintained at 100% in the targeted circles of IESCO and LESCO from 2019 onwards (Baseline: <100% in 2013)  d. Load shedding (power blackouts) eliminated in the targeted regions of the DISCOs from year 2019 onwards (Baseline for 2013: up to 12 hours in urban areas and 18-20 hours a day in rural areas)	a. DISCOs' annual report  b. DISCOs' annual report  c. National Electric Power Regulatory Authority's State of Industry Report  d. National Electric Power Regulatory Authority's State of Industry Report	
<b>Outputs</b> 1. Smart meters and communication equipment installed and functional  2. Data management system implemented and operational.	1a. 2.0 million customers (IESCO=0.8 million and LESCO=1.2 million) and all substations in the targeted regions of IESCO and LESCO are operating with Smart Meters by 2019. (2013 baseline: zero of similar type)  1b. Communication infrastructure commissioned in the targeted regions of IESCO and LESCO by 2019. (2014 baseline: None)  2a. Database and data management system developed and operational in the targeted regions of IESCO and LESCO by 2019. (2014 baseline: None)  2b. 200 (80 in IESCO and 120 in LESCO) personnel trained on data collection and data	1a. Targeted distribution centers' customer data  1b. Commissioning certificate by DISCOs  2a. Commissioning certificates by DISCOs  2b. DISCOs' project training reports	Proposed communication technology may not work as required for the AMI.  Non-integrated solutions may require homemade interfaces.  DISCO resources and capacity may not be enough to implement and operate the project.  Deployment process may be underestimated, and not be well supported by information technology.  Existing business processes may no longer be applicable



Results Chain	Performance Indicators with Targets and Baselines	Data Sources and Reporting	Risks
3. New billing and CIS systems implemented and operational.	management system by 2019. (2014 baseline: None)  3a. Billing system and CIS implemented and operational in the targeted regions of IESCO and LESCO by 2017. (2014 baseline: None)  3b. 700 personnel (250 in IESCO and 450 in LESCO) trained on Billing System and CIS by 2019 (2014 baseline: None)	3a. Commissioning certificates by DISCOs  3b. DISCOs' project training reports	with new AMI technology.  Weak procurement capacity of DISCO staff compromises adherence to ADB's ICB 1S2E bidding procedure.
4. Operation manuals updated and monitoring procedure improved.	4a. Manual for theft detection updated by 2017. (2014 baseline: Old and outdated manual)  4b. Operational procedures for M&T Unit updated, testing laboratories upgraded, and staff capacity on AMI developed in IESCO and LESCO by 2019. (2014 baseline: None or outdated)	4a-b. DISCOs' project progress reports	

### Key Activities with Milestones

1. Outputs 1–3
  - 1.1 Complete bidding process for tranche 1 by September 2016.
  - 1.2 Project implementation consultant recruited by September 2016.
  - 1.3 Installation works started by January 2017.
  - 1.4 Tranche 1 implementation completed by December 2018.
  - 1.5 Tranche 1 financial closure by June 2019.
2. Output 4
  - 2.1 Consultant hired by September 2016.
  - 2.2 Work on operational manual started by January 2017.
  - 2.3 Capacity building program started by June 2017.
  - 2.4 Complete tranche 1 (support component) by June 2024.

### Inputs

ADB: \$380.0 million (OCR Loan)  
 ADB: \$20.0 million (ADF Loan)  
 DISCOs: \$110.5 million

### Assumptions for Partner Financing

Not Applicable

ADB = Asian Development Bank, ADF = Asian Development Fund, AMI = advanced metering infrastructure, CIS = Customers Information System, DISCOs = distribution companies, EA = Executing Agency, ICB 1S2E = international competitive bidding single-stage, two-envelope, kWh = kilowatt-hour, IESCO = Islamabad Electric Supply Company, LESCO = Lahore Electric Supply Company, M&I = monitoring and inspection, MFF = multitranchise financing facility, NEPRA = National Electric Power Regulatory Authority OCR = ordinary capital resources

## A. Tranche Monitoring

80. **Project performance.** The DMF indicators will be monitored and reported on in the DISCOs' quarterly progress reports (para 88), and review missions (paras 84 to 87).

81. **Loan covenants.** Loan covenants – policy, legal, financial, economic, environmental, and others—will be monitored through semi-annual review missions, and the midterm review.

82. **Safeguards.** As Tranche 1 is category C for environmental and social safeguards, safeguards monitoring is not required. For subsequent tranches, in case they are classified as category B, then the measures in the EARF and Resettlement Framework will apply.

83. **Gender and social dimensions.** Implementation of the social and gender-specific measures prescribed in the SPRSS will be monitored and reported on in the quarterly progress reports.

## B. Evaluation

84. **Inception mission.** ADB will field an inception mission after loan signing to (i) re-establish the working relationship between ADB and the government, and (ii) ensure that the government understands ADB's procedures.

85. **Review missions.** ADB will field semi-annual review missions to check overall project implementation, and update the project implementation schedule until the subprojects are complete.

86. **Midterm review mission.** ADB will field a midterm review mission after 2 years of loan effectiveness to assess whether attainment of the project's immediate objective (in terms of the design and monitoring framework) is still likely to be achieved.

87. **Project completion review mission.** ADB will field a project completion review mission for each tranche to prepare ADB's project completion report. The Government will also submit a project completion report to ADB within 6 months of project completion.

## C. Reporting

88. The DISCOs will provide ADB with (i) quarterly progress reports in a format consistent with ADB's project performance reporting system, covering (a) progress achieved by output as measured through the indicators and targets in the project DMFs, (b) key implementation issues and solutions, (c) updated procurement plan, and (d) updated implementation schedule; and (ii) a project completion report (para 87). To ensure the projects continue to be both viable and sustainable, ADB will also review the AFS and APFS (section V.D).

## D. Stakeholder Communication Strategy

89. The investment program shall require a strong social information program with a two-fold objective. On one hand to convey the messages with the benefits of the new technology, and on the other hand to develop the capacity of the population to adapt their consumption habits based on the information provided by the smart meters. In that sense, it is also of utmost importance that the managers in the DISCOs and other stakeholders (regulator, government, etc) are also familiar with the benefits, communication plan and can also actively participate in the

communication plan. The DISCOs shall be supported by public relations specialists in the PICs to develop the aforementioned activities.

90. The plan shall comprise (but not limited to) the following aspects:

- (i) Development communication strategy for the projects that shall take into account communication, gender and customer relationship management strategies in place.
- (ii) Capacity building training to the public relations officers at DISCOs.
- (iii) Dissemination and capacity building activities to relevant stakeholders (regulator, Ministry of Water and Power, local authorities, etc.).
- (iv) Development of information materials like leaflets, brochures, exhibitions, electronic presentations, media plans and press pack, posters, and TV and radio clips to achieve objectives and deliver messages identified in the strategy.
- (v) Implementation of online platform for feedback, transparency, and future online payments.
- (vi) Permanent monitoring and periodically review of the plan to further increase customer satisfaction levels.

## **IX. ANTICORRUPTION POLICY**

91. ADB reserves the right to investigate, directly or through its agents, any violations of the Anticorruption Policy relating to the Project.<sup>13</sup> All contracts financed by ADB shall include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agency and all Project contractors, suppliers, consultants and other service providers. Individuals/entities on ADB's anticorruption debarment list are ineligible to participate in ADB-financed activity and may not be awarded any contracts under the Project.<sup>14</sup>

92. To support these efforts, relevant provisions are included in the loan and bidding documents for the Project.

## **X. ACCOUNTABILITY MECHANISM**

93. People who are, or may in the future be, adversely affected by the project may submit complaints to ADB's Accountability Mechanism. The Accountability Mechanism provides an independent forum and process whereby people adversely affected by ADB-assisted projects can voice, and seek a resolution of their problems, as well as report alleged violations of ADB's operational policies and procedures. Before submitting a complaint to the Accountability Mechanism, affected people should make a good faith effort to solve their problems by working with the concerned ADB operations department. Only after doing that, and if they are still dissatisfied, should they approach the Accountability Mechanism.<sup>15</sup>

## **XI. RECORD OF FAM CHANGES**

94. All revisions/updates to program and project implementation arrangements would be retained in this Section.

<sup>13</sup> Available at: <http://www.adb.org/Documents/Policies/Anticorruption-Integrity/Policies-Strategies.pdf>

<sup>14</sup> ADB's Integrity Office web site is available at: <http://www.adb.org/integrity/unit.asp>

<sup>15</sup> For further information see: <http://www.adb.org/Accountability-Mechanism/default.asp>.

**PROCUREMENT AND CONTRACT IMPLEMENTATION SCHEDULES**

Contract Package <sup>a</sup>	Procurement									Implementation					
	Advertisement (CSRNI)/EOI deadline	ADB Receipt	ADB Approval	Issuance	Closing	ADB Receipt	ADB Approval	Notice of Award/ Signing	ADB Receipt	Contract Effectiveness	Contract Effectiveness	Head End and Deployment Systems	Meter Data Management System	Billing System	Meters and Communication Devices
		Draft BD	IFB	Bids	Bid Evaluation Report	Contract									
		Submission 1: Report of Shortlisting	Issue RFP	Proposals	Submission 2-3: Evaluation of Proposals	Submission 4: Negotiated Contract	Submission 5: Signed Contract								
<b>1.1 Advanced Metering Infrastructure, IESCO</b> ICB Works, 1S-2E Contract period: 34 months Contract estimate: \$120.8 million	N/A	01-Jan-15	31-Jan-15	28-Oct-15						award: 17-Oct-16	24-Nov-16	23-May-17	21-Aug-17	14-Nov-18	10-Sep-19
					26-Jan-16	11-Mar-16	01-Apr-16	12-Jun-16				6 mos	3 mos	15 mos	10 months
								Concept approval							
					15-Apr-16	15-May-16	05-Jun-16	10-Sep-16							
								signing: 10-Oct-16							
<b>1.2 Advanced Metering Infrastructure, LESCO</b> ICB Works, 1S-2E Contract period: 34 months Contract estimate: \$201.2 million	N/A	30-Oct-15	30-Nov-15	15-Dec-15						award: 04-Dec-16	11-Jan-17	10-Jul-17	08-Oct-17	01-Jan-19	28-Oct-19
					14-Mar-16	28-Apr-16	19-May-16	30-Jul-16				6 mos	3 mos	15 mos	10 months
								Concept approval							
					02-Jun-16	02-Jul-16	23-Jul-16	28-Oct-16							
								signing: 27-Nov-16							
<b>1.3 Project Implementation Consultant, IESCO</b> CQS with Full Technical Proposal Contract period: 40 months, including Social Information Program: 24 months Contract estimate: \$4.0 million	CSRNI	15-Nov-15	20-Nov-15	30-Nov-15	04-Jan-16	03-Feb-16	24-Feb-16	award: 15-Apr-16	23-May-16					Supervision end: 5-Sep-19	
	01-Feb-15							09-Mar-16						Social Information Program start: 21-Aug-17	
	EOI							signing: 08-Apr-16						Social Information Program end: 11-Aug-19	
	03-Mar-15														
<b>1.4 Project Implementation Consultant, LESCO</b> CQS with Full Technical Proposal Contract period: 40 months, including Social Information Program: 24 months Contract estimate: \$4.2 million	CSRNI	15-Nov-15	20-Nov-15	30-Nov-15	04-Jan-16	03-Feb-16	24-Feb-16	award: 15-Apr-16	23-May-16					Supervision end: 5-Sep-19	
	01-Feb-15							09-Mar-16						Social Information Program start: 21-Aug-17	
	EOI							signing: 08-Apr-16						Social Information Program end: 11-Aug-19	
	03-Mar-15														
<b>2.1 Project Preparation Consultant, Tranche 2</b> QCBS with Simplified Technical Proposal Contract period: 4 months Contract estimate: \$500,000	CSRNI	10-Dec-15	11-Dec-15	15-Dec-15				award: 16-Apr-16	30-Apr-16			Inception 14-May-16	FS/BD/PC1 draft 13-Jun-16	FAM 02-Aug-16	RRP/ Fact-finding 01-Sep-16
	01-Feb-15				09-Jan-16	30-Jan-16	13-Feb-16	26-Mar-16							
	EOI							signing: 09-Apr-16							
	26-Feb-15				20-Feb-16	05-Mar-16	19-Mar-16						final 13-Jul-16		
<b>2.2 Project Implementation Consultant/s, Tranche 2</b> QCBS with Full Technical Proposal Estimated 2 contracts Contract period: 40 months, including Social Information Program: 24 months Contract estimate: \$1.5 million/contract	CSRNI	11-Feb-16	03-Mar-16	18-Mar-16				award: 11-Sep-16	19-Oct-16					Supervision end: 1-Feb-20	
	01-Feb-16				22-Apr-16	22-May-16	12-Jun-16	14-Aug-16						Social Information Program start: 13-Nov-17	
	EOI							signing: 04-Sep-16						Social Information Program end: 03-Nov-19	
	02-Mar-16				19-Jun-16	10-Jul-16	31-Jul-16								
<b>3.1 Project Preparation Consultant, Tranche 3</b> QCBS with Simplified Technical Proposal Contract period: 4 months Contract estimate: \$500,000	CSRNI	25-Feb-17	11-Mar-17	18-Mar-17				award: 19-Jul-17	02-Aug-17			Inception 16-Aug-17	FS/BD/PC1 draft 15-Sep-17	FAM 04-Nov-17	RRP/ Fact-finding 04-Dec-17
	01-Jan-16				12-Apr-17	03-May-17	17-May-17	28-Jun-17							
	EOI							signing: 12-Jul-17							
	26-Jan-16				24-May-17	07-Jun-17	21-Jun-17						final 15-Oct-17		
<b>3.2 Project Implementation Consultant/s, Tranche 3</b> QCBS with Full Technical Proposal Estimated 3 contracts Contract period: 40 months, including Social Information Program: 24 months Contract estimate: \$1.5 million/contract	CSRNI	02-Mar-17	23-Mar-17	06-Apr-17				award: 30-Sep-17	07-Nov-17					Supervision end: 19-Feb-21	
	01-Jan-17				11-May-17	10-Jun-17	01-Jul-17	02-Sep-17						Social Information Program start: 02-Dec-18	
	EOI							signing: 23-Sep-17						Social Information Program end: 21-Nov-20	
	31-Jan-17				08-Jul-17	29-Jul-17	19-Aug-17								
<b>4.1 Project Preparation Consultant, Tranche 4</b> QCBS with Simplified Technical Proposal Contract period: 4 months Contract estimate: \$500,000	CSRNI	25-Feb-18	11-Mar-18	18-Mar-18				award: 19-Jul-18	02-Aug-18			Inception 16-Aug-18	FS/BD/PC1 draft 15-Sep-18	FAM 04-Nov-18	RRP/ Fact-finding 04-Dec-18
	01-Jan-18				12-Apr-18	03-May-18	17-May-18	28-Jun-18							
	EOI							signing: 12-Jul-18							
	26-Jan-18				24-May-18	07-Jun-18	21-Jun-18						final 15-Oct-18		
<b>4.2 Project Implementation Consultant/s, Tranche 4</b> QCBS with Full Technical Proposal Estimated 2 contracts Contract period: 50 months, including Social Information Program: 36 months Contract estimate: \$1.3 million for 2 estimated contracts	CSRNI	02-Mar-19	23-Mar-19	06-Apr-19				award: 30-Sep-19	07-Nov-19					Supervision end: 16-Dec-23	
	01-Jan-19				11-May-19	10-Jun-19	01-Jul-19	02-Sep-19						Social Information Program start: 01-Dec-20	
	EOI							signing: 23-Sep-19						Social Information Program end: 16-Nov-23	
	31-Jan-19				08-Jul-19	29-Jul-19	19-Aug-19								

<sup>a</sup> Contract estimates are exclusive of taxes and duties

## OUTLINE TERMS OF REFERENCE FOR PROJECT IMPLEMENTATION CONSULTANT

### A. Objective

1. The project implementation consultant will assist the project implementation unit (PMUs) in the power distribution company (DISCO), providing them with valuable inputs and opinions about technological solutions and compliance with expected targets.

### B. Scope of Work

2. The scope of work will cover (i) technical monitoring and supervision of installation of the advanced metering infrastructure (AMI), including smart meters, concentrators, communications and systems; (ii) developing and implementing the social information and training programs on AMI; (iii) supervision of the contractor during the defects liability period; and (iv) preparing the project completion report.

### C. Experts' Qualifications and Detailed Tasks

3. The consultant shall build a team of international and national experts with extensive experience in the design and implementation of smart metering (preferably focused on revenue protection) and commercial management of public services utilities (electricity, water and sanitation, piped gas) in developing countries.

4. The assignment will be undertaken over a 44-month period. The expected inputs from the firm are summarized in Table 1. The experts' required qualifications and detailed tasks are in Table 2.

**Table 1: Summary of Experts' Inputs**

Expert	International Experts		National Experts	
	Number of Experts	Person-Months	Number of Experts	Person-Months
Team Leader/AMI Specialist	1	14		
Smart Meter Specialist	1	10	2	24
Systems Specialist	1	10	2	24
Contract Specialist	1	10	1	22
Public Relations Specialist	1	5		
Technical support staff			4	24
<b>Total</b>	<b>5</b>	<b>49</b>	<b>9</b>	<b>94</b>

**Table 2: Qualifications and Tasks by Expert**

Qualifications	Terms of Reference
<b>Team Leader/AMI Specialist</b>	
<ul style="list-style-type: none"> <li>Electrical engineer with experience not less than 15 years in power sector and 10 years of experience in project management.</li> <li>Experience in at least one project of similar nature, in transmission and distribution or revenue meter installation or advanced electricity metering,</li> </ul>	<ul style="list-style-type: none"> <li>Responsible for overall coordination of the consultant's services to fulfill the requirements</li> <li>Support the PMU Project Director by providing best practice guidelines.</li> <li>Prepare a project monitoring scheme (which will include technical, physical and financial details), and finalize formats for reporting progress of Supply and installation works and procedures for following up, supplying materials and software for installation in accordance with the technical specifications.</li> <li>Monitor and prepare progress reports of the installation of the HES</li> </ul>

<b>Qualifications</b>	<b>Terms of Reference</b>
<p>communication technologies, and commercial management systems.</p> <ul style="list-style-type: none"> <li>• Experience in managing international supply and installation contracts for IFI-funded power sector projects.</li> <li>• Good oral and written communication skills in the English language</li> <li>• High sense of organization and responsibility.</li> <li>• Strong project management skills and experience in similar project coordination</li> <li>• Experience in Central or West Asia, or other developing country.</li> <li>• Permanent staff of the firm, or if the entity is an association or joint venture, of the lead firm or lead partner.</li> </ul>	<p>and MDMS/Billing/Database systems.</p> <ul style="list-style-type: none"> <li>• Develop a comprehensive project plan covering the project time schedule, payment procedures, and quality assurance program. Establish a computerized project monitoring program using off-the-shelf software packages.</li> <li>• Review and recommend for approval the contractor's supply and installation schedules or revisions.</li> <li>• Advice on detailed design drawings, and provide recommendations to the PMU to amend technical solutions if necessary.</li> <li>• Review and approve all contractors' working drawings, and perform verification of all works.</li> <li>• Assist PMU in initiating action on slow implementation progress or deliverable delays or violation of the contractor's obligations, if any, as per contract conditions.</li> <li>• Monitor project progress against plan, report on progress and propose remedial measures as necessary</li> <li>• Assist PMU in settling any disputes arising during the implementation.</li> <li>• Inform PMU on problems or potential problems which may arise in connection with the implementation of the contract and make recommendations for possible solutions.</li> <li>• Update top management on project status on periodic basis (as decided).</li> </ul>
<p><b>Smart Meter Specialist</b></p> <ul style="list-style-type: none"> <li>• Electrical or Electronic Engineer with experience of not less than 10 years in engineering in developing IT relevant to electricity utility metering and billing technology.</li> <li>• Understanding in specifications for hardware/software systems for AMI, including meter data management system for interval metering, and automated billing and receiving systems.</li> <li>• Up-to date knowledge of commercially available AMI technologies and electricity tariff structure(s)</li> <li>• Experience in at least two projects in the energy sector.</li> <li>• Other relevant education/experience is recommendable.</li> <li>• Experience in Central or West Asia, or other developing country</li> <li>• Fluent in English.</li> </ul>	<ul style="list-style-type: none"> <li>• Advise the PMU technical team on best practice guidelines.</li> <li>• Define an installation safety process manual for the meters that follow all international and local regulations, standards and best practices.</li> <li>• Supervise the installation of the meters and concentrators according to the safety process manual.</li> <li>• Provide training in PLC noise reduction.</li> <li>• Monitor and ensure the old meters recycling process and cleanliness of the cables and waste due to the installation process.</li> <li>• Maintain detail records of documenting information supplied by the local Smart Meter Specialists, relevant events and activities, drawings and documents, decisions made at meetings, financial records, and any deviations from or changes to the contract plans. Upon notice of all completion received from the contractor, inspect the works and inform contractor and client, in writing, items needs rectification for completion.</li> <li>• Develop and recommend necessary procedures for assurance of adequate control of production, testing at the manufacturer site, supply and delivery of materials and equipment.</li> <li>• Provide assistance to PMU during the inspection of material and equipment at the manufacturers' works as per approved drawings and technical specifications as per the contract.</li> <li>• Carry out final inspection of the meters, concentrators and HES and MDMS, and billing and database systems installation.</li> <li>• Consider and ascertain technology transfer, and provide on-the-job training to DISCO staff involved in the project.</li> <li>• Undertake site supervision to countercheck project quality, and adherence to time schedule as reported by the contractor.</li> </ul>

Qualifications	Terms of Reference
<b>AMI Systems Specialist</b>	
<ul style="list-style-type: none"> <li>• Engineer, Computer Specialist, Accountant, or Economist</li> <li>• At least 10 years of direct experience in commercial management of public services utilities (electricity, water and sanitation, piped gas) in developing countries, including direct participation in the design, implementation and operation of a HES and MDMS/Billing/Database systems.</li> <li>• Knowledge in specifications for hardware/software systems for HES and MDMS, and billing and database systems.</li> <li>• Should be fluent in English.</li> </ul>	<ul style="list-style-type: none"> <li>• Advise the technical team by providing best practice guidelines.</li> <li>• Supervise the installation of the meters and concentrators according to the safety process manual.</li> <li>• Provide project supervision functions, including inspecting and accepting goods and services related to hardware/software for HES and MDMS/Billing/Database systems, confirming that the supplied goods and services conform to specifications, recommending appropriate correct actions when quality of deliverables does not meet the specifications, etc.</li> <li>• Monitor and prepare progress reports of the installation of the HES and MDMS/Billing/Database systems.</li> <li>• Advise on detailed design drawings, and provide recommendations to the PMU to amend technical solutions if necessary.</li> <li>• Review and approve all of the contractor's working drawings and perform verification of all works.</li> <li>• Assess the adequacy of all inputs such as materials and labor provided by the contractor and methods of work related to the required progress, and when required, take appropriate action in order to rectify and to expedite progress. Keep and regularly update a list of the contractors' commitments in the bid.</li> <li>• Check and approve "as built drawings", ensuring that all changes introduced in the field during installation have been incorporated.</li> <li>• Assist PMU on a full time basis, in quality assurance and control of contractors' supply and installation.</li> <li>• Monitor and provide inputs to the training sessions to be provided by contractors to DISCO staff in creating customer meter database and, operation of HES and MDMS, and billing and database systems.</li> <li>• Consider and ascertain technology transfer, and provide on-the-job training to DISCO staff involved in the project.</li> <li>• Undertake site supervision to countercheck project quality, and adherence to time schedule as reported by the contractor</li> <li>• Prepare Certificate of Completion, stating date, or dates from which the defects liability period of supply and installation, and IT work shall commence.</li> <li>• Assist the DISCO on the eventually works' defects, and issue the final acceptance certificates.</li> </ul>
<b>Contract Specialist</b>	
<ul style="list-style-type: none"> <li>• University or higher degree in major relevant disciplines (e.g. engineering, law, procurement, management, and business)</li> <li>• At least 5 years of relevant experience in procurement and contract management.</li> <li>• Familiar with ADB procurement guidelines and procedures</li> <li>• Fluent in English.</li> </ul>	<ul style="list-style-type: none"> <li>• Furnish timely assistance and direction to the contractor in all matters related to interpretation of the contract documents, testing and other matters related to contract compliance and progress of the project.</li> <li>• Certify the achievement of the contractual milestones, and satisfactory quality of progress following the progress milestones laid down in the contracts.</li> <li>• Discuss the work program for implementing the project and reporting procedures with the contractor and PMU.</li> <li>• Assist PMU in initiating action on slow implementation progress deliverable delays, or violation of the contractor's obligations, if any, as per contract conditions.</li> </ul>
<b>Public Relations Specialist</b>	
<ul style="list-style-type: none"> <li>• University or higher degree in</li> </ul>	<ul style="list-style-type: none"> <li>• In coordination with the DISCO (General Communication</li> </ul>

Qualifications	Terms of Reference
<p>communication or equivalent</p> <ul style="list-style-type: none"> <li>• At least 3 years of relevant experience for public sector utilities and energy sector related campaigns.</li> <li>• Fluent in English.</li> <li>• Previous experience in Central or West Asia, or other developing country is desirable.</li> </ul>	<p>Department), develop the social information program for the project, taking into account communication, gender and CRM strategies in place.</p> <ul style="list-style-type: none"> <li>• Training the public relations officers at the PMU, regional and district offices.</li> <li>• Assist the public relations experts within the Project in developing information materials, and hiring local companies to prepare, leaflets, brochures, exhibitions, electronic presentations, media plans and press pack, posters, and TV and radio clips to achieve objectives and deliver messages identified in the strategy.</li> <li>• Develop training materials for Training of Trainers within the communication strategy.</li> <li>• Assist the customer services units within the project regional DISCOs in implementing CRM strategies, including online platform for feedback, transparency, and future online payments.</li> <li>• Monitor implementation of the social information program and CRM strategies, and periodically review and modify them accordingly to further increase customer satisfaction levels.</li> <li>• Supervise the evaluation household survey to help assess campaign impact.</li> <li>• Provide input to quarterly progress reports, project completion report, and other reports deemed necessary by PMU and ADB. If required, the reports will be submitted more frequently as needed.</li> </ul>

#### **D. Reporting Requirements**

5. The consultant will submit the reports below to the DISCO, in CD and hard copies.
6. The inception report shall be submitted within the first month of commencement. The inception report shall outline the proposed work program, any apparent barriers to successful project completion, and capacity development plans.
7. Quarterly progress reports shall be submitted, including recommendations to resolve any issues on project implementation.
8. Quarterly training/capacity development reports, and related training evaluation reports shall be submitted.
9. A draft project completion report will be submitted 3 months before project completion. Within 1 month of its submission, a tripartite meeting comprising ADB, DISCO, and the consultant will be held to discuss the draft report and review its findings. The final project completion report will be submitted within one month of the tripartite meeting.

#### **E. DISCO's Inputs and Counterpart Personnel**

10. The DISCO will provide and make available to the consultants, free of charge, the following: (i) counterpart staff/technical support; (ii) office space with national and international telephone lines, electricity, air conditioning/heating, and internet connections; (iii) assistance in all arrangements for workshops, meetings and field visits; and (iv) access to required data, maps and other relevant information.



## OUTLINE TERMS OF REFERENCE FOR PROJECT PREPARATION CONSULTANTS

### A. Objective

1. The project preparation consultant will conduct technical, economic and financial assessment of the project. The consultant will: (i) undertake due diligence on the project impact, outcome, scope, cost, schedule and implementation arrangements; (ii) prepare the updated facility administration manual (FAM), PC 1 document, procurement plan, disbursement projections, bidding documents and technical specifications; (iii) undertake financial management assessment of the distribution companies (DISCOs) as the project executing agency; (iv) prepare a project feasibility study in the format required by the Government for its internal approval; and (v) assist the DISCOs and ADB mission in preparing relevant sections of the Period Financing Request (PFR) and PFR Report (PFRR), respectively.

### B. Scope of Work

#### 1. Task I: Review and Analysis of Existing Metering System

2. Analyze technologies and functionalities of the advanced metering systems used in Tranche 1 carried out by LESCO and IESCO, metering projects implemented at the 132 KV grid stations, common deliver points and 11 KV feeder, results and outcomes of the such pilot projects, their effectiveness and compatibility, assessment whether those correspond technically and financially (i.e. cost/benefit) to the best practices available in the market and what are the lessons for the project. Based on such assessment, update the technical specifications for the proposed project.

3. Review existing reports, information and data provided by DISCOs, including:

- (i) Available information, reports, studies on similar projects, results of pilot projects implemented in the country, other relevant documentation
- (ii) Pre-feasibility report on advanced metering infrastructure (AMI) system requirements in respective DISCOs conducted under ADB funded Loan 2439 (report is available and can be provided to participating consultants)
- (iii) Information relating to USAID's project on smart meters installed at the 132 KV grids, common delivery points and 11 KV feeders.
- (iv) Country laws, regulatory acts, technical standards and regulations, DISCOs documents and development plans that relate or could influence the project preparation or implementation.
- (v) Statistics on historical, current and projected electricity demand in Pakistan, electricity purchase and retail tariffs.

4. Conduct relevant on-site visit(s) in order to assess existing state of the metering, communication and data management systems used by respective DISCOs.

5. Analyze current system focusing on four main areas: (i) Electricity Consumption Recording (including Meters and Associated Equipment); (ii) Communication Infrastructure; (iii) Data and Information Management System, Billing System; and (iv) Load Management.

6. Analyze the billing system at the company level in respective DISCOs.

## 2. Task II: Assessment of Advanced Metering Solutions

7. Prepare detailed overview of the best practices available in the area of advanced metering implemented worldwide, and their appropriateness for Pakistan.

8. Develop several options for different types of advanced electricity metering taking into account the compatibility of different systems and technical solutions in metering automation. Set out various metering technology options that could be relevant for the Pakistan electricity market.

9. Set out recommendation on the choice of technology and functionality of the advanced metering system for Pakistan including the following:

- (i) Development of high level architecture and preliminary design of an advanced electricity metering system for respective DISCOs, taking into account the opportunities to integrate recommended technical approaches in metering automation and consolidate the data on generation, transmission and distribution of the electricity.
- (ii) Development of the unified (standard) metering installation setup for typical groups of consumers (the groups to be defined according to the criteria: the volume of consumption, tariff policy, locations, availability of infrastructure for data exchange, etc.)
- (iii) Definition of set of functionality that the advanced metering system has to provide.
- (iv) Definition of the technical and functional specifications to the metering devices comprising the system. In particular, the Consultant will analyze the following requirements:
  - (a) Necessity to measure active, reactive, import, export energies, instantaneous measurements, power/voltage quality data, and load profile recording, etc. at the points of consumption and at the distribution substations.
  - (b) Data that should be gathered processed and communicated by the meter (e.g., daily and monthly meter readings, load profiles, event logs, etc.)
  - (c) Necessity to implement a number of service functions (e.g., automatic remote disconnection or load limitation for debtors, using digital meters with built-in contactors and/or prepayment devices using electronic keys, smart cards, load limitation option at the main server to manage load shedding etc.).
  - (d) Necessity to have the functions detecting fraud and signaling on opening the meter cover and/or unsanctioned change of the meter connection scheme (e.g., reverse current or missing neutral connection, etc.).
  - (e) Necessity to relocate the metering point, need in meter placement into a locked meter cabinet.

- (f) Accuracy and frequency of meter readings which is needed to satisfy the requirements of respective DISCOs.
- (g) Automation of AMI with DISCO's business processes such as billing and collection, energy accounting and auditing, load management and system operation, system planning, customer service, and asset management.
- (h) Compatibility of the systems, software and hardware of different suppliers (interoperability).
- (i) Necessity to comply with recognized international standards existing in the areas of electricity metering, physical, electrical and software interfaces, data interchange, communication protocols, etc.
- (j) Ability to upgrade the functionality of the devices in future (e.g., remote update of firmware, adding multi-energy functionality, etc.).
- (k) Possibility of on-demand meter data reading and billing.
- (l) Timeliness of the data collection.
- (m) Ability to implement advanced tariffs (e.g., time of use, block, combined, real-time pricing, quality of supply, etc.).
- (n) Using Information and Communication Technologies (ICT) and software for mass rollout operations by utility personnel or by the system provider.
- (o) Necessity to have a set of anti-tampering features.

10. Set out recommendation on the choice of technology and functionality of the advanced metering system for Pakistan.

11. Carry out technical/economic/financial comparison of various metering options and make recommendation on most suitable solution.

### **3. Task III: Assessment of Data Communication and Management System Technologies**

12. Prepare detailed overview of the best practices available in the area of data communication and management systems and technologies implemented worldwide (e.g. power line communication carrier, broadband over power line, optical fiber, wireless, RF, radio mesh, internet, GPRS, combination of those, etc.).

13. Define minimum technical and functional specifications for the communication system that will support the implementation of the advanced metering system. In particular, the Consultant will analyze the following requirements:

- (i) Identify the data that needs to be communicated from various levels (sub-divisional, divisional, circle, company and national level).
- (ii) Describe management information system for monitoring and management, control of billing, payment, energy accounting and auditing, allowing targeted disconnecting of users for non-payment, load management through centralized load limiting options at the customer, distribution transformer and 11 KV feeder level.
- (iii) Interoperability to the providers of standardized communication equipment.

- (iv) Identify the throughput for timely transfer of metering and related data from the metering points to the head end data collection system(s) and control signals and service information in the opposite direction.
- (v) Possibility to securely protect the data transmitted over the system communication channels, especially when the communication channels are not proprietary to DISCOs and therefore exposed to potential intrusion hazards. Security measures should include usage of the advanced encryption algorithms and “digital signature.”
- (vi) Necessity and possibility to use standardized international protocols and messaging language specific to the electricity metering systems.
- (vii) Provision of sufficient robustness by having both main and reserve communication channels for the most valuable metering points. The communication software should feature algorithms of automatic engagement of reserve communication channel in case of unavailability of the default channel defined for the metering point. Within this framework the most important metering points are the 132 KV grid stations, CDPs, 11 KV feeders, and metering points of large consumers. The communication system should have an open architecture and enable for future development based on ICT for data transfer without the need of reconfiguring of the whole system.

14. Define the necessary set of functions and subsystems of the new billing system of DISCOs. In particular, the Consultant will analyze the following requirements:

- (i) Possibility of seamless and limited effort migration from current information system in use by DISCOs to advanced Metering Data Management and Billing System to be implemented during the Project.
- (ii) Identification and justification the extent of the billing system centralization (e.g., centralized billing database, archives, etc.).
- (iii) Possibility to verify the recorded data. Deployment of advanced algorithms for replenishment of missing data which was not communicated through the communication system and detection of unauthorized electricity consumption.
- (iv) Identification and justification of the minimal, extended and additional functions and subsystems of the new billing system of the AMI, more specific:
  - (a) Generation of different types of reports and billing documents, based on customizable templates;
  - (b) Calculation of the Government subsidies provided to each of the customers i.e tariff differential subsidy;
  - (c) Calculation of the balances by the specified segments of the energy system and losses within the electricity supply scheme, transformers, transmission lines and metering points;
  - (d) Tracking the contracts with the consumers having automated control

- over the usage of the preferential tariff and limits of the budgetary commitments in physical and money terms;
  - (e) Financial record keeping of the payments;
  - (f) Forming the reports and statements;
  - (g) Calculation the demand forecast, average tariff, arrears, and etc.;
  - (h) Automatic generation and printing of the reminding messages;
  - (i) Possibility for clarification/detailing of the energy consumption bills.
- (v) Identification and justification of the minimal, extended and additional functions and subsystems.
  - (vi) Possibility of automation of the direct load control commands for the consumers that do not pay their electricity bills.
  - (vii) Possibility to use alternative channels of data exchange, provided by outside communication operators, according to the international standard utility data interchange bus for interface between data management, billing and other systems (e.g., ERP system) of DISCOs.
  - (viii) Need to ensure safe storage of load profile, billing data and records for all consumers in a secured data repository corresponding to the metering and billing regulations requirements for different categories of consumers in use in Pakistan.
  - (ix) Detection and signaling of the feeder imbalances in the electricity distribution system exceeding pre-defined threshold.
  - (x) Necessity and possibility to deploy a test system parallel to industrial system that would serve for training, testing and exercising purposes without interfering to the process of data collection, management and billing.
  - (xi) Availability, indicative prices and recommended technologies and channels for data exchange of the DISCO's AMI. Recommendations to the integration of the advanced metering, communication and data management system into existing IT environment of DISCOs, interface with external IT systems of the System Operator, regulatory authorities and other related stakeholders.
15. Carry out technical/economic/financial comparison of various data communication and management system technologies and make recommendation on most suitable solution.

#### **4. Task IV: Financial and Economic Analysis of AMI Project.**

16. Carry out a financial and economic analysis of the Project. The model will be calculated for several technology, customer segmentation and rollout options recommended for implementation. For the financial analysis of the Project, the Consultant will be required to conduct the Financial Management Assessment of the two DISCOs (refer to the detailed tasks under the Financial Experts individual TORs). For the economic analysis of the Project, refer to the detailed tasks under the Economic Experts individual TORs.

## **5. Task V: Assessment of Regulatory, Legal and Institutional Arrangements and Development of Detailed Project Implementation Plan**

17. Review the current legal, regulatory and institutional framework for implementing the Project. This will include review of current responsibilities regarding the ownership of meters, meter reading, meter installations, responsible parties for technical regulations of meters, etc. The Consultant will provide recommendations to necessary changes to the system to successfully implement the Project.

18. Develop a detailed Project Implementation Plan including: (i) requirements and availability of necessary human resources for installation, operation and maintenance of the system; (ii) requirements of obtaining necessary permissions and licenses relating to the implementation of the Project; and (iii) recommended schedule of the project implementation: Definition of the main phases and milestones of the Project; and customer segmentation, prioritization of the rollout per customer segment and/or per geographical area/circle/division/sub-division/grid station.

19. List main potential suppliers of the goods and services suitable for project implementation.

20. Identify other important areas for project implementation

21. Draft TORs for the Project implementation and monitoring consultant.

## **6. Task VI: Draft Bidding Documents for the Project**

22. Prepare draft bidding documents for the Project, based on the selected technology and solutions, and the master bidding document for Tranche 1 following ADB's *Procurement Guidelines* (2015, as amended from time to time). The draft bidding documents will be revised and updated incorporating comments by DISCOs and ADB.

### **C. Experts' Qualifications and Detailed Tasks**

23. The firm shall have experience in project preparation in the power distribution sector, preferably in developing AMI in the last 5 years; and be familiar with ADB or other IFI-financed projects. The firm shall have international consultants with expertise in AMI projects, power distribution utility operations, and institutional analyses. Previous experience in the region or in Pakistan will be preferred.

24. The assignment will be undertaken over a 5-month period. The expected inputs from the firm are summarized in Table 1. The experts' required qualifications and detailed tasks are in Table 2.

**Table 1: Summary of Consulting Services Requirement (in person-months)**

<b>International</b>	<b>Pm</b>	<b>National</b>	<b>Pm</b>
Metering Expert – Team Leader	5	Power Sector Expert (Distribution)	4
Data Communication Expert	3	Data Communication Expert	1
Data Management and Billing System Expert	4	Data Management and Billing System Expert	3
Economist	2	Economic and Financial Expert	2
Financial Expert	1		
Procurement Expert	3		
<b>Total</b>	<b>18</b>		<b>10</b>

Source: Asian Development Bank estimates.

**Table 2: Qualifications and Tasks by Expert**

<b>Qualifications</b>	<b>Terms of Reference</b>
<b>Metering expert (Team Leader)</b>	
<ul style="list-style-type: none"> <li>• The team leader shall have a bachelor or higher degree in engineering with preferably at least 10 years of relevant managerial/supervisory experience in power distribution projects and operations.</li> <li>• The expert shall have worked on advanced metering infrastructure projects dealing with preparation, implementation, and management and operations in power distribution utilities.</li> <li>• The consultant shall also have experience in leading reorganization and structural improvements.</li> <li>• Previous work experience in Pakistan and with other developing countries, as well as with ADB and other IFI financed projects, is desirable.</li> </ul>	<ul style="list-style-type: none"> <li>• The expert shall lead in the preparation of feasibility study and conduct of project due diligence.</li> <li>• As the team leader, the expert shall manage the Consultant's team and ensure the quality and timely delivery of outputs.</li> <li>• The team leader will also be required to coordinate and consolidate inputs provided by the individual consultants and other relevant experts hired separately (ref. para. 3 above).</li> <li>• The Expert will also be required to supervise, coordinate and consolidate final reports from each of the experts provided in Table 1 above as well as responsible for coordination and consolidation of inputs provided by the individual experts mentioned in para. 3 above (except Evaluation Expert and Capacity Development Expert).</li> <li>• The Expert will be directly responsible for delivering TASK I, II and V above.</li> <li>• The Expert will also be responsible for providing relevant information and input to the experts working on TASK III, IV and VI.</li> <li>• Overall quality control of inputs provided by different experts, coordination with ADB, DISCOs, and timely submission of required reports will be the responsibility of the Team Leader.</li> </ul>
<b>Data Communication Expert</b>	
<ul style="list-style-type: none"> <li>• The expert shall have a bachelor or higher degree in engineering with preferably at least 10 years of work experience in power distribution projects and operations.</li> <li>• The expert shall have work experience in managing data communication particularly in advanced metering infrastructure projects in power distribution</li> </ul>	<ul style="list-style-type: none"> <li>• The expert shall assess and identify requirements for capacity building of IAs in data communication.</li> <li>• The Expert will be directly responsible for providing relevant inputs under TASK II and III above.</li> <li>• The Expert will also be responsible for providing relevant information and input to the experts working on TASK V and VI.</li> </ul>

Qualifications	Terms of Reference
utilities. <ul style="list-style-type: none"> <li>• Previous work experience with communication companies and with other developing countries, as well as with ADB and other IFI financed projects, is desirable.</li> </ul>	
<b>Data Management and Billing expert</b>	
<ul style="list-style-type: none"> <li>• The key expert shall have a bachelor or higher degree in engineering with preferably at least 10 years of work experience in power distribution projects and operations.</li> <li>• The expert shall have work experience in advanced metering infrastructure projects, involving managing data and billing systems in respect with meter inspection, loss reduction program, theft detection, tariff collection, management reporting, and other operational and procedural improvement activities.</li> <li>• Previous work experience in Pakistan and with other developing countries, as well as with ADB and other IFI financed projects, is desirable.</li> </ul>	<ul style="list-style-type: none"> <li>• The expert shall lead the review, and development of procedural improvements, and provide recommendations of the same.</li> <li>• The Expert will be directly responsible for delivering TASK III above.</li> <li>• The Expert will also be responsible for providing relevant information and input to the experts working on TASK II, V and VI.</li> </ul>
<b>Economist</b>	
<ul style="list-style-type: none"> <li>• The key expert shall have a Masters or higher degree in economics, or relevant discipline with preferably at least 10 years of work experience in power distribution projects and operations.</li> <li>• The expert shall have work experience in conducting economic analyses, but not limited to electricity tariff analysis in power distribution utilities</li> <li>• Previous work experience in Pakistan and with other developing countries, as well as with ADB and other IFI financed projects, is</li> </ul>	<ul style="list-style-type: none"> <li>• The Expert will be directly responsible for delivering TASK IV above. The Expert will also be responsible for providing relevant information and input to the experts working on TASK V and VI.</li> <li>• The detailed terms of reference and inputs required from the Expert are as below:               <ul style="list-style-type: none"> <li>(i) The Consultant will carry out the economic analysis of the Project to be undertaken by the respective DISCOs. The model will be calculated for several technology, customer segmentation and rollout options recommended for implementation;</li> <li>(ii) Undertake economic analysis of each of the proposed investment components and assess their economic viability, provide the economic rationale for each component and the overall Project including a review of historical electricity</li> </ul> </li> </ul>



Qualifications	Terms of Reference
desirable.	<p>demand and supply and projections for the sector nationally and regionally, and an alternatives and least-cost options analysis, in accordance with ADB <i>Guidelines for Economic Analysis of Projects (1997)</i>;</p> <p>(iii) Evaluate the project's direct and indirect impacts and carry out economic analysis of these impacts in terms of economic net present value and economic internal rates of return in accordance with ADB's <i>Guidelines for the Economic Analysis of Projects (1997)</i>;</p> <p>(iv) Cost-benefit analysis should be conducted to assess the economic benefits of the Project. For the economic analysis of the Project the following tasks will need to be carried out:</p> <ol style="list-style-type: none"> <li>a. Calculation of appropriate opportunity costs and conversion factors including but not limited to standard conversion factor, shadow exchange rate factor, shadow wage rate factor and any other which may be considered applicable for the Project;</li> <li>b. Estimation of the capital expenditure and operating costs of the overall Project and each sub-project in economic prices; the economic costs should be exclusive of taxes and subsidies;</li> <li>c. Estimation and recommendation of an appropriate proxy to account for the economic price of electricity by way of conducting a survey to assess consumer surplus and willingness-to-pay by the consumers;</li> <li>d. Calculation of incremental benefits and costs arising from the Project by comparing the "with project" scenario to the "without the project" scenario in accordance with guidance provided in ADB's <i>Guidelines for Economic Analysis of Projects (1997)</i>;</li> <li>e. Estimation of direct incremental benefits and costs (including but not limited to operational cost savings, increase of revenue collection, decrease of technical and non-technical losses) in economic prices;</li> <li>f. Estimation of indirect incremental benefits and costs (including but not limited to energy cost savings, improvement of efficiency across the energy resources value chain, indirect energy savings, increase of overall power system efficiency and avoided investment in power generation assets due</li> </ol>

Qualifications	Terms of Reference
	<p>to reduced demand and improved load management environmental benefits (e.g. CO2 emission reduction), national energy security, etc.) in economic prices;</p> <p>g. Calculation of economic net incremental benefits to the Project undertaken by the respective DISCOs for implementing the Project and calculation of the economic internal rate of return and economic net present value for the Project;</p> <p>h. Sensitivity analysis of the economic viability of the Project to key input parameters: and</p> <p>i. Distribution analysis identifying the expected benefits and cost implications to all stakeholder groups.</p> <ul style="list-style-type: none"> <li>• In consultation with the social development specialist, incorporate poverty reduction impacts in accordance with ADB's <i>Handbook on Integrating Poverty Impact Assessment in the Economic Analysis of Projects</i> and estimate the poverty reduction impact ratio (PIR) according to ADB's relevant guidelines and requirements;</li> <li>• Develop the Microsoft Excel spreadsheet models for the economic analysis to make them transparent and self-explanatory before handing over the same to ADB;</li> <li>• Prepare the draft PFR appendix for economic analysis and update the appendix and the tables and analyses to reflect ADB comments and suggestions; and</li> <li>• Assist ADB mission team as required</li> </ul>
<p><b>Financial Expert</b></p> <ul style="list-style-type: none"> <li>• The key expert shall preferably have a Masters or higher degree in finance, economics or relevant discipline with at least 10 years of work experience in the power sector.</li> <li>• The expert shall have experience in preparing investment plan, financial plan, financial analyses and undertaking financial management assessment in power distribution utilities.</li> <li>• Previous work experience in Pakistan and with other developing countries, as well as with ADB and other IFI financed</li> </ul>	<ul style="list-style-type: none"> <li>• The Expert will be directly responsible for delivering TASK IV above. The Expert will also be responsible for providing relevant information and input to the experts working on TASK V and VI.</li> <li>• The detailed terms of reference and inputs required from the Expert are as below: <ul style="list-style-type: none"> <li>(i) The Consultant will carry out the financial analysis of the Project to be undertaken by the respective DISCOs. The model will be calculated for several technology, customer segmentation and rollout options recommended for implementation;</li> <li>(ii) The Consultant will prepare the overall project cost estimates and detailed cost estimates using excel spreadsheet, separating foreign exchange and local currency, including physical and price contingencies, interest during</li> </ul> </li> </ul>

Qualifications	Terms of Reference
<p>projects, is desirable.</p>	<p>construction, commitment fee and other financing charges. Identify applicable local taxes and duties;</p> <p>(iii) Assist in preparing a financing plan for the Project, including proposed ADB lending, different co-financing options and counterpart funds for local currency expenditures;</p> <p>(iv) Calculate the weighted average cost of capital for the Project;</p> <p>(v) Undertake financial analysis and cash flow projections and assess the Project's financial viability, in accordance with ADB's <i>Financial Management and Analysis Guidelines (2007)</i>;</p> <p>(vi) For the financial analysis of the Project this will include the following tasks:</p> <ol style="list-style-type: none"> <li>a. Estimation of the capital expenditure and operating costs of the Project; the financial costs should be tax inclusive.</li> <li>b. Tariff analysis for each of the DISCOs for implementing respective sub-project to take into account cost recovery and affordability issues.</li> <li>c. Estimation of direct and indirect incremental benefits and costs (including energy cost savings, operational cost savings, increase of revenue collection, decrease of technical and non-technical losses) arising from the Project and each sub-project by comparing the "with project" scenario to the "without project" scenario in accordance with guidance provided in ADB's <i>Financial Management and Analysis Guidelines (2007)</i>.</li> <li>d. Estimation of financial net incremental benefits to the overall Project and each sub-project undertaken by the respective DISCOs for implementing the Project and calculation of the financial internal rate of return and financial net present value for the Project.</li> <li>e. Sensitivity analysis of the financial viability of the Project to key input parameters.</li> </ol> <p>(vii) Develop a fund flow mechanism for the Project;</p> <p>(viii) Develop the Microsoft Excel spreadsheet models for the financial analysis to make them transparent and self-explanatory before handing over the same to ADB;</p> <p>(ix) Prepare the draft PFRR appendix for financial analysis and the preliminary tables and</p>

Qualifications	Terms of Reference
	<p>analyses including but not limited to project cost estimates table, financing plan, cash flow projections and sensitivity analysis;</p> <p>(x) Update the PFRR appendix and the tables and analyses to reflect ADB comments and suggestions;</p> <p>(xi) Conduct the financial management assessment of each of the DISCOs, covering: (a) financial management structure and capacity including internal control mechanisms, (b) accounting, reporting and auditing policies and standards of the DISCOs, and (c) historical financial statements review and performance analysis, in accordance with ADB's <i>Financial Management and Analysis Guidelines (2007)</i>;</p> <p>(xii) Prepare projected financial tables for each DISCO including 15 years pro-forma financial statements and recommend financial indicators and covenants for each DISCOs;</p> <p>(xiii) Prepare the PFRR appendix on financial management assessment and financial performance review and projection in accordance with ADB's <i>Financial Management and Analysis Guidelines (2007)</i>;</p> <p>(xiv) Update the PFRR appendix and the tables and analyses to reflect ADB comments and suggestions; and</p> <p>(xv) Assist ADB mission team as required</p>
<p><b>Procurement Expert</b></p> <ul style="list-style-type: none"> <li>• The key expert shall have a bachelor or higher degree in engineering, finance, economics, law or relevant discipline with preferably at least 10 years of relevant work experience in the power sector.</li> <li>• The expert shall have experience in procurement of AMI, IFI financed projects, and developing appropriate contracting strategy. Previous work experience in Pakistan and with other developing countries, as well as with ADB and other IFI financed projects, is desirable.</li> <li>• Expert shall have experience in developing procurement documents for at least two</li> </ul>	<ul style="list-style-type: none"> <li>• The Expert will be directly responsible for delivering TASK VI above.</li> <li>• The Expert will work closely with experts working on TASK I, II and III and incorporate inputs from them into the bidding documents where required.</li> </ul>

Qualifications	Terms of Reference
similar projects (Advance metering infrastructure).	

#### A. National Experts

25. All national experts are non-key experts. Each will assist the international key experts in their respective areas.

#### B. Deliverables

26. The deliverables are summarized below, and in Table 3.

- (i) inception report within 2 weeks of mobilization;
- (ii) draft feasibility study report within 6 weeks of mobilization, including but not limited to: (a) technical assessment, (b) financial analysis, (c) financial management assessment, (d) economic analysis, and (e) financial projections;
- (iii) draft bidding documents within 7 weeks of mobilization;
- (iv) feasibility study report incorporating initial comments from the Government and ADB within 8 weeks of mobilization;
- (v) PC-1 to the Government within 10 weeks of mobilization;
- (vi) final feasibility study report incorporating ADB and Government comments within 10 weeks of mobilization;
- (vii) final bidding documents incorporating ADB and Government comments within 10 weeks of mobilization;
- (viii) final PC-1 incorporating Government comments within 12 weeks of mobilization
- (ix) draft updated FAM within 14 weeks of mobilization;
- (x) inputs to PFR and PFRR, and ADB due diligence during fact-finding mission.

27. **Feasibility Study Report** will include technical, financial, economic due diligence on the project. The feasibility report shall include all the outputs and activities inlisted in table 2 below. The draft report is expected as per Implementation schedule of each Tranche.

28. **Bidding Documents (BD)** will include functional technical specifications, tentative BoQs, and cost estimates

29. **Update FAM** will include procurement plan, implementation arrangements and schedule and disbursement projections. Consultant will also prepare a contract packaging. The draft and Final BD is expected as per Implementation schedule of each Tranche.

30. **Final Report** will include government approved feasibility study.

#### C. DISCO's Inputs and Counterpart Personnel

31. The DISCO will provide and make available to the consultants, free of charge, the following: (i) counterpart staff/technical support; (ii) office space with national and international telephone lines, electricity, air conditioning/heating, and internet connections; (iii) assistance in all arrangements for workshops, meetings and field visits; and (iv) access to required data, maps and other relevant information.